Topic as Starting Point for Syntax
Author(s): Henrietta Lempert and Brian MacWhinney
Source: *Monographs of the Society for Research in Child Development*, Vol. 49, No. 5, Topic as Starting Point for Syntax (1984), pp. 1-73
Published by: Wiley on behalf of the Society for Research in Child Development
Stable URL: http://www.jstor.org/stable/1166037

MONOGRAPHS OF THE
SOCIETY FOR RESEARCH IN
CHILD DEVELOPMENT

SERIAL NO. 208, VOL. 49, NO. 5

TOPIC AS STARTING POINT FOR SYNTAX

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MONOGRAPHS OF THE SOCIETY FOR RESEARCH IN CHILD
DEVELOPMENT, SERIAL NO. 208, VOL. 49, NO. 5

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ABSTRACT

LEMPERT, HENRIETTA. Topic as Starting Point for Syntax. With Commentary by BRIAN MACWHINNEY. *Monographs of the Society for Research in Child Development,* 1984, **49**(5, Serial No. 208).

The study of syntactical development has traditionally relied on procedures intended to assess children's existing knowledge of the language they are learning. In contrast, the current work reports the outcomes of three experiments in which children were taught a sentence form that they did not as yet understand. We wanted to find out (i) whether acquisition of word order relations for this form would be affected by pragmatic ordering principles, such as a preference for naming animates before inanimates or for naming a perceptually more salient entity before a less salient one, and (ii) whether referent animacy would be included in children's rules for word order.

Sixty children aged 2-10 to 5-0 imitated passive sentence descriptions of pictures (Experiment 1) or enacted events (Experiments 2 and 3), such as *The girl is (being) chased by the boy.* Interspersed among the imitation items were pictures or events that the children were asked to describe in the "new way" by themselves (probes). Children produced more passives to probes (*a*) when animates were affected by inanimates than when animates affected inanimates or other animates and (*b*) when the acted-upon referent was perceptually more salient than the actor. After training, the children were asked to use passives to describe a new set of pictures in which animates affected either animate, dynamic inanimate, or static inanimate entities. Children who had encountered animate acted-upons in training produced more passives to animates than to inanimates, and more to dynamic than to static inanimates.

The results are interpreted as evidence that pragmatic factors play a critical role in the acquisition of word-order knowledge. In addition, they demonstrate that the acquisition of syntax can be subjected to controlled study. As such, the work provides a paradigm that can be extended beyond the demonstration that children's acquisition of a form can be controlled by appropriate contextual manipulations toward studies specifying the linguistic and nonlinguistic variables that can shape the course of syntactical development.

I. INTRODUCTION

In the last decade, the study of language acquisition has taken on a largely pragmatic orientation that stresses the use of language in social contexts. The movement away from the more traditional focus on the syntactic and semantic aspects of children's language toward study of the growth of communicative competence has emphasized the active role of the child in the language acquisition process. Children learn language through dyadic exchanges in which they use the communicative means at their disposal to receive and send messages to their conversational partners. But while the contemporary sociolinguistic approach has advanced our understanding of how children exercise their linguistic knowledge, it has not addressed the issues of how children acquire that knowledge and of what they learn. Children learn syntax through communicative exchanges, but how do these interactions lead them to speak in ways that conform to the syntactic code of the language they are learning?

The purpose of this *Monograph* is to demonstrate that grammatical forms could, in principle, emerge in children's speech as a mapping onto pragmatic form. Developmental pragmaticists study the pragmatic structure of utterances—topic and comment—and not their grammatical form. But as discussed in the next section, linguists who approach language from a functionalist perspective hold that the syntactic category "sentence subject" is a grammaticalized topic and regard grammatical forms as linguistically prescribed realizations of pragmatic structure. Pragmatic structure may in turn reflect information processing dispositions and cognitive constraints on sentence comprehension and production that are shared by the species (Bates & MacWhinney, 1982)—constraints that make communication, as we know it, possible in the first place.

These ideas will be elaborated in an introduction that has been extended for the purpose of orienting the interdisciplinary reader to the relevant linguistic concepts and language acquisition data. This introduction is not intended to be an exhaustive review of the literature in either field—its purpose is to sketch in the background of the work. My specific hypothesis is that acquiring and using a linguistic structure is facilitated when the subject noun of that structure maps onto the child's topic. A corollary hypothesis is that acquiring a form is facilitated by conditions that increase its use by people who know it. After constructing a rationale for these assumptions, I will test them by teaching children to produce a form that they do not as yet understand and observe whether the outcomes support or refute my claims. I begin by describing the linguistic rationale so that the reader can judge whether or not the framework I have adopted is able to accommodate the child's progression from single words to syntax.

SYNTACTIC AND SEMANTIC CATEGORIES

Sentences can be described in terms of their surface grammatical relations and also in terms of underlying relations between semantic categories (or "case roles," Fillmore, 1968). To illustrate the difference between grammatical categories such as surface subject and semantic categories such as agent, consider the following sentences:

1. John opens the door.
2. John was bitten by a dog.
3. The key opens the door.

Sentences 1 and 3 are in the active voice and sentence 2 is in the passive voice. However, the surface subject of all three sentences is the initial noun phrase (*John* in sentences 1 and 2, and *the key* in sentence 3). It is marked as subject in English by agreement in number and person with the verb (e.g., *John open the door* and *John were bitten* are ungrammatical). However, the role of the entities named in subject-noun position differs in the three sentences. In sentence 1, John initiates the action that changes the state of the door and therefore functions as agent (the animate entity that causes or instigates an action). In sentence 2, John is affected by the dog's action and so functions as patient (the animate or inanimate entity that is affected by an action or toward which the action is directed). In sentence 3, the key is not the agent, but the instrument by means of which an implied agent changes the state of the door.

Sentence subject can be regarded as a superordinate category that subsumes different semantic roles. Nevertheless, agents are "normal" subjects in English sentences in the sense that the agent becomes subject when a verb occurs with an agent and other noun phrases unless (*a*) agent reference is deleted (e.g., *John opens the door with a key* versus *The key opens the door*) or (*b*) a special construction is used, such as the passive (Fillmore, 1968; Li & Thompson, 1976). Sentences with agent-subjects are also basic in the sense that the choice of a nonagent subject (e.g., patient) may require "extra" markers in the surface structure. For instance, the choice of a patient-subject is marked in passive sentences by the auxiliary (e.g., *is*), the verb suffix [en] or [ed] on most verbs, and the preposition *by* preceding the agent. As Mallinson and Blake (1981) note, the notion of an agent-subject is so fundamental that linguists sometimes assign subject to agent in languages that do not even have subject marking.

PRAGMATIC CATEGORIES

Topic and comment are pragmatic or functional categories. By topic, we mean what the sentence is about. By comment, we mean what is said about the topic. Topics are customary sentence starting points, so that topic, subject, and agent tend to coincide in English sentences (comment corresponding to predicate). It is easy to find counterexamples, for instance, *Regarding your book, John will bring it tomorrow* (where *book* is topic and the pronominal referent for the patient-object and *John* is agent-subject). But such instances are departures from the prevailing relation between subject, agent and topic.

Topic-comment structure is universal in language (Greenberg, 1966), but the relative prominence given to subject and topic in the surface structure of sentences varies across languages (Li & Thompson, 1976; Mallinson & Blake, 1981). For example, Lisu (a Lolo-Burmese language) and Japanese sentences start with topics that are identified as such by special words (respectively, *nya* and *wa*). However, whereas Lisu has no subject marking, Japanese speakers identify the subject by a special word that follows it (e.g., *Fish wa red snapper ga is delicious*). In other languages, the topic seems to have acquired the properties of a subject and has lost any independent marking that might identify it as topic. The "grammaticalization" of topic into subject does not mean that the language loses the topic construction, but only that the topic gains grammatical coding properties that mark it as subject (Givon, 1976, 1979a, 1979b; Li & Thompson, 1976; Mallinson & Blake, 1981).

English gives prominence to the subject, which is marked as sentence subject by agreement in number and person with the verb (Li & Thompson, 1976). It is the semantic role of the referent named in subject position that controls the surface grammatical form, for example, the active voice for an agent-subject and the passive voice for a patient-subject. Nevertheless, the topic carries that semantic role into sentence-initial position, and in that sense, controls the surface form of the sentence that realizes the topic. It is in this sense that the subject can be conceptualized as a "grammaticalized" topic.

THE TOPICALIZATION HIERARCHY

The fact that passive sentences have more markers (more morphemes) than active sentences could reflect a role-order hierarchy in which agents rank higher or are better subjects than patients. On the same principle, the extra marker (the preposition *to*) in the first sentence of the pair *John gave the book to Mary* and *John gave Mary the book* could mean that referents in the role of beneficiary (e.g., *Mary*) rank higher than those in the role of patient. But it could also indicate a pragmatic ordering hierarchy whereby naming animates before inanimates is more "normal" than the reverse.

After analyzing various constructions in different languages, Mallinson and Blake (1981) concluded that normal case-role ordering partly reflects an animacy hierarchy. Participants tend to be named in sentences in the following order: I ≥ you > human > animate > inanimate (where ">" stands for "precedes" or "is more topicworthy"). A more topicworthy referent, according to the hierarchy, can move to subject noun position even when the speaker begins to talk about another referent (e.g., *That book, I read it*) or comments on a topic introduced by another speaker. Although topics normally claim the sentence-initial position, they may have to yield their place to referents with higher status in the hierarchy.

The hierarchy is often explained in terms of "perspective taking." The basic argument is that the speaker's perspective or point-of-view functions as a pragmatic determinant of topic selection. In turn, the animacy hierarchy is explained in terms of a "nearness-to-ego" principle. The supposition underlying this principle is that speakers empathize or identify with the participant perceived to be most like themselves; when they speak, they adopt the perspective of that referent (Bates & MacWhinney, 1982; Kuno, 1976; MacWhinney, 1977).

Topics could be reference points in terms of which people structure the information they process to an utterance level and, in this sense, could reflect biases such as a propensity to take oneself or another animate as a reference point for structuring a situation. However, nearness to ego may operate not through empathy but through attentional biases. The topicalization hierarchy could be a salience hierarchy, reflecting what is likely to be the center of attention in a given referential event.

Egocentric and social/affective determinants of attention, in combination with perceptual attentional determinants, may render more enduring salience to humans than to nonhumans, and to animates than to inanimates, and may thereby affect what we are likely to attend to when processing a situation. Chafe (1979) suggests that people tend to focus first on humans because of their "cognitive salience." This focus subsequently functions as the reference starting point for processing other information in the situation as well as the actual or implicit utterance starting point. Even the fact that agents are normal subjects could involve attentional biases that bring animate entities into subject noun position in preference to inanimates.

On the same principle, perhaps agents become normal subjects ontogenetically, not because they instigate or cause actions as such, but because their movement or other action attracts the child's attention. In the following section, I argue that topic-comment structure could itself originate in the infant's attentional response to salient percepts, topic corresponding to the entity that is brought to the center of the child's attention.

ATTENTION AND EARLY WORDS

Children's first "words" are action concomitants (e.g., "hi" when waving, "bam" when knocking down things). They lack referential value (Bates, 1976; Greenfield & Smith, 1976). By about 12 or 13 months, children begin to utter words that seem to function as names for things (Greenfield & Smith, 1976; Volterra, Bates, Benigni, Bretherton, & Camaioni, 1979). The first nominals in production vocabularies are mostly proper names and names for dynamic things—things that move and produce sound—clocks, dogs, cats, cars, keys (Gruendel, 1977; Nelson, 1973, 1974; Rescorla, 1981; Volterra et al., 1979). Names for food and food-related things are also common (e.g., milk, cookie, cup). But names for things that are "just there," such as tables, chairs, stoves, and trees, are missing (Leopold, 1939–49; Nelson, 1973, 1974).

It is hardly surprising that infants name significant persons in their household very early, or even pets and food (Huttenlocher, 1974; Snyder, Bates, & Bretherton, 1981). However, words for dynamic things may feature among early nominals because their movement and sound can intrude into awareness, preempting whatever is holding attention at that moment and compelling the infant to attend to the source of stimulation. In terms of evolution, perception of movement (and change in brightness) may have been more crucial for survival than pattern recognition (Brow & Deffenbacher, 1979; Sekular & Levinson, 1977). Even neonates suppress nonnutritive sucking (an attentional index) in response to an intermittent moving stimulus (Haith, 1966). Sound can also result in attentional response (alerting and lateral orienting) in the newborn infant (Muir & Field, 1979).

Change and variation in the rate of change can pull an infant's attention to a portion of the visual field, but before naming can occur, the source of stimulation has to be processed to its representative perceptual code and to its phonological name code. Thus, early production vocabulary partly indexes those objects for which perceptual representations and names are acquired early. But constructing a perceptual representation implies scrutiny of the object (Gottfried, Rose, & Bridger, 1978; Ruff, 1982). Consequently, dynamic things may be represented earlier than static things because they are better able to attract visual attention. Also, the infant's overt attention to an item (turning, looking, and pointing to it) is precisely what impels parents to label that object for the child (Collis & Schaefer, 1975; Masur, 1982). Consequently, names for dynamic things may enter the infant's vocabulary earlier than names for static things. In addition, to the extent that production vocabulary indexes what small children name spontaneously, then the properties of early spoken words suggest a relation between attention and what children choose to say at the onset of the one-word speech stage.

Greenfield and Smith (1976) report that "language proper" emerged in two children in the form of naming an entity that unexpectedly appeared, reappeared, or disappeared (e.g., the child hears a door open, turns toward the sound, and says "Dada"). The word seems to indicate the object in the same way that pointing would do so and usually is accompanied by pointing toward the stimulus. Greenfield and Smith emphasize the contribution of changed circumstances in so-called indicative naming. But since the entities most likely to lead to changed conditions are animates and dynamic inanimates, their observations tie in nicely with the properties of early production vocabulary. It may not be incidental that dynamic entities can function as agents (more correctly, when they are inanimates, as "actors" or "movers").

Early naming is not always intended to communicate (Bates, Bretherton, Shore, & McNew, 1983). Naming a novel entity in the situation may often simply be overt recognition of it (whether correct or incorrect), and novelty and change may be correlates of spontaneous early naming because they can lead attention to the entity. However, regardless of whether the infant intends to communicate, parents may still respond to object naming by commenting on the object, thereby giving the child's utterance some of the properties of a conversational topic (Bruner, 1975, 1978).

It could be argued that the topic function develops from pointing, before naming appears, particularly since parents tend to name when the infant points without naming (Masur, 1982). If so, then the topic function at the discourse level may develop from selective attention (orienting response toward the percept) since as reviewed by Lempert and Kinsbourne (1985), currently available *evidence* (as opposed to prevailing *beliefs)* suggests that pointing between approximately 8 and 12 months is usually noncommunicative—the infant hardly ever shows awareness of a companion or other behavior that could be taken as evidence of communicative intent (Bates, 1976; Bates, Benigni, Bretherton, Camaioni, & Volterra, 1977; Masur, 1983; Volterra et al., 1979). The parent, by looking at what the infant points to, and by naming the object for the child, may be transforming a behavioral correlate of attending into a "topicalization" gesture that has communicative value.

Even after social pointing appears, visual attention to an object continues to be allied with pointing to it (Leung & Rheingold, 1981).

Turning, looking and pointing to a stimulus lead into pointing and naming (Greenfield & Smith, 1976; Leopold, 1939–49; Masur, 1982; Volterra et al., 1979). By about 16 months, infants name with a variety of indicative gestures that may differentiate from selective orienting (e.g., pointing, touching, looking). They may also name while "showing" an object (also "indicative" naming) or when reaching for it (so-called volitional naming). By about 19 months, children often combine an indicative gesture with verbalizing an aspect of the situation that relates to the indicated object. For instance, the child may hold up her father's shoe and say "Dada." Or she may look at her empty cup and say "juice" (Bloom, 1973). These coexist with recognition naming (e.g., saying "car" when a car is heard passing by outdoors), and volitional naming (e.g., saying "car" while reaching for the toy).

De Laguna (1927) proposed that utterances in the later one-word speech stage are "comments" on the child's topic (the entity indicated by the child). Bates (1976) and Greenfield (1978, 1982; Greenfield & Smith, 1976; Greenfield & Zukow, 1978) have formalized and extended this idea from an information-processing perspective. Their ideas are summarized in the next section.

LATER SINGLE WORDS

Bates (1976) suggests that later single words have sentence-internal topic-comment structure, comment corresponding to what is said and topic to what goes unsaid. According to Bates, the distinction between topic and comment is derived from lower level attentional and figure-ground mechanisms (ground corresponding to topic and figure to comment). Greenfield and Zukow (1978) further argue that the sensorimotor "topic" is the entity that is processed first in a given referential event. If the child redirects attention to another aspect of that situation, the first-attended entity becomes topic in relation to the newly attended element.

Actually, Greenfield is concerned with the factors motivating selection of the element that the child chooses to express, for example, the action or the entity that produces the action. She argues that children in the one-word speech stage encode the more "uncertain" or "informative" aspect of a given referential event, namely, the changing or novel aspect of the situation. However, as Bates points out, the most informative elements in a structured situation are precisely the elements that keep the child's attention. It thus suffices to assume that single-word utterances document the child's current focus of attention.

Not all instances of later one-word speech fit into a topic-comment format. Nevertheless, some utterances are clearly comments on a referent. For example, if a child says "down" when he drops a toy, the word functions as a comment on the toy (topic) (for further illustrations, see Bloom, 1973; Greenfield & Smith, 1976). The child does not name the topic and then produce a comment, except incidentally, that is, as discrete components of an episode. For example, the child may name an object at some distance from himself (e.g., "car"), and after obtaining the object, may name an action he produces with it (e.g., "down"). Although children may utter single words successively shortly before phrases emerge (e.g., "shoe/off"), the topic may not be named when it is "known" to the child.

Greenfield suggests that topics are not named because they are in the background of the child's attention when comments are verbalized. The intent of this assumption is to link one-word speech to later discourse where speakers may offer "new information" (comments) about previously introduced topics, which consequently function as "given" or "old information." "Givens" are usually pronominalized (or not verbalized at all). By analogy, Greenfield (1982) argues, for example, that a child who says "crying" when his companion begins to whimper names what is new, and therefore focal in attention, and conversely, does not name the agent because agent is given and therefore in background awareness. But why does the child stare at the agent?

Greenfield (1982) suggests that while the child's initial attentional focus in a situation is usually an agent, the child habituates to the agent's invariant features and orients to its action (the agent dropping to background awareness). But how can children attend to action without attending to the actor? In any case, naming or not naming a referent is not a window to the referent's place in an adult speaker's awareness. Whether adult speakers pronominalize or name topics or delete reference to them altogether relates to their being able to consider the listener's perspective. They pronominalize referents that they assume currently *are* in the listener's "consciousness" (working memory) and name those that they suppose are *not*, simply because they recognize that the listener needs to know what they are talking about (see Chafe, 1976).

Small children, however, talk from their own perspective (as Greenfield points out). They may not perceive a reason to name a referent they "know" (i.e., have recognized or categorized) except when they want to specify it—for example, the child wants to give a ball to his mother and not to his father (see Greenfield, 1982). Changed circumstances need to be processed and categorized, and verbalization in one-word speech stage may relate to what is currently being processed. But "comments" on unsaid topics cannot be construed as evidence that the topic has receded to background awareness. Nevertheless, Greenfield's assumption that the entity on which the child first focused functions as topic for other information that the child may process to an utterance level can be extended to word order in early two- and three-word utterances.

BEYOND SINGLE WORDS

Bloom (1970) considered whether early phrases such as the following could have underlying topic and comment structure:

1. Girl fish (describing a picture of a girl and fish).
2. Girl ball (describing a picture of a girl bouncing a ball).
3. Block bag (watching someone put a block into a bag).
4. Fly blanket (watching a fly on a blanket).

The same child also produced the following utterances:

5. Slide go (putting keys on a slide).
6. Balloon throw (trying to throw a balloon).

Sentences 1–4 conform to standard subject-object (SO) or agent-patient order, but could also be based on naming the focal entity first. Sentences 5 and 6 deviate from standard verb-object (VO) or action-patient order, but could have been produced in the same manner (the second term functioning as comment). Bloom, however, concluded that the child who uttered these phrases had learned something about SO order in English sentences but had not as yet learned the relational or syntactical features of verb forms with respect to nouns. But why should children learn SO before VO?

Inspection of samples of early utterances in Bloom, Lightbown, and Hood (1975) and Bowerman (1973a) reveals that children learning English occasionally show variable order for what is conventionally interpreted as SO order (e.g., "slipper doggie" and "doggie slipper" while talking about putting a slipper on a dog). Individual children vary in the degree to which they produce SO sequences (and some produce very few). But even so, deviations from VO order are statistically more frequent than deviations from SO order (e.g., "Kimmy kick" and "doggie saw"—Bowerman, 1973a; "balloon break" and "nose blow"—Leopold, 1939–49; "rug jump"—Wieman, 1976, in contexts that give them a VO meaning). Yet messages to children are often commands, such as "find the doggie" and "give me the doggie" (Shatz, 1982), so that children probably encounter more models of VO than of S(V)O.

Word order in messages to children seems to be important even in very early phases. For example, whereas children acquiring English usually adhere to SV order from the beginning, children learning Italian initially show both VS and SV order for utterances in which they verbalize a subject at all (Bates, 1976). However, Italian children are exposed to a subject-deleting language in which over 70% of the utterances have no expressed subject at all, that is, simple VO or V models. Furthermore, Italian parents may vary word order much more in speech to children than in speech to other adults, presumably because word-order variations are used for emphatic purposes in Italian, and adults are always trying to be emphatic with small children. Children learning English, however, tend to encounter variants of SVO order even when parents vary how they phrase their messages, for example: "Put the doggie in the chair. Can you put the doggie in the chair?" This suggests that word order in messages to small children is not the only determinant of their early word order.

Incidentally, the present use of the terms S,V, and O is not meant to credit very young children with knowledge of these grammatical categories. Investigators tend to attribute subject to a noun when its referent would function as an agent in adult's utterance. S,V, and O are used, and will continue to be used, simply because they are conventional and convenient terms.

THE POSSIBLE ROLE OF PERCEPTUAL SALIENCE

The first verb relations encoded in phrases are actional relations typified by utterances such as "ride Dumbo," "Lois kiss," and, perhaps, "Mommy pigtail" (Bloom, et al., 1975; Bowerman, 1973a; Wells, 1974). French (1971) argues that the early preference for the agentive relation of subject to verb reflects the perceptual salience of an instigator of action. According to French, the unit in the perceptual field that moves is more salient than the affected object (patient) so that agent is encoded at some level before patient. Her assumptions about the perceptual salience of actors coincide with evidence that children in the one- and two-word speech stages attend to the referent that moves first, as judged by differences in response recovery from habituation to the actor, patient, and a bystander in filmed sequences (Robertson & Suci, 1980).

Animates are salient for young children even in pictures. Luszcz and Bacharach (1983) found that 3-year-olds named only the actor in about 70% of their descriptions of pictures showing an animate and inanimate referent. Attempts to increase object naming by linguistic manipulations intended to render "givenness" to the actor and "newness" to the object were unsuccessful (e.g., before showing the child a picture of a girl picking up a flower, the experimenter said, "Children can pick up toys; children can pick up balls"; etc.). Not surprisingly, asking the child what the agent was doing increased object naming, but this does not argue against the fact that the animates were more immediately attention catching. While we cannot generalize from 3- to 2-year-olds, it is plausible to assume that small children will usually focus on an animate being in action rather than on a static inanimate.

Luszcz and Bacharach found that pictures of an actor acting on an object increased object naming more than similar nonaction pictures did. Action can lead attention from an animate to an inanimate and thus relate the two entities. But actions that change the position or state of the acted-upon seem to be basic with respect to linguistic encoding of verb relations, as judged by evidence of their early emergence in phrases (Bloom et al., 1975; Wells, 1974).

Objects of direct action and of locative action are also encoded at an early age in Russian, where a special morpheme marks the direct object of most verbs. When the accusative suffix emerges (as early as 23 months), it appears for objects that are physically affected by an action (corresponding to verbs such as *put, throw, carry,* and *give*), but not with verbs that do not affect the object (e.g., *read* and *see*—Gvodzev, 1949, described by Slobin, 1982). In contrast, children acquiring Kaluli, a language of Papua New Guinea, learn that the agent is marked ("ergative" marking) in transitive events by age 26 months in two-word utterances. However, the agent marking appears earlier for verbs such as *grab, take, hit,* and *give* than for verbs that do not affect the object (Schieffelin, 1979).

Slobin (1981, 1982) regards such findings as evidence that "those notions that are first marked grammatically are in some sense *salient* to the child" (1982, p. 402) and refers to them as "prototypical." He further suggests that prototypical situations are encoded in the most basic grammatical forms available in a language ("canonical" forms) and that children enter grammar by attending to prototypical situations in the world of reference and to canonical forms in the world of language. According to Slobin, events in which "an animate agent willfully brings about a physical and perceptible change of state or location in a patient by means of direct body contact" (1982, p. 411) are "prototypes" for learning the grammatical relations that are encoded by markers on agent and/or patient in inflectional languages and by SVO order in English declarative sentences. These relations are then extended to "nonprototypical" examples, for instance, to actions that do not affect the object.

But perhaps markings on the noun that distinguish agent from patient are acquired and first used as pragmatic markers (or supported by pragmatic factors). Mallinson and Blake (1981) note that the ergative marking on agents can also be treated as a way of marking topics, and that it may be absent when the agent is not the topic. Thus, it is possible that children learning Kaluli initially use the agent marking as a topic marking, or at least, that their use of agent marking is facilitated when it can map onto an agent-topic. Presumably children learning a language in which patients are marked would use the patient suffix to indicate a secondary topic or focus. Since verbs such as *grab, hit,* and *knock down* imply an attentional sequence moving from agent to patient, the agent could, on this basis, become the perceptual-conceptual topic in relation to the patient (in effect, functioning as given in relation to the patient).

In contrast, verbs such as *carry* and *see* do not specify an attentional sequence. When the child is a participant in a given referential event, the child's attention could in principle remain on the object that attracted attention in relation to verbs such as *see* and *hear,* or on the object that the child wants in relation to such verbs as *need* and *want.* When the child is a spectator, his attention could in principle be held by the more salient entity, for example, in connection with *carry,* by the person or by the object, depending on the specifics of the situation. Compared to contact action verbs, noncontact verbs and nonaction verbs apply to events that are less likely to result in their agents' becoming situational "topics" in relation to another entity, and this could be why they are nonprototypical. Grammatical markers could emerge as pragmatic markers that subsequently become "grammaticalized."

Since English is a noninflectional language, agent is formally distinguished from patient by word order in active declarative sentences. Agent-patient order coincides with canonical SO order. But children seem to arrive at a preference for agent-patient (SO) order even in languages that permit variable word order. For example, word order varies in Serbo-Croatian, and a complicated system of inflections (which is acquired quite late) signals the agent and patient. Although Serbo-Croatian children hear instances of OS order (OSV and VOS) as well as various permutations of SO order (e.g., SVO, SOV), they show more SVO order relative to its incidence in adult speech (Radulovic, 1975; Slobin & Bever, 1982). In contrast, Turkish presents children with a simple accusative marker that they seem to understand by age two, at least for contact actions. Although Turkish children aged 2-3 to 3-8 show less SO order than Serbo-Croatian children, they still prefer SO to OS order (Slobin & Bever, 1982). Bates (1976) found that two children learning Italian mostly used SO order (usually as SVO) in utterances produced between 24 and 35 months. It may not be coincidental that 85 languages from a sample of 100 studied by Mallinson and Blake (1981) had SO (agent-patient) as their basic order (mostly as SVO or SOV); only four clearly had OS (patient-agent) as their basic order. Perhaps children seize that order in the input language that best matches how they process information in the world of reference.

A number of intersecting tendencies could conspire to produce agent-patient (SO) order in children acquiring English. Because of their salience, animate beings in action are likely topic candidates, particularly in situations in which they physically affect an object. Because they are "normal" subjects, children hear sentences that begin by naming agents, and respond to questions (e.g., "What does the doggy say?") by replies that implicitly topicalize an agent and so have an implicit agent-subject (e.g., "woof-woof"). As Bates and MacWhinney (1982) point out, the task of learning the surface structure of sentences may be vastly simplified for children who are learning English simply because of the convergence between agent, topic and subject.

GRAMMATICALIZING TOPICS

Children's early phrases could conform to SO (agent-patient) order even without a word order rule, granted that an animate being in action is focal for them in a given referential event. However, the placement of nouns in relation to the verb implies a rule of some form (because noun order can vary in relation to verbs: SOV, SVO, VSO). Perhaps at the very early stages, SV (and VS, as with Italian children) involves a rule for positioning topics in accordance with the input language. Presumably, children learning English eventually arrive at a positional rule that specifies naming the agent before the name for the action (Bowerman, 1973a, 1973b, 1975). But small children may not conceptualize agents as "animate instigators of action." Evidence that children aged 23–26 months do not seem to distinguish animate from inanimate agents (Corrigan & Odya-Weis, 1985) suggests that if they use an agent-first rule at this age, their notion of an agent actually corresponds to an actor or mover, so that they may simply be naming the thing that moves in preverbal position (or perhaps the thing that moves first in an action sequence).

It follows that children who have an agent and action rule for word order could in principle use it for inanimate movers (e.g., cars), for animate movers in relation to intransitive verbs such as *go* and *sit,* and for animate agents in relation to transitive verbs such as *put.* Thus, evidence that small children use the subject noun position for such diverse semantic roles does not need to be interpreted as evidence that they do so on the basis of "knowing" surface grammatical categories (as Bloom, 1970, and Bloom et al., 1975, argue). Nor is it necessary to assume that they acquire discrete positional rules for these diverse semantic categories (as Bowerman, 1973a, 1973b, suggests). Nevertheless, the child's early exercise of a word-order prescription may require facilitation from the nonverbal context to which the utterance applies, namely: facilitation from a context in which an agent is the child's initial focus in the situation.

Even children who "know" a word order rule may not always adhere to it. One child studied by Bloom et al. (1975) uttered the following phrases, "sofa sit/you sit/you sit couch." The child began to speak by naming what was focal to her, and since this was a nonagent, it could not be expressed through an agent-first rule. Bowerman (1973a) provides an instance of OVS order in one child ("Mommy hit Kendall," when the event indicated the opposite), and Leopold (1971) believed his daughter meant the reverse when she said "Meow bites wauwau."

A rule for agent-first order is simply a rule that maps onto an agent topic and conversely, conflicts with a nonagent topic. Mature speakers have diverse syntactic forms at their disposal that permit them to topicalize non-agents as well as agents. Small children, however, use the means at their disposal to express their topics. A rule for agent-first order realizes an agent topic, but not a nonagent topic (e.g., "sofa sit").

The fact that deviations from SO (and SV) are statistically less frequent than deviations from VO order could mean that children learning English initially "grammaticalize" agent topics by virtue of recognizing that they precede names for actions, and later extend this process by acquiring the surface codes that mark the preverbal noun as subject (i.e., agreement in person and number with the verb). Since active sentences normally realize agent topics, an agent-first rule may emerge in children's speech as a mapping onto agent topics.

GENERAL GOALS OF THE RESEARCH

Shatz (1982) specified four conditions that need to be satisfied before we can legitimately conclude that one system facilitates learning another system:

1. There must be a regular mapping between the two domains.
2. The mapping relation must be simple enough for the child to use.
3. The facilitating system must be available prior to acquisition of the system to be facilitated.
4. Given the existence of a facilitating system, there must be evidence that children use it to advance their linguistic knowledge.

The view that pragmatic structure facilitates the acquisition of surface structure meets the first three criteria, since (1) the mapping of agent subjects on agent topics is regular in English; (2) it is simple enough for use by small children; and (3) topic-comment structure can be discerned in children's utterances in the one-word speech stage, prior to the acquisition of syntax. However, evidence that children can use pragmatic topic-comment structure to learn syntax (condition 4) is lacking. The primary goal of the research is to supply the missing evidence. Specifically, we want to show that learning and using a linguistic form is facilitated when its subject noun maps onto the child's topic.

The assumption that pragmatic structure helps children learn surface structure is not restricted to the initial stages of language learning. Pragmatic structure can be discerned even in the mature speaker's use of complex sentence forms and, in principle, might serve to facilitate learning these forms. Thus, we can validly test our assumptions against a syntactic form that preschool children do not as yet understand—for instance, full agented passives of the type *The girl is being chased by the boy*. Since people normally use passives to topicalize the patient (affected entity), then by arranging conditions so that the patient is a "better" topic than the agent (i.e., the patient and not the agent is focal in the situation), we might lead children to produce passives. That is, situations leading to use of the form by people who know may also facilitate its acquisition. However, in order to demonstrate experimental control over the production of full passives by preschool children, we also need to show that conditions in which patients are not "good" topics do not (or are unlikely to) lead children to passives. In the following sections, we described the outcomes of research in which children aged 2-10 to 5-0 who did not understand passives were taught to produce them under conditions that can increase passives from people who know the form, and conversely under conditions in which people are unlikely to use them.

II. EXPERIMENTS ON WORD ORDER: CONVERTING A PATIENT FOCUS INTO PASSIVES

Passivization is the process by which a nonagent is promoted to subject noun position (Givón, 1979a). Although even children aged 2–4 years may produce agentless "get" passives such as *I got hurt* (Horgan, 1976), they hardly ever produce full agented passives under conditions in which older children and adults may use them (Baldie, 1976; Hayhurst, 1967). Perhaps agentless "get" passives are acquired as "lexical passives" that do not include an agent in their meaning structure (e.g., *They were doomed*). Or "get" passives could be used by analogy to "get" actives like *I got a bike for my birthday*. If so, they may not be truncated (i.e., agentless) passives at all—passives in which an implied agent goes unsaid.

It has been suggested that control of the passive occurs at about age 6, at the time of the emergence of what Piaget (1963) termed concrete operations. The rationale for this assumption is that full passives involve reversal of the more usual agent and patient positions (Beilin, 1975), or else dissociation between the child's perspective and the agent (MacWhinney, 1977). It is further assumed that the entry into the concrete operational stage provides the cognitive prerequisites for production (and comprehension) of full passives that are lacking in younger children. However, since full passives are uncommon even in adult speakers (Givón, 1979; Ochs, 1979), the association between full passives and age may also exist because older children have encountered more instances of passives than younger children. Perhaps even 3-year-olds can learn to produce full passives when training conditions are compatible with naming the patient first.

There are precedents for training young children to say passives (e.g., Whitehurst, Ironsmith, & Goldfein, 1974), but the children received prolonged training. For instance, de Villiers (1980) asked children aged 3–5 years to imitate passive sentence descriptions of pictures that showed interactions between two animals. Randomly interspersed among the training instances were probes intended to elicit passive sentence descriptions from the child. Children received five training sessions. The same 40 pictures occurred in each session (20 imitation and 20 probes). So, across training, there were 100 training items and 100 probes. Yet the mean number of correct passives (patient-first passives) was only 5.1; the mean number of reversed passives (and utterances closely approximating reversed passives) was 3.7. Thus the children produced few correct passives and almost as many reversed as correct passives.

Both referents were animate in de Villiers's stimuli. Thus the agent (the referent depicted in action) could in principle have been the focal entity in the situation. In addition, referent salience was neutralized (i.e., the stimuli were neutrally constructed). Her findings may therefore be evidence that children find it very difficult to learn to say passives in the absence of pragmatic factors that might facilitate their doing so. What conditions might facilitate the production of full passives?

Linguistic manipulations intended to focus attention on the patient increase passive sentences from adults and from children who "know" the structure. They can also boost recall of passive sentences. For instance, preambles relating to the patient facilitate completing passive sentence descriptions of pictures (Tannenbaum & Williams, 1968) and enhance recall of passives (Perfetti & Goldman, 1975). Passives can also be elicited from adults (Carroll, 1958; Olson & Filby, 1972) and children (Turner & Rommetveit, 1967) by questions such as "What's happening to X?" (the patient). Free recall of passives is also enhanced when the importance of the surface subject noun referent (patient) is emphasized during storage (James, 1972; James, Thompson, & Baldwin, 1973). These procedures induce people to take the patient as a sentence starting point, thereby facilitating their use of passives.

Disparities in perceptual salience can sometimes control how people describe visual displays. Johnson-Laird (1968a) and Costerman and Hupet (1977) reported that adults tend to choose descriptions that start by naming the more immediately salient aspect of a visual display (i.e., the larger of two colored areas). Interestingly, Johnson-Laird (1968b) also found that people who are asked to illustrate sentences such as *Red follows blue* and *Red is followed by blue* tend to make colors larger when they are named first in sentences.

The findings of these studies (and of related work) suggest that the focus object in a situation provides a potential utterance starting point. When this referent is the patient, people may use the passive instead of the active sentence voice. This suggests that inducing a patient focus in preschool children might facilitate their learning to describe pictures in the passive sentence voice.

Linguistic manipulations may not be a good way of inducing a patient focus in young children (Luszcz & Bacharach, 1983). However, coloring one referent should result in its becoming an attentional focus. The focus object would be expected to become the topicalized entity in the child's sentence. If that entity functions as patient, then production of passives should be facilitated.

Because humans are more topicworthy than animals, the expected tendency to topicalize the focus object (i.e., the patient) may be strengthened when animals act on humans and, conversely, weakened when humans affect animals. However, as preschoolers are always encountering humanized animals in television cartoons and in story books, any differences in the topicworthiness of humans and animals may be negligible. Nevertheless, this factor still needs to be controlled.

In the present study, the training (imitation) items were 16 pictures showing interactions between two animates (equally divided among animal/animal, human/human, and animal/human participants). Each item was used once. In eight pictures, the patient was more salient than the agent (accomplished by coloring the patient). These will be called "patient-salient" items. The other eight pictures were neutrally constructed and are termed "patient-neutral" items. Randomly interspersed among the training items were 16 production probes. Again, the patients were focus objects in eight pictures, agent and patient salience being neutralized in the remaining eight.

If only 16 training items can elicit any correct order passives to probes at all, then the patient-salient pictures used for training must be playing a role. The critical question, however, is whether children will produce more correctly ordered passives to patient-salient than to patient-neutral pictures. Of course, they may say "X is being verbed by Y" for patient-neutral probes. However, X should more often be patient than agent for patient-salient than for patient-neutral probes.

Producing correctly ordered (patient-first) passives presumably requires a rule for that order, and the child's use of that rule presumably will be facilitated by the patient-salient items. Although rule learning is a secondary concern here, information on the shape of the rules that children might acquire for passives would be useful. Granted that they learn to name the patient in subject noun position in passives, will they then learn a narrow rule that is restricted to animate patients (the training instances), or will they acquire a broad rule that supercedes animacy differences? To answer these questions, the training stage was followed by generalization tests in which the children described 15 neutrally constructed pictures. These had animate agents and three types of acted-upons: (*a*) animate (e.g., lion washes horse), (*b*) dynamic inanimate (e.g., horse pushes car), and (*c*) static inanimate (e.g., lion washes window).

A. EXPERIMENT 1: EFFECT OF PERCEPTUAL SALIENCE

Method

Subjects

Children were recruited from a day care center in an Early Childhood Education program. Most were from middle-class or professional homes. Twenty-five children aged 2-7 to 4-5 were pretested for comprehension of eight reversible passive sentences such as *The tiger is being pushed by the bear.* All sentences had animates in subject and object noun position. The children illustrated their interpretation of the sentences with toys. On this basis, 18 children were obtained who interpreted six or fewer items correctly. One child subequently refused to complete training. One aged 2-10 and another aged 4-0 produced only active sentences during training. A fourth child's speech was difficult to understand because of dysarthria. The final training sample comprised 14 children aged 2-10 to 4-5 (mean, 3-8). Their mean pretraining comprehension was 63% and ranged from 50% to 75%. No child produced passive sentences when asked to do so following pretraining comprehension to events enacted for them with toys.

Materials

Thirty-two pictures of animates affecting other animates were drawn in black ink. There were four types of pictures, eight of each type: (1) human affects human (HH) (e.g., boy kisses girl); (2) animal affects animal (AA) (e.g., wolf punches pig); (3) human affects animal (HA) (e.g., girl washes puppy); and (4) animal affects human (AH) (e.g., mouse chases woman). Additional examples are shown in Table 1. Names for all referents were among the first 1,000 most frequently used words on kindergarten norms (Rinsland, 1945). Although the 32 pictures were all different, verbs were repeated at least twice, as the same verbs were to be used in training and in probe items.

Four pictures from each animacy combination were designated training items. Four were designated production probes. For each animacy combination, two imitation and two probe items were patient salient. In these, the patient was colored with crayons. For instance, a rabbit had a pink face, red shirt, blue trousers, etc. The agent was left uncolored in these items. The other two imitation and probe items were patient neutral. Both referents were colored in one patient-neutral imitation and in one probe item. Neither was colored in the other item. The purpose of neutral items with

TABLE 1

EXAMPLES OF IMITATION (I) AND PROBE (P) ITEMS FOR EACH TYPE OF SITUATION

Human Affects Human (HH)	Animal Affects Animal (AA)
Boy shoots giants (I)	Lion punches horse (I)
Man kicks woman (I)	Dog feeds cow (I)
Girl chases boy (P)	Wolf punches pig (P)
Woman feeds man (P)	Dog bites cat (P)
Human Affects Animal (HA)	**Animal Affects Human (AH)**
Man carries cat (I)	Pig bumps queen (I)
Woman chases lion (I)	Horse pulls man (I)
Man shoots lion (P)	Bird bites woman (P)
Man pats pig (P)	Puppy kisses baby (P)

both referents colored was to preclude a rule based on color. Across picture type, there were 16 patient-salient and 16 patient-neutral items, eight for imitation and eight for probes.

Because the patient was unavoidably larger than the agent in certain pictures such as one showing a mouse chasing a woman, referent size was systematically varied. The patient was larger than the agent in eight imitation and eight probe stimuli. In the other drawings, either both referents were comparable in size or the agent was the larger entity. Size was balanced across animacy combination and across patient salience. For example, the patient was the larger referent in one of the patient-salient AA probes, and size was neutralized in the other AA probe.

Two sets of identical pictures were formed by interchanging patient-salient and patient-neutral items. An item that was patient salient in one set was patient neutral in the other set. This procedure permitted control with respect to the salience factor for other aspects of the picture that might affect noun order. The two sets were administered in alternating order across children (each child receiving only one set).

The 32 pictures of each set were covered with transparent plastic and collated in a binder, ordered according to the following two restrictions. First, the initial 16 items comprised eight imitation and eight probe items. Items 1–3 and also items 17–19 were imitation items. This restriction was observed because the plan was to administer the pictures in two sessions, 16 items in each session. Second, a verb had to occur in imitation before it occurred in a probe. For instance, the training item *Girl pats puppy* occurred before the probe for *Baby pats mother*. Seven children began training with item 1 and the rest began with item 17.

Procedure

The procedure was introduced as a game in which the experimenter described a picture and the child repeated what she said. The experimenter's sentences had the form *The X is being verbed by the Y* (where X stands for patient and Y stands for agent). When a probe item occurred, the experimenter said, "Now it's your turn. Can you say it my way?" If the child used an active sentence, the experimenter again asked, "Can you say it my way?" or, "Try to say it the new way." Otherwise, prompting for passives did not occur. The experimenter did not comment on the child's description. However, for imitation, the experimenter repeated the original sentence after the child had responded (or if no response was forthcoming after 10 seconds). Imitation items were read to the child with equal stress on both nouns.

Before revealing a picture, the experimenter named the verb, for example, "The next picture shows *kissed.*" This procedure was followed because (*a*) it specifies the semantic role of each referent, and (*b*) it reduces refusals (e.g., "I don't know what's happening"), and unusable descriptions (e.g., "They're jogging"). Changes in verb by the child were accepted without comment. Production training required two sessions for nine children. The rest needed three to five sessions, 1–3 days apart. After each session, the child received a drawing to take home.

Generalization tests were administered 2–5 days after production training ended, using 15 black and white ink drawings of animals affecting (*a*) animates, (*b*) dynamic inanimates, and (*c*) static inanimates. For example, a pig licked a chicken, a dog pulled an airplane, and a dog painted a picture. There were five examples of each patient type.

Before generalization testing began, the child imitated three passive sentence descriptions of pictures taken from training. Then the experimenter said, "Now I'll show you some new pictures. Tell me what's happening in the new way." The verb was again provided before the child saw each picture. The experimenter did not comment on the child's description or try to elicit passive sentences from the child during test administration.

Results

The 14 children produced a total of 82 correct (i.e., patient-first) order passive to probes. Of these, 74 were full passives that included an auxiliary (*is* or *is being*), passive verb ending, and the preposition *by*. These responses include sentences such as "He's being kicked by the pig, the bunny." Five responses were truncated passives (e.g., "The bunny is being kicked"). Two responses had no auxiliary, and one lacked the verb suffix. Of the 24 reversed order (i.e., agent-first) passives, one was truncated, one had no auxiliary markers, and one had no first noun (the situational agent).

In what follows, the term "passive" refers to correct and reversed passives. The type of passive, correct or reversed, will be specified. The mean number of correct passives, reversed passives, active, and reversed active sentences is shown in Table 2, separately for patient-salient and patient-neutral items. The data are collapsed across the size factor because preliminary analysis revealed that size had no effect at all ($p > .10$ for all main effects and interactions). There were no differences in the response patterns to the two sets of stimuli.

Correct and reversed passives to probes were submitted to a $2 \times 2 \times 4$ (noun order $\times$ salience $\times$ animacy) repeated-measures analysis of variance. This procedure revealed comparable passives overall to salient and to neutral items, $F(1,13) = 3.37$, $p > .05$, and more correct than reversed passives overall, $F(1,13) = 12.82$, $p < .01$. However, the interaction between noun order and salience, $F(1,13) = 5.42$, $p < .05$, indicates that while correct order was more frequent for salient than for neutral items, reversed order was more frequent for neutral than for salient items. Noun order also varied according to animacy, $F(3,39) = 7.02$, $p < .01$. The preceding outcomes, however, were qualified by a three-way interaction, $F(3,39) = 3.55$, $p < .05$, which suggested that animacy affected noun order differently for salient and for neutral items. To clarify the shape of the interaction, correct and reversed passives were analyzed separately for neutral and for salient pictures.

A 2×4 (noun order $\times$ animacy) analysis of variance on patient-neutral items revealed the interaction between animacy and noun order, $F(3,39) = 10.40$, $p < .01$. Analysis of this interaction for simple main effects showed that reversed passives predominated for HH, $F(1,39) = 7.89$, $p < .01$, and

TABLE 2

MEAN NUMBER OF CORRECT AND REVERSED PASSIVE AND ACTIVE SENTENCES TO SALIENT AND NEUTRAL PATIENTS FOR EACH TYPE OF PICTURE (Max = 2)

	Picture Type				
Patient	AA	HH	HA	AH	MEAN
Salient:					
Correct passive ...	.93	.71	.86	1.14	.91
Reversed passive ..	.43	.07	.07	.07	.16
Correct active	.64	.71	.86	.71	.73
Reversed active ...	.00	.00	.07	.00	.02
Neutral:					
Correct passive ...	.43	.14	.86	.79	.56
Reversed passive ..	.21	.64	.21	.00	.23
Correct active	1.28	.57	.71	.79	.84
Reversed active ...	.00	.00	.00	.07	.02

occurred as often as correct passives for AA, $F(1,39) = 1.41, p > .05$. Mostly correct passives occurred to HA, $F(1,39) = 13.11, p < .01$, and to AH, $F(1,39) = 19.63, p < .01$. The overall difference between correct and reversed passives was not reliable for patient-neutral pictures, $F(1,13) = 3.72$, $p > .05$. In contrast, the corresponding analysis on patient-salient items confirmed that correct passives predominated, $F(1,13) = 14.12, p < .01$, regardless of animacy combination, $F(3,39) = 1.55, p > .05$. A separate analysis of variance on active sentence responses had no reliable outcomes ($p > .10$).

Because the age range was quite broad, we compared data for seven children aged 2-10 to 3-9 (mean, 3-4) and seven children aged 4-0 to 4-5 (mean, 4-3). Older preschoolers produced more scorable responses overall (mean, 15.3) than young preschoolers (mean, 12.1) and more correct passives (mean, 8.3; 54% of scorable responses) than younger preschoolers (mean, 3.4; 28% of scorable responses). Production of reversed passives was similar for older (mean, 1.6; 10% of scorable) and younger preschoolers (mean, 1.9; 14% of total scorable).

The data in Table 3 show the distribution of responses by younger and older children to patient-salient and patient-neutral items. Patient-salient pictures elicited more correct passives than patient-neutral pictures at both age levels. However, only older preschoolers showed a trend toward more reversed passives to neutral than to salient items.

Generalization

Twelve of the 14 children who had participated in training agreed to further tests. They produced a total of 48 correct passives, of which six were truncated. The rest had an auxiliary, verb suffix, and the preposition *by*. Since the children showed diverse response patterns, we have reproduced their data individually. Table 4 shows their passive, reversed passive, and active sentence responses to each type of patient.

Data for correct and reversed passives were first analyzed across subjects using a 2 x 3 (noun order x animacy) repeated-measures design. There were more correct than reversed passives, $F(1,11) = 4.75, p = .05$, but noun order varied according to patient animacy, $F(2,22) = 3.48, p < .05$. Analysis of this interaction revealed no effect of animacy for reversed passives, $F(2,22) = 2.00, p < .05$. This may be a floor effect, as there were few reversed passives.

Animacy did affect correct passives, $F(2,22) = 22.17, p < .01$. Use of Newman-Keuls revealed more correct passives for animate than for dynamic or static inanimates ($p < .01$) and more for dynamic than for static inanimates ($p < .05$). Conversely, static inanimates elicited the most active sentences and animates the least. The findings suggest a gradient of

TABLE 3

PERCENTAGE OF TOTAL RESPONSES BY YOUNGER AND OLDER PRESCHOOLERS TO SALIENT- AND NEUTRAL-PATIENT ITEMS IN TERMS OF SENTENCE TYPE

Sentence Type	3-Year-Olds	4-Year-Olds
Correct passive:		
Salient patient	17	34
Neutral patient ...	10	21
Reversed passive:		
Salient patient	8	1
Neutral patient ...	6	9
Active:		
Salient patient	25	18
Neutral patient ...	33	16
Reversed active:		
Salient patient	1	0
Neutral patient ...	0	1
Total	100	100

TABLE 4

NUMBER OF CORRECT PASSIVE, REVERSED PASSIVE, AND ACTIVE SENTENCES TO ANIMATE (A), DYNAMIC INANIMATE (DI), AND STATIC INANIMATE (SI) GENERALIZATION ITEMS (Max = 5)

		Correct Passive			Reversed Passive			Active		
Subject	Age	A	DI	SI	A	DI	SI	A	DI	SI
S_1	4-5	2	4	1	0	0	0	3	1	4
S_2	3-1	3	3	1	0	0	0	2	2	3
S_3	4-3	1	1	1	0	0	0	4	4	4
S_4	4-0	5	2	0	0	0	0	0	3	5
S_5	4-1	3	1	0	0	0	0	2	3	5
S_6	4-6	2	0	0	0	0	0	3	5	5
S_7	3-6	4	0	0	0	0	0	1	4	5
S_8	3-5	4	4	3	1	0	0	0	1	2
S_9	4-5	2	0	0	1	1	1	2	4	4
S_{10}	3-1	2	1	0	2	1	0	2	3	5
S_{11}	3-3	1	0	0	0	0	0	3	4	2
S_{12}	3-3	0	0	0	5	1	2	0	0	2
Mean:										
All		2.4	1.3	.5	.8	.3	.3	1.8	2.8	3.8
3-year-olds		2.4	1.3	.7	1.3	.3	.3	1.3	2.3	3.2
4-year-olds		2.5	1.3	.3	.2	.2	.2	2.3	3.3	4.4

generalization in which dynamic inanimates are treated as being more like animates than like static inanimates. The overall pattern suggests that the children acquired a semantically restricted rule for noun order in passives.

Inspection of individual data in Table 4 somewhat qualifies this conclusion. Subjects 1–7 each produced at least two correct passives and no reversed passives, while subject 8 produced 11 correct passives and only one reversed passive. Thus, these children behave as if they have some understanding of word order relations in passives (although they vary in their ability to apply this knowledge). However, subjects 1, 2, 3, and 8 produced passives to all three patient types, subjects 4 and 5 to animate and to dynamic inanimate patients, and subjects 6 and 7 to animate patients only. Thus children who use correct passives for dynamic inanimates may also produce some to static inanimates, but they do not restrict them to animates and static inanimates. Of the remaining children, subjects 9 and 10 showed both correct and reversed passives, while subject 12 produced only reversed passives (reproducing what he mostly did for probes).

Could generalization be mediated through the verb and not through patient animacy as such? Perhaps the children acquired verb-specified rules for passives, based on the verbs encountered in training. This possibility coincides with the generalization data, because four verbs for animate patients, three for dynamic inanimates, and two for static inanimates had been used in training.

This possibility was assessed by tabulating correct (and also reversed) passives separately for each verb, according to patient type. These data are shown in Table 5. A superscript ([a]) beside a verb means it was used in training. Inspection of Table 5 shows that the "old" verbs *push* and *chase* elicited more passives for animate patients (total 14) than for dynamic inanimate patients (total 6). Similarly, the verb *wash* elicited more correct passives for an animate (5) than for a static inanimate (2).

In all, there were 27 correct passives to *push, chase,* and *wash.* By pure chance, there should be 4.5 correct passives to each of these verbs for animate patients and 4.5 correct passives to each one for inanimate patients (static or dynamic). The actual distribution ($\chi^2 = 5.8$, $df = 2$, $p < .10$) narrowly missed significance of the .05 level. Although it cannot be demonstrated on the basis of this small data sample that generalization was specified more strongly by animacy than by verb, the overall pattern is nevertheless consistent with this interpretation.

Discussion

The central outcome of Experiment 1 is the finding that patient-salient pictures elicited more patient-first passives than patient-neutral pictures.

TABLE 5

Number of Correct Passives (CP) and Reversed Passives (RP) to Each Verb Used in Generalization for Animate, Dynamic Inanimate, and Static Inanimate Patients in Experiment 1

Animate			Dynamic Inanimate			Static Inanimate		
Verb	CP	RP	Verb	CP	RP	Verb	CP	RP
Push[a]	7	1	Pull[a]	3	2	Wash[a]	2	1
Lick[a]	8	1	Push[a]	2	1	Carry[a]	2	1
Chase[a]	7	2	Chase[a]	4	0	Read	1	0
Wash[a]	5	2	Throw	4	0	Paint	0	0
Catch	4	1	Roll	3	0	Play (guitar)	1	0

[a] Verb used during training.

This finding had been anticipated on the premise that the focus object would become a potential sentence starting point, thereby facilitating correct order for passives. The probe data can also be conceptualized in terms of competition between agent and topic for control of the sentence-initial position. Bates, McNew, MacWhinney, Devescovi, and Smith (1982) and Bates and MacWhinney (1981, 1982) have proposed that the surface structure of languages represents a resolution of competition between agent and topic for the initial position in sentences. They regard English as an instance of "peaceful coexistence" in that agent and topic often share the same position. The current findings can be regarded as a dissolution of this coalition, generating a state of competition between agent and topic. Coloring the patient helped children name it in sentence-initial position because this manipulation helped to override competition from the agent (which had to accept a secondary position).

Salient-patient probes typically led to patient-first passives regardless of animacy combination. However, when referent salience was neutralized, the same pictures resulted in a different response pattern. Patient-first order was easier to use in neutral pictures for AH/HA items (animal affects human/human affects animal) than for AA/HH items (animal affects animal/human affects human). Although these findings suggest that disparities in visual salience can override other determinants of noun order, they pose the question why patient-agent order is easier when referent animacy differs than when it is the same. The pattern does not coincide with what would be expected if children perceived humans as more topicworthy than animals, because in that case, they should have produced more correct passives to AH (animal affects human) than to HA (human affects animal). Perhaps differences in animacy increased the salience value of each referent, but why should this facilitate patient-first order?

The pictures were scrutinized for possible sources of differences in patient salience in the neutral AA/HH versus AH/HA items, but a systematic pattern to explain the results could not be found. However, the relevant findings may reflect differences in the amount of visual processing needed to assign semantic roles to referents in the AA/HH and AH/HA stimuli. Agent and patient are harder to differentiate in the former than in the latter, where their respective semantic roles are apparent at a glance. Presumably, the children studied the pictures with the intent of finding the agent (i.e., with an agent focus). However, this processing strategy is compatible with topicalizing the agent, not the patient (see Olson & Filby, 1972). Consequently, the longer it takes the child to find the agent, the more likely is the child to name the agent first when describing the picture. Perhaps the difficulty of discriminating agent from patient in pictures also underlies Brown's (1976) report that passive sentence descriptions of enacted events improve preschool children's understanding of passives more than similar descriptions of pictures.

The current findings are a striking contrast to prior evidence that preschoolers need extended training before they can say full passives, if they can do so at all (de Villiers, 1980; Whitehurst et al., 1974). Four-year-olds in the present study did produce more correct passives to probes than 3-year-olds. Perhaps the form was more familiar to the older preschoolers, or perhaps they learned to say it faster than the younger children. But the fact remains that over 25% of scorable sentences by 3-year-olds were correct passives.

If prior encounters with passives and/or current cognitive level suffice to account for the results, then (*a*) why did patient salience have a significant effect, and (*b*) why did de Villiers (1980) find so few correct passives even though her subjects were in the same age range as the present sample and received much more practice? We cannot escape the conclusion that passives are easier to learn and use when training is conducted in a manner that is compatible with using patient-first order in sentences.

I do not claim that the children's knowledge of passives after training resembled that of mature speakers or even approximated it. The generalization data clearly speak against this conclusion, as most children seemed to arrive at a narrow production rule. However, I do claim that conditions that can affect noun order in mature speakers can also influence young children's noun order and that there is an underlying continuity between the acquisition of a form and its use. Whereas a patient focus can increase passives from adults, it can lead children toward naming the patient first. The experimenter's passive sentences furnished the surface means through which the children could express a patient focus in a linguistically prescribed manner.

The findings for generalization indicate that most children learned "something" during training that permitted them to use passives even to neutrally constructed pictures (when asked to do so). The generalization stimuli required more conscious use of the form than the training situation, where models and perceptual salience supported its use. Such conscious or deliberate use of passives presumably reflects the child's rule for the form. The reflection may be imperfect because the dimension the child displays may mask another dimension the child may have included in his or her rule. However, the one favored by the child presumably is the one most readily available for use in the given situation (i.e., is prepotent).

Animate patient generalization items elicited more correct passives than inanimate patient items, and dynamic inanimate items led to more correct passives than static inanimate ones. Although individual variability was present, those children who used passives for inanimates usually used them more often for animates. These findings suggest that patient animacy was a salient dimension for most children. Presumably because dynamic inanimates share the property of movement with animates, a rule for passive which incorporates "animate patient" could more easily be extended to dynamic than to static inanimates.

We cannot exclude the possibility that the children acquired production rules for passives which were verb specified, at least to some extent, as this possibility would coincide with evidence of verb-specified understanding of word order in active (Roberts, 1983) and in passive sentences (Lempert, 1978; Sinclair & de Ferreiro, 1970; Sinclair, Sinclair, & de Marcellus, 1971). Generalization could be mediated through the verb and also through animacy, perhaps with additive effects on production. However, the current data suggest a larger role for animacy.

The generalization data could also reflect an effect of referent topicworthiness. If it is the case that animates are more topicworthy than inanimates (apart from their semantic role), then it may be harder for children to use passives when animates affect inanimates than when they act on other animates. Since pictures of animates affecting inanimates do not seem to elicit passives from older children and adults (Harris, 1978), perhaps our preschoolers similarly found it more natural to use actives for inanimate patients, even though they had been asked for passives. This possibility cannot be addressed with respect to the generalization pattern. However, the effect of agent and patient animacy on passive sentence training was investigated in Experiment 2.

B. EXPERIMENT 2: THE EFFECT OF REFERENT ANIMACY ON PASSIVE SENTENCE TRAINING

In Experiment 1, even 3-year-olds produced full agented passives when trained under conditions in which the patient was perceptually more salient than the agent. The more salient referent was an attentional focus that coincided with word order relations in passives. However, suppose that children were taught to use passives for enacted events instead of for pictured events. Because the agent moves first in enacted events, it should in principle function as the child's initial focus. This situation would normally be compatible with an agent-first sentence that topicalizes the agent. However, when the acted-upon referent is more topicworthy than the one in the agent role (as when an animate patient is affected by an inanimate agent), then perhaps the more topicworthy referent (the animate) will move into sentence-initial position, carrying the role of patient with it. As a result, production of patient-first passives should be facilitated.

As noted earlier, Mallinson and Blake (1981) hold that the patient may be advanced to subject-noun position when it is more topicworthy than the agent. They believe that animate patients are better candidates for promotion than inanimate patients. According to Mallinson and Blake, the tendency to topicalize an animate may lead people to use passives when inanimates affect animates (e.g., *My dog was hit by that car*).

Psycholinguistic investigations give credibility to their claim. Adults and older children tend to produce sentences with animate-inanimate (AI) order in preference to inanimate-animate (IA) order. Depending on the animacy of the agent and the patient, sentence structure can in turn be affected. Harris (1978) found that adults and children aged 5–10 years produced more passives to pictures showing inanimates affecting animates (e.g., *bus knocks down nurse*) than to pictures showing animates affecting either inanimates or other animates. Passives occurred mostly where an active sentence would have had IA order.

Agent and patient animacy can also affect the form in which people recall active and passive sentence descriptions of pictures. When animates affect inanimates, active sentences have AI order and passives have IA order. When inanimates affect animates, actives have IA order and passives have AI order. Dewart (1979) found that children aged 6–8 years recalled more AI passives and actives than IA sentences. Sentences presented in IA order tended to be recalled in AI order, resulting in a change in sentence voice. The report that passives with high-imagery initial nouns and low-imagery object nouns are less likely to be recalled as actives than are passives with low-imagery first nouns and high-imagery object nouns (James et al., 1973) may also involve differences in referent animacy.

Animate-inanimate order seems to be favored also by agrammatic aphasics (patients with Broca's aphasia). Saffran, Schwartz, and Marin (1980) asked five adult aphasics to describe pictures by arranging sentence fragments (e.g., *pulls/the girl/the boat*). They preferred AI order as evidenced by more correct arrangements for pictures with animate agents and inanimate patients than for pictures with inanimate agents and animate patients.

Beginning speakers also show AI order; their early phrases typically have animates in subject-noun position and, usually, inanimates in object-noun position (Bloom, 1970; Bowerman, 1973a, 1973b; Limber, 1973). Children aged 2-2 to 2-10 also make more ordering errors when describing actions of inanimate agents than those of animate agents. Angiolillo and Goldin-Meadow (1982) found that about one-fourth of their descriptions of inanimate agent events had incorrect order.

Where sentences are referred to pictures, the AI preference may at least in part be based on the greater salience of animates relative to inanimates (both when children process pictures and when they remember them). However, topicworthiness (i.e., noun-ordering preferences) may involve the same attentional biases that presumably lead people to focus on an animate referent in concrete situations. Thus it is possible that differences in referent animacy could be an effective training strategy even for enacted events. Specifically, training with enacted events in which inanimates affect animates may facilitate patient-first passives by preschoolers. Conversely, training with events in which animates affect inanimates may result in agent-patient order, manifested either as active or as reversed (agent-first) passive sentences.

In Experiment 2, imitation training was again used to teach preschoolers to say passives. For one group, animates (A) affected dynamic inanimates (DI), for example, *bear pushes car, tiger chases airplane*. The corresponding passive sentences had IA order, for example, *The car is pushed by the bear*. This condition will be termed "DI patient." Children who experience DI-patient training should prefer agent-patient order when describing probe events.

For a second group, dynamic inanimates affected animates, for instance, *car pulls tiger, truck hits girl*. This condition is termed "A patient." Passive sentences corresponding to the events had AI order, for example, *The tiger is pulled by the car*. Since AI order is compatible with children's presumed animacy ordering preferences, patient-agent order in passives to probes should be facilitated.

For a third group, some items showed animates affecting static inanimates (SI), for example, *girl washes kettle, tiger carries chair*. The remaining items had dynamic inanimates affecting static inanimates, for instance, *truck bumps house, train pushes piano*. This condition is labeled "SI patient." The SI-patient group should prefer agent-patient order, at least for animate agent items. However, since this condition has nonreversible events (i.e., the animate has to be the agent), expectations may have to be modified by the outcomes.

Training procedures differed as follows from those in Experiment 1. First, the events were enacted. Second, the model sentences had the form *The X is verbed by the Y* (instead of *The X is being verbed by the Y*). The shorter form was used to maintain temporal contiguity between the model sentences and the event.

Pilot testing suggested that enacted events competed with attention to the model sentences more than picture stimuli. For instance, children omitted more morphemes from their imitations than those in Experiment 1. To compensate, the number of training items was increased to 20 and the number of production probes was decreased to 12. Imitations were recorded, since imitation as well as production might be differentially affected by the different training conditions.

Two other procedural changes were instituted. First, the number of pretraining comprehension items was increased from eight to 12 passive sentences. Second, posttraining generalization items were reduced from 15 to 12 in order to eliminate pictures which children in Experiment 1 had found difficult to describe. This left four pictures for each of the three types of patients. For some of these pictures, the action was described by a different verb (e.g., *push* instead of *roll*). One of the dynamic inanimate patient stimuli was changed as well. Details of the methodology follow.

Method

Subjects

Children came from two schools, a university day care center and the same school that had participated in Experiment 1. Most were from middle-class, professional home backgrounds. No child had taken part in previous language training.

All children younger than 5 years were first tested for passive sentence comprehension. The child enacted with toys his interpretation of the meaning of four reversible active and 12 reversible passive sentences (e.g., *The horse is pushed by the cow* and *The truck is bumped by the car*). Twenty-seven children with passive sentence comprehension scores below 75% were randomly assigned to the three training groups, nine to each group. Four children could not complete training and were replaced by comparable children in the subject pool. The final training sample ranged in age from 3-0 to 4-10. Mean ages in each group ranged from 3-10 to 3-11, and mean pretest comprehension ranged from 39% to 46% correct comprehension of passives.

Materials and Procedure

Twenty passive sentences were constructed for each of the three conditions by using 10 different verbs twice. The same verbs could not be used across all conditions, but verbs were repeated across condition when possible. These sentences are designated training items. A second set of 12 sentences was constructed, using the same verbs as for training but combined with different nouns. These sentences are designated production probes. The following verbs occurred in each training condition: (a) A patient: *chase, bump, lift, carry, hit, follow, push, turn, touch, pull;* (b) DI patient: *chase, pull, bump, lift, bounce, kick, push, hit, roll, drive;* and (c) SI patient: *wash, hit, pull, carry, push, bump, play* (piano), *scratch, drop, lift.* Examples of training and probe sentences in each condition are shown in Table 6.

Sentences were illustrated with three sets of toys: (*a*) animate (tiger, man, bear, girl, horse); (*b*) dynamic inanimate (airplane, truck, train, ball, car, helicopter); and (*c*) static inanimate (house, piano, bathtub, kettle, bed, chair). The experimenter illustrated sentences by enacting an event with two toys. The procedure for training and probes was the same as in Experiment 1 except that the experimenter enacted the event while she described it in passive sentence form. The verbs *hit* and *drive* were presented as *hitted* and *drived* (to preserve verb "regularity").

The 20 imitation and 12 probe items were divided into two sets (10 imitation and six probe items each) so as to permit administering the procedure in two sessions. However, some children needed three or four sessions, 1 or 2 days apart. One to 3 days after training, children were tested for generalization, using the materials and procedure described in Experiment 1, with the exceptions previously noted.

Results

Imitation

A lenient criterion was adopted for scoring a response as a passive sentence, because children deleted the auxiliary *is* about 36% of the time and the passive verb suffix [ed] about 28% of the time (given all possible response opportunities). The first noun was deleted more often than the verb or second noun. Details of the sentence classification system follow.

Passive Sentences

Passives were classified in terms of noun order as *correct passive* (patient-agent order) and as *reversed passive* (agent-patient order). The latter include sentences in which a noun was repeated (e.g., "The tiger is chased by the tiger"). Correct and reversed passives were further subcategorized into one of three types as follows:

1. *Full passive.*—The subject and object nouns, the preposition *by*, and

TABLE 6

EXAMPLES OF TRAINING AND PROBE EVENTS IN EACH CONDITION IN EXPERIMENT 2

Training Events	Probe Events
Animate (A-Patient) Condition	
Truck bumps girl	Truck chases tiger
Airplane chases bear	Car pulls girl
Car pulls tiger	Airplane lifts tiger
Train pushes horse	Car follows man
Dynamic Inanimate (DI-Patient) Condition	
Tiger chases airplane	Girl kicks airplane
Bear pulls truck	Tiger bumps train
Bear pushes train	Girl lifts airplane
Man drives car	Bear chases truck
Static Inanimate (SI-Patient) Condition	
Tiger washes bathtub	Tiger scratches house
Truck bumps house	Girl washes kettle
Bear scratches table	Car bumps house
Train pushes piano	Airplane lifts chair

either the auxiliary or passive verb suffix are present (e.g., "The tiger chased by the bear," "The tiger is chase by the bear"). These criteria exclude sentences such as "Tiger chase by the bear" and "The tiger's chased to the bear."

2. *Noun$_1$-deleted passive.*—The subject noun is omitted. The preposition *by* and either the auxiliary or passive verb suffix are included (e.g., "is chased by the bear," "chased by the bear").

3. *Truncated passive.*—The preposition and postverbal noun are omitted (e.g., "The tiger's chased").

Reversed Active Sentences

These have patient-agent order and, typically, a passive sentence marker or an incorrect preposition, for example, "Tiger is chased on the bear" and "Tiger chase by bear" (for the event, *bear chase tiger*). Probably, they are patient-first passives with missing markers rather than noun reversals in active sentences.

Active Sentences

These have agent-patient order. They include sentences with a passive sentence marker which do not meet the criteria for *reversed passive,* for example, "Bear chase by tiger" (for the event, *bear chase tiger*). Most are simply active sentences.

Omissions and Unscorable

These include naming (e.g., "Bear. Tiger. Chase.") and confusions (e.g., "The girl by is bringing is carry the kettle"). Most are instances of no response.

The mean number of imitations by each training group, classified by sentence type, is shown in Table 7. For data analysis, correct and reversed passives were combined across subcategory to yield two categories (correct and reversed passives). A 2×3 (noun order $\times$ groups) mixed analysis of variance on correct and reversed passives revealed an interaction between the two factors, $F(2,24) = 5.62$, $p < .01$, based on the DI-patient group producing fewer correct passives relative to either the A- or SI-patient groups, $F(2,24) = 4.56$, $p < .05$. There were no differences between groups with respect to reversed passives, $F(2,24) < 1$. However, a separate analysis of variance on active sentences showed that the DI-patient group transformed passive to active sentences significantly more often than the A-patient group, $F(2,24) = 4.23$, $p < .05$. Inspection of responses by the SI-patient children separately for animate and inanimate agents revealed that their active sentences occurred mostly to animate agents. However, their passives usually had correct order regardless of agent type.

To summarize, the clearest differences in imitation are between the A- and DI-patient groups. Although the children were comparable, the DI-patient group found patient-agent order relatively more difficult to preserve.

Production

Responses to probes, categorized by sentence type as for imitation, are also shown in Table 7. The visual impression of differences in correct and reversed passives according to training condition was confirmed by a 2×3 (noun order $\times$ groups) mixed analysis of variance on correct and reversed passives. Although attempts to produce passives were comparable in the three groups, $F(2,24) < 1$, noun order in passives differed according to group, $F(2,24) = 5.98$, $p < .01$. Analysis of this interaction for simple main effects, followed by comparison of means by the Newman-Keuls procedure, revealed significant differences in the incidence of correct passives, $F(2,24) = 5.64$, $p < .01$. Correct passives were significantly more frequent in A-patient than in SI-patient children ($p < .01$) and in SI-patient than in DI-patient children ($p < .05$). Production patterns also differed within each

TABLE 7

MEAN NUMBER OF SENTENCE TYPES TO IMITATION (MAX = 20) AND PRODUCTION PROBES (MAX = 12) BY THE ANIMATE (A), DYNAMIC INANIMATE (DI), AND STATIC INANIMATE (SI) TRAINING GROUPS

	IMITATION			PROBES		
SENTENCE TYPE	A Patient	DI Patient	SI Patient	A Patient	DI Patient	SI Patient
Correct Passive:						
Full Passive	14.4	11.0	15.1	4.0	1.1	2.8
$Noun_1$ deleted ...	3.9	1.7	.2	.6	.1	.2
Truncated	.0	.1	.2	.4	.0	.0
Total	18.3	12.8	15.5	5.0	1.2	3.0
Reversed passive:						
Full passive	.9	2.6	2.1	1.8	3.8	3.2
$Noun_1$ deleted ...	.0	.1	.0	.3	.0	.1
Truncated	.0	.0	.0	.0	.0	.0
Total	.9	2.7	2.1	2.1	3.8	3.3
Reversed active	.2	1.0	.2	.0	.1	.1
Active	.2	1.6	1.3	2.9	5.4	5.0
Omissions or unscorable	.4	1.9	.9	2.0	1.5	.6

group. The A-patient group showed mainly correct passives, $F(1,24) = 7.14$, $p < .01$; the DI-patient group mainly reversed passives, $F(1,24) = 4.70$, $p < .05$; and the SI-patient group showed no asymmetry, $F(1,24) < 1$.

Separate analysis of active sentences revealed that the differences between groups in Table 7 were not reliable, $F(2,24) = 2.46$, $p > .05$. However, clear differences emerge when active and reversed passives are combined to estimate the strength of agent-patient order. The mean number of agent-patient sentences in each group was as follows: A patient, 5.0; DI patient, 9.2; and SI patient, 8.3.

Individual response patterns in each group were also studied. The number of children who showed the following four patterns is listed according to group:

1. more correct than reversed passives: A patient, eight; DI patient, one; SI patient, three;
2. more reversed than correct passives: A patient, one; DI patient, seven; SI patient, three;
3. no asymmetry: A patient, none; DI patient, one; SI patient, two;
4. no passives: A patient, none; DI patient, none; SI patient, one.

There were six 3-year-olds in the A- and in the DI-patient groups, but their response patterns did not differ from the three 4-year-olds in each of these groups. The five 3-year-olds in the SI-patient group produced a mean of 1.2 correct and 2.2 reversed passives, and the four 4-year-olds, a mean of 3.5 and 1.3 reversed passives. However, one child aged 4-4 contributed nine of the 14 correct passives from these 4-year-olds. Thus, training condition rather than age accounts for the different response patterns in each group.

Generalization

The mean number of correct passives, reversed passives, and active sentences to animate (A), dynamic inanimate (DI), and static inanimate (SI) patients is shown in Table 8. Correct and reversed passives were submitted to a $3 \times 2 \times 3$ (groups $\times$ noun order $\times$ animacy) mixed analysis of variance in which groups was the single between-subjects factor. This procedure revealed that patient type had no effect on noun order in passives, $F(2,48) < 1$. However, A and DI items elicited more passives than SI items, $F(2,24) = 11.99$, $p < .01$. Correct as well as reversed passives occurred as often for A as for DI patients. Conversely, in a separate analysis of variance, active sentences were found to be more frequent for SI than for A or DI patients, $F(2,48) = 8.83$, $p < .01$.

The analysis of variance on passive sentences also revealed a marginally

TABLE 8

Mean Correct Passive, Reversed Passive, and Active Sentences to Animate (A), Dynamic Inanimate (DI), and Static Inanimate (SI) Patient Generalization Stimuli in Experiment 2 (Max = 4)

Training Group	Sentence Type	Patient Type: Animate	Dynamic	Static	Sum
A Patient	Correct passive	.3	.4	.0	.7
	Reversed passive	.3	.4	.1	.8
	Active	2.9	2.6	3.6	8.1
DI Patient	Correct passive	.2	.1	.0	.3
	Reversed passive	.8	1.1	.0	1.9
	Active	2.7	2.4	3.4	8.5
SI Patient	Correct passive	.8	1.0	.4	2.2
	Reversed passive	.6	.3	.3	1.2
	Active	2.5	2.4	3.2	8.1
Mean	Correct passive	.4	.5	.1	1.0
	Reversed passive	.6	.6	.1	1.3
	Active	2.7	2.5	3.4	8.6

reliable interaction between noun order and groups, $F(2,24) = 3.10$, $p = .06$. Analysis of this interaction for simple main effects produced the following outcomes for each group:

1. The A-patient group showed no asymmetry, $F(1,24) < 1$, but this could be a floor effect, since they rarely produced any passives at all.
2. The DI-patient group produced significantly more reversed than correct passives, $F(1,24) = 4.81$, $p < .05$, thereby replicating their probe pattern.
3. The SI-patient group showed no asymmetry, $F(1,24) < 1$, also reproducing their probe pattern.

As in Experiment 1, the data were also studied for individual response patterns. Data for children who produced at least two passives (correct or reversed) to the generalization stimuli are shown in Table 9. Inspection of Table 9 shows that all five children in the DI-patient group (S1–S5) preferred agent-patient order in passives. It may, or may not be coincidental that the younger children were more prolific producers of reversed passives than the older children (who mostly used actives).

One child in the SI-patient group (S6) produced correct passives to all patient types (and no reversed passives). Perhaps S7 acquired a rule for passives based on inanimate patient, as his reversed passives were restricted to animate patients. In the SI-patient group, S8 does not show a clear pattern. Neither do the three children (S9–S11) in the A-patient group.

The data were also studied for evidence of verb-constrained generaliza-

TABLE 9

NUMBER OF CORRECT AND REVERSED PASSIVES TO ANIMATE (A), DYNAMIC INANIMATE (DI), AND STATIC INANIMATE (SI) PATIENTS (Max = 4) BY CHILDREN PRODUCING TWO OR MORE PASSIVES TO GENERALIZATION TESTS

		Correct Passive			Reversed Passive		
Training Group	Age	A	DI	SI	A	DI	SI
DI Patient:							
S_1	3-5	1	0	0	2	3	1
S_2	3-4	0	0	0	1	2	0
S_3	3-2	1	0	0	0	2	0
S_4	4-6	0	0	0	1	2	0
S_5	3-4	0	0	0	1	1	0
SI Patient:							
S_6	4-4	3	4	2	0	0	0
S_7	3-4	1	3	1	3	0	0
S_8	3-8	2	1	1	2	3	3
A Patient:							
S_9	3-8	1	2	0	0	1	1
S_{10}	3-7	1	1	0	1	2	0
S_{11}	4-5	1	0	0	1	0	0

tion of correct passives. The number of correct (and reversed) passives to each verb is shown for each group in Table 10. A superscript ([a]) indicates that the verb was used in training. Inspection of these data reveals that six of the seven correct passives from the A-patient group occurred to *chased*, an "old" verb. Even the child who produced a correct passive to *catch* used the verb *chased* instead. This verb also features disproportionately in reversed passives by the DI-patient group. Only the SI-patient group shows a scattering of correct and reversed passives across the various verbs. While the finding of what may be a special role for the verb *chased* is intriguing, there are not enough correct passives to perform statistical tests on the verb data.

Discussion

Although children in the DI- and A-patient groups were comparably well able to say "X is verbed by Y" when describing probe events, the DI-patient group mostly did so in agent-patient order. The A-patient group not only produced more patient-first passives than the DI-patient group, but also produced them significantly more often than reversed passives. Thus children in both groups preferred animates as sentence starting points, which resulted in patient-first passives for those in A-patient training and in agent-first passives for those in DI-patient training. These findings coincide

TABLE 10

NUMBER OF CORRECT PASSIVES (CP) AND REVERSED PASSIVES (RP) TO EACH VERB IN GENERALIZATION FOR ANIMATE, DYNAMIC INANIMATE, AND STATIC INANIMATE PATIENTS (Experiment 2)

	TRAINING GROUP					
	A Patient		DI Patient		SI Patient	
PATIENT TYPE	CP	RP	CP	RP	CP	RP
Animate:						
Chase	3[a]	0[a]	1[a]	5[a]	2	2
Carry	0[a]	2[a]	1	0	1	0
Wash	0	0	0	1	2[a]	1[a]
Lick	0	1	0	1	2	1
Dynamic inanimate:						
Chase	3[a]	1[a]	1[a]	5[a]	2	0
Push	0[a]	0[a]	0[a]	2[a]	2	1
Catch	1[b]	1	0	3	3	1
Ride	0	2	0	0	3	2
Static inanimate:						
Play (guitar)	0	1	0	0	1[a]	1[a]
Wash	0	0	0	0	2[a]	0
Paint	0	0	0	0	0	1
Read	0	0	0	0	1	1

[a] Verb encountered in training.
[b] "Chased" substituted for "catched."

with the expectation that animate entities would become utterance starting points in preference to inanimate ones, and would thereby result in correct or in reversed passives according to the semantic role of the animate.

The possibility that the A-patient group actually produced agent-first passives because they believed that the animate was the agent can be rejected for two reasons. First, the children were describing what they saw and not their beliefs. Second, if they thought that the animate was agent, then their active sentences should have had animate-inanimate (patient-agent) order. Their consistent use of agent-patient (inanimate-animate) order in actives demonstrates that they correctly assigned agent status to the inanimate.

The A-patient group was also able to preserve patient-agent order when repeating passive sentences better than the DI-patient group. However, sentences to the A-patient group had AI order and those to the DI-patient group had IA order. Thus the imitation data suggest that AI order is more memorable than IA order, not only in delayed recall (Dewart, 1979), but also for immediate recall. However, since the event and sentence co-occurred, the difference between the A- and DI-patient groups could also mean that referent animacy (the thing itself) affected how the children remembered the words of the sentence. Nevertheless, since most imitations by the DI-patient group retained patient-agent order (64%), these children could, in principle, have used that order in their passives to probes.

Some sentences to the SI group also had IA order (those with animate agents), but these were easier to imitate than IA sentences to the DI group. However, all SI sentences were nonreversible (e.g., *The chair is pushed by the bear*), so that agent and patient were always evident on the basis of the sentence alone. In contrast, most DI (and A-patient) sentences were reversible (e.g., *The truck is pushed by the bear*). Since the meaning of reversible sentences had to be obtained from the event, aspects of the extra-linguistic context, notably, referent animacy, may have affected imitations by the DI (and A-patient) group more than those by the SI-patient children.

Nonreversibility also seems to have affected probe responses, as three children in SI training tended to produce more correct than reversed passives. One even acquired a general rule very early in training (as judged by her probe and generalization responses) even though she treated passives as if they were actives in pretraining comprehension tests. Perhaps nonreversibility facilitates learning word-order relations because such sentences can be understood without contextual information. Consequently, a child who hears a nonreversible sentence may be better able to attend to word-order information in the model sentences than one who has to extract information about the "doer" versus "done-to" from the event and then match this information to word order in a stored representation of the sentence. But even if nonreversibility played a role, the fact still remains that the A-patient group produced significantly more correct passives to probes than the SI-patient group.

De Villiers (1980) also found more patient-first passives to probes among children trained with animate patients (and animate agents) than among those trained with static inanimate patients (and animate agents). She hypothesized that her findings demonstrate that animates are "prototypes" for subject noun, that is, that animates are better examples of the concept of subject than inanimates. De Villiers's prototype hypothesis represents an attempt to explain rule learning and the categories that underlie child language in terms of Rosch's (1973; Rosch & Lloyd, 1978) model of concept formation and representation. The essence of Rosch's model is that many natural and semantic concepts are organized in terms of central instances or prototypes of the category, and that exposure to such prototypical instances facilitates acquisition of the concept relative to exposure to more peripheral instances. For instance, an unsaturated red is a better example of red than a washed-out, pinkish one, and collies are better instances of dogs than chihuahuas. Since de Villiers found relatively more correct passives for animate than for inanimate patients, she concluded, after considering alternative explanations, that her data were best explained in terms of the hypothesis that animates are prototypes for subject nouns.

De Villiers has provided an enlightening account of the possible relation between concept formation and language learning. Nevertheless, her findings for word order in passives may express the contribution of agent as well as patient animacy. As noted earlier, her subjects produced few (correct) passives even to animate patients, a finding attributed to their learning passives under conditions that did not support patient-first order. In terms of Bates and MacWhinney's (1981, 1982) competition model, the agent did not meet competition from a nonagent topic and therefore tended to become the child's utterance starting point. Further, for children who saw animate agents affecting inanimates, the animate was an attentional focus and so supported agent-first order even more than for de Villiers's animate patient group.

The current findings can also be explained in terms of competition versus collaboration between topic and agent for the sentence initial position. Animacy (topicworthiness) can be regarded as a "topicality" vector that supports the agent-first ordering vector when animates affect inanimates and, conversely, competes with it (and can override it) when inanimates affect animates. In other terms, the presence of a topicality vector seems to support preverbal positioning of a noun, irrespective of its agentiality. Nevertheless, the fact remains that de Villiers's prototype model, which simply predicts more correct passives for animate than for inanimate patients, can accommodate the current probe data. The relative adequacy of the prototype model will be tested in Experiment 3 against (my reading of) Bates and MacWhinney's competition model. I will describe Experiment 3 after briefly touching on two aspects of the generalization data. The latter will be treated more exhaustively in the general discussion.

The first point to be noted is that the DI-patient group produced reversed passives only for animate and dynamic inanimate patients (and used actives for static inanimates). Thus the discriminative use of correct passives found in Experiment 1 seems to extend to reversed passives as well. However, while actives to static inanimates by children who use correct passives for animates (as in Experiment 1) could in principle reflect an effect of referent topicworthiness on sentence structure, it cannot explain the reversed passives pattern for the DI-patient group simply because the animate agent would be named first in reversed passives even for static inanimates.

Apparently, children in the DI-group learned "something" about sentences of the type *X is verbed by Y* that subsequently constrained their use of reversed passives. Perhaps they arrived at the belief that the form is used for dynamic inanimate patients (the training instances) and generalized it to animate patients via the verb *chased.* Alternatively, they could have generalized on the basis that animates and dynamic inanimates share the property of "dynamism," an explanation proposed earlier to account for extension of correct passives from animate to dynamic inanimate patients (Experiment 1).

The second point regarding the generalization data concerns the predominance of active sentences in the A-patient children, even though most of them behaved as if they "knew" passives in the training stage. Perhaps, at least some of these children acquired a rule for passives based on an irrelevant dimension, namely, inanimate agent. Although children aged 3–5 years still seem to regard vehicles as instances of agents, apparently their notion of a "normal" agent is an animate agent (Braine & Wells, 1978). However, our young subjects consistently encountered a relative unfamiliar type of sentence (*X is verbed by Y*) in an inanimate agent context. Accordingly, perhaps they concluded that it is used for inanimate agents, and so used active sentences for the animate agent generalization stimuli.

This interpretation is consistent with evidence that young children often use one-dimensional rules, that is, they typically choose only one dimension of the stimulus information that in principle is available to them (Anderson & Butzin, 1978; Anderson & Cuneo, 1978). Although word order was the most relevant dimension about passives from my perspective, agent animacy may have been more immediately relevant from the child's perspective, simply because "nonnormal" agents were salient for the child. This possibility was written into the design of Experiment 3.

C. EXPERIMENT 3: EFFECT OF ANIMATE AND INANIMATE AGENTS ON WORD ORDER

De Villiers (1980) holds that children who encounter the animate prototype for subject noun during passive sentence training will produce more correct passives than those who do not have the benefit of the prototype. In contrast, I have argued that correct passives to probes are facilitated when the referent that functions as the patient is more topicworthy than the referent in the role of agent. The results of Experiment 2 show that when animate patients are affected by inanimate agents, the more topicworthy referent (the animate) can move into sentence-initial position, carrying the role of patient with it. In other terms, an animate patient, when acted upon by an inanimate, can override the preschool child's more customary propensity to take agents as utterance starting points.

Animacy is neutralized when animate agents act upon animate patients, so that naming agents first should not be counteracted by a nonagent topic. In consequence, agent-first order should predominate (as reversed passives or actives). On this basis, we would expect to find more correct (patient-first) passives when animates are affected by inanimates than when animates are affected by animates. De Villiers, however, would have to predict no difference, simply because the presumed prototype for subject noun in passives (animate patient) is present in both instances.

The argument in favor of topicworthiness would be strengthened if the same group of children responded differently to animate and to inanimate agents. For this reason, a within-subjects design was used in Experiment 3 to investigate the effect of agent animacy on probe responses. We repeated A-patient training with a second group of children. Since animate patients will be used for both groups, we will call the one that encounters A (animate) and DI (dynamic inanimate) agents in training the A, DI–agent group. The A-patient group should produce more correct passives overall than the A, DI–agent group, as the latter should produce fewer correct passives to inanimate than to animate agents (if my assumptions are correct).

In discussing the generalization data for the A-patient group (Experiment 2), I suggested that some of the children who used actives for animate agents did so because they thought that passives are used for inanimate agents. I also supposed that they developed this idea through consistently encountering atypical (inanimate) agents in a passive sentence environment. Presumably, children whose training includes animate as well as inanimate agents will not assign importance to agent animacy, or will be less inclined to do so. They may then give more attention to word order in passives than children who always encounter animate agents. In that case, the A, DI–agent group may produce more correct passives to the generalization stimuli than the A-patient group. De Villiers's prototype hypothesis, however, would predict no difference in the incidence of correct passives to generalization, since both groups should learn about subject noun in passives to the same degree.

Method

Subjects

As the potential subject pool in the first two preschools had been exhausted, children for Experiment 3 were recruited from a third day care center located in a lower-income area. Most of these children had received less intensive language/cognitive stimulation than those who participated in Experiments 1 and 2. When tested for comprehension, some children in Experiment 3 occasionally reversed the meaning of the active sentences (almost none of the children in Experiments 1 and 2 ever did so).

Children were again selected for training on the basis of pretraining comprehension. Of the 24 children who began training, five refused or were unable to complete the procedure. Ten children, aged 3-3 to 5-0 (mean, 4-1) completed A, DI–agent training. Their mean pretest comprehension of passives was 47%. Nine children aged 2-11 to 5-0 (mean, 4-1) completed A-patient training. Their mean pretest comprehension was 46%.

Materials and Procedure

Training and probe items for the A-patient group were identical to Experiment 2. For the A, DI–agent group, the inanimate agent items were selected from items used in the A-patient condition. The remaining items had animate agents and animate patients, for example, *A horse chased a bear, A tiger pulled a horse.* Of the 20 imitation and 12 probe events, 50% had animate agents and 50% had inanimate agents. Animate and inanimate agent items were presented in predetermined random order.

One procedural change was instituted. After the child had responded to a probe, the experimenter provided the full passive sentence description regardless of whether the child had used an active or passive sentence or had not responded at all. Otherwise, the procedure was the same as in Experiment 2.

Results

Imitation

Responses were categorized in the same way as in Experiment 2. The mean number of responses in each sentence category is shown in Table 11. Since inspection of means for each group did not reveal any obvious differences in the two groups, the data were not analyzed further.

Production

The mean number of sentence types to probes produced by each group is also shown in Table 11. Data for correct and reversed passives were subjected to a 2 × 2 (noun order × groups) mixed analysis of variance. This procedure revealed that children in both groups said *X is verbed by Y* comparably often, $F(1,17) = 3.59, p > .05$. However, the interaction between noun order and groups, $F(1,17) = 11.46, p < .01$, indicated that noun order in passives differed in the two groups. Analysis of this interaction for simple main effects showed that the A-patient group produced significantly more correct passives than the A, DI–agent group, $F(1,17) = 17.25, p < .01$. As in Experiment 2, the A-patient group produced significantly more correct than reversed passives, $F(1,17) = 9.91, p < .01$. In contrast, the A, DI–agent group showed a trend toward more reversed than correct passives, but the difference was not reliable, $F(1,17) = 2.56, p > .05$. A separate analysis of

TABLE 11

MEAN NUMBER OF SENTENCE TYPES TO IMITATION (Max = 20) AND PRODUCTION PROBES (Max = 12) BY ANIMATE (A)-PATIENT AND ANIMATE, DYNAMIC INANIMATE (A, DI)–AGENT GROUPS

	IMITATION		PROBES	
SENTENCE TYPE	A Patient	A, DI Agent	A Patient	A, DI Agent
Correct passive:				
Full passive	14.7	14.0	4.9	1.7
Noun_1 deleted	1.9	1.2	1.0	.3
Truncated	.1	.0	.0	.0
Total	16.7	15.2	5.9	2.0
Reversed passive:				
Full passive	1.6	.5	2.9	3.4
Noun_1 deleted	.0	.1	.0	.1
Truncated	.0	.0	.0	.0
Total	1.6	.6	2.9	3.5
Reversed active	.7	1.4	.1	.4
Active	.4	.8	2.1	5.4
Omissions or Unscorable	.6	2.0	1.0	.7

variance on active sentences revealed more actives in the A, DI–agent group, but again, the difference was not reliable, $F(1,17) = 3.37, p > .05$.

Inspection of individual data showed more correct than reversed passives in seven A-patient and two A, DI–agent children. Five children in the A, DI–agent group showed the opposite (more reversed than correct passives). One child in A, DI–agent training and two in A-patient training showed no asymmetry. The rest produced only active sentences.

Passives by the A, DI–agent group were then tabulated separately for animate and for inanimate agents. This procedure revealed that whereas 27% of all passives to animate agents had patient-first order (and 73% had agent-first order), 45% of those to inanimate agents had patient-first order (and 55% had agent-first order). A 2 × 2 (agent × noun order) repeated-measures analysis of variance revealed a reliable interaction between the two factors, $F(1,9) = 10.57, p = .01$. Tests for simple main effects showed a reliable difference between correct and reversed passives to animate agents, $F(1,9) = 37.56, p < .01$, but not to inanimate agents, $F(1,9) < 1$.

The finding of comparable correct and reversed passives to inanimate agents could reflect the particular set of inanimate agent items that had been selected. However, 63% of passives by the A-patient group to the same items had patient-first order. This suggests that using agent-first order for animate agents made it harder for A, DI–agent children to use patient-first order for inanimate agents. But inanimate agents still led to more correct passives than animate agents, $F(1,9) = 9.47, p < .01$.

Generalization

The mean number of active, correct passive, and reversed passive sentence responses to animate, dynamic inanimate, and static inanimate patients is shown in Table 12. There were fewer active and more passive sentences than in Experiment 2. However, active sentences were again more frequent for static inanimate than for either animate or dynamic inanimate patients, $F(2,34) = 16.54, p < .01$.

Data for correct and reversed passives were subjected to a 2 × 3 × 2 (groups × patient × noun order) mixed analysis of variance. As this procedure resulted in a three-way interaction, $F(2,34) = 3.36, p < .05$, the data were reanalyzed separately for each group. The analysis for the A-patient group showed significantly more reversed than correct passives, $F(1,8) = 8.51, p < .05$, irrespective of patient type, $F(2,16) = 3.35, p > .05$. In contrast, that for the A, DI–agent group showed that the main effect of noun order was not reliable, $F(1,9) = 1.35, p > .05$. However, patient type affected noun order in passives, $F(2,18) = 3.47, p = .05$. Animate patients consistently elicited patient-first passives and inanimates elicited inconsistent order in passives.

In the overall analysis, static inanimates resulted in fewer passives than animates or dynamic inanimates, $F(2,34) = 14.43, p < .01$. Patient type also affected noun order in passives, $F(2,34) = 3.47, p < .05$. Tests for simple main effects, followed by use of Newman-Keuls, revealed, (1) more correct passives to animate than to either dynamic or static inanimate patients,

TABLE 12

MEAN CORRECT PASSIVE, REVERSED PASSIVE, AND ACTIVE SENTENCES TO ANIMATE, DYNAMIC INANIMATE, AND STATIC INANIMATE PATIENT GENERALIZATION ITEMS (Max = 4)

		PATIENT TYPE			
TRAINING GROUP	SENTENCE TYPE	Animate	Dynamic	Static	Sum
A Patient	Correct passive	.4	.1	.0	.5
	Reversed passive	1.7	1.8	.4	3.9
	Active	1.8	1.9	3.4	7.1
A, DI Agent	Correct passive	1.3	.7	.5	2.5
	Reversed passive	.1	.6	.2	.9
	Active	2.5	2.7	3.3	8.5
Means	Correct passive	.9	.4	.3	1.6
	Reversed passive	.8	1.2	.3	2.3
	Active	2.2	2.3	3.4	7.9

$F(2,34) = 4.64$, $p < .05$, (2) comparable correct passives to dynamic and static inanimates ($p > .05$), and (3) more reversed passives to dynamic inanimate than to animate or static inanimates, $F(2,34) = 5.03$, $p < .05$.

Analysis of individual response patterns clarifies and qualifies the overall data patterns. Correct and reversed passives to each patient type are shown in Table 13 for children who produced at least two passives (either correct or reversed). Two A, DI–agent children (S1 and S2) produced only correct passives, and did so for all types of patients. They behave as if they had acquired a general patient-first rule. Subjects 3 and 4, and perhaps S5, behave as if they used a patient-first rule for passives that is restricted to animate patients.

Children in the A-patient group predominantly showed reversed passives regardless of patient type. Their data is notable because the sporadic correct passive tends to be restricted to animate patients. However, this co-occurs with reversed passives to animates.

The data breakdown in terms of responses to individual verbs further clarifies the data. Inspection of Table 14 shows that four of the five correct passives by the A-patient group occurred to *chase* (an "old" verb), so reproducing findings for the corresponding group in Experiment 2. Their reversed passives to animate patients are scattered evenly across the four verbs. However, 12 of their 16 reversed passives to dynamic inanimate patients occurred to old verbs (substitution of *chase* for *catch* is counted as an instance of an old verb). As in the case of the DI-patient group (Experiment 2), the pattern could indicate an animacy-constrained "reversed passive" that is extended beyond the training instances (animate patient in this case) through the verb. However, the possibility that generalization was mediated through the shared dynamism of animate and dynamic inanimate referents cannot be excluded.

Inspection of the data for the A, DI–agent group reveals no effect of verb (old vs. new) for animate patients. Correct passives to inanimate patients were produced by the two children who had acquired a general rule (which is clearly not verb specified). There are too few reversed passives to permit any inferences.

Discussion

Animate-patient training again resulted in significantly more correct than reversed passives to probes, thus establishing the generality of the findings across different subject populations. Although children received only 20 imitation items, the (current) A-patient group used patient-first passives in 55% of their scorable responses to probes. So again, situations that should lead children to topicalize the patient can eventuate in their

TABLE 13

NUMBER OF CORRECT AND REVERSED PASSIVES TO ANIMATE (A), DYNAMIC INANIMATE (DI), AND STATIC INANIMATE (SI) PATIENTS (Max = 4) BY CHILDREN PRODUCING AT LEAST TWO PASSIVES IN GENERALIZATION

		Correct Passive			Reversed Passive		
Training Group	Age	A	DI	SI	A	DI	SI
A, DI-Agent:							
S_1	4-6	4	4	2	0	0	0
S_2	4-6	3	3	3	0	0	0
S_3	4-5	2	0	0	0	0	0
S_4	5-2	3	0	0	1	3	2
S_5	4-2	1	0	0	0	2	0
A-Patient:							
S_6	3-3	0	0	0	3	3	1
S_7	4-8	1	0	0	1	1	0
S_8	4-1	1	0	0	2	4	2
S_9	3-7	0	0	0	4	3	0
S_{10}	3-5	1	0	0	3	3	1
S_{11}	5-0	1	1	0	0	2	0

TABLE 14

NUMBER OF CORRECT PASSIVES (CP) AND REVERSED PASSIVES (RP) TO EACH VERB IN GENERALIZATION FOR ANIMATE, DYNAMIC INANIMATE, AND STATIC INANIMATE PATIENTS

		Training Group			
		A Patient		A, DI Agent	
Patient	Verb	CP	RP	CP	RP
Animate	Chase	3[a]	5[a]	5[a]	0[a]
	Carry	1[a]	3[a]	2[a]	0[a]
	Wash	0	3	4	0
	Lick	0	4	2	1
Dynamic inanimate ..	Chase	1[a]	5[a]	2[a]	2[a]
	Push	0[a]	5[a]	2[a]	2[a]
	Catch	0	5[b]	1	2
	Ride	0	1	2	0
Static inanimate ..	Play (guitar)	0	2	1	0
	Wash	0	1	2	1
	Paint	0	1	2	1
	Read	0	0	0	0

[a] Verb used in training.
[b] "Chased" substituted in two responses.

uttering sentences that coincide in surface form to that of full passives (or that closely approximate it).

The A-patient group produced more correct passives to probes than the A, DI–agent group, even though both groups encountered animates in the role of patient. Also, the A, DI–agent group produced more correct passives to animate than to inanimate agents. These findings clearly demonstrate that noun order in passives to probes cannot be controlled simply by the presence or absence of the animate patient prototype for subject noun in passives (as de Villiers hypothesizes). The findings instead fit the prediction that children will tend to take the agent as their sentence starting point when animacy is neutralized (both referents animate) and conversely, the entity in the role of patient when animates are affected by inanimates. This pattern was anticipated on the basis of the premise that differences in agent and patient animacy, and not patient animacy by itself, would function as a topic-selection vector.

The finding that the A, DI–agent group produced fewer patient-first passives to inanimate agents than the A-patient group suggests that the animate agent items increased the overall strength of the agent-first vector (or conversely, depressed that of the animacy vector), and thus suggests that the strength of a given vector depends on the situation. Even so, the fact remains that the A, DI–agent group used patient-first order more often for inanimate than for animate agents.

The agent-first vector was probably composed of at least two discrete components. First, since the agent moved first, it should have been the initial focus (i.e., a "topicality vector"). Second, agent-first order is well-established in preschoolers simply because they normally use that order in active sentences. Thus, our notion of an agent-first vector in the current context is of one that includes the contribution of an established linguistic rule. However, it does not follow that an agent-first vector in beginning speakers is anything more than a propensity to focus on the more salient entity in a given referential situation. Since agents are normally animates, and further, animates in action, and since patients are usually static inanimates, topicalizing the more salient referent in the situation could, as discussed earlier, lead beginning speakers toward agent-first sentences. Differences in referent salience may also be involved in the animacy effect in preschoolers. This possibility, and alternative interpretations of the animacy effect, will be discussed at a later point.

The generalization data for the A-patient group (i.e., mostly reversed passives) contrast with their probe data. However, these data also differ from those for the corresponding group in Experiment 2, who mostly used active sentences. Neither A-patient group seems to have learned very much about word order in passives, but they may have selected different (irrelevant) dimensions as the basis for their "rule" for passives. While the group in

Experiment 2 apparently chose inanimate agent, the one in Experiment 3 may have centered on patient animacy since they showed fewer reversed passives to static inanimate than to animate or dynamic inanimate patients. Perhaps they did not as yet regard animate agents as normal agents and so did not perceive inanimate agency as a noteworthy dimension. Like the DI-patient group (Experiment 2), the current A-patient group may have reached the notion that *X is verbed by Y* is used for animate patients (the training instances) and generalized to dynamic inanimates either because they had encountered two of the verbs in training, or because they regarded dynamic inanimates as similar to animates, or for both reasons.

Although it is notable that the sporadic use of correct passives by both A-patient groups was usually restricted to the verb *chase*, this finding does not permit the conclusion that children may acquire a verb-specified rule for word order in passives. In both *chase* pictures, the patient was the entity on the left-hand side, so correct passives to *chase* could derive from a bias toward processing pictures left to right (naming the entity to the left first in the sentence). But even if this interpretation is correct, it still suggests that some children "knew" at some level that word order in passives differs from actives simply because they never used reversed actives for the *chase* pictures. A processing bias that might lead children to topicalize one entity in preference to another entity in the absence of a word-order rule cannot override an established rule for a structure (i.e., for active sentences).

In contrast to the A-patient group, two children who had received A, DI–agent training produced correct passives (and no reversed passives) to all types of patients. Two other children behaved as if they had acquired an animacy-constrained rule, since they produced correct passives to animates and either actives or reversed passives to inanimates (the possibility that their correct passives were derived from a left-to-right processing bias was considered and rejected). One of these children apparently associated the passive verb marker [ed] with animate and dynamic inanimate patients, but not with static inanimate ones. He used correct passives with the [ed] marking for animates (e.g., *A monkey is chased by the tiger, The dog was carried by the cow, The horse was washed by the lion*), reversed passives with [ed] verb marking for dynamic inanimates (e.g., *The tiger was catched by the ball, The lion is pushed by the wheel*), and various verb endings in reversed passives to static inanimates (e.g., *The cat is playing by the guitar, A pig is reading by a book, A doggy is paint by a picture, A lion is washed by the window*).

One child, who behaved as if she had acquired a general rule for passives, apparently thought the experimenter wanted her to reverse agent and patient even in active sentences. For example, "The cat chase the monkey, or the monkey is chased by the cat," "The cow carry the dog, or the dog ride on the cow," "The cat is going to catch the ball, or the ball . . . is going to land on the cat," "The cat play the guitar, or the guitar is played by the cat," and so forth. She clearly had a word-order rule for passives, but it was overgeneralized.

Although we can provide conditions that lead children toward patient-first order, children control what they learn and how they learn it. We can predict how they will respond to probes as a group and, usually, how they will respond to them individually, but we cannot predict which dimension will be relevant to them. Nor can we assume, on the basis of the child's apparent control of word order for a form, that the child "knows" a linguistic rule that in any way approximates that of the mature speaker, even if it has the same manifest result. Pragmatic structure can give children the key to surface structure, but they use that key in individually different ways.

III. GENERAL DISCUSSION AND CONCLUSIONS

The major findings of the three experiments are easily summarized. Children who did not understand passives when training began could produce them *(a)* when perceptual salience of the patient was enhanced by coloring and *(b)* when inanimate agents affected animate patients. Conversely, children used agent-first sentences (actives or reversed passives) *(a)* when animate agents affected inanimates and *(b)* when animate agents affected animates (and perceptual salience was neutralized). I have argued that these findings demonstrate a role for pragmatic structure in the acquisition and use of grammatical structure. I will now summarize how they do so, considering the three experiments in turn.

The findings for generalization in Experiment 1 reveal that most children who participated in this study acquired a rule for word order in passives at some undefined point in training. Consequently, while there are grounds for arguing that the salient-patient items facilitated their learning a word-order rule for passives, we cannot conclude that their patient-first passives to probes preceded acquisition of that rule. However, if it is the case that their correct passives to probes were mediated by a rule, then the finding of more correct passives to salient- than to neutral-patient items implies that use of the rule was facilitated when it mapped onto a patient topic. Coloring the patient brought it to the sentence-initial position, i.e., to the subject-noun position of a form that can realize a patient topic.

The findings for the A(animate)-patient groups (Experiments 2 and 3) go beyond the conclusion that a "known" structure maps on pragmatic structure and suggest that pragmatic structure can itself result in sentences that appear to be rule governed even when they are not generated by a linguistic rule. Most children in A-patient training used patient-first passives to probes, yet none of them evidenced a rule for that order in their responses to the generalization stimuli. It could be argued that they were blocked from using a known patient-first rule for animate agents because inanimate agency was included as a dimension of that rule. But this argument presupposes that children can attend to the position of the name of the patient in passives and also to agent animacy and still extract both dimensions within the space of 20 model sentences. While the findings for Experiment 1 imply that patient animacy can be included in a patient-first rule, extracting such information requires attention to one referent only, and not to both. Also, since the A-patient children in Experiment 3 used reversed passives for animate agents (i.e., they did not include "inanimate agent" in their notion of passive), they could in principle have used correct passives for them, had they known how to do so.

Since there is no evidence supporting the supposition that any of the children who received A-patient training learned a rule for patient-first order, I conclude that they produced patient-first passives to probes by taking the animate referent as a sentence starting point, and not by using a patient-first rule. Taking the animate as a starting point carried the patient into subject-noun position without the benefit of a rule specifying its position in the sentence. A word-order rule simply takes this process one step further—the child recognizes that the entity named in subject-noun position is the patient and formalizes that knowledge at some level.

Although it is usually supposed that competence can be underestimated on the basis of performance measures, the findings for the A-patient group imply that linguistic competence can also be overestimated on the basis of performance. If pragmatic factors can have the same manifest effect on word order as a linguistic rule, then children's linguistic knowledge cannot always be read off from the surface structure of their utterances. The assumption that a child's language knowledge includes a rule for a form because the child speaks in a manner that conforms to that rule may not always be warranted.

By analogy, the findings for the three experiments strengthen the argument that standard SO (agent-patient) order in children's early phrases may not be rule governed. Agent could be brought into sentence-initial position in early phrases simply on the basis of topicalizing an animate that functions as agent in the given referential event. Evidence that deviations from English word order are statistically more frequent for VO than for SO could be evidence that children's first phrases show conventional or deviant order depending on their topic. They could also be evidence that agent topics facilitate early rules for word order and, conversely, that patient topics override them. Both possibilities are consistent with the findings and are simply alternative versions of the same principle—namely, that surface structure is the manifest realization of pragmatic structure. As such, the findings provide evidence for Shatz's fourth condition, that is, evidence that pragmatic structure may give children the key to surface structure.

It might still be debated that the A-patient children somehow used patient-agent order in their passives to probes because they heard that order. For example, they might have acquired a rote-learned rule for patient-first order that they forgot by the time they were tested for generalization. However, the outcomes for the DI (dynamic inanimate) patient group (Experiment 2) indicate that exposing children to models of patient-first order does not suffice to lead them to that order. The DI-patient group consistently used AI (agent-patient) order to probes and even tended to use that order in their imitations of IA (patient-agent) models. These children did not treat passives as equivalent to actives, since in generalization, they did not say "X is verbed by Y" to static inanimates. However, we could not guide them toward patient-first order. Like the A-patient group, they favored animates as sentence starting points, but this brought agents, and not patients into topic position, and so strengthened their customary use of agent-first order.

While the A, DI–agent group (Experiment 3) also used mainly reversed passives to animate agent probes, most children in this condition produced some correct passives to the inanimate agent probes. Apparently, the latter, by leading children toward patient-first order some of the time, permitted two children to learn about word order relations in passives and two other children to acquire what seems to be an animacy restricted word order rule.

To summarize, the outcomes of the three experiments clearly demonstrate that manipulating the extralinguistic context can control children's noun order and so control whether or not they can be brought to use the surface structure of a syntactic form. However, the conclusion that children "know" a grammatical rule simply because their sentences superficially conform to that rule may not always be justified. The child may not be using a linguistic rule and yet utter a sentence that adheres to it, simply because the rule realizes the pragmatic structure that led the child to use the form appropriately without that rule.

"GRAMMATICALIZATION" OF TOPICS

Some children behaved as if they learned a rule for word order relations in passives. Some of these children restricted the rule to animate patients. Others used it for animate and dynamic inanimate patients. A few also used it for static inanimates but never restricted correct passives to animates and static inanimates.

Perhaps the animacy effect actually reflects how the children conceptualized the more usual role of the referents used as patients during training. Preschoolers aged 3–5 years conceptualize animates as agents, dynamic inanimates as agents and also as patients, and static inanimates as patients (Braine & Wells, 1978). They seem to allocate agency to dynamic inanimates that they perceive as being capable of self-propelled movement. However, it is likely that there are individual differences in how children aged 3–5 years conceptualize dynamic inanimates (Lempert, 1985). Some children may not regard them as agents at all. Individual differences in the generalization data may actualy tap individual differences in children's concept of agent.

Although animates can function as patients, this is not their normal role (at least, from the child's perspective). Thus some children who were taught to say passives for animate patients may have assumed that the form is applied to patients that are "normal" agents and generalized it to DI patients according to whether or not the child regarded them as things that can also function as agents. Children who seem to have an animacy-constrained rule for word order in passives may actually have acquired a hierarchical semantic rule in which a referent conceptualized as agent with respect to one grammatical structure became patient in the context of another grammatical structure. If this interpretation is correct, it implies that semantic concepts can themselves become hierarchically organized into a superordinate semantic category, which on superficial scrutiny might be taken for an abstract grammatical subject-noun category.

Agent ("doer") and patient ("done-to") are concrete concepts in the sense that they have perceptible correlates and are defined by children in terms of overt action and the results of these actions (Braine & Wells, 1978). However, semantic concepts in young children generally seem to be superimposed on their concrete experience (Nelson, 1978). Until about age 5, children who are asked to give associates to nouns typically name what animates can do (e.g., *dog—run* or *bark; bird—fly*) and what is done to inanimates (e.g., *chair—sit on; table—eat,* Heidenheimer, 1978; Nelson, 1978). That is, animates tend to be treated as agents and inanimates as patients even in young children's noun associations. Agent and patient may simply be superordinate, experientially derived concepts that reflect the salience of action for young children (the child's own action as well as perception of action of other entities).

The assumption that young children's linguistic rules usually involve concepts that can be apprehended through concrete experience rather than linguistic abstractions does not conflict with the view that children may learn by rote certain aspects of surface structure as unanalyzed chunks that they later decompose into elements (Bowerman, 1982; MacWhinney, 1982). We are simply suggesting that when young children do analyze out an aspect of surface structure, they will usually give it a concrete rather than a strictly linguistic reading. The consistent use of the verb ending [ed] in the context of "X is verbed by Y" for animate and DI patients, but not for SI patients by one child in the A, DI–agent group (Experiment 3) illustrates this principle. The young child's "rule" for a form may represent an interaction among the aspect of its surface structure that is salient for the child, what is salient for the child in the extralinguistic context in which the form is encountered, and the child's existing level of semantic-conceptual development.

The current findings do not resolve the issue whether production rules are verb specified. The research was not designed to test whether children who receive animate patient training can generalize passives to static inanimates through the verb, simply because this possibility was not anticipated. (The verb analyses were performed after all three studies were completed.) Resolution of this possibility requires a design in which animate-patient training is followed by tests for generalization of the passive to A and SI patients, using the same set of old verbs (verbs encountered in training) and new verbs for both patient categories. We have embarked on a series of studies designed to investigate the rule-learning process, giving special attention to the possibility of verb-mediated generalization not only in production, but also in comprehension.

TOPICALIZATION PRIORITIES

Sentence starting points may reflect the resolution of "competition" and "collaboration" between agent and topic (Bates & MacWhinney, 1981, 1982). If so, the topic vector has to be conceptualized, not as a unitary construct, but as composed of discrete topic selection components such as "givenness" and "topicworthiness" that can support or compete with each other (and with agent) for sentence-initial position. For instance, when an animate patient is given on the basis of preceding discourse, perhaps its net strength would be increased to the point where it gains order precedence over an animate agent. Further, perhaps an inanimate agent, when given, would receive order precedence over an animate patient. But animacy appears to be a notably powerful vector, as judged by the general preference for animate-inanimate order. It can even overcome the agency vector, suggesting that the strength of the latter is at least partly derived from the animacy topicality vector with which it is often confounded. Is the preference for animate first order based on the greater salience of animates over inanimates or on differences in the accessibility of conceptual information about animates and inanimates? Or are animates better reference points for structuring the information to be verbalized?

Enduring or innate dispositions that involve the physical characteristics of stimuli such as movement and sound (Kahnemann, 1973) and collative dispositions such as novelty (Berlyn, 1960) may render salience to dynamic inanimates, but animates become able to elicit attentional response independent of their salient perceptual properties. There may be enduring or preconscious orientation of the perceptual system toward animates, based not only on their perceptual salience, but also on their interpersonal and affective salience. Thus, the animacy effect on noun order and the preference for

AI order in sentences could mean that people's sentence starting points tend to mirror what is central or focal in their attention.

The animacy effect could also reflect differences in the accessibility of conceptual information about animates and inanimates. Preconscious screening of perceptual input for what is worthy of conscious attention could lead children to develop a more differentiated and more integrated representational system for animates than for inanimates. Evidence that children understand more words for animals than for vehicles by age 2 and more names for vehicles than for food (Rescorla, 1981) is consistent with this possibility. However, long-term tuning to salient stimuli can prime (activate) the relevant underlying representational systems and result in automatic availability of some stimulus-relevant information. If an instance of that stimulus category is subjected to further processing (i.e., becomes the object of conscious attention), the activated concepts can feed back into facilitating the availability of more specific information about that instance (see Carr & Bacharach, 1976, for a discussion). If so, then conceptual information about animates is "primed" to some degree most of the time in members of the human species, so that information about animates might be accessed at shorter latency than for inanimates.

Bock (1982) argues that selection of the appropriate semantic category and of the words to express the speaker's meaning are attention consuming (consume processing resources). According to Bock, more readily accessed information is topicalized in sentences because this leaves residual processing resources free to extend ahead of utterance and execute speech planning for information that is currently being formulated. She holds that procedures intended to manipulate the focus object in a situation (such as those reviewed in the introduction to Experiment 1) affect sentence structure by placing the name of the focus object at the tip of the speaker's tongue. On the same principle, she suggests that given information occurs before new information because the former is more accessible.

Bock emphasizes the availability of a word to the speaker as a primary determinant of word order ("lexical accessibility"). However, while difficulty in retrieving names for concepts can play havoc with sentence structure (Bates, Hamby, & Zurif, 1983), the accessibility of a lexical item does not suffice to account for ordering preferences. To illustrate, the preference for AI order in agrammatic aphasics occurs when they arrange written words to describe pictures (Saffran et al., 1980) and therefore, when word retrieval per se is not an issue. Also, people tend to pronominalize givens, even though their names should be readily available to the speaker, since according to Bock's model, accessibility is increased by hearing the word or by uttering it. Nevertheless, word order could still involve the prior availability of conceptual information to the speaker.

A third possibility is that sentence starting points reflect the speaker's perspective. Animates may have priority over inanimates because speakers tend to take the perspective of an animate, presumably because they are more "speaker-like" (Bates & MacWhinney, 1982; Kuno, 1976; MacWhinney, 1977). The finding that children in Experiment 1 did not favor human-animal order is not consistent with this view simply because humans are more "speaker-like" than animals. However, since it is possible that young children project human attributes into animals, the finding does not disconfirm the model.

The three explanations for the animacy effect ("salience," "accessibility," and "perspective") are potentially testable. For example, the accessibility hypothesis can be regarded as one explanation why given information tends to occur earlier in sentences than new information. Thus, prior to passive sentence training with static inanimate patients, "givenness" could be rendered to one set of static inanimate things by showing the child pictures of these objects and then using them as acted-upons in the context of agent-patient picture probes for passives. The finding that these items elicit more patient-first sentences relative to control (new static inanimates) would give credence to the accessibility hypothesis. Conversely, the finding of no difference would pose problems for the view that prior activation of concepts can affect word order.

A choice between the salience and perspective hypotheses is also possible. For example, if the animacy effect reflects the speaker's tendency to adopt the perspective of an animate, then coloring SI patients to enhance their salience relative to animate agents should have no effect on passive sentence training relative to control (training with neutrally constructed pictures). While this outcome would not demonstrate the validity of the correlated "identification" or "empathy" hypothesis, it would still imply that the animacy effect cannot be reduced to a salience effect. The opposite finding, namely, an effect of coloring, would be consistent with my position that the topicalization hierarchy, of which the animacy effect is an instance, reflects what is central to the speaker.

The current findings coincide with other demonstrations of the greater impact of visual information over verbal information before age 5 (see Lempert & Kinsbourne, 1983, for a review). Young children behave as if they assimilated verbal information into the context of their visual impressions, according to what compels their attention in the immediate stimulus field. Learning word order is not merely a matter of matching incoming verbal information to its extralinguistic context. Rather, young children seem to profit more from sentence exemplars that topicalize their perceptual-conceptual focus than from those that topicalize what conflicts with their attentional priorities. Perhaps the former are easier for them to process (see Huttenlocher, Eisenberg, & Strauss, 1968; Huttenlocher & Strauss, 1968).

Topicalization priorities that affect speech output may also operate in sentence processing, so that, for example, sentences about animates may be better models than sentences about inanimates (i.e., easier to process or easier to retain in working memory while extracting linguistic relations). The same may apply to the use of verbal language as a communicative medium. If the same information-processing dispositions and cognitive constraints operate in sentence formulation and in sentence decoding (taking into account modality-constrained processing), then sentences normally would be framed in a manner that facilitates their parsing.

SUMMARY

I have argued that surface structure maps onto pragmatic topic-comment structure. This claim was tested by teaching children to say passives under conditions compatible with topicalizing the patient and, conversely, under conditions compatible with topicalizing the agent. The findings support the view that children learn the surface structure of sentences as a means of expressing their topics.

Current beliefs about how children learn language are mostly derived from samples of utterances children have produced spontaneously under uncontrolled or unspecified conditions. Consequently, models of language acquisition are largely descriptions of what children choose to say rather than models that generate testable predictions. Although the study of children's naturally occurring speech has an essential role in understanding language acquisition, no one would argue that our knowledge of memory development or of conceptual development can be advanced only by studying the exercise of these functions in the real world. The current studies demonstrate that the acquisition of syntax can be subjected to controlled study. They offer a paradigm that can usefully be extended beyond demonstrating that children's noun order can be controlled by appropriate contextual manipulations, to investigating the dimensions of context that children will choose to incorporate into their linguistic rules.

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ACKNOWLEDGMENTS

I am grateful to the directors and teachers of the following Toronto day care centers, whose interest, assistance, and enthusiasm made this work possible: the Learning Center, Ryerson Polytechnical Institute; Margaret Fletcher Day Care Center; and Edgewood Manor. I would like to thank Marcel Kinsbourne, Ann E. McCabe, and Marilyn M. Segal for their comments and interest and the anonymous reviewers whose instructive and thought-provoking comments have vastly improved the manuscript. Special thanks go to the children who participated in these studies and to Nina Littman for her invaluable assistance with data collection. Preparation of this manuscript was supported in part by the Social Sciences and Humanities Research Council of Canada, grant no. 410-83-0973.

COMMENTARY

TOPIC AND PERSPECTIVE AS COGNITIVE FUNCTIONS

COMMENTARY BY BRIAN MACWHINNEY

The study of language acquisition often seems to be singularly removed from the rest of the study of child development. Language acquisition people have their own set of theories and their own jargon. They often seem to pay more attention to the latest shift in linguistic theory than to current issues in closely related topics such as cognitive development and parent-child interaction. Because of this, reading the language development literature is often a nonrewarding experience for other developmentalists. The present *Monograph* certainly goes against this general rule. Here Lempert deals with issues of general interest. Why is this the case? Why is the study of concepts such as "topic" or "starting point" of such general interest?

I believe that there are two reasons why the study of starting points is so important, not just to developmentalists, but also to adult cognitive psychologists, linguists, philsophers, and sociologists. First, the selection of a topic can tell us something about the way in which the child and the adult structure their thoughts. Vygotsky (1962) saw this when he claimed that the grammar of inner speech was predicative. Vygotsky gives a simple example of predicative speech among several people who are waiting for a bus. When the bus appears, no one will say, "The bus for which we are waiting is coming." Rather, they may simply say, "Coming." This is a pure predication with the topic "bus" deleted. Vygotsky goes on to claim that, in inner speech, the topic is routinely deleted. It may be that we can never test Vygotsky's claims, but they must be taken as perceptive introspections. It is clear that something must guide the mind through the pathways of associations that we call thought. Topicality may provide a useful "starting point" for this search. Movement from one thought to another appears to be easiest when the focus of a previous thought is also the starting point for the development of the next thought. By using the topic in this way as a starting point for predication, we preserve coherence in thinking. Without such topical links, our thoughts would move not smoothly, like a searchlight, but sporadically, like flickers of light. But the choice of a starting point cannot be governed only by topicality. It is not only the links between ideas that call them to our attention. Some items may be temporarily or even intrinsically more interesting to us than other items. These items may actually draw our attention to them. Thus we should not think of the flow of attention as controlled by a single process. Rather, there are multiple processes going on in the mind, all clamoring for the limelight.

Second, topic selection is of general interest for the developmentalist because it allows us to study the basic thread that connects the speech of the parent with that of the child. Writers like Bates (1976), Greenfield (1978), Karmiloff-Smith (1981), Keenan and Schieffelin (1976), and others have seen this link and focused attention onto the child's development of a full adult control over this slender conversational link. It would be a mistake to attempt to separate these two approaches to the study of the acquisition of topic. The child's use of topicality in thought must surely be influenced by the way it is used in social interactions. At the same time, the development of the social skill of topic manipulations may be at least partly governed by cognitive limitations.

Linguists and philosophers have also been enchanted by the way in which topicality serves as the basic "glue" of discourse. Aristotle made use of topic-comment analysis in his grammar and rhetoric and the tradition of topic-comment analysis remains virtually unbroken in linguistics down to the current day. Unfortunately, the long history of this "topic" has also produced an immense amount of discrepant and inconsistent terminology and theory. Lempert has done an excellent job of cutting through this miasma to focus on the clearest analyses of modern linguistics. Following a variety of authors, she thinks of the subject in languages such as English as a "grammaticized" topic. Descriptively, this claim is accurate. It is certainly true that the notion of "subject" is central to virtually any theory of grammar. However, there is a real functional underpinning to the notion of subject. In fact, in English, the subject is always the "perspective." This is to say that, for each sentence in English, we must choose one nominal phrase from whose perspective we can interpret the sentence. We interpret a passive sentence, such as "The target wasn't hit by many arrows," from the viewpoint or perspective of the target. We see that the face of the target has one or two arrows lodged in it and no more. In the corresponding active sentence, "Many arrows did not hit the target," we see arrows littered around the base of the target. In the passive we take the subject "target" as the "starting point" for interpreting the sentence. In the active, our starting point is still the subject or perspective, but now it is the "many arrows." These asymmetries in interpretation were first noticed by Fillmore (1977).

Both he and I (MacWhinney, 1977) used them to argue that sentences must be understood from a particular perspective. I then went further to claim that in English, one can observe a complete association between the cognitive construct of perspective and the linguistic concept of "subject." At that time, it also became widely recognized that a variety of forces impinge on the speaker in his or her selection of a perspective for a predication. As Lempert notes, these factors include animacy, definiteness, humanness, etc. Both Kuno (1976) and I (MacWhinney, 1977) argued that all of these factors could be understood in terms of a single dimension of closeness to ego.

Now it seems to me that these analyses of the late 1970s are all essentially correct. However, they fail to address two crucial and knotty issues. The first issue is that of the chicken and the egg. Is it perspective or closeness to ego that determines topicality, or is it topicality that determines perspective? On the one hand, we seem to select and maintain topics that are maximally animate, human, definite, and so on. It looks as if we were using perspective as a criterion for topic selection and maintenance. On the other hand, Bock (1982) and others have shown quite convincingly that one of the major factors in the selection of the perspective is topicality. The viciousness of this dilemma becomes obvious only when one begins to think in terms of actual processing models for sentence production and comprehension. In such terms, it may be that the newer parallel processing models such as those of McClelland and Rumelhart (1981) will allow us to express the relation between topic and perspective in a more natural fashion. However, as it now stands, it seems to me that this relation must be considered to be an unsolved problem.

The second issue is the developmental problem. If we grant that both topic and perspective play an important role in adult sentence processing and the grammars of adult languages, we must still ask how children come to master these constructs. One might well want to argue that nature bestows these gifts on us as a part of our human birthright. Certainly, it seems to me that the most basic parts of topic and perspective must be fundamental to human thought. In order to compute topicality, one must be able to judge givenness, which means that one must be able to keep track of items in memory. At the same time, as Bates and MacWhinney (1982) and Greenfield (1978) have argued, the roots of the topic-comment distinction can be traced into the child's desire to lexicalize the information which is most salient. Both the ability to keep track of givenness and the desire to focus on newness or salience are processes that must be basic to our cognitive apparatus.

Similarly, the notion of perspective must have deep cognitive roots. As Guillaume (1927) argued so clearly many years ago, the notions of identification or Einfüllung are fundamental to the status of man as a social animal. These functions have particular importance in the parent-child relation, which is also the cradle from which language emerges. Thus, even the nonnativist would be inclined to accept the fact that both topic and perspective have an innate component. However, when one looks at the ways in which these constructs are elaborated in the sentential and discourse patterns of languages, it is clear that most of the final system must be learned. If we look for evidence about whether these systems exist in children, there is a fair amount of literature that one can cite. But if we ask how it is that children piece together these concepts, then we find virtually nothing in the literature to even give us a clue.

It is here that Lempert makes her main contribution. She asks whether the learning of a relation-changing rule (the passive) is facilitated when the child can identify the element being moved or changed as a topic. Of course, this is not the first attempt to get children to produce passives. But, unlike earlier attempts, Lempert makes the task easier on both the child and the investigator by teaching the child to use the passive in precisely the situations where it would normally be used. She does this by manipulating the perceptual salience, animacy, and dynamism of the nouns in the pictures. She finds that children are able to develop a correct mapping between the salience, animacy and dynamicity of the patient and the use of the passive construction. Before discussing Lempert's interpretation of this result, we should take a quick look at her analysis of the passive construction. Following Bates and MacWhinney (1982) she suggests that when the coalition in English between agency and topicality breaks down, the passive provides a means by which a piece of what we call the "surface real estate" can be assigned to each of the two functions. Although Bates and MacWhinney did emphasize the competition between agency and topicality, I believe that it would be more accurate to think of the coalition as one between three functions: agency, topicality, and perspective. Generally Lempert's reading of Bates and MacWhinney's position is accurate, but at this point there is an important difference. The difference is important here, because one needs to argue that in these studies Lempert has manipulated not topicality, but rather perspective. Thus the real competition here is between perspective and agency, rather than between topicality and agency (for a review of studies of the latter competition see MacWhinney, 1982, 1984). The English passive is best understood as a means of resolving the competition between perspective and agency. When the perspective is not the agent, the passive is used. It is also true that selection of a nonagent as perspective usually only occurs when that nonagent is either topical or contrastive. However, it is important to emphasize that the salience manipulation is not one that increases the topicality of the patient. Rather, it is a manipulation that strengthens the candidacy of the patient as perspective.

There are at least two possible explanations of the fact that preschoolers find patient salience, animacy, and dynamism of assistance in making use of the passive. The first explanation is that there is some preexisting (possibly innate) basis for the relation between the passive construction and the three perspective dimensions. This appears to be the explanation offered by Lempert. I would agree with the claim that the child has a preexisting interest in finding a mapping of salience and perspective onto the surface structure. When presented with a device that appears to express this relation, I believe that the child seizes on this structure as a way of expressing a previously unexpressed function. However, I do not understand how this particular explanation can work for these experiments. For example, in Experiment 1, passives were modeled for both salient and nonsalient patients. In that experiment, how could the child have discovered the mapping just on the basis of the data of the experiment? Of course one could argue that the connection between the passive and patient salience is prewired, but I doubt that Lempert is actually claiming that.

The second explanation is the one that I favor. It is that before they come to the experiments, children have already had a fairly wide exposure to the passive. Although they have not yet made use of the full passive in their own speech, they have stored a possibly large number of examples of the use of the passive in a lexical memory. In these stored exemplars, it is generally the case that the subject of the verb is perspectival. Thus, they have begun, albeit weakly, to detect the relation between the passive and the competition between perspective and agency. It seems to me that the rarity of the passive in both the child's speech and the speech directed toward the child may lead us to believe that the structure is fully unknown when, in fact, it is simply very uncommon. In support of this claim, I can report data from my own children. My son Ross used his first full passive at the age of 2-9. As a 3-year-old he produced perhaps a dozen full passives. He is now 6 years old and the frequency of the construction in normal conversation has remained constant at this low level. My younger boy, Mark, produced his first passive at 3-6. He is now almost 5 and full passives continue to be very rare—I have recorded only four in my notes. Lempert downplays the possibility that her subjects may already have a certain understanding of the passive that forms the main basis for their successful performance in her study. She tested for comprehension of passives, but the materials she used for this test were reversible sentences and her own results indicate that these are the very constructions that should be hardest for children. Moreover, full reversible passives must be very rare in the input to the child.

This second explanation in no way vitiates Lempert's findings. In fact, it seems to me that this explanation strengthens Lempert's position. It does this by allowing us to understand Lempert's studies as convenient laboratory measurements of normal language abilities, much as Ervin (1964) and I (MacWhinney, 1978) have shown Berko's nonce-probe task to be a convenient way of encapsulating the same results that one would obtain from naturalistic studies of the acquisition of morphology. Related studies by Brown (1976), Dewart (1979), and Harris (1975) could be viewed in the same light. I would go so far as to state that training studies such as these by Lempert are the best way we currently have of evaluating the development of grammatical categories. Only in such studies can we capture the complex natural confoundings and coalitions between functions. Only here can we set forces into competition and allow the child to show by his learning patterns which structures conform to his internalized grammar. A further logical extension of this reasoning suggests that we may some day wish to rethink our attempts to teach artificial miniature linguistic systems to children. If we can construct non-English patterns that are nonetheless real and languagelike, we may be able to derive an even tighter understanding of the ways in which children learn language.

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