Theoretical and Methodological Considerations in Aphasia Research and Practice: Communication

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In thinking about putting Dr. Caramazza's talk into a communication perspective, I have considered his two provocative claims. I have also considered his basic working assumptions that he used to develop the logic in support of his claims. These assumptions are the three points he made in the first third of his presentation, and I thought mostly about two of them. First, a model of normal cognition underlying language behavior depicts a reality of nature and consists of a computationally explicit set of components leading to language comprehension and production. Second, a cognitive impairment, namely, a patient's pattern of deficits, results from impairment of one or more components of this normal system. I thought about these things, and then decided to play with my dog.

After returning with my dog from the yard of an angry neighbor, it was difficult for me to conjure up communication-related comments about Dr. Caramazza's two claims. I do think that our main speaker's working assumptions can be viewed with a communication perspective, and so I can be consistent with my charge by talking about "M." In doing so, I want simply to expand upon what he had to say about a model for, to steal Caplan's (1984) words, the "mental organ of language."

The history of clinical aphasiology has been somewhat atheoretical with respect to actually using models of normal language processing to create valid assessments and treatments for impaired language functions. This generalization may be even more true of clinical neuropsychology. In this field, the traditional "model" for characterizing deficits has been the tests that are used, not a theory that depicts normal cognitive structure and process. For many of us in clinical aphasiology, our background has been the "medical model" for understanding aphasia. Our theoretical origins dealt with issues of localization. Our training programs have more courses in neurological bases of aphasia than on cognitive bases. I imagine that I see more "frustrated physicians" in our field than I see "frustrated cognitive psychologists." We can speak more fluently about action potentials than we can about computationally explicit mental operations. We depend on hard-wire metaphors, talking about our patients' disorders in terms of impaired "circuitry." When we have a question for someone presenting a case, we often want to know where the lesion was -- as if knowing that fact would actually clarify something. We are simply more wired into the brain side of the problem rather than into what often appears to be murky waters of the mental side. When it comes to understanding our patients, we look to their hardware more than to their software.

We have problems with the notion of "processes." What are they? I think that one reason why anatomy and physiology are easier for us to think about was pinpointed by Caramazza (1984) in his Brain and Language article where he said: "Unfortunately we do not have a sufficiently well-worked out theory of language processing" (p. 11). This may be one reason why our classifications are psychologically weak. The basis for making them strong is still under construction. What excites me about Caramazza's contributions is that he is directing a skilled logic toward encouraging us to see the value of increasing our understanding of aphasia as an impairment of

cognitive processes. In doing so, we may play a part in working out a theory of language processing that tells us what these processes are.

This brings me very close to discussing M with respect to communication. In leading up to my topic, I wonder what does "computationally explicit" mean? (Cognitive scientists say things like this.) I shall take this term to mean, by analogy, that a computationally explicit process is one that is so definitive that it can be programmed to make a computer comprehend and talk like a human being. Certainly the field of Artificial Intelligence (or AI) has been trying to develop "natural language processing" programs that may model how M works (e.g., Tennant, 1981). It has been a two-way street, with theories in cognitive psychology helping AI researchers dcide how to create such programs. Furthermore, I understand that Joe Duffy has been interested in adding an L (functional lesion) to such programmed Ms to see if computers will behave like real aphasic people (Gigley and Duffy, 1982).

However, there has been one major drawback to developing computer programs that work like the human mind. Computers have yet to be able to process language in context in the way that we can. It seems that the way M interacts with context for the purpose of interpersonal communication is what makes our language processing programs human. It is obvious that, when we think of the language processor chugging away in nature, it is working for the purpose of communication. This we know. We know that patients buy our services because they no longer can communicate with family and friends as well as they could a mere instant prior to that episode in their brain. Cognitive scientists know that a complete accounting for the operation of M must explain how M works in nature for the purpose of communication.

A big problem for us clinically has been the development of methods for assessing and treating M in naturalistic circumstances. What are the variables? How can we control them? A problem for cognitive scientists has been how natural processing can be studied in the laboratory. In this sense, our challenges have been quite similar. However, we have come to understand that the key to observing natural operation of M is to see how the products of comprehension and production may vary in relation to contexts in which a given linguistic unit occurs. Context is an observable and manageable variable for both clinical and experimental purposes.

For the rest of my time, I want to explain and elaborate on these points. I want to discuss how the manipulation of extralinguistic contexts demonstrates important variations in the operation of a language processor when it is used for interesting features of communication in nature. In meeting this objective, I may repeat that clinical and experimental work are correlated, and rightly so. We want our assessments of language to be valid with respect to the way language function really works. We also want to treat what we are supposed to treat. We want valid procedures that facilitate the language processor in ways that it works naturally. In being valid clinically, we pay attention to what psycholinguists and cognitive scientists say about the nature of M. We depend on what Alfonso is trying to accomplish. Therefore, we look to models of the processor to tell us what is relevant for how people use it in real life.

Our traditional methods for dealing with language have been described as being somewhat acontextual. Facilitation methods of treatment depend on our manipulation of variables that make outcomes of M, comprehension and production, as successful as possible for a particular patient. We have manipulated variables such as vocabulary, length, and subtle distinctions in systactic complexity. As within-utterance variables, I like to think of

these as language-processor-focused manipulations. We have had a tradition of pushing and pulling at M, without attention to its contexts.

Some of these methods were derived from linguistics and psycholinguistics. For example, we learned that passive sentences are transformationally more complex than active sentences. We learned that normal adults take more time comprehending passive sentences. Then in a laboratory somewhere, Olson and Filby (1972) decided to fiddle with pictures used in sentence verification research. They found that, when attention was directed to logical objects in a simple event, passive sentences were easier than active sentences. In effect, they demonstrated that how M deals with passive sentences depends on the situation. It was evidence that purely linguistic theories cannot account for how M works. It was an early suggestion to us that treatment hierarchies might also be derived by considering variables outside of an utterance as well as within an utterance.

In further developing the idea that natural processing is linked to context, I want to go back to very basic notions about what communication entails. I feel that we need to be reminded of the classic "speech chain" in that communication involves using language as a code for transmitting a message from the mind (or brain) of a speaker to the mind (or brain) of a listener (Denes and Pinson, 1963). The goal is to convey what is in the head of a speaker, what shall be called speaker-meaning; and the presence of a listener plays a crucial role in how a speaker goes about achieving this goal. In a conversation, M operates in a special communion with another M -- what might be called the "M & M concept of language processing."

Herb Clark, who has done a lot of creative research into how M interacts with context, referred to this special communion as a "social contract" in which there is a mutual understanding that we try to be informative, truthful, and relevant to the topic as we convey ideas to each other (Clark and Haviland, 1977). In order to be informative, for example, a speaker uses various linguistic devices to distinguish between presuppositions about what a listener already knows from what the speaker intends to be new information for that particular listener. The listener's job is to figure out a speaker's true intentions. As I shall point out shortly, this social contract becomes important to conveying speaker-meaning.

This notion of speaker-meaning is not a trivial one in understanding the essence of the communication process. This is because in real-life conversation, speaker-meaning often differs from sentence-meaning, a distinction made by Searle (1979) in a relatively recent analysis of speech acts. With the study of indirect requests, for example, we are becoming increasingly sensitive to the idea that for various reasons we formulate utterances in such a way as to be indirect in conveying what we really mean. In real-life communication, our Ms are not involved solely in matching words to dictionary meanings or in matching sentences to literal interpretations.

What a speaker produces and what a listener comprehends depends on relating an utterance to what the other person in the conversation knows, to the situation, and to the setting. As listeners, our job is to interpret something like "She is a good woman" as a function of being spoken by Hugh Hefner or Jerry Falwell. Our job is to interpret sentences like "It is getting hot in here" when the room is sufficiently air-conditioned. As listeners, with a tacit awareness of a social contract, we often derive speaker-meaning through a process of inferencing to arrive at an interpretation with little resemblance to the meaning of a sentence if we just stare at it by its ownself. ["It's cold in here, but he must be trying to be

truthful. He is trying to be relevant as I see his head nodding in the direction of that debate over there. It's a heated discussion."]

Clark studied the influence of shared knowledge and situational contexts on fun little things we like to do with the language, such as creating verb phrases out of nouns: "Please, do a Napoleon." "He did a Nixon." On what basis are these spoken? How are they understood? A speaker of "Please, do a Napoleon" might be a photographer assuming that the listener knows about a painting of Napoleon (Clark and Gerrig, 1983). Clark and Gibbs in independent investigations looked for specific elements of a situation that determine the form of indirect requests we might use (Francik and Clark, 1985; Gibbs, 1986). They developed an "Obstacle Hypothesis" suggesting that we specify in our request the greatest obstacle to meeting that request. In the real world, such as McDonald's, we are more likely to use the Do you have... form when requesting "Do you have enchiladas?" than when requesting "Do you have Big Macs?" ["Of course, we got Big Macs, turkey. What do you want? An enchilada?"]

Cognitive scientists, such as Clark and Glucksburg, have made rough beginnings in studying indirect requests and metaphor as a means of developing a model for making inferences in deriving speaker-meaning (Clark and Lucy, 1975; Glucksberg, Gildea, and Bookin, 1982). Their three-stage models of the process were a starting point, just as Caramazza has discussed models of spelling to dictation and reading aloud to explain his logic about how M might work.

But there are major challenges ahead for those of us desiring a model of how M works and those of us charged with maximizing the operation of a broken M. I do not learn much about a patient as a communicator when I hear a list of test scores as to how well he can read aloud, spell to dictation, or copy letters. Three-fourths of America doesn't spell too well! Furthermore, we don't know all of a person's skill with language by knowing his or her accuracy with literal interpretation or sentence-meaning. We know a good part of it. Just not all of it.

In closing, I hope you may have noticed that in talking about communication, about conveying messages, in talking about "pragmatics," I have not mentioned gestures once. Being concerned about communication does not mean the avoidance of language; it means, perhaps, having an even greater respect for what we do with language than we ever had before. Also, whether we be cognitive scientists figuring out how M works in nature or clinicians trying to facilitate natural functioning of a broken M (perhaps, for programming generalization), all of us should consider variables such as other persons and situations as they interact with the language processor (Davis, In Press). We must work with the communion of two Ms along with lexicon, length, and syntax. In this way we will be dealing with the mental organ of language as it works for us in our daily lives.

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