

PROCESSING DEFICITS: A MATTER OF SEMANTICS

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This paper will reflect upon the research by psycholinguists, applied linguists and speech-language pathologists in children's semantic processing of the formal language of the academic classroom, and recent attempts to devise intervention procedures that will assist children in comprehending the often decontextualized language of instruction. In so doing, it is necessary to consider the child's developmental status, present cognitive and metacognitive strategies, speed of lexical access and retrieval, semantic schemas and scripts, as well as the episodic memory constraints of young children. Indeed, while it is important to analyze how children process instructional language, it is equally important to consider how instructional language, either spoken or written, may be modified to more clearly meet the processing capacities of language disordered children.

As we more clearly understand how the formal discourse of the schools (Butler, 1984) imposes difficulties for the language learning disordered child, we gain added appreciation for the difficulties encountered by normal children whose first language is not English, for children whose social or economic status varies from that of the broad middle class, and for children with dialectical differences. The processing of the language of instruction requires children to utilize differing strategies than those required to process the informal language of the home and of the peer group.

A model of message processing that may prove helpful is that of Sajavaara (1981) which, while designed to address processing requirements inherent in the acquisition of foreign language, has relevance to our topic today. In contrast to some other models, Sajavaara takes into account such factors as the child's discourse

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history and social constraints, while acknowledging the existence of performance potential, affective and emotional variables and motivational factors.

As Slobin (1977) noted, early on, the structure of language is determined by the needs and constraints of speakers and listeners. He specified four "rules" of language, at least one of which is antithetical to the others. They are: "Be clear. (2) Be humanly processible in ongoing time. (3) Be quick and easy. (4) Be expressive." (p.186) It is the injunction to be "quick and easy" that manages to muddy the waters of instructional discourse. Children find it difficult to deal with the propositional and referential content when surface structures differ greatly in form and organization from underlying semantic structures, a condition which exists in much of the language of the schools.

Interest in so-called "teacher talk" and "text talk" (i.e., decontextualized written language) within the educational setting in the United States has only recently focused upon the **implicit** literate standards of the academic setting (Michaels, 1983) rather than the **explicit** requirement of literacy. In the late 1970's, the classroom has become a research arena, providing as it does, an opportunity to evaluate children's intuitive comprehension of the implicit as well as the explicit requirement of literacy and the instructional context. We now know that for children with language disorders or differences instructional discourse provides a challenge of considerable dimensions.

For researchers in instructional discourse, recent work by van Dijk and Kintsch (1983) in discourse comprehension and narratives, and Jackendoff's (1983) work in semantic and conceptual structure may provide some useful insights. However, for those language specialists whose task it is to deal with children's language processing disorders within the academic milieu, clinical implications are somewhat more difficult to deduce from such literature. For example, Jackendoff's proposal that "to study semantics of natural language is to study cognitive psychology" (p.3) might meet with considerable agreement, but his arguments in favor of the Conceptual Structure Hypothesis, i.e., "the existence of a single level of

mental representation onto which and from which all peripheral information is mapped" (p.19), if it be true, is not yet ready for clinical translation. However, the reader is encouraged to review Jackendoff's conclusions on preference rules, and their application to word meanings, default values and prototype images and taxonomies (pp.135-147) which may provide a conceptual base for experimenting with certain semantic intervention strategies.

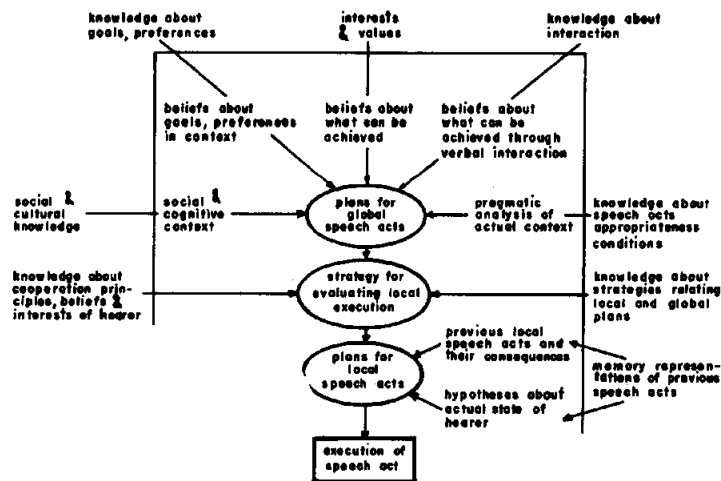
In van Dijk and Kintsch's recent work (1983), they point out that their initial work on cognitive models for discourse comprehension developed from previous work on semantic memory, and was largely structural in nature. They report that they have now moved to a more "dynamic process-oriented, on-line model" (p.4), which they identify as "strategic", since it is based upon the assumption that the

discourse process, just like other complex information processing, is a strategic process in which a mental representation is constructed of the discourse in memory, using both external and internal types of information, with the goal of interpreting (understanding) the discourse. (p.6)

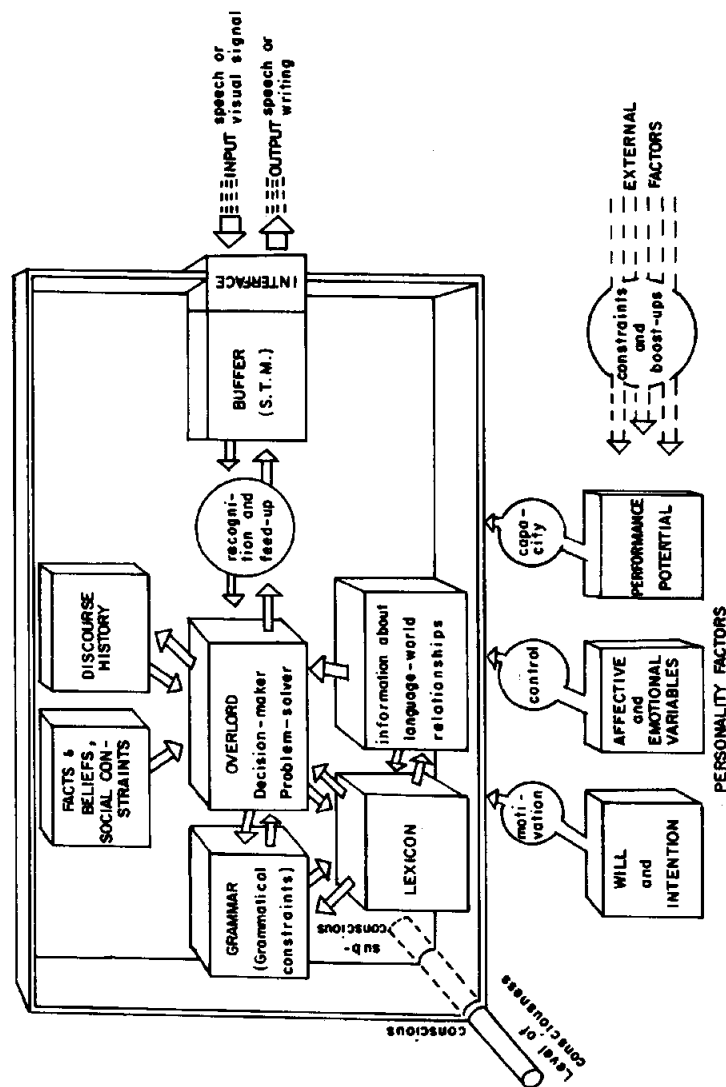
The cognitive and contextual notions they define can be viewed within the context of interactive and pragmatic production strategies, as noted in Figure 8.1 (p.271) of their text, and shown below as Figure 1.

As the reader may note, there is considerable similarity between van Dijk and Kintsch's view of discourse production (Figure 1) and Sajavaara's (1981) model of message processing. (See Figure 2).

The similarity stems from the consideration both models give to social and cultural knowledge and constraints of the speaker/listener. While Sajavaara speaks of "discourse history", van Dijk and Kintsch focus upon previous speech act memory representations. Both the constraints imposed by the language learner's past social and cultural knowledge and the activation of memorial representations are significant factors for language specialists interested in devising language intervention strategies to consider.



From van Dijk, T. A. and Kintsch, W. (1983) Strategies of Discourse Comprehension.
 New York: Academic Press. p. 271.
 FIGURE 1. The interaction of strategies in discourse production.



A MODEL OF MESSAGE PROCESSING

Adapted from Sajavaara, K., Message Processing and Language Acquisition in the Foreign Language Teaching Context. Selostetta, Occasional Papers, No. 4, Jyväskylä, 1981, p. 4.

FIGURE 2. Message Processing in the Acquisition of Second Language

In an effort to deal with the social and cultural constraints observed in the language disordered child's communication patterns, there have been a number of recent proposals (Wollner, 1983; Savich, 1983; Snow et al. 1984) to revise the language intervention services. Snow et al. propose that therapy, including the therapy session itself, be viewed within the context of social interaction. Noting that all language is pragmatically based and that the social use of language is the source of increased communicative competence, they suggest that the language specialist in a school setting might best serve as a consultant who will train language interactants, i.e., the language disordered child's peers, teachers, parents, and/or primary caregivers. The difficulty of replicating a large number of facilitative interactive sequences within the "artificiality" of a traditionally structured session is obvious, and changes are recommended. Tiegerman and Siperstein (1984) provide some suggestions for the training of parents based upon such a philosophy, one that is supported by emerging research literature.

As appealing as this approach may be, there is also a need to recognize that the instructional setting requires that language learning reflect a cognitive processing approach which is highly structured and decontextualized. Evidence (see Heath, 1982 for a discussion on narrative skills) suggests that language disordered (and perhaps culturally different) children may experience difficulty in utilizing language to learn. As Westby (1984) points out:

When children learn to talk, they are learning the phonology, syntax, and semantics necessary to communicate their basic desires and needs. When they talk to learn, children use language to monitor and reflect on experience, and reason about, plan and predict experiences.

Such reflection and reasoning requires certain cognitive strategies and there have been recent attempts to provide cognitive strategy training in oral communication (Dickson, 1983). He cautions that it is risky to assume that short interventions, designed to improve metacognitive skills with the goal of improved communicative performance, will be successful.

Dickson (1983) cites Robinson's work of 1981, pointing to the fact that even young children with normal language receive "remarkably little explicit feedback from adults in the home or school about the causes of communicative failure" (p.38). Surely, then, language disordered children may be expected to experience similar difficulty due to the lack of explicit feedback, whether their inadequate messages are misperceived in the more informal communicative interactions, or are misevaluated within the constraints of the classroom, wherein teacher expectations tend to focus on the language of instruction.

If short term intervention, utilizing cognitive strategy training, is not likely to be successful, are there other alternatives? Dickson hypothesizes that "metacognitions about communication, if developed over a long period of time, may play an important role in communicative performance" (p.38-39). He notes that successful cognitive strategy training for children has been conducted by an adult on an **individual** basis, utilizing intensive clinical resources. Microcomputer technology may lead to interesting solutions to such high-cost intervention procedures. For example, Dickson and Bilow (1982) have developed a referential communication game which they claim is highly motivating, and brings "about oral communication that is rich in its social and linguistic properties." (p.39)

Computarization of assessment and intervention strategies is still in its infancy, however. The classrooms of today (and probably of tomorrow) reveal a significant degree of instructional ambiguity and implicit standards that will not yield easily to the explicit requirements of technology. Pressley (1983), while bullish in his position that cognitive strategies can and do increase learning, stresses that it is necessary to carefully analyze children's performance with the language of texts and teachers, which he deems inadequate. Such inadequacies are exacerbated by children's "processing deficiencies" which he reports can be alleviated through careful modification of input. Pressley points out that interventionists must consider, however, that:

1. Children are less able to deal with poorly structured, illogical, and ambiguous materials than are adults.

2. Children are not as capable (as adults) of going beyond the information given and deriving inferences from input.
3. Children are not as adept at using strategies when working with meaningful materials. (Pressley, 1983, p.240.)

It is within the context of structuring of materials and messages that Pressley sites the literature on story grammars. He highlights the need for further research in the structure of stories to ascertain the regularities that stories possess and to utilize that information in determining how one may assist children in processing information and increasing their memory for prose (p.245). Indeed, stories are an important source of information and a unique form of discourse with consistent and predictable structures (Page and Stewart, 1984; Snyder and Downey, 1983). As Johnston (1982) has hypothesized, children's failure to comprehend stories may be related to difficulties with the discourse-level characteristics of such stories (1982). (See Page and Stewart, 1984, for a thoughtful discussion of story structure skills in school age children and some existing remediation procedures).

To return to the topic of ambiguity in presumably meaningful presentations, it is incumbent upon the language specialist dealing with language disordered children to not only modify, if possible, school-based procedures and materials, but to address the temporal nature of instruction. Not only must normal and language-disordered children alike deal with ambiguities, irrelevancies and illogical information in the classroom, they must do so within a frequently explicit requirement for rapid responses. As Van Kleeck (1984) has stressed, speed in processing is critical. Children "must gradually acquire the context free knowledge systems that allow for increasingly fast and complex processing and planning". Routinization and automatization is acknowledged as a necessary prerequisite skill for reading. (See, for example, Perfetti, 1977 and Denckla and Rudel, 1974). Equally, the multifunctionality of spoken language requires rapid access to, and retrieval from the lexicon, both in short and long term memory tasks.

It has been suggested that measuring children's performance on the naming of pictured objects, colors, letters and numbers

(Denckla and Rudel, 1974, 1976) or in counting, saying the alphabet, naming the days of the week and months of the year (Rupp, 1984) may be diagnostically significant of either spoken or read language disorders. Blachman (1983), for example, maintains that rapid automatized naming (RAN) tasks may differentiate successful readers (at least in the early school years) from those who will be "slow decoders". Those whose retrieval skills are swift and sure appear to have the academic "edge".

Kail and Nippold's (1984) recently reported work on retrieval of lexical information from semantic memory focused upon the naming of as many animals and pieces of furniture as possible by 8-, 12- and 21- year olds over a 7 minute period. Their interest lay in not only the temporal aspects of such retrieval but in the number of clusters retrieved, and the use of prototypic, typical, and atypical category members. They conclude that while the information in semantic memory changes with age, the processes used to retrieve such information do not. They stress that cluster retrieval is based upon the number and strength of associative links as activation spreads through semantic memory. They also note that the target information in such naming tasks requires a different strategy for retrieval than is required for tasks that are well specified (e.g., naming the 13 American colonies). They conclude that task characteristics are associated with age-related changes in retrieval, a statement that agrees with Pressley's (1983) comments cited earlier. Again, the message to language interventionists appears to be that task characteristics must be carefully analyzed when attempting to discover the disordered child's language comprehension and production strategies. Certainly, the degree to which prototypical, typical and atypical lexical items are retrieved is worthy of study, as is the rate and magnitude of cluster recall. While language specialists have made qualitative judgments in the past, in the future it should be possible to adapt research methods, such as described by Kail and Nippold, to define more precisely, and in quantitative terms, the parameters of lexical processing difficulties.

In summary, it is clear that potentially successful

intervention procedures are yet to be fully derived from cognitive and linguistic research. There is a continuing need for those who deal in clinical intervention to integrate that which is known about communicative exchanges, speech acts, narrative and instructional discourse, metacognitive and metalinguistic development, higher-level cognitive strategies, and contextual constraints in some reasonable fashion. As Lougeau-Mottinger and Friel-Patti (1984) have reported, clinicians are attempting to implement pragmatic language intervention, but note that the role of the clinician is both complex and difficult.

As we have seen, the ambiguities inherent in much of spoken and written instructional language places a particularly heavy burden on language-disordered children. Such children exhibit greater difficulty in processing the often-decontextualized language of the classroom. The triad of teacher, text, and normal child is frequently beset with problems, as evidenced by the research reported here (e.g., Pressley, 1983). But intervention implies at least as quadrangle: clinician, teacher, text and language-disordered child. It seems evident that only a multi-directional, multi-level approach to language intervention would auger for success. How far have we come, if this is our goal? Lewis Carroll (1885) put it well in an article designed to assist readers deal with mathematical notions of algebra and geometry; he prefaced *A Tangled Tale* with the couplet:

Straight down the crooked lane
And all around the square. (p.984)

Perhaps it is fitting to close on such a note.

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