FRAME SEMANTICS AND THE NATURE OF LANGUAGE*

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The decision to schedule sessions on "formulating the target" for the first day of this conference, based undoubtedly on the simple wisdom that knowing what a thing is like is a prerequisite to asking how it got that way, was probably also made in the hope that the target-formulating contributions might actually lead to some sort of consensus on the nature of language. Scholars inquiring into the origin of language will surely want to agree on at least some of the details of the last scene of the evolutionary scenario they are trying to construct. Unfortunately, the problem of describing this last scene is a notoriously difficult one: making clear the true nature of language is no trivial assignment, as I think everybody here is well aware.

As a contribution to at least a part of the understanding we need, I will present for your consideration a way of talking about one aspect of the process of communicating in a human language, something I will refer to as "framing." I choose this, not because I find it intrinsically more important than the formal structures of messages or meanings, or more important than the many global properties by which, from a more purely comparative perspective, human languages can be shown to differ from other communicating systems; I choose framing because I think it is important and because I suspect that it might not get mentioned, or that it might not be sufficiently highlighted, in the other papers to be read at this conference.

I mean by framing the appeal, in perceiving, thinking, and communicating, to structured ways of interpreting experiences. It is an alternative to the view that concepts or categories are formed through the process of matching sets of perceptual features with, say, words. I plan in this paper to justify the frames notion, to give a number of examples, mostly from English, of different kinds of frame structures, to suggest informally and intuitively how the frame concept can figure in the explanation of the communication and comprehension processes, and in the end to offer some hedged speculations on how the study of frames might appear in research on evolution toward language and on the evolution of language.

Thinkers who lacked a true evolutionary perspective could find questions like "What is the origin of language?" intelligible in a way that we cannot. We can envy the simplicity and admire the reasonableness of Samuel Johnson's speculations on the question.[1] Dr. Johnson argued as follows. If language was invented, it was invented either by children or adults; it could not have been invented by children, because children do not know enough to invent a language; it could not have been invented by adults, because adults are not pliable enough to learn a language; therefore the appearance of language in the history of mankind has to be due to divine inspiration.

When the question of the origin of language is considered from an evolutionary perspective, it loses much of its clarity and simplicity. Should we be looking for the *first step* in the chain of events that led to what we now see as human language? The first step away from what? Or should we be trying to determine the *last step*, the step by which the final criterial property of language was acquired? What might that have been? Or is it perhaps some kind of a *key step* in this development that we need, that step by which was overcome the last serious barrier to the natural and inevitable sequence of changes that ended in the kind of language we have today? Or, are these the right alternatives? Since there is no evidence whatever on the nature of any of the intermediate stages along the great distance separating present-day language and even the most elaborated of the call systems, and since communication systems appear to have had different histories in different branches of the evolutionary tree, none of these questions may turn out to be useful. Ultimately, I believe, we can be satisfied with nothing short of the whole story, and for that we may need to reconstruct a long and complex chain of events.

Linguistic scholars, who have seldom felt called on to make anything more than slight lip-service acknowledgments of the problem of the origin of language, have generally not troubled themselves very much about these uncertainties. For example, one common suggestion found in the standard treatises and textbooks is that speech ultimately goes back to the involuntary cries of animals; to Sir Alan Gardiner the prototype was the squeal of a trapped rabbit.[2] A part of this story, as in Sapir's version,[3] is that the expressive vocalization, initially inseparable from the experience that caused it, came by some leap of imagination to be used as a name for the experience. This story gives the origin of language an account somewhat similar to the way ritualized movements among some animals are traced back to more directly functional movements appearing in acts of combat or surrender.

At least since the time of Gabelentz (1891)[4] there has been, in treatises on language, a standard list of factors in the development of man that were hospitable to the birth of language: the upright gait, the enlarged brain, the infant's long helplessness, and all the rest. Building pieces of a language-origin scenario around one or another of these has been a favorite and inexpensive pastime of grammarians and philologists for a long time. One such account, using the enlarged brain as the explanatory principle, is given by C. D. Buck.[5] Buck tells us that while many animals, including primitive man, had cries that expressed emotion, primitive man, because his brain was larger than that of any of his competitors, was alone able to gain "an awareness of a connection between the sound and something expressed by it." This account seems to require two magic wands, one for explaining why the size of the brain is relevant to the ability to perceive relationships, and the other for explaining how "an awareness of a connection" makes it possible to go further.

One of the most imaginative of the language-origin stories is found in Otto Jespersen's 1921 book on the nature, origin, and development of language.[6] Jespersen may have been the first to use actual linguistic data in guiding his speculations. He compared what he called "savage" languages with civilized languages, imputing to the primordial language features that predominate in "savage" languages; and he took a number of well-documented principles of language change and applied them backwards. Irregular forms tend in time to get regularized; the primitive language therefore lacked regular or recurring patterns of word formation. Long words tend in time to get shortened, and complex phonetic systems tend to get simplified; the primitive language abounded in very long words pronounced with an exuberant variety of difficult sounds. "Savage" languages tend to have tones; the long and phonetically intricate words in the primitive language were sung, not spoken. Many words for abstract or general concepts in modern languages originally had concrete

or specific meanings; words in the primitive language were names of highly specific objects.

The Jespersen scenario begins with people devising individual courtship and battle songs, using in them as wide a variety of sounds as their vocal equipment and their inventiveness would allow them. To the members of a familiarity group, each of these personal songs came to be associated with its singer, as a kind of Wagnerian *leitmotiv*. Within the group, one person could refer to another by imitating his song. The song, thus, became a proper name—and what, Jespersen asks, could be more concrete and specific than a proper name? Once this naming relationship got established within a group, it became possible for people to use a proper name to refer to some trait of the owner of that name, or to remind the group of some event in that individual's history. On this base, then, the processes of analogy and simplification did their work.

Just one of the reasons why all of these stories are unsatisfying is that they end too soon. The last scene has got to be more than a state in which people name things and evoke memories.

Suggestions about the origin of language are frequently embedded in discussions of the essential or criterial features of language. And in the way that many language-origin stories have concentrated on single critical events, many inquiries into language essentials are concerned with the discovery of some single trait or cluster of traits that separates human language from everything else. The attempt to give a "key feature" definition of language has had some of the same kind of history that we see in the definition of man, namely one in which the official definition undergoes changes, not because of new knowledge about the thing being defined, but through the discovery of new facts about the rest of the world. Changes in the definition of man have been forced, not by anybody's having found out anything new about the nature of man, but by observations about sea otters and chimpanzees; in the same way, many proposals on the nature of language have had to be rejected because of discoveries about rhesus monkeys, computing machines, or the language of deaf-mutes.

I think there is much to be gained by separating the effort to characterize language from the effort to determine what is uniquely human in language. The question, "What can folks do that beasts can't?" need not be regarded as a necessary part of the inquiry into the nature of human language. There are certain general dangers in the comparative approach to characterizing language. The comparative approach sometimes invites scholars to take positions on badly understood issues that in any case have no relevance to their main work. The Gardners report their annoyance at the question, "At what point would you be ready to announce that Washoe has a language?".[1] They wisely rejected this question, because no matter what stand they had taken, fruitless polemic and endless misunderstandings would have been the result. Linguists trying to formulate their view on the nature of language would be wise to avoid such a trap.

Linguists, especially those working within the generativist tradition, take as their main goal that of characterizing the set of abilities that together make up an individual's knowledge of his language. In order to separate purely linguistic from other sorts of knowledge, certain abstractions and idealizations are thought to be necessary: the linguist's observations are first of all abstracted away from the contexts in which they occur; that is, they are isolated from the larger behaviors which they interpenetrate; and second, the observations undergo certain "editing" functions to eliminate mistakes and "noise" caused by factors in the speaker and in the environment that are not related to the speaker's purely linguistic competences. Once these adjustments are made, the linguist strives to capture the *regularities* detected in his data by formulating *rules* imputable to his subjects.

The part of linguistic knowledge that can be represented by rules makes up the *grammar* of the speaker's language; the part that cannot be so represented—that is, the part that represents item-by-item knowledge—makes up the *lexicon*. In one part, at least, a language system can be described by stating the rules of its grammar and by listing and describing the items in its lexicon.

In this view, what is common across languages, in the form and substance of the rules, in the contents and organization of the lexicon, in the dependencies and redundancies in the system, is taken as representing the nature of language in general, that is, as indicating the universal properties of human language. The parts of this universal structure that cannot be accounted for by appeal to common experiences or uniformities in the environment are imputed to innate structures in the human mind, that is, to capacities innate to the species.

I have no quarrel with this program as far as it goes; but I feel sure that for many purposes we need to add to this approach an awareness of the importance of the social functions of language, a concern with the nature of the speech production and comprehension processes, and an interest in the relationships between what a speaker says and the context in which he says it.

My effort is to look for what can be known about the workings of language through a consideration of the processes of communication. A proposal that I favor is that in characterizing a language system we must add to the description of grammar and lexicon a description of the cognitive and interactional "frames" in terms of which the language-user interprets his environment, formulates his own messages, understands the messages of others, and accumulates or creates an internal model of his world. The evolution *toward* language must have consisted in part in the gradual acquisition of a repertory of frames and of mental processes for operating with them, and eventually the capacity to create new frames and to transmit them. In considering the evolution *of* language, we may find that degrees of general language complexity among the attested languages can be described partly in terms of the relative extent of elaboration of the system of frames and of the ways in which these are codified in the vocabulary and in the grammatical categories of the language.

There are several notions that make up the background to what I have in mind, and these are: the concept of context, the concept of prototype or paradigm case, the notion "frame" or "schema" as it is used in recent work in psychology and artificial intelligence, and the notion that sometimes goes by the name of "semantic memory."

In discussions of meaning, the notion of context appears in several different contexts. We can speak of the context of an utterance (or utterance fragment) and intend by that either the real-world situation in which the utterance is produced or the other utterances that surround it in a discourse. We can also speak of the context of the experience or percept that makes up the base of our understanding of a word. The linguist has good reasons for regarding the description of context, in any of these senses, as an added complexity in his job of describing a language; but unfortunately, it has been easy for linguists to think of knowledge of context as an added complexity for the language-user as well.

It is easy to believe that the following description predicts the scale of complexity for the language-user. At one level a speaker is able to pronounce, say, the utterance,

"Good morning, sir." At another level he knows that by saying "Good morning, sir" he can succeed in greeting his addressee. That is an additional piece of knowledge, beyond merely knowing how to pronounce the sentence. At a third level he can also know that the greeting is appropriate only during a certain part of the day; that the person greeted with this utterance should be a male adult to whom the speaker owes, or wishes to suggest that he owes, a certain level of deference; and that such a greeting is appropriately addressed to the same person at most once per morning. This "pragmatic" knowledge represents a third degree of complexity. We have, at one level, the ability to produce an utterance; at another level, an awareness of the particular function that can be served by a performance of this utterance; and at a third level, the knowledge of the appropriate and meaningful contexts in which this purpose can be achieved with this utterance.

The important question to ask, of course, is whether complexity for the analyst reflects complexity for the participant. The argument that it in general does not comes from work on behavior and perception. Goldstein and Scheerer have argued from their work with aphasic patients that behaviors separated from meaningful contexts are a greater cognitive challenge than the same behaviors in context;[8] and Rudolf Arnheim reports that art students studying the techniques of realistic painting need to learn to decontextualize the objects of their perception in order to become aware of the "real" nature of their color perceptions, in order to eliminate color constancy effects.[9] In these examples, acts and judgments that require abstraction from context are cognitively more complex than the kinds of acts and judgments that occur naturally in context.

These facts about context and perception are relevant to the theory of language in two ways. First, the meanings of words may, more than we are used to thinking, depend on contexted experiences; that is, the contexts within which we have experienced the objects, properties or feelings that provide the perceptual or experiential base of our knowledge of the meaning of a word (or phrase, or grammatical category) may be inseparable parts of those experiences. Second, the process of interpreting an utterance may depend, more than we are used to thinking, on our perception of the context in which the utterance is produced and our memories of the contexts for earlier experiences with the utterance or its constituent parts.

A second notion needed for the concept of framing is that of the prototype or paradigm case. The notion figures importantly in the Philosophical Investigations of Ludwig Wittgenstein,[10] is adumbrated in the writings of the German semantic theorist Karl Erdmann,[11] and plays a role in recent work in psychology on category formation, especially that of Eleanor Rosch.[12] The idea is that in order to perceive something or to attain a concept, what is at least sometimes necessary is to have in memory a repertory of prototypes, the act of perception or conception being that of recognizing in what ways an object can be seen as an instance of one or another of these prototypes. This "situating" process depends not only on the existence of individual prototypes, but also on the character of the whole available repertory of prototypes. A child's seeing a squirrel as a "funny looking kitty" (taken from Woodworth's discussion of "reification"[13]) is one example of this kind of perception; the description of a 170° angle as a "bent stick" is another (that example from Arnheim[9]).

The appeal to prototypes is to be distinguished from the idea of perception according to which the perceiver consults a checklist of criterial properties. In the extent to which knowledge of word meanings involves knowledge of prototypes, a typical device in linguistics for representing meaning, namely, in terms of clusters of

semantic features, however well it may serve the purposes of linguistic theory, may not be usable in describing the language-comprehension process.

A particularly important notion, figuring especially in recent work in linguistics, cognitive psychology, and artificial intelligence, is the notion that goes by such names as "frame," "schema," and "scenario." Briefly, the idea is that people have in memory an inventory of schemata for structuring, classifying, and interpreting experiences, and that they have various ways of accessing these schemata and various procedures for performing operations on them. Some of the schemata may be physiologically built in (such as various aspects of the body schema, the identity of the focal hues in the color spectrum, and perhaps what the gestalt psychologists call "good figures"—see Rosch[12]), others may owe their existence to perceived constant cause-effect relationships in the world, while still others may depend for their existence on symbolization.

The concept of frame does not depend on language, but as applied to language processing the notion figures in the following way. Particular words or speech formulas, or particular grammatical choices, are associated in memory with particular frames, in such a way that exposure to the linguistic form in an appropriate context activates in the perceiver's mind the particular frame—activation of the frame, by turn, enhancing access to the other linguistic material that is associated with the same frame.

A language has both interactional frames and cognitive or conceptual frames. The most explicit proposal for including interactional frames in a description of a language is found in Dell Hymes's paper on the ethnography of speaking.[14] The interactional frames amount to a categorization of the distinguishable contexts of interaction in which speakers of a language can expect to find themselves, together with information about the appropriate linguistic choices relevant to these interactions. One simple example is the greeting frame. In some languages a greeting frame specifies that the socially superior initiate the greeting, in some it is the socially inferior, while in others the initiator role is unassigned or is based on other considerations; in all languages the form of a greeting is determined from a restricted inventory of topics and expressions, many of these dependent on highly specific contextual conditions. A part of knowing a language is knowing or recognizing a large number of such frames, and knowing what linguistic choices are relevant for each of them.

Here is an example of a cognitive frame. There is in English, and presumably in every language spoken by a people with a money economy, a semantic domain connected with what we might call the commercial event. The frame for such an event has the form of a scenario containing roles that we can identify as the buyer, the seller, the goods, and the money; containing subevents within which the buyer surrenders the money and takes the goods and the seller surrenders the goods and takes the money; and having certain institutional understandings associated with the ownership changes that take place between the beginning and the end of each such event. Any one of the many words in our language that relate to this frame is capable of accessing the entire frame. Thus, the whole commercial event scenario is available or "activated" in the mind of anybody who comes across and understands any of the words "buy," "sell," "pay," "cost," "spend," "charge," etc., even though each of these highlights or foregrounds only one small section of the frame. Each of these words, so to speak, brings along with it simultaneously a ground and a figure, simultaneously a setting and the piece of that setting to which the word is pointing.

As a second and quite different kind of example of cognitive frames, we can consider (borrowing from Coseriu[15]) the Greek nouns *brotos* and *anthropos*. They

both designate man. But the first presents man as one term of a contrast set in which the other is god; the second presents man as one term in a contrast set in which the other is animal. *Brotos* designates man as non-god, *anthropos* designates man as non-beast. Each word simultaneously identifies the creature and the larger framework or context within which the creature is being spoken of.

Another important notion in writings on language understanding is that of a speaker/hearer's ongoing model of the world, this conceived of as some kind of network of interlinked relationships representing bits of knowledge and the ways in which these bits of knowledge are integrated into a more or less coherent model or image of the world. Associated with this concept is the view that in an act of communication, one person affects the content of another person's world model. The term "semantic memory" is used by Quillian for what I have in mind;[16] the word "image" has a meaning something like this in the work of Kenneth Boulding.[17]

This model or image is thought of as including a record of the individual's beliefs about the world, a filtered and partly interpreted record of his past experiences, a current register of information about his position in space, time, and society, together with his version of the world-models of the other relevant people in his environment.

The process of communication can be seen as involving one person saying something that will induce another person to change his model of the world. In Boulding's words, "The meaning of a message is the change which it produces in the images."[17] This process involves appeal to contexts, because current, imagined and remembered contexts make up part of the model; it involves frames, because frames, in the sense I have in mind, provide the building blocks for constructing the pieces of the model; and it involves prototypes, because many of our framing abilities require a knowledge of prototypes.

The proposal I am representing is made up of the concepts I have just reviewed. I will state the proposal in an extreme form, for the enhanced clarity that I hope will attend such a formulation; the necessary hedges and qualifications are to be filled in by the cooperative listener.

Every memorable experience occurs in a meaningful context and is memorable precisely because the experiencer has some cognitive schema or frame for interpreting it. This frame identifies the experience as a type and gives structure and coherence—in short, meaning—to the points and relationships, the objects and events, within the experience.

Individual words are learned within such meaningful contexts, and each word serves to foreground some part of the context. For example, it is probably true that American children first learn the nouns "orange" and "grapefruit" through the experience of eating them in the ways we typically eat them: the one by peeling it and breaking it into its natural segments, the other by cutting it in half and eating it with a spoon. A student in my department reports that a group of seven-year-old children were not willing to accept as anything but an orange a grapefruit she was eating the way one eats an orange. It may be that the first frames these children acquired for these fruits were scenarios that included specific ways of eating them, and that only later are these to be replaced by a naming frame based on context-free perceptual properties.

We sometimes find that a single word has concurrently more than one frame, even though the same history of experiences was responsible for both frames. This appears to be true of the English noun "breakfast." This word identifies the first meal in the day, presupposing a community in which more than one meal is eaten per day and in

which one of those is eaten shortly after the end of one's nightly sleep. In the first instance the word is associated with a complex frame made up of the frame for the divisions of the day and a frame for an eating pattern of the kind familiar to us, placing in the foreground the first meal of the day. It is by having this complex frame, with the time of day as an essential element, that a speaker of English can understand a sentence like, "The Wongs always have chicken soup for breakfast." The same word is also associated, however, with a particular familiar combination of foods typically eaten as breakfast, in America this being most typically fried eggs and toast with fairly restricted possibilities for substitution, omission, and extension. It is this frame for the word which makes it possible for a speaker of English to understand a cafe sign that reads, "Breakfast served any time." In short, a meal can satisfy the breakfast prototype in either of two ways and still deserve the name.

In general, a word can be linked to its meaning in any of three ways, and we can refer to these as *functional*, *criterial*, and *associational*. Identifying "breakfast" with one in a structured pattern of meals is functional; identifying it with a particular collection of foods is associational. Katherine Nelson discusses the child's acquisition of the meaning of the word "ball," which begins with a functional concept, that of a particular set of things played with in particular settings and with particular people, and ends with the criterial concept, having to do with sphericity and bounceability.[18] Wittgenstein discusses the word "disease" and points out that diseases are sometimes identified functionally, by their symptoms, and sometimes criterially, by their causes.[19] We can say either that a certain disease has symptoms shared by other diseases, thus separating the notion from a particular syndrome, or we can say that a certain disease has no known cause, thus separating the concept of disease from a disease's causes.

Given the assumption about framing and word meaning that I have been suggesting, we can say that the process of understanding a word requires us to call on our memories of experiences—selected, filtered, and generalized—through which we have learned the words in their labeling or describing functions. It follows, of course, that the kinds of understandings I have been talking about can be communicated only between people who share the requisite frames. People who eat only one meal a day will not need the word meaning what "breakfast" means; people who believe that all diseases are caused by evil spirits will not have separate frames for diseases according to symptoms and causes. Similarly, in a society which lacks the institution of marriage and which uniformly practices free love, there can be no word for cuckold, or wittol either.

Lexical framing contributes in important ways to the comprehension of sentences and larger utterances. The following examples will show something of how that works. Imagine that two men spend a short period of time in San Francisco, the two doing more or less similar things during their visit. Then suppose that after the experience one of them writes home, "I spent two hours on land this afternoon," and the other writes home, "I spent two hours on the ground this afternoon." The process of understanding the sentence with "on land" requires having a frame for sea voyages and knowing that people engaged in sea voyages spend part of their time "on land" and part of their time "at sea," and knowing that these phrases identify the two states given in the frame. To understand the sentence with "on the ground" is to know about air travel, and to know that the two alternating states in an extended period of air travel are called being "on the ground" and "in the air." In understanding these sentences, we have not merely activated these two-state frames, but we have also made use of the fact that the sentences begin with "I" (first person) and "spent" (past tense) and contain the time-deictic expression "this afternoon." Since the person is speaking of himself within a two-state temporal frame, and since he refers to his

being in one of the two states in the past, we conclude that at the time of writing he is in the other state. The one man wrote his letter while at sea, the other wrote his in the air. One of the most characteristic features of intelligent activity is knowing more than you are told (on this point see Lindsay[20]); one of the ways in which people accomplish this in speech understanding is by using knowledge of lexical and grammatical frames.

Many objects, persons, and experiences in the world are framed in terms of their potential role in supporting, harming, or enhancing people's lives or interests. We can know that this is so if we know how to interpret expressions in which such things are evaluated—expressions containing, for example, the word "good" or "bad." We readily understand the phrases "a good chair," "a good steak," and "a good teacher," because we know in what ways a chair or a steak or a teacher can be life-enhancing. We have to work a little harder to understand phrases like "a good leaf," "a good triangle," or "a good widow," because we cannot count on any scenario we might invent as being the one the speaker had in mind. The act of understanding the simple word "good" requires us to find an appropriate dimension of evaluation. If we can do this immediately when the phrase with "good" is given to us out of context, that is a measure of the extent to which the head nouns come with ready-made function-identifying scenarios. That we can sometimes do this successfully by appealing to contextual information that is evidence of the creative aspect of the language comprehension process. In either case, the evidence supports the point of this paper, that the process of language understanding is a creative process and that it depends on the language-user's ability to use language to indicate ways of framing experience.

When I spoke earlier of the commercial event frame and the large collection of words that are linked with this frame, I pointed out that the experience of confronting any one of these words will activate the entire frame. It is obvious, of course, that any sentence containing one of these words could have the effect of introducing other frames, these getting hooked up with the commercial event frame in such a way as to determine some piece of the resulting model of the information in the text. Examples of how the interlinking of different frames works can be seen in the following: consider an event within which one person gives money to another person (equivalent to one of the subevents in the commercial event frame), and consider the words we can use in English for naming that money, or that presentation of money. Almost anything that we call it will introduce a new frame. To get a sense of the variety possible, consider the larger scene that you find yourselves imagining when you know that the money that changed hands was a bribe, or a tip, or ransom, or change, or rebate, or alimony. Each of these words is understood as naming a quantity of money that changes ownership in one kind of event, but it simultaneously locates that event within a larger history about which a number of details are known.

One of the goals of the kind of frame semantics that I am speaking for is that of having a uniform representation for word meanings, sentence meanings, text interpretations, and world models. The word "alimony" links together a frame involving money transfer with a frame that identifies an occurrence in two people's life histories in a fairly specific way. Understanding this word requires knowing the whole scenario; understanding a sentence containing this word requires knowing the scenario and using the lexical contents and grammatical structure of the rest of the sentence to fill in some of the details; understanding a large text containing such a sentence may require situating a scene described by this text as a well-defined part of a larger story or state of affairs. Furthermore, the representation of an individual's model of the world might include information about the people the individual knows that is structured in ways similar to the frames needed for linguistic description.

A frame is a kind of outline figure with not necessarily all of the details filled in. If I tell you that I bought a new pair of shoes, you do not know where I bought them or how much they cost, but you know, by virtue of the frame I have introduced into our discourse, that there have got to be answers to those questions. Comprehension can be thought of as an active process during which the comprehender—to the degree that it interests him—seeks to fill in the details of the frames that have been introduced, either by looking for the needed information in the rest of the text, by filling it in from his awareness of the current situation, or from his own system of beliefs, or by asking his interlocutor to say more.

The ultimate correct theory will have to provide for the ways in which the interpreter of a text acts creatively to build a detailed model of the text, it will have to show how specific lexical items in specific grammatical relation to each other (as suggested by the adjective-noun constructions in which the adjective is "good") constrain the way in which the creative structuring takes place, and it will have to show (as we saw in "alimony") how individual lexical items can bring along with them fairly large pre-packaged complex frames.

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We can speak of a single integration of the instruments of a language—phonetic, semantic, syntactic—as a language *system*, using that term independently of whether we have in mind the system of an individual or that of an entire speech community. One aspect of a linguistic system, I have been arguing, consists in the ways in which the language user's cognitive and interactional frames are linked up with linguistic material. One way of examining a linguistic system, then, is that of providing an inventory of the frames that have linguistic reflexes, paying attention to the number of frames, to the areas of special elaboration, to the degree to which complex frames have been prepackaged in lexical meanings, to the structure and complexity of the frames, and so on.

The classification of frame types, for example, can be used in analyzing the vocabulary of a language. This analysis can begin at the one end with lexical items that have relatively simple word-to-world mappings, such as the names of colors or the names of natural kinds, and can continue on to the highly elaborated conceptual frameworks that presuppose subtle sorts of knowledge about the intellectual and institutional life of a people.

We may find from such a survey that certain kinds of frames are missing from language systems whose users lack certain kinds of training. To give a simple example, the word "angle," in connection with its simple perceptual frame, designates a simple two-straight-lines figure of the kind that easily permits closure with a straight line. Such an angle would be described by people who have the more technical frame as an angle between 0° and 180° but not too close to either end. Only people with special training will have this additional abstract or procedural frame for the word, this second frame involving the imaginary rotation of a line around a point and measurement of the arc created by this rotation. This frame for "angle" is the one that lends itself to certain mathematical purposes, but it is no longer a perceptual "given."

Once we have, at least for some domains of thought and action, descriptions of frame inventories, it will than be possible to compare different language systems with respect to their range of communicative possibilites. If we had any extant primitive languages to work with, we would, of course, wish to compare those with some of the fully developed languages, and learn something about the course of language

evolution directly; but unfortunately we do not. Yet there may be other kinds of comparisons we could make that would give indirect evidence, or at least some useful hunches. By studying the developing language system of a child we may be able to get a fairly good idea of which frames are conceptual or developmental prerequisites to which other frames. A study of the cognitive potential of a developing language system will be more reliable if it is based on an examination of frames than if it is based on some superficial measure such as vocabulary size. As we have seen with words like "ball," "angle," and "disease," the measure of the conceptual richness of a language system cannot be predicted from an inventory of its vocabulary.

There are, throughout the world, auxiliary trade languages called pidgins, and in many places creole languages developing, or developed, out of them. It may be fruitful to examine the frame inventories of a creole language before and after creolization. Since pidgins were created as auxiliary languages by people who already spoke fully formed regular languages, there is no compelling reason to believe that the course of the evolution of language followed the kind of development seen in the creolization process, but it is not unreasonable to believe that some insights on the growth and elaboration of a language system could result from such an inquiry.

It should also be possible to use frame analysis for studying what happens to a language when its community acquires a writing system and moves toward civilization. Before the introduction of writing, languages are generally restricted in their use to direct, typically face-to-face, interactions. The more highly developed languages will differ from these in having mechanisms that facilitate more public uses: uses, for example, in which the sender and the receiver know very little about each other's model of the world, in which sender and receiver are separated by space and time, and in which mechanisms exist that compensate for the absence of a shared context and the use of paralinguistic signaling systems. The very least the more advanced languages will have is a vocabulary appropriate for talking about the writing system; but it is likely to have more rigidly codified mechanisms for coreference and anaphora and less dependency on demonstrative elements, and it is likely to have developed grammatical and rhetorical mechanisms for enhancing sustained reasoning.

Another area of research to which an analysis of frames can offer some contribution is the question of whether the possession of language is a necessary condition for the existence of certain cognitive abilities. The correct answer to the question is undoubtedly going to be some version of Arnheim's conclusion that language facilitates but is not necessary for thinking.[9] Given an analysis of frames and their combinability into larger conceptual structures, it ought to be possible to learn which particular styles and strategies of thinking are especially enhanced through the use of language; in that way such issues as whether languageless thought deserves to be called thought can be replaced by more substantive concerns.

Similarly, some clarity could be brought, through frame analysis, to the question of whether the faculty of *abstraction* is in some sense restricted to possessors of human language. After disposing of the narrowest view of abstraction—by which the use of language is the only evidence of abstraction—and the broadest view of abstraction—by which animals at play are engaged in abstraction—attention can be turned to the different senses in which lexical items have been described as abstract. The words people have called "abstract" differ greatly in their frame structure, as can be readily understood by imagining the frames that would be needed for such words as "color," "angle" (in its procedural sense), and "charity." In asking what sorts of abstractions nonhumans are capable of, the many different kinds of "abstraction" will need to be examined separately. As with the question of language and thought,

here too is a case where a large and general question needs to be replaced by a set of smaller, more precise questions.

The remarks I have presented in this paper were introduced as offering a contribution to our understanding of the nature of language. In some ways of defining that question I have probably failed. I have felt that an important aspect of the workings of a language is what people go through in the experience of using a language. I suspect that human language must have evolved, and must now be structured, in ways that allow the framing and model-building and coherence-imputing processes in language communication to do their work. Fortunately, it is possible to study these processes without having to worry about which of them are unique to language, or even which of them are unique to man.

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A HYPOTHESIS ABOUT THE
UNIQUENESS OF NATURAL LANGUAGE *

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Descartes made the following claim:

> ... none are so depraved and stupid, without even excepting idiots, that they cannot arrange different words together, forming of them a statement by which they make known their thoughts; while, on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same.[1]

This claim has fared far better than Descartes's other, more famous claim about the seat of the soul. Research specifically designed to disprove Descartes's claim that language is a uniquely human attribute has left it entirely intact, whereas research undertaken with no motive to confirm or disconfirm the claim has strengthened it.

The Gardners, Premack, and others take issue with Descartes's claim, arguing, on the contrary, that if chimps are so "fortunately circumstanced" as to be in training with the proper psychologists, they can be taught a language or something differing only inessentially from a language. Their empirical results, however, fail to shake Descartes's claim. For example, Washoe and Sarah string words together to make their thoughts known, but they do not form genuine sentences. Nothing in the chimp studies to date suggests that these animals can do anything more significant than a dog or cat does when it rings a bell to communicate its desire to go outside. A chimp does, of course, acquire a far more complex set of discriminations in learning to arrange chips as a signal for food than a dog or cat does in learning to ring a bell, but such a difference in degree does not amount to *the* difference in kind required to refute Descartes's claim. Concluding their examination of Premack's work, Fodor *et al.* express this point as follows:

> ... *all* of what Premack calls productivity in Sarah's use of language consists in her "generalizing" from the trained content. ... there is no indication that Sarah has ever done the most characteristic thing that a productive syntax permits human speakers to do; namely, use a sentence of a syntactically novel form without being specifically trained on sentences of that form. Productivity in human languages exploits iterative syntactic mechanisms which generate *novel constituent sequences.*[2]

In short, chimps fail to produce the novel constituent structures from which we can infer internalized syntactic rules.

Descartes had empirical support for his claim that language is uniquely human. He pointed out that

> ... men who, being born deaf and dumb, are in the same degree, or even more than the brutes, destitute of the organs which serve the others for talking, are in the habit of themselves inventing certain signs by which they make themselves understood.[1]

Recent work on American Sign strengthens this argument by producing evidence that the "gesture language" of the deaf is not essentially different from spoken natural languages.[1] Since a gesture system can qualify as a natural language, and since