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Investigating the System of Development:

The Skills and Abilities of Dysphasic Children

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Research with Dysphasic children most often explores the the nature of their linguistic deficit and its relationship to normal linguistic development. When Dysphasic children are found to perform more poorly on cognitive measures, researchers speculate on the relationship of language deficits to cognitive abilities. A conclusion drawn from these studies is that language deficiencies may index a more general cognitive deficit.

In this paper I report research which compares the problem-solving, social and linguistic skills of dysphasic children with linguistically normal children working on a number of computer tasks. In this research, as in previous research, the dysphasic children performed lower than linguistically-normal students on many of the measures used. But, the nature of their performance enables me to present an alternative to the general deficit interpretation of dysphasic children. These children engaged in strategic behavior directed at avoiding some aspects of the research task and, by inference, much of the educational activities that are directed towards them. The development and use of compensating "passing and managing" skills seem to be at least partially responsible for the very slow educational progress of dysphasic children. I then present evidence from a computer training study which supports these interpretations. I conclude with the educational implications of these findings as well as strategies for the use of computers with children in special education.

Educational Definitions of Dysphasia

Dysphasic children have a testing profile which demonstrates a language problem or delay that is disproportionate with their other skills. Their nonverbal IQ scores fall within the normal range and they do not appear to have any other serious academic problems. Children who are found to be more than two grade levels below their mental age in two or more areas of language (phonology, morphology, semantics, and recently pragmatics) are placed in special classrooms and educated in small groups.

Dysphasic children are seen as deficient in important skills by the school system. Since, as of yet, there is no definitive theory which locates the source of the problem for any group of these children, the educational system has little choice than to treat the common symptom of dysphasic children: their language problems. But in attempting to remedy their problems, schools often focus on the students' areas of weakness, trying to teach them the language skills which have failed to develop normally. Frequently this is done with intensive drills in language arts using principles of behavior modification. Despite these educational efforts, when dysphasic children leave elementary school, their school achievement in language arts is still likely to be two to four years delayed <u>and</u> their school achievement in other areas is also likely to be significantly below grade level.

Research Definitions of Dysphasia

Researchers have had a number of overlapping interests in dysphasia. Examining the deviant forms of language acquisition provides critical knowledge about the normal acquisition process (Menyuk 1964, 1968; Ingram 1975; Lenneberg and Lenneberg 1975; Morehead and Morehead 1976). Dysphasic children have severe linguistic problems which are said to only minimally affect cognitive and social skills. This population of children is very useful in understanding the relationships between language development and cognitive and social skills (Ingram 1972a; Morehead and Ingram 1973; Cromer 1974, 1976; Inhelder 1976; Bloom and Lahey 1978; Riel 1982). Understanding the relationship between a linguistic delay and these other aspects of development may also provide a way to understand their interrelationships in normal development. And finally, locating the source of the language difficulties of dysphasic children in terms of processing deficits provides valuable information for developing special treatment programs for these children (Reichstein 1964; Lowe and Campbell 1965; Rosenthal 1972; Tallal and Piercy 1974, 1975; Tallal 1976).

A central issue in the research on dysphasia has been to determine if these children were following a normal, (delayed) pattern or a different (deviant) sequence of language development. Menyuk (Menyuk 1968, Menyuk and Looney 1976) claimed that the language acquisition process of dysphasic children was not just delayed, but was qualitatively different. Her findings were based on a comparison of dysphasic children to normal children matched on chronological age (Menyuk 1968) or by performances on IQ tests (Menyuk and Looney 1976). In subsequent research (Eisenson and Ingram, 1972; Morehead and Johnson, 1972; Johnson and Schery, 1976 Bloom and Lahey, 1978), dysphasic children were matched to linguistically normal children on the basis of linguistic measures such as the mean length of utterance, (Brown 1973). The general finding of this recent research is that the language development of dysphasic children was a delay of the normal developmental sequence with a few notable exceptions.

For example, Dysphasic children develop much more extensive vocabulary at the one word stage than do normal children (Eisenson and Ingram, 1972). They also spend proportionately much longer periods of time using two word constructions. Rather than expanding the length of their utterances to three words, they begin to use morphological endings (plural, tense markers, etc.). In the normal sequence of development, children do not attend to these features of language until they have learned to combine three words. When Dysphasic children do form three-word utterances, they frequently use a smaller numbers of lexical categories per construction. Three word utterances in normal language development frequently contain three semantic categories (agent, action, object), such as "I read book". The three word utterances of dysphasic children often contain only two relationships and a function word to modify one of these relations (Morehead and Ingram, 1973) such as "read the book". In general, dysphasic children develop the same language forms as do normal children, but at a much slower rate, using these forms much less frequently.

Some researchers have argued that since dysphasic children process and use grammatical features of language generatively, the problem is not with language but with the cognitive ability to express more complex ideas (Morehead and Ingram 1973; Cromer 1974,1976; Inhelder 1976). Other evidence suggests that the slowed-down process of language acquisition may result from deficits in rapid auditory perceptual skills (Tallal 1976). While the primary interest in this research has been the relationships between language and cognition, the relationship between linguistic deficits and patterns of social interaction has not been examined.

Educational Prosthesis

Children with severe language problems need special educational help. Educators, sensitive to this need have developed special programs to educate these children. Often these programs are based on a deficiency model of the child in which failure to learn in school is explained in terms of linguistic or possibly more general cognitive deficits of the child. But it is also possible that the way that some special education programs are structured may unwittingly contribute to the child's deficiencies.

Until we understand the complex nature of language learning difficulties, it is difficult to determine how language problems are related to other learning problems. I will use an analogy between physical and mental handicaps to illustrate this problem. Suppose a child comes out of an accident with a paralyzed leg and the prognosis that he might, with effort, be able to regain control of his leg. Now imagine an intensive program of physical therapy in which the whole body is held motionless while the patient tries to move the toes of the paralyzed leg. Suppose the patient makes some progress in learning to wiggle his toes, but becomes frustrated by the slow progress in learning to walk. If the rest of the body is kept motionless during the treatment, it is possible that the muscles will weaken so much that the child will have trouble moving the other leg. Frustration coupled with lack of exercise may lead our imaginary patient to give up on walking; to refuse to even try. In this case we would be fairly sure that the paralysis is not spreading, and that the method of treatment is at fault for the degeneration of the child's physical skills.

It is not likely that such a program would actually have been designed for our imaginary patient. Instead, the kind of treatment that would be seen as most effective would be one that encouraged the child to experience walking as soon as possible with whatever support was necessary to take the place of the paralyzed leg. The child would be taught to walk focussing on the abilities that are under his command and would be helped to understand the extent of his handicap and ways to deal with it effectively.

Now how does this situation help us think about children with language problems? These children come of school age with problems in acquiring language. Like our physically-disabled patient the prognosis for the language-disabled student is unclear; the problem may go away with the right kind of "exercise" or it may not. The traditional approach by schools to this situation has been to instigate intensive language remediation programs. In these programs the children receive concentrated individual instruction in language arts while other school subjects are dealt with only superficially. The belief is that reading and writing are so basic that not much can be done until the children acquire these skills. Just as our imaginary patient's intensive therapy began by practicing toe-wiggling, the language students program begins by practicing sound-letter correspondence and decoding skills. The notion is that there are a number of component skills that must be learned in sequence, because higher-order skills are dependent on them. These children, like our imaginary patient, may become frustrated with their slow progress. They may begin to doubt their ability to learn and refuse to try. They may not only give up on reading, but, like our patient who gives up on walking, they begin to see school learning as something they will never be able to do successfully and therefore not worth the effort.

There is an important difference in the causal inferences that are drawn from these parallel examples. In the example of the physically handicapped person it is the method of treatment that we would immediately question when the patient fails to show progress. However, learning problems of children in special education are rarely seen an effect of the method of treatment. Because we have an unclear notion of what causes the difficulties in the first place, it is easy to attribute the difficulties to the disabilities of the child. If the child does not learn under these conditions, then this is taken as evidence of a more general learning problem. Almost always, the child rather than the treatment is seen as the source of the difficulties.

PROBLEM-SOLVING, SOCIAL AND LINGUISTIC SKILLS OF DYSPHASIC CHILDREN

The results of two recent studies (Riel, 1982) suggest that dysphasic students' educational history can lead to the development of secondary deficits. Less skillful performance is not always a property of _individual_ deficits, as it occurs within a _system_ of interrelated goals and activities. Understanding this system is vital to efforts to create effective educational programs for dysphasic children.

The first study was a comparison of the problem-solving strategies, social skills and linguistic performance of eight dysphasic and eight normal children (ages 10-12 years) on computer tasks. The lower performance of dysphasic children in this study could be used to support a deficiency model but the variability of performance suggested a need to analyze a wider range of behavior. The second study was a training study in which dysphasic students from the first study were provided special training in solving problems presented on computers. In the training sessions, game playing shifted gradually from computer-controlled playing to student-controlled playing as students' skill increased. The change of conditions in this second study resulted in rapid increases in skill which suggest that individual deficits may not be responsible for lower performance which was evident in the comparison study.

In the Comparison study, I examined the problem-solving, linguistic and social skills of language-impaired and normal children. Pairs of students from a Language (linguistically impaired) and a Control (linguistically normal) group worked together on three computer games in two types of sessions, Cooperative and Didactic. Cooperative sessions were those in which there was symmetrical game knowledge. The game was new to both players. Didactic sessions were those in which there was asymmetrical game knowledge. The game was known only by the student who assumed the teacher's role. Three computer games were used, each requiring a particular skill. "Harpoon the Shark" was a numerical estimation game; "Astronaut" was an auditory perception and spatial game and "Crack the Safe" required logical inference.

The performance of the pairs of students was compared in terms of two types of problem solving measures: problem-framing and game-playing skill; two linguistic measures: language fluency and language errors; and social measures which examined their skill in adopting the roles of the teacher and the learner.

Similarities

All the students approached and played the games with interest. They all seemed to enjoy interacting with the computer. On subsequent visits to the school, children from both groups urged me to bring the computer back. They understood the procedures that were established for the different sessions and generally followed instructions.

There were no group differences in the average number of words per minute or in the mean length of communication units used by the students when teaching the games to their peers as defined by Loban (1976). A communication unit is a grammatical independent clause with any modifiers. By either of these two measures the Language students were just as verbal as the Control group when they engaged in teaching activities. In contrast to the research of Ingram (1972b), the Language students asked more, not fewer questions. Both groups of students used language to regulate their own behavior and to direct the behavior of their partner.

The students were able to coordinate game playing and establish their own systems for dividing up the task or taking turns. With a few minor exceptions, the students worked out any disagreements that arose among themselves without requesting or needing adult intervention. The students in either group were just as likely to ignore questions from their peers as they were to answer them correctly.

Differences

Dysphasic children were selected because of their history of difficulties with language. It was not surprising, then, that they demonstrated more problems related to language use than did the Control students (these differences are described in more detail in Riel, 1982). Briefly, the Language students spent less time during the teaching sessions providing their peer with information about how to play the game and used only half as many communication units to explain the games to their peers than did the Control students. The higher percent of mazes (false starts, repetitions, and incomplete utterances) and words per maze of the Language group indicated that they had more trouble expressing their thoughts in words (Loban 1976).

Their pattern of language errors revealed that they were more likely to take liberties in modifying linguistic relationships which on other occasions were used correctly. Verb string and question formation errors were the most frequent types of linguistic errors. After identifying language errors, the same transcripts were examined for utterances in which the error could have occurred, but did not (for more details on this error analysis see Riel 1982). When language errors were compared with correct usage, the average rate of error for identical linguistic constructions was one out of four or 25%. In only one type of error for only one subject did the error rate ever reach above fifty per cent. Except for this one error, the language students did not seem to be lacking a formal knowledge of language.

The language difficulties of dysphasic children (incomplete utterances and grammatical errors) seemed to have consequences for their social and problem solving behavior. The Language students were highly dependent on adult help to solve problems. They turned to the adult first, rarely requesting help from the computer or one another. Computer help required a minimal amount of reading and problem-solving; peer help required a higher degree of verbal explicitness than was necessary to elicit adult help. The Control students turned first to the computer, then to their peer and only to the adult as a last resort when a problem could not be solved. Even when the Language students were directed to the computer or to their peer for help they continued to request adult help.

The Language students divided up the tasks in game playing in a different way than did the Control students. The Language students took turns playing the games, attributing success or failure to the individual. The Control students were more likely to divide up the tasks within a game and work jointly, sharing the responsibility for success and failure. Working together involves sharing perspectives to reach a common understanding of the game and the strategies for playing the game. Problems with language could be responsible for difficulties in engaging in joint problem solving.

Finally, all the Language students demonstrated very different problem solving skills. They did not approach and organize the problem-solving situation in a way that would enable them to succeed. prior to each game the students were given the option of instructions and were asked to select a level of difficulty. The Language students frequently began games without instructions and did not move down in level when a game proved to be too difficult. They played twice as many games at a level at which they had a low percent of successes (level five) than at a level at which they had a fairly high rate of success (level three). Rather than choose an easier game level, they were more likely to change the rules of the game to accommodate their understandings. In contrast, the Control students monitored the problem solving situation and their own skills and worked reasonably efficiently towards the goal of playing the game well.

These patterns of differences indicate that the language difficulties of dysphasic children do have consequences for the development of other skills. These findings suggest that language was not the only area of difficulty for most of these children. Attempts to be more precise about the type of problems these children have in other areas of development are hindered by the variability of their performance.

The problem of Variability of Performance for Skill Assessment

A common observation among researchers and clinicians is that the performance of dysphasic children on IQ tests is highly variable. Because intelligence is treated as a property of the individual, even if a person exhibits intelligent behavior only sporadically, he or she is, nevertheless, said to "be" intelligent or to "have" intelligence. Factors such as lack of attention, poor concentration or low motivation are assumed to be responsible for inconsistencies in performance. Dysphasic children are, therefore, seen as having normal intelligence, but are also likely to have short attention spans and be easily distracted.

Prior to my research, my interpretation of these observations was that the children were not interested in testing. Not understanding the consequences of their behavior, they were not taking the testing seriously and were not highly motivated to do well. My choice of computer games was directly influenced by these observations. I assumed that the students would be very excited about playing computer games and with this high motivation the inconsistency of behavior would disappear. My premise about their motivation was correct but the inference concerning behavioral consistency did not follow. The children were very excited about the games and were eager to play but their performance remained highly variable.

Variability in the performance of the Language group in my research was evident in a number of different kinds of skills. This inconsistency of behavior often made it difficult to assess the skills or abilities of these children.

Variable performance is clearly evident in the pattern of language errors made by the dysphasic children in this study. For most of the language errors recorded for each child, there were numerous examples of the same linguistic construction formed correctly on other occasions. The correct usage indicates that, at least on some occasions, the students understood the grammatical relationships that govern a particular construction. I have no principled reason for, or clear way to characterize, the environments in which language errors were made versus those in which no errors were made. It is as if the language lacked automaticity such that when other systems of interaction competed for cognitive resources, linguistic production suffered.

This finding is particularly interesting in the light of the research on language acquisition of dysphasic children. The major differences between the dysphasic children and normal children were not the presence of absence of various linguistic transformations but the relative frequency of use (Morehead and Ingram 1973; Riel 1982). At both ages in many instances the language behavior of dysphasic children is indistinguishable from that of their linguistically normal peers.

This same variability of performance was evident when I examined the students' knowledge of game playing. It was difficult to determine when a student in the Language group knew a particular game procedure. On one occasion a student may be playing so well that there is no doubt that he understands a procedure like aiming the harpoon in "Harpoon the Shark" of using the radar in "Astronaut". On a later occasion, the same student's performance will drop so low that an observer would doubt the student had any knowledge of how to play the game. This on/off quality of performance was most striking during the Training Study as the students played the same game over a period of several weeks. It would be easy to say that the student simply lost interest in the game and therefore stopped concentrating or even forgot how to play. This did not seem to be the case. One student was eager to demonstrate to me that he knew the game well enough to teach it to another child. He knew his performance was being evaluated and wanted to play well, but on this occasion was unable to do so. Several hours later when, because of an absent student, he was given another chance to play he was able to play very well. Again, I could find no principled way to account for all the instances of inconsistencies of performance. At the time when knowledge of the game fades, the students sometimes remained eager to play and other times abruptly decided that they did not want to play any more that day.

Even auditory perception seemed to vary under different conditions for some of these children. In the "Astronaut" game there was a sound pair discrimination task that was similar to the test that Tallal (1976) used to locate deficits in auditory processing in dysphasic children. The interval between the two sounds decreased as the level of difficulty of the game increased. At levels four and five, the interstimulus intervals were less that 53 miliseconds, a condition which should result in discrimination problems for children with auditory processing problems. Watching the children play the games it seemed clear that the sound discriminations were more difficult for the Language children than the Control students. It was difficult to assess because of the different numbers of games at the different levels and because the children played in pairs.

After the sessions were over, I gave the children in the Language group a tone test by dividing up the tasks in the game so that the Language student was only responsible for determining when to take pictures using the "radar". To do this, the students had to determine if the two sounds were the same or different. I navigated the ship so that they did not need to monitor direction or worry about crashing into a planet. Under these circumstances, some of the children who had had a difficult time with the sound discriminations during the Comparison Study, now made the assessment error-free.

Deficiency Interpretation

One way to understand these inconsistencies in performance is to assume limited ability on the part of the students. In such a deficit interpretation, the Language students would be described as lacking certain skills or having limited processing ability. But such formulations usually only account for one aspect of behavior and cannot account for the whole configuration of behavior.

For example, Torgesen might interpret the relatively poor problem-framing moves of the language students as indicating a lack of metacognitive abilities (cf. Torgesen 1977).

Brown, Bransford, Ferrara and Campione (1982) suggest two clusters of metacognitive abilities are involved in problem solving. The first involves the person's knowledge about his or her cognitive resources, the demands of the situation and the match between cognitive resources and task complexity. The second cluster includes self-regulatory mechanisms used by a person during any attempt to solve problems. These include:

> Checking the outcome of any attempt to solve the problem, planning one's next move, monitoring the effectiveness of any attempted action, testing, revising, and evaluating one' strategies for learning (Baker and Brown 1980:6).

It is possible to conclude from examining the problem solving performance of the Language Students in these computer sessions, that they lacked metacognitive abilities. Their way of structuring the game playing situation does not, on the surface, suggest that they understand the demands of the task in relationship to their own abilities. They did not exhibit the same kind of checking, planning, monitoring, testing, revising and evaluating strategies that were used by the Control students in learning these games.

Once a deficit is assumed, possible causal relationships are drawn between the deficit and known problems with language. In the example used, metacognitive deficits could be related to language problems in at least two ways. One way is to assume that the lack of metacognitive skills is the direct result of the language problem. The logic of the argument might be as follows: because the Language students have more difficulty in representing the ideas to themselves verbally or are less able to use language to regulate their behavior, it becomes more difficult for them to engage in planning, monitoring and checking behavior.

Conversely, it could be claimed that the lack of metacognitive skills themselves are responsible for the linguistic problems. In this case, the logic would be that metacognitive skills are necessary for organizing ideas and coordinating the rules of the language to produce acceptable utterances. Therefore, deficits in metacognitive skills will be manifested in difficulties with linguistic expression and decoding. Both these formulations interpret the absence of a behavioral display in one setting as evidence for a general deficit.

Alternative Interpretation: A Systems Approach to Understanding Cognitive and Metacognitive Behavior

By examining the whole system of behavior of the Language students in these game playing situations, it is clear that they were engaging in metacognitive activities of another sort and doing so very skillfully. Their checking, planning, monitoring, testing, revising and evaluating strategies are directed at another level of interaction. The Language students have another goal that superceded playing the game well. They were actively working to construct a situation in which they did not have to face doing things that they did not believe that they could do well. For them, the nominal task of the computer game is secondary to doing well in a larger context (Birney, Burdick and Tecran 1969). In sociological terms, they were primarily occupied with "passing" and "managing" the scene (Goffman, 1959; Garfinkel, 1967; Edgerton, 1967).

The metacognitive skills of these children can be observed in their more frequent questions about session procedures, their verbalizations about being taped and concern with who would view the tapes, and especially in their strategies for avoiding situations that are likely to be problematic for them. Changing the focus of attention from how the Language students played the games to how they managed the larger scene, provides a way to understand the inconsistencies in their behavior. Their actions can be interpreted in terms of strategies for managing the situation to pass as competent students. These strategies will be discussed in the following sections.

Strategies for Avoiding Reading. The students in the Language group were aware of their reading difficulties and they actively avoided situations that required reading. One way they did this was to claim to know how to play, bypassing the instructional loop and then seeking adult help when the game began. When they were told to go back through the computer instructions, they had various strategies for assuring the presence of the adult to help them through the instructions.

Strategies for Avoiding Failure. It is possible that the choice of the more difficult levels was not the result of poor problem framing skills alone, but at least partially motivated by fear of failure and strategies for avoiding failure (Birney, Burdick and Teevan, 1969). Playing at a level that is so easy that everyone can do it or at level that is so difficult that few can succeed provides very little information about the skill of the player. If one is uncertain about one's ability at a level that is described as easy, then a possible strategy for avoiding evaluation is to persist at the most difficult level. If one tries but does not succeed on the most difficult task the failure is not necessarily attributed to lack of skill on the part of the player but can be seen as a reflection of the difficult nature of the task. If one persists at playing a high level game, he can always believe or assume that others believe that he can play successfully at the easier levels. Another strategy the Language students sometime used to avoid failure was to give up on the game as defined by the computer and redefine the goal of the game it so that they were then successful at this newly defined game.

Strategies for Avoiding Peer Instructions. The Language students used two different strategies for avoiding the teacher-student role relationship. The first was to claim to know how to play before the student-teacher had provided sufficient instructions. In order to begin teaching, the teacher needs feedback from the learner on what is already known. The language students avoided the interactive work required in teaching and learning by claiming to know how to play. They seemed more interested in playing the game than eliciting information from their peer. Like the adult, the peer teacher was seen as someone who could do the problem-solving, making it unnecessary for the learner to figure out the goal of the game was or why a given procedure should be followed.

The Language students were also less likely to make effective use of peer help when it was offered. The second strategy for avoiding peer instruction was to challenge the teacher's ability to teach before the teacher had an opportunity to explain the game. In this case, the learner, set on "not understanding," tried to establish adult help as the only way to learn the game. The student in the role of learner may not want to be in a situation where his peer can out perform him. By challenging the peer teacher's ability to teach, the student removes the focus of attention from his own ability (or inability) to learn the games and focuses on his peer's ability (or inability) to teach. Children who have been set apart from their peers as language- or learning- disabled are likely to have learned from experience not to acknowledge when and what they do not understand and how to restructure an event such that their performance is not the focus. It is likely that such revelations among their peers have often been more painful than productive (Hood, Cole and McDermott 1981).

Strategies for Avoiding Language as a Form of Mediation. While the Language students actively elicited adult help, the form of the help they sought was not verbal mediation. They did not commonly locate the source of their problem nor the kind of help that they needed. Instead, they used more general strategies for eliciting adult help. For example, they would ask the adult to join them in playing the game, or show them how to play, without specifying what they did or did not understand. Since the session procedures included the instruction to try to figure the game out themselves and only request help when they could not understand some part of the task, their general requests did not bring the kind of help that they wanted. In these situations the adult either redirected them to the computer or to their peer teacher to figure the game out, or tried to get them to be verbally explicit about their needs. Their way of avoiding this request was to continue playing, selectively ignoring the questions of the researcher. In these situations, they were less likely to respond to elicitations or to produce back-channeling signals which indicated that they were listening to what was being said.

The Language students did not use the adult as a resource to provide information about the computer and game playing. Instead they tried to appropriate the adult as a problem-solving tool that would do the work for them. After direct efforts to elicit adult help, they would continue to play aimlessly waiting for the adult to assess the problem and provide the solution. They effectively rearranged the context so that with the adult present, the need to problem-solve vanished.

The dysphasic children had more trouble using language to convey information and share ideas with each other as well. They did, however, have strategies for getting through situations without making their difficulties overt. An example of peer interaction from the first cooperative session of Len and Bob demonstrates the use of such a strategy. In the first exposure to the "Harpoon" game, Len expressed some reasonable but different interpretations of the game world presented. Bob gave no indication of his perceptions of the game. He neither agreed nor argued with anything Len asserted. Both students continued to initiate interaction while trying to learn how to play this game. Neither boy made any attempt during the game-playing phase to determine the other's interpretation of the game or to discuss how they might work together to figure out how to play the game. In checking students' understanding of the game, the researcher asked a question that might have revealed Len's alternative interpretation. Bob quickly supplied a response that was consistent with the researcher's interpretation. This suggests that he had held the conventional view of the game despite Len's constructions. While Len looked a little surprised by Bob's response and the approval he received, he did nothing to indicate that he did not agree with this view or that he had entertained an alternative account. By not challenging or making evident different interpretations at either time, the students are able "to pass" as having understood all along.

Summary. What is similar about these strategies is that together they are used by the Language students "to manage" (Goffman 1959) the social situation to enable them "to pass" (Garfinkel 1967) as competent students. These students did not lack metacognitive skills of monitoring, checking evaluating, and planning, they were just employing them in the service of a different goal: that of presenting and maintaining their identity as a normal, competent students. In order for metacognitive abilities to be focussed at the problem-solving task, situations which called for "passing" behavior would need to be minimized. A goal of the Training Study, then, was to change the structure of the interaction to encourage the Language students to apply metacognitive strategies to game success.

Further Evidence Challenging a Deficit Interpretation

If the lower performance and ineffective problem-solving strategies of the Language students were the result of processing, cognitive, or linguistic deficits located in the individuals, affecting change in their behavior in a short period of time would be difficult. On the other hand if situational or educational factors are responsible for the lower performance, then producing improvements in behavior may be possible by changing these factors. In order to determine the effects of situational differences on the performance of dysphasic children, I carried out a Training Study in which the learning situation was carefully controlled.

The Training Study provided further evidence that the children in the Language group did not lack metacognitive skills.

In the Training Study the computer was used to demonstrate the steps that could be used to frame the problem efficiently. The students began playing with no problem framing options: they were given instructions and were started at the easiest level with the computer providing "hints" when they did not succeed. This problem-framing structure was systematically withdrawn as the students demonstrated the ability to perform these functions for themselves. In this way, the computer was used to construct a support system that allowed students to engage an a task that was too difficult for them to accomplish alone and without help. This computer-social situation models the informal skill learning situations common in childhood. Children often participate in activities that are beyond their ability level, with either older children or adults managing the situation enabling them to participate. For example a young child who know very little about the rules or goals of a game, can "play" as a member of a team if more experienced players are willing to frame the behavior of the child so that it is consistent with the goals and rules. In doing this, the other players create a "Zone of Proximal Development", a social system which handles all the work that eventually and gradually the new player will learn to do for himself (Vygotsky 1978; Brown and French, 1979; Wersch 1979.

This form of instruction is also evident when parents teach their young children academic skills such as reading. (Ninio and Bruner 1978). They start with a book that they enjoy reading and help the child to participate in whatever way is possible given the ability of their child. With very young children this means that the mother does most of the work. She reads the words, points to the pictures, asks the questions, and even provides the answers to these questions. Indeed, the child's role at the beginning is very limited. When the child begins to point or make unintelligible responses, the mother encourages the child interpreting the responses. As the child demonstrates more understanding of the pictures, the attention is gradually shifted to the text. Slowly, as the child is able to take on more of the actions involved in reading, the mother takes a more and more passive role, providing encouragement and approval. But from the beginning the child has always been involved in the activity of reading (with the parent doing more of the work), and not simply getting ready to learn how to read.

In an analagous fashion, the computer sessions were designed so that the computer would begin by carrying more of the workload while the students concentrated on one part of the task. The problem-framing moves made by the computer are visible to the students. In this way the social system, which includes the computer, provides a way for the students to begin playing without having to attend to metacognitive monitoring, planning and evaluating problem-solving activities. As the students gain skill in game playing they were gradually called on to do more metacognitive structuring. One of the goals of the training study was to see if the students would internalize the problem framing help provided by the computer.

Problem-framing Skills. In order to determine the effect of the Training Study on problem-framing skills, two transfer tasks were used. In the first task (Transfer 1), the problem-framing skills of the students were examined when they taught the Training Study game ("Harpoon the Shark") to younger students who had never seen the game. In the second task (Transfer 2), the problem-framing skills of the students were examined when they faced a different computer game ("Crack the Safe").

The hypothesis was that participation in a Training Study would lead to improved problem-framing skills and that these gains would be evident in the two transfer tasks. The following chart indicates that the problem-framing strategies of the language group changed in the direction of the Control group following the Training Study.

Problem-Framing Strategy	Comparison Study		Training Study	
	All games Language	All games Control	Transfer 1 Language	Transfer 2 Language
First Game Level - choose levels 1 - 3	50	94	88	100
After Successful Game choose same level or move up 1-3 levels	68	82	77	81
After Unsuccessful Game choose same level (1-4) or move down (2-5) levels	47	78	79	81

Table 1: The percent of Time a Problem-Framing Strategy Was Utilized by the Language and Control Dyads During the Comparison Study and by the Language Dyads following the Training Study.

The choice of game levels by the Language group following the Training study provides further evidence of their improved problem-solving skills. The percent of completed games at each level suggests that the students were making choices that were appropriate for their level of skill. The percent of games played at each level is shown in table 2.

Levels	Comparison Study Language (n=90)	Comparison Study Control (n=78)	Training Study Transfer 1 (n=89)	Training Study Transfer 2 (n=40)
One	30	33	20	57
Two	12	13	38	22
Three	13	23	17	8
Four	12	8	11	5
Five	33	23	12	8
	100	100	99	100

Table 2: Percent of Games Played at each Level for the Teaching Sessions from the Comparison Study and the Two Transfer Sessions from the Training Study.

In both Transfer Tasks, the Training Study students played most of their games at levels one and two, levels at which they had a high rate of success. Again this contrasts with the Language group in the Comparison Study which played one-third of their games at level five with little success.

To summarize, the Training Study group displayed efficient problem-framing skills and demonstrated their ability to play the game well at the levels of difficulty that were appropriate for their skills. These findings were consistent for both Transfer Tasks, and the magnitude of the change in their self-monitoring and planning skills from their earlier performance suggests that they were able to internalize the structure of help provided by the computer and develop efficient problem-solving skills.

Numerical Skills. A second hypothesis was that playing a computer game which required the students to deal with numbers could lead to increases in numerical skills. A pre- and post-test was given to determine the automaticity of counting and number skills. The questions on these tests were divided into three areas: counting, numerical comparisons, and number line midpoint assessments. These tests were given to the students who participated in the Training Study and to a group of students from a Severe Language Handicapped (SLH) Classroom in another school. The second group served as controls for school learning over the six week period. The average number of errors made by each student in these two groups were compared.

The average number of errors per student for the two groups was almost identical on the pre-test as can be seen in table 3:

	Counting		Number Comparisons		Midpoint Assessment	
	Mean	SD	Mean	SD	Mean	SD
SLH Training Study Group	6.85	5.5	.85	1.2	12	12
SLH Control Group	6.40	3.9	.80	1.7	13	13

Table 3: A Comparison of the Average Number of Errors per Student on Math pre-test.

The same test, with minor differences in the questions and the addition of a written midpoint number line assessment were given at the end of the six-week training period to both groups. The scores of the children in the Training Study indicate improvement while the scores of the students in the Control group remain almost unchanged.

	Counting		Number Comparisons		Midpoint Assessment		Midpoint Assessment	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Training Study Group	3.85	4.0	.14	0.32	7.8	8	7.4	9.5
Control Group	6.40	3.6	1.00	2.10	18.5	25	19.0	23

Table 4: A Comparison of the Average Number of Errors per Student on Number pre-Test.

The decrease in the number of errors in the counting post-test by the Training Study group indicates that using numbers to aim the harpoon in the computer games increased student knowledge of numbers and number boundaries. The Training Study demonstrated that twelve to fifteen hours of practice on a well-designed series of computer games resulted not only in increased skill in locating a symbolic shark, but increased knowledge of the number line, more skillful arithmetic operations, and the internalization of strategies for approaching and solving a different computer game (Riel 1982).

Social Skills. Accompanying these increases in academic knowledge and problem-solving skill were changes in social and linguistic behavior. The students were placed in a situation in which the goal they sought could best be accomplished if they cooperated with their peers. The individual, competitive orientation to game playing exhibited in the Comparison Study was replaced by a more cooperative spirit which enabled the students to share the responsibility for discovering the correct location of the shark.

To assess the degree to which students defined game playing as an individual or cooperative enterprise, the way they talked about each game was examined. Specifically, their use of personal pronouns with reference to each game was considered twice: once at the beginning of each game as the level was selected, and once at the end of the game when the score was displayed. Their language was coded into one of the four categories:

Individual	Singular personal pronouns used to characterize the whole game ("This is my game." "I won." or "You crashed!";
Shared	Singular personal pronouns used to characterize different parts of the tasks ("you do the aim, I will do the distance." or "You had three misses and I had two misses.";
Joint	Plural personal pronouns used to characterize the game ("We won!" or Let's try level three.");
Not marked	No personal pronouns were used by the students.

The movement by the Language group away from individual and towards cooperative game playing can be seem in Table 5:

	COMPARISON STUDY		TRAINING STUDY
Pronominal Use	Language	Control	Language
Individual responsibility (singular pronouns)	73	10	42
Shared responsibility (singular pronouns)	21	18	21
Joint responsibility (plural pronouns)	5	54	29
Not marked (No Pronouns used)	1	19	8
	100	101	100

Table 5: Percent of Type of Pronouns Used by the Students in the Comparison and Training Study to Characterize the Beginning and End of Games.

This cooperation resulted in more language use than in prior sessions. Students also monitored the performance of their peers, often reducing the need for adult supervision and guidance. They were also less distressed by wrong guesses as these were not seen as a reflection of lack of skill of one of the players.

One of the common fears expressed when computer use in classroom is discussed is a possible negative effect on social interaction. The thought of each child staring at a monitor removed from important teacher-student interaction is frightening to many educators and parents. Individually programmed units are only one way computers can be put to use in classrooms. Current research programs investigating the role of social interaction in cognitive development have begun to point to the vital role of cooperation for the development of cognitive processes (Flavell, 1981; Newman, 1980; Wertsch 19xx; Levin 1981; Riel 1982; and work in process by Laboratory for Human Cognition, UCSD) . The results of the Comparison Study suggest that children with language problems may have had more difficulty sharing their ideas and perspectives on problem-solving. These interactive difficulties may lead to lower performance of cognitive measures. Joint problem-solving on computers could provide opportunities for social exchanges that may be essential for the development of higher cognitive processing.

<u>Language Skills.</u> The use of language by the dysphasic children changed with the change in conditions. If we compare language use and fluency of the students in the Training Study with the performance of the Language and Control students during the Comparison Study there are a number of interesting changes.

As was done in the earlier Comparison Study, all transcript segments in which the student in the role of the teacher gave procedural or descriptive information about the game were included in the "teaching transcripts". These transcripts served as the basis of the analysis of the process of teaching. Table 6 shows that the teaching efforts of Language students in the Training Study are much more similar to those of the Control group in the Comparison Study.

	Time (mins.) of Teaching Transcript		Total words in transcript segments		Number of Communication Units	
	Mean	SD	Mean	SD	Mean	SD
Language	5.5	3	322	231	77	36
Control	11	5	711	384	198	91
Language (with training)*	12	5	768	478	151	76

*Training did not explicitly involve either language use or instructional strategies.

Table 6: Length of Teaching Transcripts of the Language and Control Students for the Comparison and Training Study.

This indicates that the Language students in the training study actively used language as a means of instruction when trying to teach the game to third-graders. It also suggests, since there was no explicit language training in the Training study, that the low measures on language use during the Comparison study are not a reflection of an inability to use language in this way. Rather, that the whole situation was one in which they did not choose to participate in this way.

While the number of communication units per minute remained the same, the number of words per communication unit and the number of words per minute increased for the language students in the Training Study. This increase is another indication of the effort on the part of the language students in the Training study to give good explanations and descriptions to their third-grade students.

	Number of words per C-unit		Number of words per Minute		Number of C-units Per Minute	
	Means	SD	Mean	SD	Mean	SD
Language	3.77	.64	58	20	15	6
Control	3.49	.13	64	13	18	4
Language (with training)	4.8	.79	79	44	15	8

Table 7: Length and Rate of Communication Units for the Language and Control Students during the Teaching Sessions of the Comparison and Training Study.

The analysis of language mazes provided evidence that increased effort did not make language difficulties disappear. Longer communication units were accompanied by a higher frequency of language mazes as cam be seen in table 8:

	Total words in Mazes		Number of Mazes		Average words per Maze		Average Mazes per Comm. Unit	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Language	22	20	6	5	3.36	.46	.08	.03
Control	18	12	9	8	2.12	.46	.05	.03
Language (with training)	71	59	27	17	2.40	1.04	.18	.09

Table 8: Language Mazes of the students in the Training study compared with the Students in the Comparison Study.

However it is interesting to note that despite the higher number of mazes, the average number of words per maze is much lower making it very similar to that of the control group and the normative data collected by Loban (1976). The variation has increased suggesting different patterns of change accompanying the increase of verbal production in the group of students in the Training Study.

While the rate of language mazes, false starts, hesitations, etc., increased, it is possible that this will decrease with more practice in similar situations. What is important is that rather than avoiding the situation the students were engaging in the learning activities. With a minimal amount of training, the Language students were able to internalize strategies for game playing from the computer and strategies for teaching from an adult and apply them in the appropriate context. It is unlikely that students who lacked metacognitive skills such as planning, monitoring, evaluation, etc, could develop these skill over this very short period of time. Rather it is more likely that the change in the overall context enabled the students to direct more of their metacognitive abilities to problem solving rather than identity management. These findings suggest ways to restructure the educational environment of dysphasic children.

EDUCATIONAL IMPLICATIONS

A major educational issue that has been central in this research is the way that dysphasic children react when they do not attain goals. The reluctance of these children to engage in a given task has been examined in light of their concern for passing as normal students. Recommendations for how to restructure the educational experiences of dysphasic students utilizing the interactive potential of computers follows.

The Consequences of Nonattainment of a Goal

Not being able to accomplish a task is not, in itself, a failure. It is only when others (especially those in institutional settings) observing a person's performance define non-attainment as failure that it comes to have the consequences that are often associated with failure. Children in special education have come to know the consequences of failure. By not doing what they were expected to do, they have been labelled and segregated into separate classrooms. Chances are that they do not have a good formulation of of what it was that they did differently that led to their placement They do acquire some general formulation of their problem from parents, teachers and peers such as "not being very smart" or "having trouble learning how to read". These general formulations of the differences between themselves and their unlabelled peers often serve as guides to the kind of situations they will avoid in order to pass as normal.

The problem is that in trying hard to pass as normal, these children often "pass out" of important learning situations. If they are not trying, then it is hard to determine whether or not they have the skill to accomplish a task. "Not trying" is only one of many ways to pass out of a learning situation. Several different kinds of avoidance strategies used by the children in this research have already been discussed.

These children work so hard at trying to hide their perceived inabilities, so hard at passing, that they refuse the kind of help that is crucial if they are to learn. Because their formulations of their problems are often broad, they avoid many situations in which they might have otherwise done well.

In addition, educational programs are not particularly sensitive to the problem of passing as normal. Most of the knowledge imparted in schools is acquired through the medium of reading. If a child is actively avoiding reading, then he is avoiding most of what counts as knowledge in school.

There are two recommendations that follow from my research and these observations. They are closely related and describe a system of interaction that focuses on the use of positive skills to overcome handicaps.

Learning in Interactive Systems The first recommendation is to involve the students in learning activities which focus on students strengths rather than weaknesses. If a child is having trouble with reading and language, it is not necessary to make all forms of knowledge acquisition dependent on reading skills. By decoupling reading from knowledge acquisition dysphasic students are likely to discover areas in which they do exceptionally well. Children labelled dysphasic generally do well on the kind of tasks that make up the performance scale of IQ tests. However, these skills are not used systematically to help design educational programs. Finding areas of expertise are important as it is easier for a student to accept help in some areas if he or she is able to offer help in others.

Just as the physically-handicapped patient, in the example at the beginning of this paper, needed support to begin walking, these children need support to participate in learning environments in school. They need to know that while they are having some difficulties with language and reading, they are still able to learn. This means that knowledge acquisition must be decoupled, to some extent, from reading. Children need to be encouraged to use and develop all the skills they have to acquire knowledge. This does not mean that reading or language instruction is not important. It does mean that a different method needs to be used to teach these skills. Instead of breaking these skills into isolated components each of which is meaningless by itself, the approach would be to engage these children in learning activities in which reading plays an important part. For example the students may be assembling something that requires following written instructions, working on a school newspaper or designing a science project. At the beginning not all children will not be able to carry out all the tasks involved in the learning activity. Some students will only be able to do some parts of the task. Participating with students, they see the other tasks that need to be done. As skill builds, so will self-confidence, and the children will be able to take over more and different aspects of the task until hopefully they are able to do all the different parts of the task. Placing children in social support systems, "Zones of Potential Development" (Vygotsky 1978) challenges them to learn what they need to know to be able to accomplish the task alone.

The question that remains is how to provide the kind of support that will help rather than cripple. A good model of how this is done comes from the analysis of the way that mothers teach their very young children to read (Ninio and Bruner 1978). Children's knowledge about reading is a continuous process of internalizing new forms of interaction with books introduced by other people. Because reading is a continuous rather than dichotomous skill, establishing exactly when a child "knows how to read" hinges on the way reading is defined.

This informal learning contrasts with teaching efforts which break an activity into component parts and teaches each element in isolation with students working independently. For example, reading is taught in school by having children learn letter-sound correspondence, and then by sounding out each word assembling the words into sentences to read aloud without help. If parents were to follow this same procedure, they would start with a book of blank pages and teach the child to turn them one at a time giving them positive reinforcement for learning to turn pages. Instead in this informal learning environment the child is kept in the whole activity of reading with the parent carrying more of the workload.

This same model could be used with children with special problems, and not necessarily requiring one to one interaction with an adult. Other children, as well as computer programs, could be used to help create a "Zone for Potential Development" for these children. Learning environments in which children with language difficulties are able to contribute what they are capable of and observe what they need to learn, are likely to led to skill development with less frustration than current approaches.

This research has demonstrated that computers can be used to accomplish this goal. Educational software can be designed to provide exposure to a wide range of topics as well as simulations of important activities. They can also do so with a minimum reliance on text. Programs can be designed so that beginning interactions require a minimum of reading or writing. As skill develops, new goals can require new forms of interaction. Game worlds can be used to draw students into activities that require reading and writing to accomplish goals that become important to the student. Programs can interact with the ability level of the student so that the kind of help needed is supplied. The confidence that children can gain from doing well on some of the tasks will help provide the courage to undertake others.

Task Analysis. The second recommendation from this research is to redirect these students' metacognitive or passing skills from task avoidance to task analysis. To do this, the traditional structure of classroom lessons may need to reorganized. Children need to be encouraged to help organize their lessons, to monitor their behavior, to check and evaluate their progress, and to plan for the next activity. Many current educational programs promote the error-free learning of isolated skills which is highly structured and requires only the repetition of previously presented material by the student. A side effect of this method of education is that the children learn to fear wrong answers. If they do not know the correct answer or fear that they will not know an answer, then they often work very hard to get out of the task altogether. They frequently succeed by engaging in disruptive behavior that is taken as further evidence of their learning problem (McDermott 1976).

One way to use metacognitive skills in the service of education is to have children evaluate their ability before they attempt each task. When the child faces a task, evaluates it as difficult, and then does poorly the child was right in an important way. The child can gain approval for this knowledge. "Being right" about the difficulty of a task, makes it possible to try a task in which one suspects they may not succeed without some of the negative consequences of failing. The child can then be encouraged to evaluate what aspect of the task is the source of the difficulty. If the child does succeed in the task, then he or she was wrong about the evaluation yet gains approval for being able to do the task. This will help the child to understand that being wrong is not something to be feared and to understand that tasks can be objectively hard. In this way the child remains in the task, a necessary condition for learning. Just as in certain competitive races in which the winner is the one who can most accurately predict his or her running time rather than being the one who is first to finish, children could be rewarded for accurately monitoring their own progress. By utilizing these skills in the educational process, they are less likely to be used to subvert the the process. It is also very important that these children develop an accurate knowledge of their limitations as well as their strengths.

Teaching is made easier when the students can communicate to their teacher their understanding of the material and the source of any confusion. In order to learn, one must be willing to admit to not knowing. Giving students an important role in the educational process may increase their courage span enabling them to risk revealing weaknesses so that they may be strengthen.

Educational Grouping of Children with Special Needs

The pattern of language errors and the high dependency of dysphasic children on adult help suggests that the educational practice of grouping these children together in small numbers for instruction may have undesired consequences.

One problem with grouping children with language problems together is that the children are continually exposed to language samples that are deviant. Since language acquisition depends on exposure to the language, grouping children with deviant language together may contribute to their problem as they do not get an opportunity to listen to good speech models from their peers. The errors listed for each of the children were very similar and in some cases the same incorrect phrases were used by different children.

Another effect of homogeneous grouping of children is that when difficulties arise with lessons, the children are less likely to be able to help one another. Thus, the dependency on adult help (that was found in this research) develops. It has been observed in other studies that children with learning disabilities know what kinds of activities are likely to be difficult for them and develop strategies for avoiding or managing these situations (Hood, McDermott and Cole, 1980; Cole and Traupman. 1980). For example, a learning disabled child, Adam, could not read very well. As a member of a cooking club he was able to successfully hide his reading difficulties by working with a younger child who had a hard time carrying out directions. Together they are able to complete a task that would be close to impossible for either one of them to carry out alone. By grouping children with specific problems together they are unable to get the kind of help they need from anyone but adults. It is possible that we have ignored the importance of informal learning that takes place when peers help one another. Homogeneous grouping of children may eliminate an effective channel of education: peer teaching.

Students with the same educational problem are grouped together so that they can be given more individual and small group help in the same curricular areas. There are a number of ways of accomplishing these goals that do not have the negative consequences that have been described. One is to group children heterogeneously in special education programs. In this configuration children with different skills could be used as peer experts to help other children learn. Yet the classes would remain small. Another solution is to place a greater emphasis on partial mainstreaming. This could be accomplished by flexible grouping of children for different subjects.

Computers may provide the link that will make these alternative groupings feasible. Computers can be programmed to provide the support systems which enable students to work cooperatively on a variety of skills. We are currently developing Programs that allow teachers to create interactive lessons and store them for student use. Used in this way, the computer can help teachers with the problem of needing to be in more than one place at one time.

Computers and Education

One of the initial reactions that people often have when computers are paired with education is to conjure up the stereotypical vision of a child sitting before a computer acting in an almost robot like fashion. This vision of a mechanical teacher scares those who believe that teaching is an intrinsically human enterprise.

While computers are extremely useful tools, they do not have a mind of their own. Children interacting with a computer are not interacting with a machine. They are interaction with teachers and programmers in non-real time (Black, Levin, Mehan and Quinn 1983). Just as books enable students to interact with authors who are not co-present in the classroom, computers can enable to students to participate in lessons that are arranged prior to class time. Just as books are used by teachers and students to raise issues, provoke discussions and provide information, computers can be used in a similar fashion. But unlike books, computer programs can be tailored to adjust themselves to the level of the students, thus providing an important resource for teachers who work with students of differing abilities. Because computers can also be used as a communication medium between teachers and students and among students they can create more, not less, networks of interaction.

My experience with computers and children during this research, and the work of other researchers exploring the educational uses of computers in our laboratory, (Levin and Kareev 1980; Levin, Boruta, and Vasconcellos 1982; Quinsaat 1981) has created a completely different image than the robot-like one described above. Children frequently work on computers in pairs or small groups. Together children discuss, propose and check responses to computer questions or problems. They help each other remember information regarding the form of interaction that is allowed, find keys on the keyboard, and correct mistakes that are made. Frequently interactions which begin during computer work continue after the children are no longer working on the computer.

The measures of social interaction I used in the research suggest Dysphasic children had more difficulty engaging in social perspective sharing. A number of theories of cognitive development place a high premium on social interaction as a way of providing multiple perspectives to be internalized as a means of learning (Piaget, 1971; Vygotsky, 1978; Newman, 1980; Flavell 1981).

In the Comparison Study, the Language students could answer the questions asked by their peers, but they did not ask the question that would give them the kind of help they needed. Remedial instruction provided to children in special categories provides practice answering "known information questions" posed by a teacher. It does not help them to learn how to ask questions. Formulating questions is as important a skill as answering them. Working with peers on computers provides this needed practice in asking, as well as, answering questions.

Working together on computer games during the training study led to increases in joint problem solving that may have important consequences for cognitive development. Sharing the responsibility for failure as well as success seemed to help the students to take the necessary risks involved in working toward success. These findings and observation suggest that computers encourage, not inhibit, social interactions. Computers may help in regrouping special education children because they can be used to create social systems in which children with different skills can work together toward a common goal with guidance.

CONCLUSION

Dysphasic children appear to have problems that cannot be said to be language problems alone. In other ways, they act less capable than other children. They may be mislabelled, but they are not misidentified.

Analyzing each of their skill domains in isolation leads to inferences about deficits that are not warranted when the whole system of their skills and abilities is considered. Trying to account for the differences necessitated a widening of the analytic focus to include the total system in which they were operating. By reformulating the nature of the task to which the dysphasic students were oriented, a different way of interpreting the skills of these students became possible.

The analysis of the skills of these children suggest that dysphasic children spend a great deal of energy avoiding tasks in which their problems are made overt. They are working very hard to manage the situations so that they are able to pass as competent students. These "passsing and management" strategies often make it very difficult for teachers to engage them in learning situations. Two recommendations were make for restructing the educational environments for dysphasic children focussing on their strengths rather than deficits. The first was to decouple reading from knowledge acquisition and to utilize student skills to draw them into systems of activities that model the skills that need to be learned. The second is to redirect "passing and management strategies" from task avoidance to to task analysis and skill assessment.

Students with language problems, even more so than linguistically normal students, need the help of their peers to learn. Isolating them together may not be the best way to help them. Finally computers, because of their ability to store interaction, can be a valuable tool for special education.

These are children who need and can profit from educational assistance, but not of the kind that public schools are currentlty providing. Assisting them in their learning, rather than assisting them to learn what current theories say they should learn, appears to be the way to success, theirs and ours.

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