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ABSTRACT

Defining schemas as specific representations of world knowledge, this paper contends that schema theory offers a promising approach toward the development of a comprehensive theory of communication. The paper traces the development of schema theory, reviews current literature on the subject, and points out its potential for use in future communication research. The paper concludes with a description of a schema theory-based message reception model. (FL)

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SCHEMA THEORY:

CAN IT CONNECT COMMUNICATION'S DISCOURSE?

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In the last seven years a radical shift in the focus of memory research has brought it directly in line with the interests of Communication researchers. Although the trend is brand new, its historical roots reach back to 1932 and Sir Frederick Bartlett's schema theory set forth in his book Remembering: An Experimental and Social Study.

Schema theory's potential impact can be likened to the effect cognitive dissonance theory had on this field some years back. Schema theory offers a promising approach toward the development of a comprehensive theory of Communication.

This paper will trace schema theory and its development, review current schema theory literature, and point out its potential for use in future communication research. At the end of the paper, a schema theory-based message reception model will be offered.

Before Schema: The Ebbinghaus Tradition

Prior to the 1970s and its rekindled interest in Bartlett's schema theory, the Ebbinghaus "trace" approach, based on empiricist-associationistic theory prevailed in memory research. The memory trace approach assumes that a

receiver passively stores information. The information stored creates a "trace' in memory analogous to an electrical impulse. The trace strengthens as the information is repeatedly encountered. Analogous to a muscle strengthening with exercise, the more a memory trace is used the more established or "stronger" it becomes. Stronger traces are more available for recall, prompting Kintsch (1977) to label this approach to memory the availability approach.

"Trace" research is best conceptualized as a passive reception approach. Information reaches the receiver's sense receptors and automatic mechanisms place the received information in a memory storehouse. Over time, the memory trace decays (unless reinforced) and at recall that part of the trace which has not decayed is automatically retrieved (see Reder, 1978, pp. 1-2).

"Trace" theory had great appeal to a behavioristaically oriented (e.g., Watson. Skinner) psychology field, and dominated memory research for 60 to 75 years (Cofer, 1976). Then Bartlett (1932) challenged the Ebbinghaus tradition and its reliance on list learning of nonsense syllables as a methodology. Bartlett (1932) leveled three telling criticisms at the Ebbinghaus approach:

(1) It is impossible to rid stimuli of meaning so long as they remain capable of arousing any human response.

(2) The effort to rid stimuli of meaning creates an atmosphere of artificiality for all memory experiments, making them a study of the establishment and maintenance of repetition habits.

(3) To make the explanation that the variety of recall responses depend mainly upon variations of stimuli and of their order, frequency and mode of presentation, is to ignor dangerously those equally important conditions of response which belong to the subjective attitude and to predetermined reaction tendencies. (p. 4)

As powerful as these criticisms may seem to the modern reader, Bartlett's arguments went unnoticed until Endel Tulving's research. Tulving challenged the memory trace explanation with his "encoding specificity" principle. The encoding specificity principle contends that all information is stored in memory, but that some information is more accessible than other information. By re-establishing the cognitive environment in which a specific piece of information was encoded, Tulving argued, the receiver will be able to access the information. For example, a person might seek to recall a telephone number by trying to remember where he/she was or how he/she was feeling, thereby re-establishing the encoding environment present when he/she heard the telephone number.

One of the significant research trends fomented by Tulving was work in defining semantic memory phenomena. Tulving (1972) made a distinction between semantic and episodic memory stores. Episodic memory is one's memory for specific life episodes (e.g., a person's first roller coaster

ride or first car accident). Semantic memory contains abstract concepts and the rules of language use (e.g., democracy, verb tense, usage). Kintsch (1977) defined semantic memory as "the organized store of knowledge that a person possesses, about the world as well as about language and its use. As such, it includes rules or programs for actions or operations" (p. 284).

The two prominent semantic memory models are the hierarchical network model and the feature comparison model. Collins and Quillian (1969) first conceived the hierarchical network model which was recently formalized by Collins and Loftus (1975). Smith, Shoben and Rips (1974) are the founders of the feature comparison theory. Both theories attempted to define the enduring structure of semantic memory. Extensive discussions of these theories are offered elsewhere (see Housel and Acker, 1977; Kintsch, 1977; or Loftus and Loftus, 1976).

As shown, these semantic memory theories differ significantly from the Ebbinghaus empricist-associationistic approach to memory. In many ways, however, they share epistemic assumptions. Like Ebbinghaus, semantic memory theories assume passive reception (as did Tulving's encoding specificity principle). The real value of the move to semantic memory theories was that it freed memory

researchers from an explanatory theory (i.e., trace theory) that was unable to explain memory in everyday situations. Neisser argues this point in Cognition and Reality (1976) and emphasizes the need to study memory in real day-to-day situations. Other memory researchers also saw in this rejection of the Ebbinghaus approach an opportunity to tackle the problem of receiver's use of memory in processing meaningful stimuli: prose passages, conversations, jokes, and the like (Kintsch, 1977; Van Dijk, 1977; Rumelhart, 1975. . . .).

Even before the move from the empiricist-associationistic tradition in memory research, a similar rebellion was happening in language research. Chomsky, in a 1959 review of Skinner's (1957) Verbal Behavior, pointed out serious weaknesses in the empiricist explanation of language behavior, signalling the beginning of the end for this approach to language behavior study.

Modern Linguistic Research Turns To Schema Theory

As Chomsky's linguistic theory (1958, 1965) gained acceptance, empiricist language approaches declined in popularity. Chomsky distinguished between deep and surface syntactic sentence structure and postulated transformational rules to explain the relationship between the two. Psycholinguistists

developed a wide range of experiments to test Chomsky's theory (see Clark and Clark, 1977; Fromkin and Rodman, 1978; and Kess, 1976 for examples). Many of these experiments used memory as a dependent or manipulated variable.

Chomsky's Transformational Generative Grammar (TGG) was a set of formal categorical rules designed to account for the competence that the "ideal" native user of a language must have to speak the language. The focus of Chomsky's theory was the generative syntactic component of language with the semantic and phonological components serving a purely interpretative function (Kess, 1976). In the main, psycholinguists concentrated on validating these syntactic relations specified by TGG (see Clark and Clark, 1977; Fromkin and Rodman, 1978; and Kess, 1976).

While Chomsky's advocates were busy testing the syntactic implications of the theory, a growing number of others (Chafe, 1970; Osgood, 1971; Lackner and Garrett, 1972; Clark and Card, 1969) were questioning the dominance of syntax over semantics in predicting language behavior. This led psycholinguistic research beyond the single sentence level to the multiple sentence or whole message level (e.g., references, passages, conversations).

Psycholinguists faced one problem with this approach and that was how to explain the highly regular expectations receivers had as a function of a message's structure.

Sentences arrayed in isolation have one meaning, but when arrayed in whole messages often take on different or added meaning. A passage from Bransford and McCarrells' (1974) research illustrates this point:

> First you arrange things into different groups. Of course one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated . . . (p. 206).

Individually, the sentences of this message make sense, but as a paragraph (i.e., message structure) they aren't comprehensible. If a theme is provided the reader-receiver for the paragraph, the paragraph as a whole takes on meaning. Reread the above but first add the title "Instructions for Washing Clothes."

Moving beyond the single sentence level of analysis necessitates postulating a memory component which will hold the processed sentence meaning units of a message until meaning can be assigned at the whole message level. It is also necessary to postulate a memory component which represents a receiver's world knowledge so that he/she can fill in the blanks in typically incomplete messages. For example, if

one individual instructs another about washing clothes, the sender usually assumes that the receiver knows what washing machines, detergent, and clothes are without explicitly defining them. Clark and Clark (1977) summarized the need for positing an enduring memory structure when researchers focus on the whole message level:

> Because stories are so large, they cannot be studied in the same immediate and direct way that words, constituents, and sentences have been studied. Their influence on comprehension can only be inferred indirectly from studies on memory. Yet, with the story, the lessons have remained the same: The structure of the whole affects the understanding of each part (p. 172).

These are the problems that led psycholinguists back to Bartlett's (1932) schema theory in search of answers. Psycholinguists (e.g., Kintsch, Van Dijk) began to study similar issues with schema theory as their common theoretical base. One of the most valuable aspects of this overlap was the cross-fertilization of the two methodologies -- psycholinguistic's descriptive methodology and memory's experimental approach.

Schema Theory

Although Bartlett's (1932) work lays out schema theory, there have been many recent variations and extensions on it. Examples of such variations are the constructive-reconstructive

memory research (Cofer, 1977; Spiro; 1977) frame theory (Minsky, 1975), story grammar (Thorndyke, 1977), semantic macro-structures (Van Dijk, 1977), and discourse schema research (Rumelhart, 1975; Winograd, 1977). The following version of schema theory is a synthesis of Bartlett's (1932) original work and several of the recent variations on the same.

Schemas are specific representations of world knowledge. For example, "restaurant dining" may represent a schema. Anyone who has eaten in restaurants knows that one enters a building, sits at a table, is usually waited on, orders a meal, eats food, pays a bill, leaves a tip, and leaves. If a person describes a restaurant experience with the words: "It took ten minutes before we were even waited on. The food was lousy, so we got up and left" the receiver of this comment has no trouble comprehending what the sender is talking about because his "restaurant dining" schema fills in the necessary "missing" knowledge (e.g., that the sender of the message had entered a building, sat down, didn't tip, etc.).

Schemas aren't fixed but are flexible, ever changing and adapting to new life experiences (Bartlett, 1932; Neisser, 1976). If a person eats at restaurants in different parts of the country, he/she may develop different restaurant schemas

for each part of the country. For example, a New York restaurant schema might include the expectation that the food will be good and the service bad while a Kentucky restaurant schema might include the expectation of friendly service but bad food.

Some schemas are relatively more permanent than others. Minsky (1975) labeled these relatively permanent schemas as frames. An example of a frame might be "how people look and behave." We all expect that most people will have a given list of physical attributes and exhibit a limited range of behaviors. Another example would be a "world geographic" frame. Most of us "picture" the world as a group of major continents, with given shapes, and with certain spatial relationships to each other.

Van Dijk (1977) treats frames as hierarchical sets of facts, assumptions, propositions, expected actions, and objects, which are stored in semantic memory. Frames have macro and micro levels. For example, the macro level of "world geography" frame might be the "African continent," and a micro-level might be Kenya. A macro-level proposition for "restaurant dining" would be "having a meal," with a micro-level proposition being "ordering from a menu." A further assumption Van Dijk (1977) makes about frames is that macro-propositions constrain the possible interpretations

of micropropositions. Within the world geography frame the micro-level proposition Kenya would only happen within the macro-level proposition "African continent." For Van Dijk (1977) frames are enduring (in semantic memory), hierarchically ordered in terms of macro-propositions, and represent knowledge shared by "most members of a society or culture" (p. 22).

Van Dijk argued that schemas are generated and operate within the context of changing discourse. Taking a textualist position, Van Dijk argues that each discourse has its own semantic macro-structure, and that the receiver will generate a schema representation for a given discourse using "macro-rules" and frame knowledge (Van Dijk, 1977, pp 8-16).

Most schema theorists would agree with Van Dijk's assertion that a relatively enduring world knowledge semantic memory store is needed to account for the common knowledge that persons of the same culture share. Exactly how this kind of knowledge is organized in semantic memory is an issue of continuing debate.

One way to conceptualize this semantic memory knowledge store would be to draw upon the hierarchical network theory-nested words (e.g., canary-bird-animal) approach. In like manner, one could postulate a hierarchical network of macro and micro propositions. For example, the macro-proposition

"behavior typical of humans" would constrain a variety of micro-propositions like: "Humans use language," "have gender," "work, sleep and play." In turn, each of these propositions constrains a smaller set of micro-propositions. Under "uses language" for example we might find "vocalizes," "prefers the native tongue for conversation," or "often speaks humorously."

Using this conceptualization we have a hierarchical network of interconnected propositions which receivers can access at will, entering the network at any desired level. For example, when you first meet another person whom you assume to be a U.S. citizen from your part of the country you will access the "human communicative behavior" frame (which would be a sub-level of the "human behavior" frame) at the macro-propositional level "Communicative assumptions about a Kentucky white male (in this instance)" and assume he will shake hands, speak English, probably smile, maintain an interpersonal distance of 2-3 feet, give his name, and ask your name (micro-propositions constrained by the above macro-proposition). On the other hand he may greet you with "Hola: Como se llama?," forcing you to change frames. You might now assume he is Latin American, and you would access the macro-proposition, "communicative assumptions about Latin Americans." Using this macro-proposition would allow you to

access the attendant micro-propositions, "speaks Spanish," "maintains interpersonal distance of 1-2 feet," etc.

This hierarchical semantic networks conceptualization offers one way to approach the problem of specifying the structure of receivers' world knowledge. The assumption that knowledge is organized hierarchically is consistent with modern memory conceptualizations (Collins and Quillian, 1969; Collins and Loftus, 1975; Norman, Rumelhart, et al., 1975; Van Dijk, 1977). The hierarchical schema network elaboration offered in this paper is one possible extension of the previous semantic memory research.

One of the most pressing problems remaining in schema theory memory research is to identify and delineate specific knowledge networks that members of a culture share. Schank and Abelson (1977) concisely summarize the problem:

> There is a very long theoretical stride. . . . from the idea that highly structured knowledge dominates the understanding process, to the specification of the details of the most appropriate structures. It does not take one very far to say that schemas are important: one must know the content of the schemas. To be eclectic here is to say nothing. If one falls back on the abstract position that only form is important, that the human mind is capable of developing knowledge structures of infinitely varied content, then one sacrifices the essence of the structure concept, namely the strong expectations which make reality understandable. In other words, a knowledge structure theory must make a committment to particular content schemas. (p. 10)

There are a number of ways that schema theory researchers

have categorized types of schemas. Winograd (1977) explicitly identifies three kinds of discourse schemas:

A. Interpersonal schemas-conventions for interactions between the participants in the communication.

B. Rhetorical schemas-conventions for laying out a reasoning sequence which speaker wants the hearer to follow.

C. Narrative schemas-conventions for connecting a sequence of utterances into a coherent text. (p. 81)

Rumelhart (1975) and Thorndyke (1977) identify a story grammar schema which represents a reader-receiver's expectations of typical story structure, e.g., setting, episode(s), event, reaction, action, theme, plot, goal, etc. (see Thorndyke's discussion in his 1977 article, p. 78-83). Neisser (1976) and Bartlett (1932) identified typical visual schemas (e.g., geometric shapes, faces and pictures of animals). It is possible to postulate action-goal schemas (e.g., the range of behaviors a skier must perform to attain a desired goal -- linked parallel turns to get down the mountain).

In a recent paper, Housel (1979) proposed two varieties of semantic memory schemas, content and relational. Content schemas are receiver-stored knowledge about objects and events not specifically related to other people (e.g., knowledge about World War II, language research, T-scopes). Relational schemas are receiver's expectations for the different ways people relate to one another (e.g., seduction,

one upmanship, competition, love, and hate).

Receivers may engage both content and relational schema in attempting to comprehend a message. At one level the receiver may engage a specific content schema (e.g., the receiver's knowledge of the best places to ski in Utah or Colorado) and at another level engage a relational schema (e.g., competition with a skiing partner). Kintsch (1977) noted this possibility stating, "in a dialogue the interaction with the other person might be much more salient than the content of the dialogue, ..." (p. 35) (italics mine). Winograd (1977) made similar observations about parallel schema operation. Kintsch's (1977) comment brings up another definitional trait of schemas, namely that there are different levels of meaning within any discourse and that some schemas may have greater importance in assigning meaning to discourse than others. For a more complete discussion read Kintsch's article in Just and Carpenter's (1977) Cognitive Processes in Comprehension.

In the preceeding paragraphs we discussed the term "schema." We now turn the reader's attention toward a number of schema theory's basic tenets.

The most basic schema theory assumption is that perceivers are active information processors. Perceivers actively construct schema to interpret or assign meaning to environmental

stimuli (Bartlett, 1932; Cofer, 1977; Neisser, 1976). This assumption is reflected in Neisser's (1976) comment, "perception is a constructive process. The perceiver is active" (p. 57). Cofer (1977) stated, "Constructive theory holds that the form and the contents of all experience are constructed, except insofar as perception is predicated on basic predispositions of the organism, such as feature detectors, ..." (p. 319). This assumption focuses research on the perceiver's higher order mental activities, namely how perceivers construct and use schemas in assigning meaning. Bartlett (1932) refered to this use of schemas as "an effort after meaning" (p. 44).

Schema theorists generally assume that schema construction and change is partially due to the structure of stimuli and partially due to the perceiver's structuring of stimuli. Although schema theorists concur that both affect information processing, each usually assumes that either the environmental stimuli structure (e.g., text structure) or the perceiver's psychological processes dominate the cognitive processing of a message. Winograd (1977) primarily focuses on the perceivers' psychological processes. Kintsch, (1977), and Van Dijk, (1977), concentrate on the "Structural form of the texts or dialogues that are produced and comprehended? (Winograd, 1977, p. 64). Addressing the same point, Spiro and Tirre (1979) stated, The constructive orientation, which posists a process of active in interaction between information explicit in the text

and information contained in pre-existing knowledge structures or schemata, served as a point of departure in the search for differences in discourse processing style" (p. 3).

In schema theory, memory plays a critical role in all the perceptual processes (Bartlett, 1932; Clark and Clark, 1977). Stressing the importance of memory's role in language processing, Clark and Clark (1977) state:

> "Memory plays an integral part in listening from the moment the first sound hits our ears to our recollection, years later, of what was said. In the construction process it is the halfway house where sounds and words are stored, and it is the final storehouse for the propositions that are built from them. In the utilization process it is the place where new information is stored, asked-for information is sought, and planned actions are placed. It is also the archive for the facts and general knowledge that are used in inferring indirect meanings." (p. 133)

From the active perceiver standpoint, we constantly engage memory schemas in producing and receiving stimuli of all degrees of complexity. Neisser (1976) discussed the "perceptual cycle" (pp. 20-24), referring to the assumption that all perceptual processes are <u>interdependent</u>, and so, are engaged during all perceptual processes.

Schemas are alive, constantly changing to meet the demands of a changing environment. This change occurs over time. In Bartlett's (1932) words, "remembering appears to be far more decisively an affair of construction rather than

one of mere reproduction" (p. 205). A significant amount of modern schema theory memory research supports this assumption (e.g., Dooling and Christiansen, 1977; Keenan, MacWhinney, and Mayhew, 1977; Spiro, 1977, to name a few).

The model to be presented in this paper focuses on the cognitive activities receivers use to structure, assign meaning to, store, and retrieve incoming messages. This model differs from other schema theory models in several critical ways. Message themes, as developed by the receiver, play a central role in this model's explanation of the message reception process. In contrast, Van Dijk (1977) treats theme as being in the message before the receiver acts on the message. In the present model, we assume that receivers construct message themes over time.

Message theme is defined as the central idea of the discourse. Receivers use their developed message theme as a judgment criteria for inclusinn or exclusion of message propositions in the comprehension and retention process. (This assumption is very similar to the function of macro-propositions and the macro-rules discussed by Van Dijk, 1977). Themes may serve to retrieve schemas useful in comprehending new messages. For example, if a receiver hears a message about Hitler and develops the theme "Hitler the evil dictator," he/she may retrieve the

content schema for Hitler from his/her semantic memory, and use the schema to aid in comprehension and storage of the new message (see Dooling and Lachman, 1971 and Sulin and Dooling, 1974). Receivers may also elect to use sender provided themes. Senders often attempt to provide receivers with message themes. For example, the sender may state, "I want to show you how to serve a tennis ball," and then proceed to discuss the serve. The receiver may elect to use this theme as provided or may develop for himself an even more unambiguous message theme. For instance, the receiver might decide after hearing more about the tennis serve that a more unambiguous theme would be, "There are seven steps needed to deliver a successful tennis serve." The important point is that the receiver ultimately decides what message theme he/she will use.

Themes vary in terms of their ambiguity. The more ambiguous the theme, the less useful it is in comprehending, storing, and retrieving message information. Recent research (Bransford and Johnson, 1972; Bransford and McCarrell, 1974; Dooling and Lachman, 1971; Dooling and Mullet, 1973; Reichman, 1978; Van Dijk, 1977) supports this assumption. To use the tennis serve example, the theme "How to play tennis," would not constrain interpretation of "throw the ball over your head" as well as the theme, "The seven steps to delivering

a good tennis serve." Degree of theme ambiguity affects comprehension in that the less ambiguous the theme the more it constrains possible interpretations of the propositions it organizes.

Developed message theme also affects storage and retrieval of message information. Dodd and White (in press) view the role of message theme in memory as follows:

> "In general, the theme of a passage (or sentence) is the focus of memory representation. This also suggests that there is some hierarchical organization to the memory for propositions, namely that there is a higher-level node (more accessible and more durable) for the theme. It has also been established that the recall of the theme will increase the likelihood of recall of the ideas closely related to it."

Van Dijk (1977) argued that themes, "not only organize and reduce information, but may also serve as retrieval cues" (p. 14). Bisanz, LaPorte, Vesdonder, and Voss (1978) concluded that message theme operated in message storage and retrieval as specified by Dodd and White (in press).

The less ambiguous a theme, the more tightly it organizes message propositions in memory. Tightly organized messages are less susceptible to constructive-reconstructive intrusions from prior semantic memory schemas. For example, one student listening to his/her tennis instructor talk about tennis serves might develop the relatively unambiguous message theme "The seven steps to delivering a good serve." Another student might

develop the more ambiguous, less constraining message theme, "How to play tennis." The latter message theme could organize a wide variety of message propositions relating to how to play tennis. The former theme would organize only those propositions pertaining to the seven steps used in delivering a good serve. Over time, message propositions organized around the more ambiguous theme would more likely to change to fit the student's prior semantic memory schema for tennis. The student using the less ambiguous message theme would more likely develop a well articulated and unique memory schema about delivering a good tennis serve. Even though this unique schema for the tennis serve will be hierarchically stored within the existing schema network for "Playing Tennis," it will represent a new, lower level, more specific sub-schema. This notion of hierarchical schema knowledge organization is consistent with Van Dijk's (1977) conceptualization of micro and macro structures and conceptually extends Collins and Loftus' (1975) semantic memory network model.

Receiving conversational messages is often more complex than receiving non-conversational messages, because conversations contain content and relational information (Keenan, et al., 1977; Olson, 1977). A person reading a story does not usually assume that the author is attempting to establish a personal relationship with him. Winograd (1977) and Kintsch (1977) argue that receiving

a conversation involves comprehension of content and relational message meaning. Several other researchers (Keenan et al., 1977; Markus, 1977; Schank and Abelson, 1977) have attempted to define the role of relational schemas in the message reception process. As Schank and Abelson (1977) point out, however, the relational schema research is highly speculative with little firm empirical support.

Because message themes are so useful in comprehending, storing and retrieving information, it follows that individuals who receive conversational messages will attempt to develop both content and relational message themes. Reichman (1978), in her excellent analysis of conversational structure, explicitly affirmed that conversational coherency depends to a large extent on how well a speaker's utterances are constrained by a conversational topic (or theme) and on a listener's ability to discern the underlying conversational topic (or theme). Although Reichman did not categorize conversational messages in terms of their content and relational dimensions, others (Keenan et al., 1977; Kintsch, 1977; Olson, 1977; Winograd, 1977) have done so.

As previously noted, receivers use theme as an organizing device for message storage and as a retrieval mnemonic. During initial interactions receivers will develop themes linking comments perceived to be relational to aid them in developing

a schema about the sender. This development of relational themes for senders may be an important part of the uncertainty reduction process described by Berger and his associates (see Berger and Calabresses, 1975). At first, receivers may categorize senders at a relatively high level of abstraction, as in Miller and Steinberg's (1975) cultural or sociological level. Receiver's prior relational schemas for cultural or sociological level knowledge may absorb or exert strong change influences on relational message information. For example, on first meeting another person the receiver may develop a relatively ambiguous theme for the relational elements of the other's message like, "He's a competitive S.O.B." The receiver would then store the relational message propositions around this relational message theme. The receiver would likely have an existing relational schema for "competitive S.O.B's" and this schema would likely absorb the new relational message propositions about the receiver changing or deleting any information that was inconsistent with the existing schema knowledge. This process may explain why receivers often do not base attributions about senders on specific behavioral evidence (Trope, 1978; Tverski and Kahneman, 1973). Characterizing the problem of inaccurate recall in the attribution process, Trope (1978) stated:

> Social judgment is frequently based on inaccurate recall of other's behavior. We are often called upon to make inferences about other's personal attributes even when we are unsure whether we can remember how they actually behaved. Under such circumstances, we have to base our attributions on uncertain behavioral evidence. (p. 93)

As receivers interact with others over time they begin to develop less ambiguous relational message themes. These themes reflect the receiver's attempt to develop a relational schema for a particular sender at an interpersonal or psychological level (here again we are following Miller and Steinberg's, 1975, conceptualization of levels of relational knowledge). Receivers who develop less ambiguous relational themes, in part based on their psychological level relational schema knowledge of the sender, more accurately recall relational message information. Keenan et als., (1977) research provides support for this assumption. They found that receivers who knew senders "very well" recalled, over time, relational statements from naturally occurring conversations more accurately than receivers who did not know senders "very well." (We are assuming here that knowing another "very well" is synonymous with knowing senders at the psychological level).

Another crucial element in the message reception process is receiver processing strategies. Receivers develop message

processing strategies to help them accomplish communicative goals. Following the content-relational distinction, receivers generally have content or relational goals which prompt them to implement content and relational strategies. Berger and associates have categorized a variety of relational strategies receivers implement during interpersonal communication with others. Roloff (1976) and Miller and Steinberg (1975) also categorize relational strategies interactants use during interpersonal communication. Just and Carpenter (1977), Kintsch and Van Dijk (1978), Spiro (1977), and Winograd (1977), discuss such receiver strategies. Reflecting this content-relational distinction for receiver strategies, Just and Carpenter (1977) state, "He [receiver] knows that speaking and writing styles vary from context to context, so he will use different strategies for casual conversations than for technical reports" (p. ix).

The following discussion of content and relational strategies will focus on how interactants use strategies in receiving conversational messages. We assume that receivers who want to reduce relational uncertainty will focus their primary strategic effort on the relational dimension of a sender's message. If a receiver's primary goal is to broaden his/her knowledge of some content area he/she will focus primary strategic effort on the content dimension of

a sender's message. Receivers always implement both a content and a relational message reception strategy. When a receiver's primary goal is relational he/she will primarily focus on implementing a relational strategy with secondary attention on content. This may explain why we can often remember very well what a person was like (e.g., angry, competitive, happy) on a particular day, but have great difficulty remembering the particulars of what he/she said (content).

The central role that themes and strategies are assumed to play in the message reception process sets this message reception model apart from existing models, in particular those of Kintsch and Van Dijks' (1978) and Winograd's (1977). The following discussion stresses the importance of these variables.

Message reception involves three general stages; two comprehension stages and a storage-retrieval stage. During the first comprehension stage receivers employ schemas for single sentence language rules. This stage breaks a message into meaningful propositions which are organized in working memory around a receiver selected message theme. When a receiver decides a message is complete, it is assigned meaning and transferred to long term semantic memory. Over time, prior schemas constructively act on the new message representation and may, depending on degree of message theme

ambiguity, absorb or change the message representation to make it consistent with the prior schema. To recall, the receiver uses message theme as a mnemonic to retrieve original and constructively changed message information and may reconstruct other message information (based on prior schema knowledge) to fill in any gaps in recall. Throughout the reception process, semantic memory schema are accessed to facilitate processing at each stage.

During initial comprehension (stage one) receivers employ single sentence language rules to decompose sentences into "meaning elements" (Kintsch and Van Dijk, 1978) or "propositions" (as Clark and Clark, 1977, p. 143, labeled them). Receivers retrieve these rules from their semantic memory schema for single sentence language rules. Because this schema is in constant use during the communication process, it is constantly activated and receivers are relatively unaware of its use. Clark and Clarks' (1977) discussion of single sentence reception strategies (see Chapter 2) provides a very useful approach to the comprehension activity that occurs during stage one of the reception process.

Receivers use short term memory to decompose these single statements or sentences into proposition which are then stored in working memory. During stage two comprehension

activities receivers focus on building a coherent representation of the message propositions by organizing them around a message theme. A receiver strategically attempts to develop a message theme as soon as possible (Bransford and Johnson, 1972; Dooling and Lachman, 1971; Kulhavy, Dyer, and Caterino, 1975; Reichman, 1978). The developed message theme serves as an organizational criteria for relating propositions to one another. It also serves as a retrieval cue to access prior semantic memory schemas, and to decide if a message is completed and ready for long term semantic memory storage.

Receivers are more aware of using processing strategies at this stage in message reception. Bransford and Johnson (1972), Kulhavy et al. (1975) and Reichman (1978) found that receivers actively attempt to develop message themes to facilitate message comprehension. At this stage, a receiver with a primary relational strategy may develop a relational theme to organize and interpret relational propositions with the strategic goal of making attributions to the sender. A receiver with a primarily content strategy will develop a content theme to facilitate comprehension of propositions that broaden his knowledge in some content area. After stage two comprehension, the receiver may produce a specific response to the sender's message, or continue to listen. In either case, he/she will commit to long term semantic

memory the representational message schema developed in working memory.

During stage three, receivers store message representation. Over time, these representations are susceptible to constructive-reconstructive intrusions. Receivers often store messages to fulfill future goals. Spiro (1977) found that subjects asked to memorize a conversational message used an isolation storage strategy. This is similar to the strategy used by students to "cram" for tests. They store information in a form as close as possible to that provided by the instructor and isolate it completely from other memory schemas so that they can reproduce (regurgetate) exactly what they have been told. Shortly after the test, with the goal met, the information quickly becomes inaccessible.

Spiro (1977) also found that subjects asked to listen to a conversation, as "psychologists" with the purpose of analyzing a couple's interpersonal situation, stored the conversational messages in such a way that they were highly susceptible to constructive-reconstructive intrusions from prior schema. In terms of the present model's relational-content distinction, these subjects stored the messages within prior relational semantic memory schemas and these schemas influenced the new messages representation over time.

Spiro (1977) found no constructive-reconstructive intrusions

when subjects immediately recalled the stimulus conversations. This finding indicated that constructive-reconstructive intrusions do not occur immediately, but rather, over time. Dooling and Christiaansen (1977) reported similar results with regard to the effect time has on constructive-reconstructive memory processes.

This model is at present in an early stage. It will take further conceptualizing and research to flesh it out. Housel (1979) is engaged in research which may answer some of the unanswered questions about the function of relational themes, strategies and schemas in the reception process.

Before concluding that schema theory is only useful in conceptualizing psychologistically oriented explanations (i.e., the present reception model), the reader should examine how others have used schema theory. For example, Rumelhart (1975) and Thorndyke (1977) work with text structures. Schema theory also provides a useful basis for descriptive linguistics, which focuses at the discourse level. Those interested in discourse analysis may find schema a useful concept in explaining communicators' shared cultural knowledge. While Reichman's (1978) excellent research Conversational Coherency, does not explicitly claim a schema theory foundation, she does use past schema theory research (e.g., Bransford and Johnson, 1972; 1973; Bruce, 1977; Schank, 1977) in

developing her conceptualization of the dialogue process. Others (Hastie and Kumar, 1979; Tsujimoto, 1978; Snyder and Uranowitz, 1978; Markus, 1977; Trope, 1978) use schema theory to explore the attribution process and person perception in general.

The utility of schema theory conceptualizations in communication research seems apparent. Those involved in mass media research may find schema theory useful in explaining viewers' expectations of movie, television, or newspaper formats. The result of tapping such media created schemas and the effects of violating these schemas in changing formats may provide an interesting avenue of research.

Another possible use of schema theory in communication research involves a form of discourse analysis. Attempting to answer the question, "What are the typical conversational schemas interactants use in attempting to accomplish a variety of communicative goals (e.g., relational, content, rhetorical, etc.)?," may provide a useful approach for future communication research. The discourse analyst might also look to past schema theory researchers (Rumelhart, 1975; Van Dijk, 1978; Thorndyke, 1977; Reichman, 1978; and others) for examples of structural approaches to analyzing a variety of discourses (e.g., prose passages, stories, conversations, jokes).

Arguments have been presented demonstrating schema theory's role in communication research. Its direct applicability to a wide variety of interests has been indicated. Schema theory is not a passing fad or "flash-in-the-pan," it is here and here to stay. Readers who pursue this literature will find invaluable impetus for refining and extending their own inquiries.

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ADDENDUM:

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