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The Role of Key Visuals in Improving Listening
Comprehension for English as a Second Language Students

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ABSTRACT

The Role of Key Visuals in Improving Listening
Comprehension for English as a Second Language Students

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With increasing globalization, more and more second language students are entering Canadian universities, be they international students completing their university studies in Canada before returning home or new Canadians furthering their studies in their new homeland. Tertiary institutions are facing the challenge of successfully integrating these students into programs as quickly as possible. They are expected to function well alongside their native language peers in spite of their linguistic limitations. In the university, the lecture is an important source of information for students. Understanding lectures may constitute a major problem for second language students because of linguistic deficiencies.

Research on comprehension suggests that background knowledge plays a role in understanding. This background knowledge may consist of knowledge of the topic, linguistic knowledge or familiarity with the form of the information being presented. Studies have shown that preparing students for what they are going to hear by activating or providing background knowledge can help them to understand and remember what they have heard.

The purpose of this study was to compare two preparation techniques to see which was more helpful for ESL students. Two groups of university students received training and practice with problem-solution lectures. One group received vocabulary instruction before each practice lecture and the other group worked with a key visual or graphic organizer designed to sensitize students to the problem-solution format of the lecture and help them to organize the ideas of the lecture. A third group, the control group, received no particular training with this type of lecture. All groups, on average, improved in their ability to understand the test lecture although it was impossible to say, based on the statistical evidence, whether either of the pre-training methods was more effective than the other or than the instruction received by the control group. The teacher's and the students' reaction to the graphic organizers was positive and the technique made them conscious of lecture comprehension and note-taking strategies and promoted active engagement in the process.

Thus, it may be concluded that language training courses for university-bound ESL students should incorporate many techniques to improve students' comprehension. Among them are vocabulary instruction and training in preparing and using graphic organizers for the information presented in lectures.

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CHAPTER 1

INTRODUCTION

In the university setting, the lecture plays a great role in academic work, and is usually "the principal medium of teaching" (Flowerdew & Miller, 1996b, p. 23). In courses where they do not simply repeat the text, lectures represent an important information source and ESL students who have difficulty understanding lectures will be at a disadvantage in their course work. Thus, listening comprehension is an important skill to be acquired by second language learners hoping to succeed in the university milieu. Both faculty and students seem to recognize its importance. Flowerdew and Miller (1996a) working in their Hong Kong setting and Powers (1986) in North America report that lecturers and students rate lectures as the most important medium of instruction. Ferris and Tagg (1996) found that faculty in North American tertiary institutions expressed concern about ESL students' ability to take effective lecture notes. Indeed Ferris (1998) in her follow-up study found students describing problems with note-taking as well as comprehension problems. Since lectures are so important and since faculty and students acknowledge that second language learners have problems, more research is needed to help us better understand the listening comprehension process and to guide teachers as to what activities could be done in class to prepare second language learners for their academic careers and in particular for the challenges of learning from lectures.

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Much more research has been done on reading comprehension than on listening. Many researchers (Lund, 1991; Rost, 1990; Rubin, 1980; Samuels, 1987; Sticht, 1972) consider the two skills to be similar. There are differences, of course, in the initial subprocess (decoding) because of the difference in stimuli (oral versus written), but after the initial decoding process, comprehension is considered by most researchers to be an interactive process involving both bottom-up (data-driven) processing and top-down (content-driven) processing (Buck, 1995). For the bottom-up processing, the data come from the text itself while for the top-down processing, the reader/listener brings two kinds of background knowledge or schemata to the comprehension process: content schemata and formal schemata. Content schemata refers to background knowledge of the content area of a text while formal schemata refers to background knowledge of the formal, rhetorical organizational structures of different types of texts (Carrell & Eisterhold, 1983, p. 79).

Various studies of first language reading comprehension have shown the importance of background knowledge. Anderson, Reynolds, Schallert, and Goetz (1977) using ambiguous texts, demonstrated this influence. Steffenson, Joag-Dev, and Anderson (1979) showed how cultural schemata influence comprehension. Stevens (1980) and Hayes and Tierney (1982) demonstrated that providing background information related to the topic of a text could increase learning from that text.

Formal schemata have also been shown to play a major role in first language reading comprehension. The work of Kintsch and Yarbrough (1982); Meyer (1979, 1985);

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Meyer, Brandt and Bluth (1980); Taylor and Samuels (1983) among others, with expository prose, has shown that awareness of text structure appears to facilitate reading comprehension. Researchers further addressed the question of whether instruction in awareness of text structure would have positive effects on reading comprehension. Some studies (Geva, 1983; Reutzel, 1985) concluded that it did, while others were ambivalent (Taylor & Beach, 1984). Roller (1990) sums up the research with her conclusion that awareness of structure facilitates learning from texts about unfamiliar topics, but is less useful for texts on familiar topics.

For second language readers, as for first language readers, deficits in background knowledge of content can undoubtedly hamper reading comprehension (See Coady's, 1979, model of the ESL reader, research concerning discipline by Alderson & Urquhart, 1988, research on the target culture by Johnson, 1981, and by Hudson, 1982.). Deficits in knowledge of formal schemata can also hamper comprehension (Carrell, 1983, 1984a, 1984b, 1992). Second language readers' deficits in formal schemata, though, may stem not from lack of awareness of the structures of expository prose, but from having different structures in their own language and culture which interfere with the interpretation of expository prose in their new language. Kaplan (1966) was the first to point out this problem. Carrell (1984b, 1987, 1989, 1992) has done a great deal of research on the importance of awareness of text structure on second language readers' comprehension. Carrell (1985) and others (Carrell, Pharis & Liberto, 1989; Raymond, 1993a, 1993b) also

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looked at the facilitative effect of training students to recognize the rhetorical structure of expository texts.

The research on listening comprehension seems to indicate that content schemata are just as important for listening comprehension as for reading comprehension (Bacon, 1989, 1992; Chiang & Dunkel, 1992; Schmidt-Rinehart, 1994). Formal schemata are also important, as the research on discourse markers shows (Chaudron, 1983; Dunkel & Davis, 1994; Flowerdew & Tauroza, 1995). Lectures are usually pieces of extended formal discourse, planned in terms of the message to be conveyed, but not planned word for word. Students must be able to distinguish main ideas from supporting details, ignore digressions, recognize examples and follow the logic of arguments. Not only may second language speakers not have the appropriate formal schemata on which to draw, but they may not be sensitive to cues which signal the structure of lectures. Graphic organizers can be an interesting way of displaying formal schemata and if presented before listening may alert students to the organization of oral and written texts.

Mohan's (1986) key visuals are a particular kind of graphic organizer which grew out of his work on the knowledge framework. His aim was to integrate language and content learning. His framework is based on the logical analysis of structures of knowledge. His goal was to identify general language and thinking skills which the learner can apply to new activities or social practices. He isolated six knowledge structures (classification, description, principles, sequence, evaluation and choice) which he

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considers common to all disciplines of study. Related to each of these are key visuals or graphic organizers (flow charts, webs, classification trees, etc.). Early (1989) suggests that these key visuals are particularly useful to second language speakers because they enable them to learn new concepts while lowering the language barrier. Learners can record information on graphics such as tables instead of having to write extensively. Such key visuals could be used as advance organizers to facilitate comprehension and memory of concepts by second language learners of limited proficiency. If the visuals are found to be helpful, they will be of particular interest to classroom teachers faced with integrating second language students into the mainstream, to teachers of English for academic purposes courses who are preparing students for academic studies and to teachers of second languages in academic settings. Furthermore, textbook writers and developers of computer-assisted language learning courses may want to use the framework as an organizing principle for their materials and to incorporate key visuals into their instructional units.

On the other hand, in second language classrooms and in published texts for classroom use, a great deal of attention is paid to vocabulary instruction. Indeed, Nation (1993) with reference to reading comprehension maintains that "good vocabulary knowledge makes good comprehension" (p. 115). Research by Pike (1979) and more recently by Laufer (1989, 1992a) supports this view. There is less research on the role of vocabulary instruction as preparation for lecture comprehension.

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Second language listeners are handicapped by their limited proficiency in the target language. This is particularly the case when they are required to understand university lectures and learn content from them for their academic program. Lectures, in Cummins' (1984) terms, are context-independent and cognitively demanding. The question is what would best help learners to understand and remember complex listening material. In this study, the question investigated is whether key visuals would be a useful tool to facilitate the comprehension and memory of listening texts by second language learners with limited proficiency or whether it would be better to spend valuable second language classroom time on vocabulary development.

1.1 Overview of the Thesis

Chapter II is a review of the literature relevant to key visuals and their role in improving listening comprehension and the comprehension of lectures in particular. Recent research on memory and retrieval is presented. The review touches on research on reading and listening comprehension and on content-based language instruction to describe the current situation in schools and post-secondary institutions in North America. The number of students seeking education in their second language is growing continually, and in urban settings, there is often a preponderance of ESL students in regular classes. Often, these students have not yet reached a level of proficiency in their second language that would enable them to cope with academic demands with ease. They are expected to learn from written and spoken material which is beyond their linguistic level.

A review of the literature on the importance of vocabulary knowledge for reading comprehension and for lecture comprehension leads us to see the merit of vocabulary preparation to aid lecture comprehension. The chapter ends with a summary of the issues and the research questions.

Chapter 3 outlines the development of the training and test materials and presents a description of a pilot study undertaken before the main study and includes a discussion of the problems of classroom research. Chapter 4 outlines the research methods of the main study, including a description of the participants, the materials, procedures, scoring and post-experimental interviews. Chapter 5 is devoted to the analysis of results. It contains descriptive statistics of the pre-experimental measures and of the dependent variables, inferential statistics of the latter and qualitative analysis of the interviews, recall protocols and students' notes. Chapter 6 includes a discussion and interpretation of the results. The limitations and implications of the study are also suggested.

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Content Based Language Teaching

The number of ESL students in English-speaking North America has been growing

dramatically in the last decade. Canada receives between 190,000 and 215,000 immigrants

a year (Ashworth, 2000, p. 21). These new Canadians tend to settle in large urban centres.

The Oakridge Reception and Orientation Centre in Vancouver processes more than 4,000

new students a year (Ashworth, 2000, p. 59). Roessingh (1999) reports that in centres like

Calgary, Toronto and Vancouver, ESL students form 20% to over 50% of the student

population in grades K-12. These large numbers, combined with government measures to

reduce spending, have led to the placement of Limited English Proficient (LEP) students

with native English-speaking peers at age- and grade-appropriate levels in ever increasing

numbers, whether they are ready or not (Gunderson, 1988). Rosenthal (1997) also remarks

on the enormous increase in Asian and Hispanic students in American colleges who are

immigrants to the country. These students see further education as the key to a better

future. They need to learn not only conversational English but to develop academic skills

and cognitive academic language proficiency to attain and perform worthwhile jobs as

adults in North American society.

Research in Canada (Cummins, 1984) and in the United States (Collier, 1987,

1989; Wong-Fillmore, 1983) has shown that although newly arrived immigrants can

become proficient at basic conversational skills (context-embedded language, cognitively-undemanding tasks) in one to two years, they require four to eight years to acquire academic language (context-reduced, cognitively demanding), the kind of language required in school. If a bridging course, such as Chamot and O'Malley's (1987) Cognitive Academic Language Acquisition is not available, the regular classroom teacher is faced with a class with a large number, or even a preponderance of Limited English proficient (LEP) students, and the problem of how to teach the subject matter curriculum to all her students, without watering it down to accommodate the ESL students and therefore boring the more proficient speakers. Furthermore, the ESL students must be able to progress through the school system and into society as quickly as possible.

Thus, content-based language teaching, the concurrent teaching of academic subject matter and second language skills (Brinton, Snow & Wesche, 1989, p. 2), is widely taking place in schools out of necessity if not by design. Content-based language teaching sometimes takes the form of sheltered language teaching – content courses taught in the second language to a segregated group of learners by a content area specialist (Brinton et al., 1989, p. 15), adjunct language teaching where students are enrolled concurrently in two linked courses – a language course and a content course (Brinton et al., 1989, p. 16), or sometimes simply a sink or swim approach. Content-based programs are popular because they are economical. If students can get double value for their classroom time, mastering content and their new language at the same time, the costs to the educational system are lowered.

There are good reasons for expecting the teaching of language and content at the same time to work. The success of French immersion programs, a form of content-based language teaching, in Canada (Swain, 1974) lends support to the approach. Furthermore, research on sheltered and adjunct subject matter language teaching at the University of Ottawa (Edwards, Wesche, Krashen, Clément& Krudenier, 1984; Hauptman, Wesche & Ready, 1988) showed that university students, if given language support, were able to succeed as well in a subject matter course in their second language as in the same subject matter course in their first language. At the same time they made gains in second language proficiency equal to or greater than those of students in regular second language courses. According to Krashen's input hypothesis (Krashen, 1984), content-based language teaching works because it provides second language learners with input at the i + 1 level, that is, linguistic input that is just a little bit beyond their current level of second language competence. This input is comprehensible because of the familiarity of background knowledge, contextual cues or extralinguistic cues such as gestures by the teacher. Furthermore, Krashen hypothesizes that because the focus is on content and not only on linguistic form, a non-threatening situation is created for language learning.

Wong-Fillmore (1982, 1989), however, claims that if done poorly, teaching English through content can entail the teaching of subject matter in a language the students do not understand. She concurs that the best material for LEP students is content which is age- and grade-appropriate, indeed the grade-level curriculum. This will promote Corno and Mandinach's (1983) 'cognitive engagement.' The problem is making the content

accessible. The material must be carefully organized and presented in order to give children multiple ways to access its meaning. There needs to be a focus on language so that patterns are presented repeatedly in the course of time, enabling students to learn language when it is needed and when they are ready. Swain (1988), too, has suggested, based on her research on immersion programs, that comprehensible input is not enough, that learners also need to be given opportunities for comprehensible output or what Wong-Fillmore (1989) called "supported practice" (p. 136). Swain recommends that students be given input in the full functional range of the language and the opportunity to produce this full range of language. Teachers need to engineer contexts for specific infrequent usages of language. Consistent and helpful feedback should be provided for learners with regard to their errors, helping them attend to and act on their language weaknesses.

Content-based language teaching is taking place in many schools and post-secondary institutions of North America. Second language learners, sometimes without adequate preparation or support, are being expected to function academically alongside their native speaker counterparts in the school system. They are expected to read and learn from material written for native speakers; to understand and learn from explanations or lectures in class that are aimed, for the most part, at native speakers; to participate in class discussions or seminars on an equal footing with native speakers; and to write essays, examinations and reports which will be assessed, at least in terms of clarity and appropriateness of content, according to native speaker standards. Is the content-based language teaching being done in the best possible way? What kind of support could

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language teachers or content teachers with some ESL training offer second language learners so that they could perform successfully in their new academic setting? This thesis focusses on providing support for second language learners in their listening comprehension. Because most of the research on comprehension has been done on reading, the literature review begins with reading comprehension in an attempt to understand how the comprehension process works for both reading and listening.

2.2   Research on Reading Comprehension

Understanding oral and written language has historically been considered to represent essentially the same process (Lund, 1991; Rost, 1990; Rubin, 1980; Samuels, 1987). It consists of "two aspects, decoding (converting acoustic or printed stimuli into basic language units) and comprehension (the construction of meaning using both the decoded language and the comprehender's prior knowledge)" (Lund, 1991, p. 196). Kintsch and van Dijk (1978), for example, claim that their model applies to both reading and listening, for the main differences between reading and listening occur at lower levels (p. 364).

Reading research at times has focussed more on the decoding part of the process and at other times on the comprehension aspect. The majority of current models of reading are interactive (Perfetti, 1985; Rumelhart, 1977 in first language reading, and Coady, 1979; Devine, 1983; Segalowitz, 1986 in second language reading). They involve a combination of bottom-up processing which entails a linear progression of processing from

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visual input of the text itself to an eventual meaning (Gough, 1972) and top-down or conceptual processing whereby the reader makes hypotheses, based on background knowledge or schemata, about the content of the text and its text-type and is continually confirming, refining or rejecting them as the reading process continues (Goodman, 1988; Smith, 1973).

Because this thesis focusses on listening comprehension and because the decoding processes differ in the two media, research on meaning construction rather than decoding will be emphasized. This comprehension part of the reading process relies heavily on schemata. Carrell and Eisterhold (1983) and Carrell (1984a), working in the area of second language reading, categorize schemata as either content (knowledge of the content area of a text) or formal (knowledge of the formal, rhetorical organizational structures of different types of texts).

2.2.1 Content Schemata

In first language reading research, several experiments have investigated the importance of background knowledge or content schemata for comprehension. Bransford and Johnson (1972, 1973), in a series of experiments involving the comprehension and recall of ambiguous paragraphs, were among the first to demonstrate that for comprehension, the context of a passage had to be given before one reads it. Just providing an illustration of isolated objects mentioned in the passage without showing the context was not effective in facilitating recall. The parts of the picture had to appear in the

same relationship as in the passage to be read. "In order for prior knowledge to aid comprehension, it must become an activated semantic context" (p. 724).

A study by Anderson et al. (1977) further showed the importance of using the right schema when interpreting a text. They used two ambiguous texts, each of which could plausibly be interpreted in two different ways (the Prison/Wrestling passage and the Card/Music passage). They found that music students tended to give the Card/Music passage a music interpretation and that physical education students tended to give the Prison/Wrestling passage a wrestling interpretation although both of these interpretations were unusual in that pilot studies indicated the other interpretations to be more typical in the general population. The background of the subjects, however, did not affect the number of idea units recalled. Theme-revealing disambiguations and intrusions, though, as expected, were significantly related to subjects' backgrounds. Autobiographical inventory responses indicated that subjects imposed one framework on the message without deliberately considering or even being aware of the other.

If, as Anderson et al. (1977) show, a person's background determines the interpretation of an ambiguous text, unfamiliarity with the cultural background of a text could lead a reader relying on her experience to misinterpret texts which assume certain cultural knowledge. On the other hand, familiarity with the concepts in a text should ease comprehension. Indeed, Steffenson et al. (1979) in their landmark study of the effect of cultural schemata on reading comprehension showed that adult subjects read, in their own

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language, a culturally familiar letter about an American and an Indian wedding more rapidly, recalled a larger amount of information from the passage and produced more culturally appropriate elaborations than they did for a culturally unfamiliar letter. Pritchard (1990) did a similar follow-up study, this time using letters about funerals read by proficient American and Palauan adult readers. Again, students recalled significantly more idea units and produced more elaborations and fewer distortions for the culturally familiar passage than for the unfamiliar one.

Reading texts in one's second language would create greater problems for readers who lack the proficiency to understand a text with ease. Thematic pictorial cues presented before second language subjects read a text might facilitate comprehension by compensating for the absence of appropriate schemata or by triggering the activation of such schemata. Omaggio (1979) followed up on Bransford and Johnson's work (1972, 1973) with first language readers. She investigated the effects of various types of pictorial contexts, used as advance organizers, on measures of comprehension of texts read in one's first language or in one's second language and what information can be obtained from the pictorial contexts alone. Each of her 18 groups read a text in their first language, in their second language or received no text in one of the following conditions: with no picture; with a thematic picture consisting of one object or of a scene from the main portion of a 650-word story; with a prethematic context picture; with a posthematic picture; or with a series of three pictures. Omaggio found that "the pictures did not differentially affect reading comprehension in the native language" (p. 112). For second language reading,

however, there were differences, with the best performance obtained when the prethematic picture was provided, and the worst results with no picture. For Omaggio, the results suggest that for a relatively easy text in the native language, the pictorial aids may have been superfluous, but were helpful for second language readers.

Hudson (1982) also found differential effects of induced schemata on reading comprehension according to proficiency level. He worked with three levels of second language readers of texts at three levels of difficulty. His three methods of intervention were cue pictures, intended to induce appropriate schemata, and vocabulary items and extra exposure to the text, both intended to allow the readers to reconcile their initial schemata with those of the actual text. The ANOVA showed significant effects for treatment, treatment by order and a significant treatment by level by order interaction. Different types of intervention seemed to be effective at different levels of proficiency with the type of treatment having a greater effect at the beginning and intermediate levels than at the advanced level. The advanced level readers found self-reconciliation through the text itself, without cue pictures or vocabulary aids, more effective than externally induced schemata (p. 20) whereas the pictures were more beneficial at the beginning level than the vocabulary or extra reading (p. 18).

This differential effect according to proficiency level might explain the findings of Carrell's (1983) study in which fairly advanced second language readers of English read two ambiguous texts (the Bransford & Johnson, 1972, 1973, texts). Her conclusion was

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that background knowledge in the form of contextual cues (the title and a picture page) , within-text cues signalling the content area of the text, or familiar content had virtually no significant effects for fairly advanced second language readers. Lee (1986a) criticizes Carrell for not having several levels of learners so that results could be compared across levels, and in a second article (1986b) suggests that another confounding factor in Carrell's study may be the fact that the recalls were done in subjects' second language. Lee (1986b) replicated Carrell's (1983) study, except that he used recall protocols in the native rather than the second language. He found that second language learners did appear to benefit from the contextual cues for the familiar passage, but did best on the novel topic passage when no contextual cues were provided. He maintains that the picture had no effect because it was just as novel as the text. Thus, the interaction between comprehension of a text in one's second language and one's background knowledge related to the text is a complex one.

In summary, most researchers conclude that if learners already have appropriate concepts at their fingertips and/or if the text they are reading is not ambiguous either in terms of novel concepts or because the text is too difficult, contextual or pictorial clues are not necessary for comprehension and have no positive effect, although Lee's (1986b) study raises some doubts about this conclusion. Furthermore, the picture or induced schema itself must be contextualized and familiar to the reader for it to be helpful.

Another factor which may affect the comprehension of a text is interest in the topic. Carrell and Wise (1998) in their study with 104 ESL-EAP students at an American university attempted to tease apart the effects on reading comprehension of prior knowledge of a topic and expressed interest in the topic. They used fairly mature students (mean age of 25) all at a fairly high level of second language proficiency. The students ranked ten topics according to their interest and completed a task involving ten multiple-choice questions to assess their level of knowledge of each of the topics. Later each student read four texts from an encyclopedia: a high interest-high prior knowledge, a high interest-low prior knowledge, a low interest-high prior knowledge and a low interest-low prior knowledge text, selected according to her results on the pre-test. Each student did a ten-item multiple choice comprehension test on each of her four texts. The researchers found students' prior knowledge of the topics and topic interest to be essentially uncorrelated. They suggest that this should not be unexpected because students who reach university are likely in their academic careers to have had to read many texts in which they are not really interested and may not yet have had the luxury of learning about topics in which they are truly interested. Surprisingly the researchers also found that neither prior knowledge nor topic interest was highly significant nor an additive factor in reading comprehension for their subjects on the topics used in their experiment although the results do suggest that when either prior knowledge or topic knowledge is high, reading comprehension is slightly facilitated and may suffer most when both prior knowledge and topic interest are low. The authors themselves admit that the study is somewhat limited by

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the fact that they used only a single, conservative multiple-choice measure of reading comprehension. Clearly, more focussed research is needed on this issue.

To conclude, the presence of appropriate content schemata can have a positive influence on a reader's success at understanding a text. This is particularly true if a text is ambiguous or, for the second language reader, difficult to understand. Choosing an inappropriate schema to apply to an ambiguous text (Anderson et al., 1977) or to a text from an unfamiliar culture (Pritchard, 1990; Steffenson et al., 1979) can lead to distortions and misunderstandings. Induced schemata if clear, familiar, and in the appropriate context, can help to compensate for reading difficulty. The reader's interest in the topic of a text may also affect success in understanding (Carrell & Wise, 1998) although this issue needs further research. The material chosen for the experiment should be interesting or on topics generally familiar to the participants. The induced schemata, to be helpful, must be clear and familiar and not introduce another dimension of difficulty to the reader.

2.2.2 Formal Schemata

Another influence on comprehension besides familiarity with content is familiarity with appropriate text types and text structure or formal schemata. Failure to activate the appropriate formal schema for a text can lead to non-comprehension (Carrell & Eisterhold, 1983, p. 560; also Carrell, 1984a). This failure may be due either to the writer's failure to use conventional patterns or to provide sufficient clues in the text to alert the reader to

the appropriate schema or to the reader's limited skill which may vary at different stages of development due to age, innate ability or second language proficiency.

According to the models of Kintsch and van Dijk (1978) and Meyer (1975), both working in the area of first language reading, the use of text structures is a necessary skill in comprehending and summarizing text. For Kintsch and van Dijk (1978), using a general text-type schema, a reader applies the rules of deletion, generalization, and construction to the microstructure of a text to form a macrostructure, or mental gist, of the important information in the text to be remembered. To produce a written recall of text, the reader-now-turned-writer applies the rules of addition, specification, and particularization to the gist in his or her head. In the same vein, Meyer (1979) maintains that readers use top-level structures (her term for organizational structures) when they approach a text and to retrieve a text to facilitate recall. Finally, among the factors identified by Brown, Campione, and Day (1981) in their tetrahedral model for considering problems of learning from texts by first language learners is the ability to recognize text structure, cohesion and the logical content of the materials.

Written materials are usually classified as either narrative or expository (Meyer, 1975). This thesis will concentrate on expository prose as this is the kind of writing that students most often deal with in the academic setting.

There has been considerable interest in first language education in the exploration of the organization patterns of expository text and the value of familiarizing students with expository text structures (Brown et al., 1981; Kintsch & van Dijk, 1978; Meyer, 1975). Meyer (1985) identifies five basic logical relations in expository text: collection, causation, response, comparison and description. These logical relations underlie the message of expository texts and can serve to organize the text as a whole. They help readers identify and tie together the most essential related propositions. Meyer (1979) contends that a skilled reader possesses a finite number of formal schemata related to text organization and approaches text comprehension with the knowledge of how certain texts are conventionally organized. These schemata act as guides for organizing the text during the process of comprehending and later for recalling the information in the text. Similarly, Kintsch and Yarbrough (1982) assumed that experienced readers were familiar with a number of rhetorical forms--such as argument, comparison-contrast, and definition, and that they used these to organize the texts they were reading.

Studies of the influence of organization patterns of expository prose on reading can be placed in two groups: first, those which look at whether the presence or absence of good organization in texts affects comprehension and, implicitly, whether readers are aware of text structure, and second, studies in which researchers teach participants techniques to identify organizational patterns and investigate the effect of this instruction on learners' comprehension and retention of material read.

2.3   Text Structure and First Language Reading Comprehension

2.3.1   Awareness of Text Structure

Geva (1983), Meyer (1985) and Taylor and Beach (1984) found that skilled first language readers use their knowledge of how texts are organized to aid their comprehension and memory. One way of investigating the effect of good organization on readers' performance, is to work with tightly- versus loosely- organized texts. Meyer, Brandt, and Bluth (1980), for example, asked 102 ninth graders with high or low scores on a reading comprehension test to read a comparison and a problem-solution text and recall it both immediately and with some delay. They found that clearly signalled rhetorical structures led to better performance in free recall than loose, list-like structures. They also found that skilled readers used the texts' top level structures and recalled significantly more idea units.

Similarly, Kintsch and Yarbrough (1982) used well written and poorly written texts as stimuli for their experiment. They felt that well organized texts that followed the expected pattern should lead to better global understanding of a text, but clear organization should not have any effect on the local processing. The authors concluded that various cues in the good versions of the texts triggered appropriate rhetorical schemata in the reader (p. 833) and claimed this lent support to the notion of strategy-based comprehension processes. The absence of cues seemed to interfere with global comprehension. Once again, clearly organized texts which followed the conventional pattern proved easier to understand than poorly written texts.

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Tyler and Bro (1992) compared the difficulty which different, including some unconventional, types of text organization would present for native speaker readers. They began with four excerpts of discourse produced by Chinese speakers of English which Young (1982) reported were difficult for native speakers of English to understand. Tyler and Bro asked 115 native speakers to rate four written versions of these excerpts. The four variations were: 1) the original Chinese speakers' discourse reported by Young; 2), the original with the ideas rearranged into a supposedly typical English rhetorical pattern; 3) a reconstruction with the original order of ideas, but with changes in interpretive cues in the areas of specificity, tense/aspect and logical connectors and 4) a version with the order of ideas reversed and the discourse-structuring miscues manipulated. For three out of the four excerpts, subjects rated the original version as more difficult to follow. The third excerpt was easy to follow in all versions. The general pattern seemed to be that varying the order of ideas made no difference. The missing discourse cues or cues used in unexpected ways by non-native speakers caused the native speakers to find the discourse hard to follow. Tyler & Bro's (1992) study showed that second language learners' unconventional schemata can make their writing difficult for native language readers to understand.

Generally speaking, awareness of text organization seems to develop during the middle years of elementary school (Englert & Hiebert, 1984; Taylor & Samuels, 1983). Poor readers at the college level, however, may still not have mastered certain types of organization such as comparison-contrast (Hiebert, Englert & Brennan, 1983). According

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to a study by Richgels, McGee, Lomax, and Sheard (1987), the causal pattern is acquired later than the others. So, there seems to be some variation in the acquisition of organizational patterns.

In view of the evidence that some organization patterns are learned sooner than others, it is worthwhile to ask whether certain organization patterns are more salient for readers than others. Horowitz (1982) looked into this issue with a replication of a study by Meyer and Freedle (1979). In this study graduate students in education listened to a text organized according to one of the four types (comparison, causation, collection and problem-solution). The participants were to identify the organization schema of the passage and write a free recall immediately and one week later. Meyer and Freedle found the best recall for the comparison text and concluded that the more tightly organized a text, the better it is recalled. In a similar vein Richgels et al. (1987) found that since description or collection is not tightly organized, poorly organized descriptions did not seem to present particular problems to readers. Horowitz, in her replication of the Meyer and Freedle (1979) study, looked at reading rather than listening and added a control group. She sought to investigate whether different organization patterns had a differential effect on reading comprehension. She used the patterns: causation, problem-solution, comparison, and a collection of descriptions for two texts. Her subjects were at two grade levels (grade 9 and university freshmen). Her instruments were immediate free recall, time on task recorded and a metacognitive knowledge questionnaire. She found no main effect and no differential

effect for rhetorical patterns. Her passages were very short, however, and very well organized.

It is apparent that when skilled native language readers approach a text, they activate certain formal schemata which second language speakers may not possess. The research seems to support the hypothesis that a poorly organized text or a text which does not follow the expected organization pattern will be more difficult to understand than a well organized text which follows conventional patterns. Tight organization presents less difficulty for the reader than loose, list-like structure and leads to better recall of the text. Furthermore, the presence of appropriate rhetorical cues is facilitative. Overall, we can conclude that recognition of the organization patterns of texts has positive effects on students' reading and writing performance (Hiebert et al., 1983; Taylor & Samuels, 1983). One might well ask if instruction to foster awareness of different organization patterns would improve readers' success.

2.3.2 Instruction of Techniques to Identify Text Structure

Brown et al. (1981) suggest that sensitizing young readers to the logical structure of texts and the inherent meaning in certain passages will help the less able reader. Students could be taught to examine a text for cues the author has provided to signal important statements and to appreciate the significance of these devices. Their work with training average and remedial junior college students to summarize well showed the effectiveness of teaching the clearly specified rules used by experts.

Other researchers have experimented with teaching learners different techniques for identifying the organizational structure of reading passages to see if readers' comprehension improved. Singer and Donlan (1982), for instance, taught eleventh-grade students a problem-solving schema for comprehending short stories, along with a strategy for generating story-specific questions. These procedures enabled the students to understand the complex stories significantly better than control students.

Taylor and Beach (1984) taught a hierarchical summary procedure for social studies material to seventh-grade students. The instruction and practice enhanced students' recall for relatively unfamiliar, but not relatively familiar, social studies material.

Text mapping is another way of sensitizing students to the structure of a text. Geva (1983), in two studies with students from community colleges, taught students to do flowcharts for expository paragraphs. Low students benefited most from the training in making flowcharts. They improved the most on the standardized reading test. The experimental students as a whole performed significantly better than the control group on a reading comprehension measure designed to measure students' sensitivity to interpropositional relations.

Reutzel's (1985) study showed the benefits of story mapping for grade five readers in their recall of a narrative and an expository text. The story map group recalled significantly more propositions on both texts than the directed reading activity group.

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Roller (1990) in her discussion of the research on the importance of formal schemata for reading comprehension emphasized the effects of world knowledge and text structure variables on comprehension. She concluded that "structure facilitates learning from text in situations where the content of the text is relatively unfamiliar to the reader" (p. 84), but that "structural features are less useful when the information in the text is relatively familiar and when the text is so unfamiliar that the reader cannot focus on and sort out the relations between ideas" (p. 84). This conclusion fits well with Omaggio's (1979) finding that pictures were superfluous, and therefore not helpful, for reading material that is familiar.

Is it enough for readers to just study a teacher-prepared map before approaching a reading or is it better to instruct learners on map construction and give them practice in map-making beforehand? Berkowitz (1986) in her comparison of four instructional techniques designed to improve sixth graders' ability to recall expository prose found no advantage for just studying a map. Actual construction of maps for one of her expository passages was significantly more beneficial, as measured by immediate free recall, than the map study, a conventional question-answer and a rereading technique. When only students judged to be expert at either constructing maps or answering questions were included in the analyses, she found significant beneficial results for the map construction under immediate and delayed recall conditions. No effects were found in favour of the map study procedure. These results suggest that instruction and practice in map construction would be beneficial for middle-grade students.

Techniques focussing on text structure do seem to facilitate comprehension and memory of expository texts for first language readers. This is particularly the case for unfamiliar material (Taylor & Beach, 1984), provided it is not too unfamiliar (Roller, 1990). Such techniques include teaching actual schemata (Singer & Donlan, 1982), flow chart construction (Geva, 1983) and story mapping (Reutzel, 1985). Actually constructing or manipulating the maps seems more beneficial than just studying them (Berkowitz, 1986). Other types of concept mapping will be discussed in Section 2.9.2 of this chapter.

2.4   Text Structure and Second Language Reading Comprehension

2.4.1   Awareness of Text Structure

We turn now to second language learners. We have already seen how culture can affect second language learners' interpretation of a text (Steffenson et al., 1979) and how second language learners can produce texts that are difficult for native speakers to follow because of unconventional organization patterns or missing discourse cues (Tyler & Bro, 1992). Carrell (1987) attempted to tease apart the effects of content and formal schemata on reading comprehension. Her subjects were adult high-intermediate ESL students of either Catholic or Muslim background. She prepared two versions of 250-word fictionalized historical narratives about little known religious personages of both religions. One version had familiar organization, the other unfamiliar with scrambled order. Students did written recalls and answered multiple choice comprehension-inference questions after reading the text. Carrell found content to be a stronger predictor of performance than was form or any interaction between the two, although the form of the text was found to be a

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significant factor in whether subjects clearly expressed the two main organizing ideas of each text or not and in the comprehension of event sequences and temporal relationships among events. On the other hand, subjects familiar with the content of a text recalled significantly more main topics and major idea units than those unfamiliar with the content and produced fewer culturally based elaborations and distortions.

It is obvious that second language learners may experience difficulty understanding a text due to deficits in target language proficiency. They do, however, already have reading skills in their first language. Would their experience in first language reading lead them to use different strategies from native speakers to counterbalance their limited proficiency in the target language?

Block (1986) did a small case study to attempt to answer this question. She used six generally nonproficient ESL readers (3 native speakers of Spanish and 3 native speakers of Chinese) and three nonproficient English native speakers. Based on think aloud protocols, she divided her subjects into integrators and non integrators with integrators being the more successful readers and generally better students. She found 'integrators' integrated information, were more generally aware of text structure, responded in an extensive mode, i.e., focussing on the author's ideas versus their own thoughts and feelings and monitored their understanding consistently and effectively. Language background did not seem to account for the different patterns. Nor did ESL readers appear

to use different strategies than did native speakers of English. This led Block to conclude that strategy use is a stable phenomenon, not tied to specific language background.

Carrell (1989) was also interested in investigating the relationship between readers' metacognitive awareness of various types of reading strategies and their reading ability in their first and second language. She used a self-report measure, a metacognitive questionnaire with 45 intermediate and advanced ESL Hispanic university students and 75 anglophone students of Spanish who were at low intermediate, intermediate and advanced levels. A multiple choice test on two 300-word reading passages (comparison-contrast and problem-solution text types) was used to determine reading proficiency. For first language reading, local reading strategies tended to be negatively correlated with reading performance, a finding in consonance with that of Kintsch and Yarbrough (1982). The students of Spanish, who were at lower proficiency levels, relied more heavily on bottom-up decoding skills while the more advanced ESL students tended to favour more global strategies. Although this difference coincided with the difference in first language, Carrell attributes the difference to proficiency level rather than linguistic origins. The lower proficiency readers, like Block's less successful non-integrators, tended to use local rather than global strategies. These studies lead us to conclude that differences in strategy use stem from proficiency level in the target language, with low-level readers depending more on bottom-up strategies while more competent readers are able to use the top-down strategies they would use in their first language, because some of the bottom-up processes have been automatized and thus do not require the reader's attention.

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Second language speakers reading in their target language may have appropriate metacognitive strategies and be aware of the organization patterns of expository prose, but be hampered by having different organization patterns in their own language and culture which interfere with dealing with those of expository prose in their new language. Kaplan's (1966) article was the first to suggest that thought patterns specific to the learner's native language or culture might be evident in the organizational patterns of ESL learners' free writing in English. Connor and McCagg (1983) wanted to see if this tendency would be evident in an immediate recall task written after subjects had read a typically organized English expository prose passage. They used a problem-solution text type. Subjects were eleven native English speakers, eleven native Japanese speakers and eleven Spanish speakers all studying at an American university. Culture specific patterns of organization did not emerge on the recall protocols as the native English speakers were the only writers to deviate from the pattern of the original text. It should be noted that the sample size was small and that only one text type was examined.

Carrell (1984b) looked at differing performance of various linguistic groups, but added the dimension of different text types. She used 80 adult intermediate ESL readers who read four types of expository texts (comparison, causation, problem-solution, and collection of descriptions), each a one-hundred-and-thirty-five word version of a text originally used by Meyer and Freedle (1984). (This study is described in the Listening Comprehension section of this paper.) Carrell wanted to find out whether differences in text type would be reflected in subjects' reading recalls and whether there was a

relationship between their ability to recognize and utilize rhetorical organization and the amount of information recalled from an expository text. One quarter of the subjects read each version. She found that recall (both immediate and delayed) was significantly better for the three tightly organized texts than for the collection of descriptions. This result held for three of her four linguistic groups (Spanish, Oriental and Other) but not for the Arabic group. She also found that for different language groups, different discourse types appeared to have different effects on the quantity of ideas recalled. For example, for the Oriental group, there were clear distinctions between problem-solution and causation, on the one hand, and comparison and collection of descriptions on the other hand. She also found that those ESL readers who recognized and used the text's original discourse structure to organize their own recall protocol (about a quarter of the sample) were able to recall more information from the original text. It should be noted that overall scores on the recall tasks were low, probably indicative of the fact that the task may have been too difficult for the participants although these scores were only slightly lower than those for native speakers in the Meyer et al. (1980) and Meyer and Freedle (1984) studies.

Carrell (1992) focussed on two text types (comparison-contrast and collection of descriptions) to check on second language readers' awareness of text type and the effect of text type on recall. Each text was about 270 words in length. She asked her 45 high-intermediate adult ESL students of various first language backgrounds to do a recall protocol and answer a direct question about their perception of the original writer's organization plan (a recognition measure). Recall protocols were scored for the number

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of idea units recalled (quantity) and the number of idea units recalled at four different levels of text structure (quality) as well as for use of the author's original text type organization. Carrell found that subjects did not recall more ideas from one type of text structure than the other. As for quality of idea units recalled, the two text structures differed only in terms of the top-level ideas recalled, with more recalled for the comparison-contrast text type. Those subjects who used the structure of the original passages to organize their written recalls recalled significantly more ideas than did those who did not. There were no such differences for the recognition measure of awareness. Qualitatively, students who used the text structure of the original passage recalled more of the main ideas and major topics of the original than did those who did not.

This study is surprising in that it conflicts with previous studies (Carrell, 1984b; Meyer & Freedle, 1984; and Richgels et al., 1987), which had all found superior recall for comparison-contrast structure although the Hiebert et al. (1983) and Englert and Hiebert (1984) studies provide supporting evidence for problems with the comparison-contrast text type. Carrell herself points out that her texts are very short and pure examples of the text type, something that is unlikely to be found naturally.

Research (Block, 1986; and Carrell, 1989) seems to show that readers do not tend to use different strategies when reading in their second language than in their first although low proficiency readers rely more heavily on bottom-up decoding skills than high proficiency readers. One might ask if second language readers could be taught to use

higher level global strategies to compensate for their language deficiencies. Another issue is whether differences between the organizational patterns of the target language culture and the reader's own organization conventions could lead to reading difficulties. Carrell (1984b) did in fact find differential effects on reading comprehension due to different language backgrounds. The issue of whether particular text types cause more problems than others is still unresolved. Some studies (Carrell, 1984b; Meyer & Freedle, 1984; Richgels et al., 1987) report superior recall for comparison-contrast texts while other studies (Carrell, 1992; Englert & Hiebert, 1984; Hiebert et al., 1983) provide conflicting evidence. For research focussing on the role of formal schemata, it would be best to use a tightly organized text type such as comparison-contrast or problem-solution.

2.4.2 Instruction on Techniques to Identify Text Structure

If, as Carrell (1989) found, second language students are at a high enough proficiency level that they are able to rely less on bottom-up decoding processes and use more global, top-down processing, they might benefit from training on recognizing the organization patterns of texts. Carrell's (1987) study and Roller's (1990) analysis suggest that there are times when awareness of the structural features of a text is useful. Some studies have involved training students to recognize text structures.

Carrell (1985) trained 14 high-intermediate adult students to identify and use four of Meyer's (1975) comparison, causation, problem-solution and collection of descriptions text types. A control group of 11 students also received training using the same text types

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but they focussed on content. Only two of the four text types (comparison and collection of descriptions) were used on the pre- and post-tests. A second post-test was administered to the experimental group only, three weeks after the first post-test. Each recall was analyzed in terms of the number of idea units recalled, the levels of idea units recalled and classified according to whether or not it used the text type of the original. Results showed that the training enabled the experimental subjects to recognize the two discourse types and use them in their recall protocols, even three weeks after training. The experimental group reached a mean significantly higher than that of the control group for high-, mid- and low-level idea units at the end of the study. Carrell concludes that explicit, overt teaching about the top-level rhetorical organization of texts can facilitate ESL students' reading comprehension as measured by quantity and quality of information recalled.

Raymond's (1993a and b) study was modelled closely on Carrell's (1985) except that the training was in French and all subjects were native speakers of English placed at the high-intermediate level in French as a Second Language. Recall protocols were done in the first language to avoid problems with confounding comprehension and production. Subjects in the experimental group received training in five of Meyer's (1979) top level structures (description, sequence, causation, problem-solution and comparison). The control group followed a conventional program with the same amount of exposure to the five top level structures. Some of the more proficient readers spontaneously used the problem-solution top level structure on both the pre- and post-test (problem-solution texts); thus, all subjects did not start with the same knowledge of top level structures and signal

words. After treatment, the experimental group recalled significantly more idea units from one text. A significant loss was observed though in the mean number of idea units recalled for the other text, a text which subjects considered more difficult. The loss could be attributed to the challenges to controlled processing afforded by the more difficult text, compounded by those of performing a complex task or simply the lack of background knowledge of the topic. This differential effect of instruction of textual organization is consistent with Carrell's (1987) study of the interaction between content and formal schemata and Roller's (1990) conclusion that structural features are less helpful "when the text is so unfamiliar that the reader cannot focus on and sort out the relations between ideas" (p. 84).

A third study compared the effects of two different types of strategy training on second language reading: pre- and post-reading semantic mapping and the experience-text-relationship (ETR) technique, a method which focusses on leading students to make connections between their experience and the content of a text. Carrell et al. (1989) trained two experimental groups of university ESL students for four days on one of these techniques while a control group received no special training. Each group had only 8 or 9 members. The researchers found metacognitive training to be significantly more effective than no training at all. Surprisingly the experience-text-relationship group made the only significant gain on the cloze semantic map post-test while only the semantic mapping group showed significant gains on the open-ended semantic maps. They also found significant aptitude-by-treatment interaction. Learning styles were measured by the

Inventory of Learning Processes (ILP) constructed by Schmeck, Ribich, and Ramanaiah (1977). Both deep and shallow processors in the experimental group performed well on the open-ended post-test map while only deep processors in the control group did so. Control group students high on the elaborative scale of the ILP out-performed those lower on this scale whereas in the ETR group, those lower on the elaborative scale out-performed those higher on the scale.

Some problems with this study should be noted though. The numbers in each group were small. There were only three multiple choice questions and two open-ended questions about the main idea and a synthesis question plus semantic maps. Still, the evidence suggests that metacognitive training varied to accommodate individual learning styles should be beneficial. Such training is helpful in cases where the reader is unfamiliar with the text topic. More studies on semantic mapping and concept maps will be described in Section 2.9.2 of this chapter, but we turn now to listening comprehension.

2.5   The Relation Between Reading and Listening

Listening and reading comprehension have historically been considered to represent essentially the same process. As early as 1963, Fries maintained

> "... learning to read is the process of transfer from auditory signs for language signals which the child has already learned to the new visual signs for the same signals..." (p. xv).

Samuels (1987) describes the reverse process in which the reader

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"must recode the printed words to subvocalized speech and then the same mechanisms used for listening comprehension will allow the reader to understand the text." (p. 295).

He identified seven "inside the head" factors which influence listening comprehension and ten which affect reading. The differences between the two sets (kinesics and speech registers for listening and decoding ability and graphic literacy for reading) reflect differences in the medium of input. Kintsch and van Dijk (1978), too, claim that their model applies to both reading and listening, for the main differences between reading and listening occur at lower levels, that is, at the decoding stage (p. 364).

For both reading and listening, after initial decoding, comprehension is taken to invoke both top-down and bottom-up processing which interact as the comprehender develops the textbase (Hansen & Jensen, 1994; van Dijk & Kintsch, 1983). Wilkinson (1980) stresses the role of memory (the storage of information and subsequent retrieval) as part of the wholistic understanding process. He even suggests that other processes may be involved but that recognition, comprehension and memory are the most critical components of understanding. Among the elements from long term memory which contribute to the development of the situational model of the input is knowledge of the organizing conventions of the type of discourse (Carrell's 1987 formal schemata). Buck (1992) and others (Alderson & Urquhart, 1984; Carrell, 1987; Rumelhart & Ortony, 1977; Schank & Abelson, 1977) maintain that comprehension is "largely a process of hypothesis

generation and testing in which hypotheses are often based on schemata and other sources of world knowledge" (p. 331).

Danks and End (1987) reviewed a number of studies which either directly compared the components in reading and listening or could lead one to infer similarities or differences between the two processes. They identified five processing components which they believe interact in both the reading and listening comprehension processes: speech perception and print decoding, lexical access, clause and sentence integration, discourse understanding and comprehension monitoring. They admit the dearth of studies on speech perception versus print decoding, but suggest that, although the two modalities are obviously different, at a higher level, the operating principles may be similar. Danks and End maintain that, in spite of severe methodological problems with many of the studies on sentence or clause integration and discourse understanding (Elgart, 1978; Hildyard & Olson, 1978; Smiley, Oakley, Worthen, Campione, & Brown, 1977; Walker, 1976), listening and reading components work in similar ways in laboratory situations where the cognitive demands for the two tasks can be kept constant. They believe that both language comprehension processes have the same set of strategies available to them to accomplish the task of comprehension and that they differ according to the cognitive demands imposed by the text characteristics, situational factors and cognitive skills (p. 291). For Danks and End, in first language comprehension, the understanding processes are essentially the same once the decoding has taken place.

Working in second language comprehension, Lund (1991), too, posits one process of comprehension for reading and listening but this is a flexible model which varies according to the nature of the medium. According to his model, listeners should recall more main ideas while readers should recall more details. Listeners should produce more idiosyncratic responses relying on the creative construction of meaning. Repetition of the task should help listeners to add more detail to their verbal constructs of meaning. He tested these hypotheses comparing listening and reading recall among beginning and intermediate college German students. He found that the readers had the advantage over listeners in quantity of recall. Contrary to expectations, repetition helped the readers more than the listeners at least until the intermediate level where listeners and readers showed equal gains on the second trial. Readers recalled more propositions at all levels of importance although listeners recalled a greater proportion of higher order ideas and produced more erroneous but idiosyncratic creative constructs. Lund concludes that the flexible model of comprehension which allows for strategic differences in the use of these processes according to the requirements of the different modalities explains his results.

Buck (1992) believes that listening comprehension is a separate trait from reading and that this can be isolated by tests. He admits that his earlier study with Ross (Buck, 1988) failed to show the construct validity of second language listening comprehension but suggests that the tests used in that study could have better "incorporated the differences between spoken and written texts" (p. 332). In 1992, he attempted to isolate listening as a separate trait, different from reading comprehension. Whereas texts of general language

comprehension did not measure listening comprehension as a separate trait, his tests, which used unscripted, more natural language, pointed to a distinctive listening trait, but his results were not significant. More research needs to be done to determine how the listening process differs from reading comprehension.

There is agreement among most researchers that, since the comprehension task involves different sensory modalities, the decoding tasks are somewhat different. Flowerdew (1994b), for example, notes that listening comprehension correlates with reading comprehension, but that a second set of skills is required for listening comprehension in its own right. Readers, for example, as Pratt and Krane (1980), based on their study of college students' processing of ambiguous passages under reading and listening conditions, noted, can turn to italic print and listeners to vocal intonation to help them interpret ambiguous passages. Flowerdew (1994b) and other researchers (Brown & Yule, 1983; Buck, 1991, 1992, 1995; Carlisle & Felbinger, 1991; Danks & End, 1987; Rost, 1990) point out that oral text is temporally based and fails to provide the comprehender with continuing access to text whereas written material exists in space and the reader has more control over the text and can revisit parts of it to revise her interpretation. Thus, listening comprehension entails real time processing and listeners have to make decisions about meaning based on different information than do readers. Redundancy does help and sometimes, in conversational settings, the listener can stop the speaker, ask for clarification or just indicate problems in comprehension so that the speaker can revise the input.

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The other distinctive aspect of listening comprehension for Flowerdew (1994b) involves the phonological features of the input. They can lead to problems with cognates which may differ in speech versus in print, difficulty recognizing unit boundaries within the stream of speech, and problems with hesitations, irregular pausing, false starts and stress and intonation patterns. If learners have been only exposed to ideal classroom language, they may have difficulty understanding colloquial speech (Brown, 1990). Furthermore, since linguistic patterns in speaking and writing are demonstrably different (Biber, 1988), there are different lexico-grammatical features which affect the two processes. Carlisle and Felbinger (1991) did indeed find different types of errors by fourth, sixth and eighth-grade L1 students who were good readers and/or listeners versus poor readers and/or listeners on tests of listening versus reading comprehension. They note, in particular, the tendency of listeners to repair sentences and to interpret sentences as meaning what they think they should mean rather than what they do mean.

As for differences in the input itself, researchers have compared spoken and written language. In a theoretical paper based on an analysis of the difference between the typical child's oral language and the language of a children's story. Rubin (1980) outlines differences in medium which include the use of stress, intonation and other prosodic features in speech only, as well as pauses and changes in speed used to provide clues for the chunking of words into larger constituents, interaction, involvement characterized by the use of first- and second-person pronouns, paralinguistic features, references to

temporal commonality, concreteness of reference, and clarity of distinction between different people's points of view.

Oral passages are usually regarded as context dependent, informal, unplanned and unedited (Chafe, 1982, 1985; Ur, 1984). Tannen (1982) views listening texts as ranging along a continuum from informal oral speech at one end to formal literate expression, such as lectures, at the other end. Chafe and Danielewicz (1987) documented differences between two types of written text (academic papers and informal letters) and two types of spoken language (conversations and lectures) based on samples produced by twenty professors or graduate students. Academic writing, the most formal, displayed the least colloquial vocabulary, the most literary vocabulary, the most passives and abstract subjects and the longest clauses or intonation units (the most prepositional phrase sequences, nominalizations, attributive nouns and adjectives). Clauses were joined together in complex ways. The authors point out that the writer has the luxury of time and resources to choose words carefully and the opportunity for unlimited editing. At the other end of the continuum is conversation which exhibited the most colloquial vocabulary, the most contractions, the shortest intonation units or clauses and the most responses to one's audience. Speakers tended to chain intonation units together most often with "and" and to insert, often incorrectly, a sentence-falling pitch. For different reasons, letters, perhaps because of the letter-writer's desire to imitate the casualness of spoken language and the tendency not to edit, and lectures, because of the processing constraints of having to produce language rapidly, fell in the middle of the continuum.

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Flowerdew 's (1994a) findings are similar. He compared biology lectures with the written material designed to accompany the lectures. Not surprisingly, the lectures had a lower lexical density and range and a shorter mean word length than the book and used fewer nominalizations and gerunds. Lectures contained more demonstrative pronouns and more discourse markers (such as "and," "so" and "well") but fewer logical connectors (such as "as a result," "moreover" and "nevertheless") than the book. Lecturers used first and second person pronouns, interactive particles (such as "okay" and "right") to engage their audience more than writers. Lecturers also used more boosters and downtoners (such as "only"), along with modals, all signs of less precise vocabulary.

We can conclude that there are inherent differences between oral and written material. These include: register, with written discourse generally more formal; vocabulary, with written discourse displaying more literary, more precise vocabulary; syntax, with written discourse containing more passives, nominalizations and fewer demonstrative pronouns; and organization, with written discourse being better planned and containing more logical connectives. In addition, written discourse is less context dependent than oral material. These differences, in addition to the fact that written material is more permanent, whereas speech is fleeting unless the listener has the luxury of access to repetition because the speech is recorded or the speaker is available to repeat, are notable, but affect the initial decoding of the input rather than the second, the comprehension stage of reading or listening.

2.6   Research on First Language Listening Comprehension

Not nearly as much work has been done on first language listening comprehension as on reading comprehension. Early research was with children and their understanding of stories. Arnold and Brooks (1976) did do an extension of Bransford and Johnson's (1972) study on reading comprehension which used ambiguous passages. They provided visuals and verbal organizers to activate schemata for second and fifth grade children. One group was given content-clarifying visuals while the other group saw visuals with the objects randomly placed in the frame. Fifth grade listeners who had received the content-clarifying visuals showed better comprehension and produced better recalls than the control group. In a second study researchers found contextualized verbal organizers did not produce significant results for either grade level. They concluded that older subjects had scripts or schemata which were activated by the picture, but not by the verbal organizer whereas the younger children perhaps did not have the relevant fairy tale schema to activate. This finding is similar to Omaggio's (1979) conclusion from her experience with second language readers that sometimes pictorial aids do not help.

Researchers (Mandler & Johnson, 1977; Stein & Glenn, 1979) have identified a close relationship between formal schemata and the aural comprehension of stories by children. Danner (1976) looked at the influence of passage organization on recall of expository prose. Second, fourth, and sixth graders listened to organized and interwoven taped passages and then completed a recall task and a test of their understanding of the passage structure. Logical passages produced better recall than the interwoven passages.

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Older children had better overall recall and better awareness of passage organization. This finding is in tune with the reading studies of Taylor and Samuels (1983), Englert and Hiebert (1984) and Richgels et al. (1987) which showed that awareness of text organization develops during the middle years of elementary school. It is also in line with the research of Kintsch and Yarbrough (1982) who found that adult readers better understood clearly organized texts than poorly written texts and that of Tyler and Bro (1992) whose native speakers had trouble understanding texts written by non-native speakers which contained discourse cues used in unexpected ways or were missing expected discourse cues.

Meyer and Freedle (1984), in a study of listening comprehension with forty-four teachers, tried to determine whether differences in discourse type affect learning and memory. Results indicated that such differences in discourse type do influence learning and memory. As expected, because it is more loosely organized, the collection of descriptions was less effective for learning and memory than causation, problem-solution and comparison discourse types which have additional organizational components in the structure. It is noteworthy though, that recall and use of structure from the problem-solution passage were poorer than expected. Furthermore, subjects who listened to the comparison and causation passages, as well as the majority of those who listened to the collection/description passage used the discourse structure of the original passage when recalling it, whereas those who heard the problem-solution passage did not. Further investigation revealed that the subjects did not agree with the solution presented in the

passage and therefore provided their own schema for the passage. This shows how background knowledge can influence the interpretation of a text.

The second study (Meyer & Freedle, 1984) involving two content structures, comparison and collection of descriptions provided support for the conclusion that the more organizational components of a discourse schema there are, the more facilitation for memory there will be. It should be noted, however, that Horowitz (1982) in a similar study, albeit with differences in mode of presentation (written rather than spoken) measuring only immediate recall, and using an additional text to Meyer's (1975) original Body Water text, found no differential effect for higher order structures on literal idea units recalled in her immediate recall task. She attributed this absence to factors such as readers' familiarity with text topic and content, the short length of the text and readers' skill.

Although there are fewer studies about the effect of the type of text organization and readers' awareness of organization on listening comprehension, the results seem similar to those for reading comprehension. In listening, just as in reading, awareness of organization develops in middle elementary school. More tightly organized passages produce better learning and recall. Differences in discourse type affect comprehension. We turn now to research on expository passages with second language listeners to find out whether awareness of content and formal schemata can facilitate listening comprehension

and whether teaching formal schemata to second language learners can improve their listening comprehension.

2.7 Research on Second Language Listening Comprehension

2.7.1 Content Schemata

There are fewer studies of second language learners' comprehension of spoken expository material than of written. However, as with reading comprehension, studies on listening comprehension have shown the importance of content schemata or background knowledge for understanding. Bacon (1989, 1992) conducted interviews with subjects who had listened to two expository passages selected from Voice of America broadcasts, to learn about their strategy use and comprehension. She found little use of advance organizers during the perceptual or decoding phase of listening comprehension, but effective use of previous knowledge during the utilization or comprehension phase. Successful listeners used their personal world and discourse knowledge well, whereas less successful listeners either ignored their previous knowledge altogether or focussed too much on it and built erroneous meaning. Having appropriate schemata available to use can make all the difference as Long (1990) found. Her third-quarter university students of Spanish recalled more correct idea units for a passage on a familiar topic than for one on an unfamiliar topic as measured by recall protocols in English.

The findings from Chiang and Dunkel's (1992) study with Chinese EFL students are a little more complicated. The researchers were investigating the effect of speech

modification through redundancy in lectures on familiar and unfamiliar topics on the listening comprehension of EFL learners, at the high- and low-intermediate levels as well as the influence of topic familiarity. Participants listened to a familiar and unfamiliar lecture and wrote a multiple choice test that contained both passage-dependent and passage-independent items, thought to be a measure of background knowledge. The speech modification was helpful only for the high-intermediate listeners. Subjects scored higher on the familiar-topic lecture than on the unfamiliar-topic lecture, but a significant effect was found only on the passage-independent items. For the unfamiliar lecture there was no difference in performance on passage-dependent and passage-independent items. For the passage-dependent items, there was no significant difference between scores on the familiar versus unfamiliar lectures. Chiang and Dunkel suggest that items on comprehension measures be classified as passage-dependent and passage-independent to control for the effect of background knowledge.

By including the variable of proficiency levels, Schmidt-Rinehart (1994) expanded on Long's (1990) study on the importance of familiarity of content for listening comprehension. University students of Spanish at three different course levels (elementary to intermediate) were asked to listen to two unscripted passages presented by a native speaker, one on a familiar topic, the other about a novel topic and complete an immediate recall in English. Schmidt-Rinehart looked at both the total number of idea units recalled and at the recall of units weighted according to their semantic importance to the passage. According to both scoring systems, subjects scored considerably and significantly higher

on the familiar topic than on the novel topic. There was also a significant difference between levels one and three and between levels two and three. Familiarity effects did not, however, vary according to the course level. Familiarity remained a powerful factor at all three proficiency levels of this study.

Religion is a kind of background knowledge which can influence understanding of a passage, as Markham and Latham (1987) demonstrated with university students who reported being either religion-neutral, practising Muslims or practising Christians. Christians recalled more units and had more elaborations and fewer distortions than Muslims on a passage with content familiar to Christians while the reverse was true on a passage with content familiar to Muslims. The neutral group performed better on the Muslim passage, perhaps because the major concepts were more highly signalled (numerically labelled).

One way of dealing with students' linguistic weaknesses is to provide illustrations. Mueller (1980), Teichert (1996) and Wolff (1987) did this with success. Mueller presented visual contextual cues prior to or immediately after a 300-word taped interview to beginning students of German. The visuals enhanced comprehension as measured by a free recall but in inverse proportion to the listeners' level of language proficiency. The more proficient the learner, the less comprehension was enhanced by the visual aid. Teichert's study was less conclusive. He compared the effectiveness of illustrations, brainstorming for key vocabulary, and cultural background and general questions about the topic, for

listening comprehension in German conversation classes at the intermediate level. It should be noted that students in the experimental groups also received a video or audio presentation which they had access to outside of class whereas the control class received only vocabulary instruction and a discussion of the topic. The experimental students demonstrated significantly superior performance to control subjects on a listening comprehension post-test although it is difficult to say which of the advance organizers was most beneficial or whether the improvement was due to the additional viewing or listening to the video or audio material. Wolff (1987) who provided an illustration to help German ESL learners, aged 12 - 18, found that the harder the text, the more subjects used the illustration. He also found that learners used more top-down processing strategies for difficult texts than for easier ones.

All these studies deal with content schemata and how they affect listening comprehension for second language learners. Familiarity with the topic of a passage has been shown to have positive effects on listening comprehension as measured by recognition and recall instruments. When selecting texts for listening comprehension the likely familiarity of the topic for listeners must be taken into account. As was found with reading comprehension (Carrell, 1983; Hudson, 1982) familiarity will be facilitative for passages readers find difficult. For research on formal schemata we will turn to studies of lecture comprehension, for, of course, lectures are examples of extended expository prose. First, however, it is worthwhile to examine studies of strategy use by second language listeners. At issue are what strategies second language listeners call upon to compensate

for linguistic deficiencies and how effective the teaching of compensatory strategies in improving second language learners' listening comprehension is.

2.7.2 Strategies

Bacon's (1989, 1992) studies showed that successful listeners made good use of their background knowledge whereas less successful listeners did not. Further signs of this tendency of low proficiency listeners to rely more heavily on bottom-up decoding skills than more proficient ones come from Conrad (1985) who worked with university students of English. She found an inverse relationship between reliance on bottom-up processing and second language proficiency. As second language listeners increase in proficiency, they rely less on syntax (bottom-up processing) and more on contextual, semantic cues (top-down processing). Instead of using a recall protocol, she based her scoring on a cloze test with semantic (content words) or syntactic responses (function words). Bacon (1992) adds further evidence. Her intermediate students of Spanish used more top-down strategies with a familiar passage than with an unfamiliar one. O'Malley, Chamot, and Kupper (1989) noticed that learners shifted to bottom-up processing (listening for individual words rather than listening to larger chunks) only when there was a breakdown in comprehension (p. 429). Rubin (1994) suggests that the interaction between top-down and bottom-up processing comes into play particularly when there is a communication breakdown (p. 211).

Studies focussing on successful second language listeners have identified general cognitive strategies (elaborating, inferencing, predicting) and metacognitive strategies, (self-monitoring) that successful second language learners use (O'Malley et al., 1989; Rost & Ross, 1991; Vandergrift, 1998). In other studies researchers have attempted to instruct students in the use of such listening comprehension strategies. O'Malley et al. (1989) instructed students on one metacognitive strategy and one cognitive strategy. Their technique met with some success in daily tests but failed to show significant improvement on post-tests, perhaps because of insufficient instruction and time for automatization (only one hour and forty-five minutes over a two-week period).

Rubin, Quinn, and Enos (1988) taught modelling, corrective and/or supportive feedback, explanation and assessment to English-speaking high school students in second year Spanish under three different conditions: self-control, in which participants compared the usefulness of the different strategies with different kinds of texts and tasks; informed, in which participants were given the names of the strategies and informed about their usefulness; and blind, in which they were not given the names of the strategies or information about their usefulness. The self-control group did not out-perform the blind, informed or control groups, as expected. The authors attribute the lack of difference to insufficient training of the teachers. Thus, not only does it take time for students to integrate new strategies, but teachers too require "many opportunities to observe, practice, and integrate them" (p. 23).

Thompson and Rubin (1996) conducted a longitudinal study focussing on the effect of both cognitive (predicting content, listening to known elements, listening for redundancies, listening to tone of voice and intonation and resourcing), and metacognitive (planning, defining goals, monitoring and evaluating) strategy instruction on listening comprehension performance by university students of Russian on videos. Results indicated a significant advantage of the experimental group over the control group on one dependent measure (the video test) but not on the other (the audio test). The audio test was a standardized ETS instrument and less closely reflected the type of instruction than the in-house video test. Still, the control group received as much exposure to the video stimuli as the experimental group and the difference between their improvement on the video comprehension post-test and that of the experimental group was significant. Sometimes strategies help listeners, particularly with difficult texts, but it is not yet clear which strategies help with which tasks.

2.8   Research on Lecture Comprehension

2.8.1   Lecture Text Type

All of the studies discussed in the previous section on listening comprehension have been with fairly short pieces of expository discourse. In the university setting lectures play an important role in student learning. In most courses they are an important source of information for students. Flowerdew and Miller (1996a) report that lecturers and students in their Hong Kong setting were almost unanimous in regarding lectures as the most important medium of instruction. How could lectures be characterized? What kind of

discourse do we find in lectures? What special problems do they present for second language listeners?

Hansen and Jensen (1994) describe lectures as planned, message-oriented discourse delivered by one person to a group of people, usually with little or no interaction between the speaker and the listeners. Although syntactically complex with literary rather than colloquial vocabulary, they contain oral features, such as redundancies, pauses and disfluencies (pp. 246, 247). Most academic lectures are primarily transactional with some interactional parts, usually at the beginning. Dudley-Evans and Johns (1981) identify three different styles of lecturing: reading style, in which the lecturer either reads from prepared notes or speaks as if reading from notes and interacts very little with students; rhetorical style, in which the lecturer is more like a performer; and the most common, conversational style, which is characterized by informal speaking and more interaction with the students. Idiomatic phrasal verbs are especially frequent as are contracted forms and more of the macro-organizers of spoken transactional discourse (p. 34).

Flowerdew and Miller (1997) analyzed a 48-minute lecture on economic development addressed to ESL students at a Hong Kong university whose scores ranged between 450 and 530 on the TOEFL test. They concluded that authentic lecture discourse is structured according to tone groups, often incomplete clauses rather than the complete clauses of written text. The tone groups are often signalled by filled or unfilled pauses such as "ah" and "er". Authentic lecture discourse, in contrast to written text, also

contains many false starts, redundancies and repetitions. Of course, in lectures, body language, such as shifts in position or posture of the speaker, may signal change of topic. The lecturer reported to the researchers that he tried to reassure his listeners through rhetorical questions and first person pronouns. Words, such as "okay?" and "yeah?" were often used to check comprehension or to signal the termination of a topic. Sometimes, the lecturer sent out false signals of particular organization which did not follow.

Certainly, conversational style lectures are the most common in North America. Lectures are usually planned in terms of the message to be delivered. The vocabulary may be technical or literary, but elements of oral discourse will be in evidence. Unless it is scripted, the lecture will contain errors, unfilled pauses, false starts, comprehension checks, backtracking and false signals. To train students to deal with this type of discourse, Flowerdew and Miller (1997) recommend the use of longer passages in training sessions to train students to handle interpersonal strategies, discourse structuring and integration found in authentic lectures.

Are all lectures basically the same in structure and style with only differences in technical terms? In an analysis of a small data base of lectures in two disciplines, plant biology and international highway engineering, Dudley-Evans (1994) showed how lectures in each discipline are characterized by their own organizing frameworks. He found the problem-solution framework prevalent in the soft, applied discipline of highway engineering as opposed to the classification and description framework of plant biology,

a hard, i.e., paradigm-driven, pure discipline concerned with life systems. He gives examples of graphic organizers suitable for drawing students' attention to the scientific methodology underpinning the points made in a plant life lecture. He recommends that students in EAP courses, beyond learning common-core listening strategies, be sensitized to the particular features that distinguish the practices of the discourse community they wish to join.

The listening passages used in this study were simulations of the transactional type of lecture. The training texts were long enough to introduce some of the vagaries of normal extended discourse. Some of the pauses, fillers and false starts of the original passages were included in the rerecorded versions. The length of passage was, however, also limited by the amount of time available in the normal hour and a half ESL class. The test passages were short, because of the constraints of the test situation. All passages were rerecorded in a sound-proof studio or a quiet office to adjust for length and focus. Audio- rather than video- recordings were used because it is easier to produce a high quality product with audio than with video. Recordings rather than live lectures were used to ensure consistency across administrations of the training and test sessions.

2.8.2 ESL Students' Problems with Lectures

What problems have students themselves noticed as they tried to understand lectures? What problems have professors noticed among second language students? Ferris (1998) questioned 768 ESL students at three tertiary institutions in North America about

their perceived difficulties with the oral skill requirements of their academic courses. She received complaints from students that some professors tended to mumble, speak too rapidly, use inaccessible vocabulary or not provide any visuals.

University professors in Powers' (1986) study reported that non-native speakers had difficulty with the speed of lectures, with unfamiliar vocabulary, deducing meaning from context, informally structured lectures, discourse cues and irrelevant matter. Other problems they had noticed for the non-native speakers included the misinterpretation of instructions, problems understanding idioms, slang and technical terms and the pace of lectures. The Hong Kong university students and faculty in Flowerdew and Miller's (1992, 1995, 1996a, 1996b, 1997) ethnographic studies mentioned problems with speed of delivery, new terminology and concepts, and difficulty in concentrating. Failure to comprehend a certain concept could lead to their getting lost in the lecture and giving up. They also reported having difficulty following informally structured lectures.

Other researchers point to more global problems with lectures. Lebauer (1984), for instance, maintains that "many students, in spite of apparent fluency, still have difficulties understanding the points made in lectures" (p. 41). Nattinger and De Carrico (1992) observe that many students think they understand lectures and are not aware that they are having serious comprehension difficulties. They describe one particular case in which the student had spent years studying English, insisted he was able to understand the lectures, and therefore, was completely at a loss as to why he was failing the exams. A discussion

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of his lecture notes revealed that what he was missing was a sense of the flow and direction of the lecture, and a sense of what counted as important information and what did not.

Olsen and Huckin (1990) report a similar problem for most of their fourteen non-native speaking graduate and undergraduate students who took notes on an authentic 16-minute problem-solution videotaped mechanical engineering lecture and then provided immediate oral recall summaries. Only five of the subjects successfully identified the three main points of the lecture. Of the nine who failed, six failed in spite of demonstrating adequate English (through long, fluent and coherent summaries). They understood most of the details of the lecture but "apparently didn't see how things fit together" (p. 40). For Olsen and Huckin they were taking an information-driven rather than a point-driven approach. They failed to look for the main point of the lecture, did not pay attention to discourse-level markers and intonation patterns or expect the lecturer to be trying to make a point. The professors in Powers' (1986) study had implicitly identified similar problems because they suggested the following specific listening skills as most important: identifying major themes, relationships, topic, supporting ideas, retaining information and understanding key vocabulary. For them recognizing irrelevant matter, the function of non-verbal signals, attitudinal signals and structural signalling were least important. Researchers in second language acquisition would not agree with the latter statement, as we shall see later in the discussion of research on discourse signalling.

2.8.3 Facilitating Lecture Comprehension

How are students to recognize the major themes, topic and relationships among main and supporting ideas in a lecture? Is it in the lecture itself? Flowerdew and Miller's (1992, 1995, 1996a, 1996b) Hong Kong students reported having particular difficulty following informally structured lectures. They indicated that they found lectures easier to understand if materials were presented systematically, if the purpose of the lecture was made clear, if summaries of main points were provided and if important points were repeated. In fact, the Hong Kong lecturers tried to use relevant examples to ensure student interest and as an aid to comprehension and used more visual media for ESL students than they would with native speakers of English, as a compensation for poor listening and note-taking ability. Students found the visual aids helpful although they found it difficult to simultaneously listen, read/decipher a visual and take notes. Lecturers worried that too much written support would encourage rote learning and indeed, students did indicate that if they had too much written information, they would not have to listen to the lectures. Lecturers reported discomfort with simplifying their language and the researchers felt from their own observations that in fact the lectures were neither noticeably slower nor simplified. Among the strategies students found helpful were pre- and post-reading activities.

Flowerdew and Miller (1996b) recommend putting an outline onto an overhead transparency and constantly referring to it to help students follow a lecture (p. 44). Dunkel (1988), too, based on her study of the notes of university students, suggested that advance

organizers of skeleton notes might free second language learners to concentrate on understanding the content of the lecture rather than frantically writing down as much as they can.

It is interesting to note, as Tauroza and Allison (1994) found, that students may become familiar with the usual pattern of lectures in their field, yet not be able to handle the unexpected when it arises. In their study, first-year undergraduate students of electronic engineering at a university in Hong Kong were able to recognize the usual organization of lectures as the presentation of a string of isolated problems which served as occasions for selecting and applying formulae as solutions. Problems arose when the lecturer presented an evaluation of the solution to a given problem. Students either omitted that section of the lecture in their oral recalls or misinterpreted the lecturer's warning about inappropriate use of the solution. The authors suggest that ESL teachers should try to raise students' awareness of formal schemata although they note that lack of fit between the model and actual discourse development might lead to student dissatisfaction with the model or the task. Their solution was to do such activities as a class activity with teacher guidance. Post-listening exercises in which students could identify mismatches between their written summaries and the lecture transcript could also be done.

2.8.4 Discourse Markers

ESP and advanced ESL courses often devote some time to teaching students to recognize discourse markers with the assumption that this subskill enables students to

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recognize the structure of discourse and better understand what they hear. Young and Fitzgerald (1982), for example, provide exercises to train learners to identify markers with the functions of addition, comparison, contrast, exemplification, explanation and others. Research into the usefulness of discourse markers supports this approach to teaching listening comprehension.

Chaudron (1983) focussed on the effects of topic signalling in experimental lectures on ESL learners' immediate recall of topic information. He found that redundancy in the form of actually repeating the topic-signalling noun was more helpful for both recognition and recall than the other devices tested which included giving a synonym, using a rhetorical question and priming with an if-clause.

In a further study of discourse signals and markers in lectures, (Chaudron & Richards, 1986), three groups of university and pre-university ESL students listened to a short lecture with macro-markers, higher order discourse markers which signal the macro-structure of a lecture, micro-markers, those which indicate links between sentences or which serve as fillers or a lecture with both macro- and micro-markers. Students were not allowed to take notes. The researchers found that macro-markers were more conducive to successful recall of the lecture as measured by a listening cloze task than micro-markers. It seems that macro-markers help listeners to establish a schema for portions of a lecture and thus provide a familiar way of structuring the incoming information. The micro-macro combination version was not superior to or at least equal to the macro-version, perhaps

because, according to the authors, they increased learners' attention requirements without adding any valuable information.

Nattinger and De Carrico (1992) rightly point out, however, that in the micro-macro versions of the lectures, sometimes micro- and macro-markers were placed next to each other. Nattinger and DeCarrico further note that the distinction between micro- and macro-markers was one of length of the marker itself (up to 4 words for micro-markers and longer for macro-markers) rather than of its function. They suggest that macro-organizers be further categorized into global macro-organizers (topic markers, topic shifters and summarizers) and local macro-organizers (exemplifiers, relators, evaluators, qualifiers and aside markers). In their view, this would facilitate teaching them as recognition vocabulary for second language learners. They do need to be taught as it is unlikely that second language learners would already know them in lecture contexts.

Dunkel and Davis (1994) examined the differences between the lecture information recall of first and second language university students relative to the presence or absence of both macro- and micro-markers in narration and comparison-contrast lectures. Students took notes during the lecture and then did a written recall in their native language. The non-native ESL students' notes and recalls were translated into English. Understandably, native speakers wrote twice as much information in their notes as did non-native speakers, but there was no significant difference between the quantity of notations by those who heard the explicitly signalled lecture and those who heard the lecture without the cues.

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Both native and non-native recall was higher for the non-explicitly signalled form of the lecture than for the explicitly signalled form. To explain these surprising findings, the authors speculate that the two structures of the lecture may have been sufficiently salient to listeners so that the macro-markers were not necessary. Flowerdew and Tauroza (1995) also point out the number of micro-markers was small, much smaller than the proportion they had found in lectures they had analyzed and, furthermore, that the markers chosen for insertion with the exception of 'and' and 'but' were those most often associated with written rather than oral language. Dunkel and Davis note that the first-language recall measure was different from Chaudron and Richards' (1986) listening cloze and that subjects were allowed to take notes.

Flowerdew and Tauroza (1995) attempt to improve on both Chaudron and Richards' (1986) and Dunkel and Davis's (1994) designs by using an authentic videotaped lecture, rather than the scripted ones of the previous studies, containing a normal selection of markers to provide baseline data on comprehension to be compared to an experimental lecture without markers. Significant gains on written partial recall summaries based on notes taken during listening and a test with three short answer questions and twelve true/false questions indicated that subjects comprehend a lecture better when discourse markers are included rather than deleted.

Do discourse markers in lectures facilitate comprehension for second language learners? What kind of signalling helps? According to Chaudron (1983), explicit repetition

of the signalling noun is helpful. Macro-markers seem to facilitate comprehension, perhaps by helping listeners to establish a schema for the lectures so they can structure incoming information, (Chaudron & Richards, 1986), but the usefulness of global versus local macro-markers should be explored (Nattinger & De Carrico, 1992). Whether or not students are allowed to take notes appeared to affect the results in both the Chaudron and Richards (1986) and the Dunkel and Davis (1994) studies. Thus, Flowerdew and Tauroza's (1995) study with multiple measures of comprehension seems more conclusive and enables us to conclude that discourse markers aid comprehension although more research needs to be done to specify what kind of markers are facilitative and when they are particularly helpful.

2.8.5 Note-taking

Students usually are expected to take notes and indeed, note-taking skills are important. Aiken, Thomas, and Sheunum (1975) posited that note-taking facilitates learning by causing first language listeners to process the lecture content, that is, they have to interpret the lecture, infer information from it, condense auditory input and paraphrase the lecture material in order to take notes. An additional benefit is that notes store the lecture information externally and can be used for reviewing it, thus improving recall. Of course, the necessary information for answering a specific question must be recorded in notes to be useable as external storage (Dunkel, 1988).

Snowman (1986) rates note-taking as a comprehension-directed tactic. He further points out the importance of "matching the demands of the criterion task and the encoding processes invoked by note-taking" (p. 260). He reviewed ten studies of note-taking by native speakers of English. Four of these studies found note-taking no more or less effective for reading than "rereading for such criterial tasks as short-answer questions for main ideas and details, multiple-choice questions, essays, and free recall" (p. 259). He attributes this lack of effectiveness to the fact that "subjects may not have processed the right information with respect to the criterion task or may have copied information verbatim from the passage instead of constructing a more personally meaningful paraphrase" (p. 260). He attributes the positive results of the six other studies to a better match between the criterion task and the encoding processes involved in note-taking.

Dunkel and Davis (1994) found that, when listening to lectures, native speaking university students took more notes than non-native speakers. Although they write down less than native speakers, second language speakers have a tendency to take notes somewhat indiscriminately. The students themselves express concerns about their inability to take effective lecture notes. For example, Ferris's (1998) students at tertiary institutions acknowledged their perceived difficulties with note-taking skills and problems with note-taking. Ferris and Tagg (1996) noted that the subject-matter instructors in all fields at four tertiary institutions (a community college, and three universities) felt that effective lecture note-taking was very important, and many expressed concern about ESL students' ability to take effective lecture notes although general listening comprehension skills were ranked

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of higher importance among the aural/oral tasks they required of their students. It should be noted that the response rate was fairly low (25.6%) and therefore the respondents may not be representative of the respective departments. Still, the reservations were expressed by respondents in all departments.

Chaudron, Loschky, and Cook (1994), based on their study with second language speakers, caution that note quality should not be considered directly as a measure of comprehension because they found no strong or consistent overall relation between their quantity and quality measures of notes taken and students' comprehension. Certain information in the lectures, however, was better retrieved with the aid of notes. They further found that accuracy in note-taking, particularly of key words, was critical to the effectiveness of notes as external storage. This conclusion is congruent with Dunkel's (1988) findings from her cross-cultural investigation of the notes of one hundred and twenty-nine first and second language university students who listened to a twenty-three-minute video-taped lecture. Dunkel found that terseness of note-taking was a better predictor of good post-lecture quiz scores than was a large number of words in their notes. Second language students who performed less well had written more structure words and made less use of symbols, drawings and abbreviations. This finding led Dunkel to suggest that advance organizers of skeleton notes might free second language learners to concentrate on understanding the content of the lecture rather than frantically writing down as much as they can. Flowerdew and Miller (1996b) also suggest that the lecturers provide skeletal outlines as advance organizers to help second language learners.

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2.8.6 Summary

What can language teachers do to help second language listeners with their lecture comprehension? Flowerdew and Miller (1997) recommend that they should use long passages for training so learners will get used to the disorganization of natural speech and learn to recognize false starts, non-sequiturs and unimportant digressions. They could be taught the particular features of the discourse of their discipline (Dudley-Evans, 1994). Lecturers could help by structuring their lectures very clearly (Flowerdew & Miller, 1992, 1995, 1996a, 1996b) and by providing skeletal outlines as advance organizers to help second language listeners (Dunkel, 1988; Flowerdew & Miller, 1996b), although advance organizers should not be so complete that learners do not need to listen at all (Flowerdew & Miller, 1992, 1995, 1996a, 1996b). Corno and Mandinach (1983) come to a similar conclusion based on their attempt to integrate theories and research related to motivation with those dealing with learning processes. They caution that teachers can short circuit self-regulation, the highest form of cognitive engagement by providing ready-made advance organizers, diagrams, charts etc. They use the term short circuiting because the cognitive process of selecting relevant information or linking it to familiar knowledge is carried out for learners rather than requiring them to do it. However, Corno and Mandinach acknowledge that short circuiting can be a learning tool, particularly for low or average ability learners and sometimes for high ability learners. Teacher-prepared advance organizers are more useful if teachers explain the purpose of such tools and how they were constructed so that eventually learners will create them themselves. For Corno

and Mandinach, the teacher must consider student, task and instructional characteristics when planning instruction.

English for Academic Purposes courses could also prepare students for lecture comprehension by raising students' awareness of formal schemata (Tauroza & Allison, 1994), by teaching global and local macro-organizers (Nattinger & De Carrico, 1992) and note-taking skills so that instead of trying to write everything down, learners would write concise notes and use symbols, drawings and abbreviations to express concepts (Dunkel, 1988). We turn now to the issue of advance organizers, drawings and other graphic organizers, including concept maps.

2.9 Graphic Organizers

2.9.1 Concept Mapping

Derry (1987) notes the three most common instructional goals of current classroom procedures: acquiring a) the ideas and facts fundamental to disciplined studies; b) the basic procedural skills of these disciplines, such as reading and problem solving; and c) higher-order thinking capabilities for application of this knowledge to solve meaningful problems. The third goal, for Derry and her colleagues, is essential and subsumes the first two. For factual information to be useful, it must be understood and stored within well-structured, well-elaborated networks. For procedural skills to be accessed and used spontaneously, they must have evolved through practice and their conditions for applicability clearly understood. Royer, Cisero, and Carlo (1993) suggest that "successful instruction is

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thought to result in qualitative changes in the organization structure of knowledge and in the fluency with which the knowledge can be used" (p. 202).

Schallert (1982) suggests that for Ausubel too, whose theories she considers a precursor to schema theory, meaningful learning, as opposed to rote learning, involves changing one's current organization of knowledge. New ideas are subsumed under more general concepts already known to the learner. Ausubel (1968) claimed that the most important factor influencing learning is what the learner already knows. It was Ausubel who first used the term advance organizers which he defined as

"Appropriately relevant and inclusive introductory materials...introduced in advance of learning...and presented at a higher level of abstraction, generality and inclusiveness" (p. 148).

The idea was to provide scaffolding so that the more detailed material to follow could be subsumed into the general framework. Ausubel (1960) presented undergraduate students with an introductory paragraph written at a higher level of abstraction to organize and anchor the new information from the test passage which the students subsequently read. Although there were certain confounding factors in his experiment, he found a small statistically significant advantage for his experimental group over the control group. In a similar study, Ausubel and Youssef (1963) also found a small advantage in reading retention for the advance organizer group.

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Craik and Lockhart's (1972) study lends further support to the notion that material that is understood is more likely to be remembered. They reexamined many of the reported experiments on incidental learning, selective attention and sensory storage. Rather than the multistore approach to explaining how material is retained and forgotten, they proposed a framework based on depth or levels of processing. Their different levels of processing proceed from preliminary sensory analysis, through matching or pattern recognition and finally to more semantic-associative stages. Highly familiar, meaningful stimuli will be processed to a deep level more rapidly than less meaningful stimuli and will be well retained. Furthermore, Craik and Lockhart (1972) propose two types of processing: Type I or same-level processing through which we recirculate information at one level of processing and Type II or deeper processing

> "which involves further, deeper analysis of the stimulus and leads to a
> more durable trace" (p. 681).

The strength of the memory trace is a function of depth of processing.

A second view of memory suggests that the greater the elaboration or extensiveness of one's encodings, the better the subsequent memory. In other words, a greater number of encoded features leads to a more elaborate memory trace and hence to better recall. Craik and Tulving (1975) asked participants to decide whether a word would fit meaningfully in either a simple, medium or complex sentence. The most complex sentences were remembered best, presumably because the complex sentences activated larger, richer cognitive structures than did the simpler sentences.

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Hasher and Johnson (1975), on the other hand, showed that the quality of semantic elaboration rather than just the quantity is an important a determinant of recall. Hashtroudi (1983) too investigated the quality of processing. In her first experiment, she found that words modified by their core properties were better recalled than words modified by more peripheral adjectives. Furthermore, although the task of remembering pairs of peripheral words was as difficult in terms of the amount of elaboration required as remembering pairs of necessary words and although remembering mixed pairs was the simplest task, recall for the mixed pairs was superior to that for pairs of peripheral words while pairs of necessary or core words were best remembered. This result is better explained by the core meaning or levels of processing approach which emphasizes the nature of semantic elaborators (core or peripheral) than by the cognitive analysis view for which the amount of processing is critical.

Roediger and Guynn (1996) point out that theories such as Craik and Lockhart's (1972) levels of processing were trace-dependent theories of memory. Performance on memory tests was largely determined by the status of the memory trace at the time of testing. There has been a more recent emphasis on the retrieval process and the view that retrieval failures account for most cases of forgetting. The encoding specificity hypothesis was presented in the late 1960s by Tulving and his colleagues (Tulving & Osler, 1968; Tulving & Thomson, 1973). According to this principle,

> "the recollection of an event, or a certain aspect of it, occurs if and only if
> properties of the trace of the event are sufficiently similar to the retrieval
> information [provided in the retrieval cues]" (Tulving, 1973, p 223).

This principle was later broadened in the notion of transfer-appropriate processing (Bransford, Franks, Morris & Stein, 1979). In this view, performance on a memory test can be considered a task of transfer which is affected by the match between encoding activities and retrieval activities. The emphasis is on the psychological similarity of the encoding and retrieval processes.

Morris, Bransford and Franks (1977) focussed on how manipulations designed to influence the level of processing of studied stimuli affected performance on different types of memory tests. They had participants study the same words in sentences that promoted either phonemic or semantic encoding of the words. The memory tests were either the standard recognition test with words studied mixed with words not studied and a rhyme recognition test with words that rhymed with studied words and distractors which did not rhyme. The levels of processing and the elaboration view of memory would predict better performance on both tests for words encoded semantically because of the levels of processing or elaboration required. Results, however, revealed better performance for semantically-processed words on the standard recognition test and better performance on the rhyme recognition test for the phonemically-processed words, that is, participants performed better on the test that matched the encoding process they had used when learning the words. Glisky and Rabinovitz (1985) had similar findings when they used word recognition versus word generation at study and at test. Engelkamp, Zimmer, Mohr and Sellen (1994) compared subjects' recognition of phrases that were either verbally

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encoded or self-performed. Performing operations on the test that matched those at encoding enhanced performance at test.

Blaxton (1989) looked more closely at encoding processes and the match between them and typical memory tests. Some researchers, like Tulving (1972), have made a distinction between episodic memory which requires recollection of a particular event with its temporal-spatial relations to other episodes and semantic memory which relies on world knowledge rather than the retrieval of specific episodes. Blaxton compares explicit memory tasks to episodic memory tasks and implicit tasks to semantic tasks. She also maintains that there are two types of processing: data-driven in which the subject relies on processing the physical features of the presented stimulus to produce the target; and conceptually-driven processing whereby retrieving the target cold from memory involves the analysis of meaning. She showed how transfer-appropriate processing could better predict and explain results on data-driven tests if they are matched with data-driven encoding processes and on conceptually-driven tests matched with conceptually-driven encoding processes whereas the memory systems approach would have predicted different results.

Another related principle, according to Roediger and Guynn (1996) is that of distinctiveness. The more events are distinctive or stand out from a background of other similar events, the better they will be remembered. There are two different ways of encoding information. Paying attention to the item-specific characteristics of a particular

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event increases the likelihood that memory for that event will include features that differentiate it from others in memory, thus making it distinctive. The other type of processing is relational whereby one tries to interrelate events or to organize them according to some scheme. It is expected that item-specific processing will primarily enhance recognition whereas both types will benefit free recall. In free recall, the inter-relations or associations among events help to cue subjects so that recall of some events will cause people to remember more events later. Hunt and Einstein (1981) demonstrated this in an experiment using a list of related and unrelated words and the two types of processing.

A second important principle related to retrieval is the cue overload principle according to which the more information that is subsumed under a single retrieval cue, the poorer will be the recall for one piece of information. Tulving and Pearlstone (1966), for example, showed that the more items presented in a given category, the less likely that category name is to cue a particular item. According to Roediger and Guynn (1996) item-specific processing will explain the phenomenon of cue overload because for a distinctive event subjects will have only one item to retrieve in the category.

Mayer (1989), like Ausubel, talks about meaningful learning which, in his view, depends on three basic processes: selecting, organizing and integrating information. The first process, selecting, involves paying attention to the information in the text, particularly information relevant to the current task demands. Organizing involves arranging the

selected units of information into a coherent mental structure. The third process, integrating, involves connecting the coherently organized information to existing cognitive structures. According to Roediger and Guynn (1996), these processes should improve recall for the information because recall of some concepts will cue the recall of others. Mayer (1979), like Ausubel, places great importance on advance organizers which serve as anchors or pegs on which to hang new information. According to his assimilation theory, advance organizers generally 1) consist of a short set of verbal or visual information, 2) are presented prior to the information to be learned, 3) contain no specific content from the body of new information, 4) provide a means of generating the logical relationships among elements in the new information, and 5) influence the learner's encoding process (p. 382). Mayer's definition of advance organizers is a little less strict than Ausubel's, but in his view, they are only useful "when material is unfamiliar, technical or otherwise difficult for the learner" (p. 372). Alvermann (1986) makes a distinction between graphic organizers and advance organizers. She specified that the latter use prose whereas the graphic organizers use lines, arrows and the hierarchical ordering of ideas.

Novak and Gowin (1984) claim that the concept mapping they have developed follows most closely the theories of Ausubel. In their view, concept maps are an explicit, overt representation of the concepts or propositions a person holds. They can be both a creative activity and a means of fostering creativity because the map-maker may recognize new relationships and hence new meaning as the map progresses. Concept maps can help

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the learner to make evident the key concepts or propositions to be learned and suggest linkages between the new knowledge and what she already knows. Novak and Gowin train learners to label the lines linking concepts on their maps. There is a certain amount of flexibility with their concept maps, for the same set of concepts can be represented in two or more valid hierarchies, but their definition of concept maps is fairly narrow. They admit that there are alternative ways to represent meanings, such as flow charts, cycles and organizational charts, but only their concept maps are based on Ausubel's theory of learning and his theory of knowledge.

After numerous experiments by his students and research group, Novak (1990) writes that he has found that all domains of knowledge can be represented by concept maps. The primary benefit of concept maps accrues to the person who constructs the maps. This is in accord with Bransford and Johnson's (1972) finding that "prior knowledge must become an activated semantic concept" (p. 724) in order for it to aid comprehension. Novak's students did, however, find teacher-prepared maps helpful if they had had practice in map-making themselves.

Berkowitz (1986) found that sixth grade students benefited more from making graphics themselves for social studies textbook passages than students who just studied completed graphics. They scored higher on immediate and delayed free recall protocols than did students who just studied the graphics. Similarly, Dean and Kulhavy (1981), working with a relational map as an organizational device in the comprehension of an

extended prose passage, found that students who completed the map on cue out-performed students who just studied the map, and students who had an unrelated map to study, on a recall protocol task, a multiple choice task and a constructed response task. Furthermore, completing the map on cue was significantly more effective for college students with low verbal scores, as evidenced by a vocabulary test, for the recall protocol task, the task which allows the learner to display comprehension for a wider range of passage information whereas there was no main effect for the multiple choice or constructed response measures. Constructing a map may facilitate comprehension and recall because it requires deeper processing (Craik & Lockart, 1972), because it requires more elaboration (Craik & Tulving, 1975) or because the encoding of information in this way is similar to the processes involved in free recall and other constructed or recognition tasks (Morris et al., 1977). Mapping is particularly effective for learners with low verbal facility.

Mayer (1989) suggested that graphic organizers would be useful for selecting and organizing from a text information that is to be learned. Meyer defines graphic organizers as "tools which select concepts and display them with links between them which convey the structure or organization of the ideas" (p. 371). Mayer includes, among graphic organizers, concept maps, networks, flow charts, knowledge maps, conceptual models, and many others.

Mayer (1979) reported on several of his studies involving the use of organizers to induce student imposed structures on texts. They upheld his prediction that organizers would be useful to compensate for specific types of loosely organized text structure, such as description, if readers were required to reorganize the information, but would not help when reorganization was unnecessary. Mayer (1989) reported on twenty studies he had conducted using conceptual models, defined as "words and/or diagrams that are intended to help learners build mental models of the system being studied" (p. 43) to help novices understand scientific explanations. As he had predicted in his model, students learning science material with the aid of models recalled more conceptual information than control students. They were less likely to retain the material in verbatim form than controls. They were able to generate more creative solutions to transfer problems than control students. It could be that building the mental models aids students in integrating new ideas into the knowledge organization they already possess (Ausubel, 1968; Mayer, 1989; Schallert, 1982), that the semantic processing of material that is required in order to build the model entails Craik and Lockhart's (1972) deeper processing, that the extra elaboration is helpful (Craik & Tulving, 1975) or that the relational processing involved in organizing the material is similar to that required to transfer the learning to new problems (Bransford et al., 1979). In any case, creating the models was beneficial for learning the concepts.

Lambiotte and Dansereau (1992) refer to knowledge maps but their maps resemble concept maps because, like Novak and Gowin (1984), they prefer the paths between nodes to be labelled. Their study focussed on knowledge maps compared to outlines and lists of

key terms as aids for biology lectures. A delayed free recall task showed that students low in prior knowledge recalled significantly more central ideas when they viewed knowledge maps while hearing the lectures than did students with low prior knowledge using either the outlines or word lists. Students with prior knowledge of the topic, however, recalled significantly more when they viewed lists of terms than when they used the other aids. For Lambiotte and Dansereau, these results are explained by Mayer's (1989) three-stage cognitive model of assimilation encoding. According to this model, organizers are helpful because they provide anchors to which new information can be attached. They do not work as well though if the learner already has enough background or has already structured her prior knowledge. For such students, lists of words are sufficient for activating their schemata. The researchers suggest that students with greater prior knowledge might benefit from creating their own knowledge maps rather than looking at maps already prepared for them. The evidence from Novak (1990), Dean and Kulhavy (1981) and Berkowitz (1986) supports this view.

In the tradition of Novak and Gowin (1984) and Novak (1990), and Telaro (1990) compared concept mapping instruction to a more traditional teacher oriented approach for one unit of high school biology taught over a four week period. In the concept-mapping condition, students made their own maps which were used as the basis for discussion and thereby integrated into the course. Results on content tests indicated that concept mapping did not facilitate performance on items testing the retention of facts, but it did enhance performance on conceptual items. Transfer-appropriate processing would explain this

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result because when learners are encoding the information as they make their maps, they are making connections between concepts. The nodes in their maps may serve as retrieval cues. Even conceptual mapping students of low reading ability out-performed the traditional group and surprisingly performed as well as high ability traditional subjects. It should be noted that there was an initial decline in the performance of high ability students in the concept mapping condition, although they out-performed the high ability traditional students in the end. This suggests that acquiring the concept mapping skill occurs at the expense of learning the target content, but since the results in the end were positive and since the students rated concept mapping superior to alternative approaches, the added effort seems worthwhile. Unfortunately, although the low ability learners benefited from the concept mapping approach, they were only mildly enthusiastic about it. The researchers concluded that concept mapping enhanced performance on tests of relational knowledge more than for factual or procedural learning material. In contrast, Hamaker (1986) who used questions inserted in text after passages which contained the relevant information had shown a larger effect size on factual questions than on higher-level questions.

Bernard and Naidu (1992), in their distance education field experiment with registered nurses in a Community Mental Health course, also found initial deficits for concept mappers on performance on multiple choice items administered early in the experiment. The concept mapping was optional and some did not persist with the mapping. Those who did at least two thirds of the maps outperformed both the control group and

those who did fewer maps, lending support to the view that continued practice with the technique is required to affect achievement outcomes. It is interesting to note that almost half of the concept mappers persisted with the strategy and found it to be beneficial.

2.9.2 Other Graphic Organizers

Researchers have been very interested in advance organizers. Studies have been done using different kinds of advance organizers ranging from illustrations, pre-listening questions to actual concept maps, and vocabulary preparation, as we will see in the last section of this chapter. They have used terms like 'frames' (Armbruster, Anderson & Meyer, 1991), 'knowledge maps' (Lambiotte & Dansereau, 1992), 'graphic organizers' (Bernard & Naidu, 1992) and 'text graphs' (Graney, 1992). Studies have attempted to compare the effectiveness of these types of advance organizers with other types or in a no advance organizer condition.

Alvermann (1981, 1982) followed up on the work of Mayer (1979) on graphic organizers and that of Meyer et al. (1980), and Meyer and Freedle (1979) on different types of text organization. Alvermann (1981) used partially completed graphic organizers with tenth graders with both a description and a comparison text to see under which conditions graphic organizers would facilitate comprehension and retention. In line with Mayer's (1979) findings, she predicted that low comprehenders would benefit more from the instructional support of the organizers than high comprehenders. Regardless of reading level, for the descriptive text, students exposed to graphic organizers recalled significantly

more than the controls for both immediate and delayed measures. For the comparison text, there was no effect for the organizers. Alvermann concludes that "organizers facilitate recall when readers are required to reorganize information found in text but have no effect when reorganization is unnecessary" (p. 47). For Alvermann the comparison text itself may have provided the anchoring ideas, such that an idea from one side of the argument may have provided the cue to remembering an idea from the other side. This conclusion is in congruence with Horowitz's (1982) finding about the differential effect of instruction of textual organization for different text types. Mayer's (1979) assimilation theory would explain the results for the descriptive passage which is loosely organized. Other explanations could be found in the deeper processing of the semantic content (Craik & Lockhart, 1972), the elaboration of concepts (Craik & Tulving, 1975) or the transfer-appropriate processing theory of Morris et al. (1977).

Alvermann (1982) constructed a cloze graphic organizer which encouraged students to restructure the original loose list organizational structure of a passage into a comparison-contrast organizational plan. Students who worked with the graphic organizer showed better recall of important information in the text than those who had not received it.

Armbruster, Anderson, and Ostertag (1987) and Armbruster et al. (1991), experimented in middle school classes with "frames" which were the visual representation of the organization of important ideas in informational text. In the first study with the

problem-solution structure, students showed improvement in answering a main-idea essay question. In the second large-scale academic-year-long study using a social studies text, frames used as advance organizers and as a note-taking tool in the experimental group were compared to the text-recommended activities used in the control groups. Immediate criterion tests consisted of matching and short-answer items designed to test concepts and relations. Overall, students in the framing condition scored higher than students in the control condition. There was no difference in results between those groups who completed the frames themselves and those in which the teacher led the completion of the frames. Framing was more successful for fifth-grade than for fourth-grade students, perhaps because of differences in cognitive development or differences in the texts themselves which lent themselves to better frames for the fifth-grade texts than for the fourth-grade.

In Bernard's (1990) experiment with one hundred and fifty-nine junior college students enrolled in a first year hotel/business management course, the graphic organizer was a "flow diagram which reiterated the structure of the text" (p. 210). Only the better readers who received the graphic organizer with processing instructions which explained its purpose, benefitted from the technique because, for poor readers, understanding the flow chart seemed to be as difficult a task as reading the material.

As we saw in Armbruster et al.'s (1987) study, advance organizers are helpful for comprehending expository material. Ausubel's (1968) rather strict definition of advance organizers has been broadened to include any advance preparation one does with students

before they tackle the particular material to be comprehended. One sees vocabulary preparation, illustrations, text graphing, knowledge maps and concept maps. In the Ausubel tradition, as interpreted by Novak (1990), concept maps are an overt representation of the concepts or propositions a person holds. They are used to represent one's previous knowledge before receiving new information and the subsequent knowledge structure with the new information incorporated. They are time-consuming to make because they may have to be redrawn to express relationships the learner develops through the process of map making and of course to make them neater. Novak reports an average decline in performance on standard course exams for the first two to four weeks of concept mapping with scores gradually moving up and finishing significantly higher than control groups' scores. In his study, as in Schmid and Telaro's (1990) study, weaker students seem to benefit more from the process than higher-level students, whereas Bernard (1990) had the opposite result because the flow chart was too difficult for the poor readers. Bernard and Naidu's (1992) result is encouraging for those who foresee the benefits of concept mapping because those students who persisted with concept mapping achieved positive results by the end of the experiment.

The other forms of mapping, such as text graphing or graphic organizers are less demanding to make than Novak's concept maps and seem to be useful (Alvermann, 1981, 1982; Armbruster et al., 1991; Armbruster et al., 1987; Mayer, 1979, 1989). Graney (1992) suggests that text graphing challenges readers to make use of their content and organization schemata in working toward a better understanding of the text because it

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entails the pattern-seeking aspects of learning. Text graphing for pre-reading activities should help students to identify their purpose in reading and how they will read the text. For post-reading activities, the graph should clarify the content of the text and can serve as a guide for summarizing activities.

Flood and Lapp (1988) recommend that teachers use all kinds of illustrative materials such as maps, charts, graphs, illustrations, as a useful tool to help children see the relationships between what they already know and what is contained in the text. It can help them distinguish superordinate from subordinate ideas and understand the organization that authors used as they wrote their texts. They stress the importance of having children personalize their maps by adding their own pictures, illustrations and notes as they work on the map. They suggest that pausing during the completion of the map to summarize can help children relate the new information to previous information in the text as well as to what they already know, and develop appropriate oral academic language. Schmid and Telaro (1990) showed better performance for concept maps on conceptual memory tests than on factual tests. The graphic organizers may facilitate conceptual learning because they force deeper processing of the semantic content (Craik & Lockart, 1972). On the other hand, their positive effect may be due to the elaboration of the material required to make the maps (Craik & Tulving, 1975). The transfer-appropriate processing view can explain the positive effects in terms of the similarity between cognitive processes invoked at the encoding stage by the concept mapping and those required in the conceptual memory test (Bransford et al., 1979).

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The most common type of graphic organizer being used in Canadian schools is Mohan's (1986) key visuals. The key visuals may seem similar to the other forms of concept mapping, but they are little bit different in that they are based on his (1986) 'knowledge framework.' They form the focus of my experimental study and thus will be dealt with separately in the following section.

2.9.3 Mohan's Knowledge Framework

In the 1970's the Vancouver School Board was facing problems with large numbers of ESL students in the schools who were experiencing difficulty coping in the school system. Mohan (1979) addressed the problem of how to integrate these students into the mainstream of schooling. He looked at three common ways of doing this: second language teaching by content teaching, combining second language teaching with content teaching and second language teaching for content teaching (English for specialized purposes). He recommended that language teachers also teach content systematically, that content teachers try to improve their communication with second language students, that teachers provide general techniques for second language students to help them with their content classes and that study skills courses be organized around a unifying set of cognitive categories. Ultimately his solution was the knowledge framework. Mohan (1986) describes this knowledge framework as a system of integrating language and content in an organized way, combining language and content through a set of six "knowledge structures" that underlie the thinking skills of all disciplines. His framework is based on the logical analysis of structures of knowledge. To Mohan the central idea in education is an activity

which is a combination of actions and theoretical understanding. He draws on the work of philosopher Richard Peters who claimed that education is "an initiation into activities" (Peters, 1966, p. 55) and, citing Brubacher (1947), reminds us that historically the curriculum of schools in ancient Egypt, Babylonia and China originated in the daily activities of the people. Mohan draws more directly on Dewey (1916) who saw the activity as a corrective to the natural tendency of education toward verbalism. Dewey described the pattern of an activity as comprising "careful observation of the given conditions to identify means to the desired end", "the proper sequence" in the use of the means and finally "the choice of alternatives" possible (Dewey, 1916, p. 102). In Mohan's view a typical situation has a semiotic structure containing an action situation or practical knowledge and background or general theoretical knowledge. The three aspects of the action situation as outlined are *description, sequence* and *choice*. The three aspects of background knowledge are: *classification, principles,* and *values*. These six form the knowledge framework. He says it is important to present the structure of knowledge so that learners will be able to transfer their learning beyond the immediate lesson. Visuals should be designed systematically to develop greater understanding of the fundamental knowledge structures.

Support for the ubiquitous presence of the knowledge framework came from Early, Thew, and Wakefield's (1986) examination of several British Columbia Ministry of Education curricula, resource guides and textbooks. They found that the six knowledge structures recurred in these texts. Mohan (1989) further maintains that these knowledge

structures appear across modes of communication and understanding, for they can be expressed verbally and non-verbally. He has, for example, shown how *classification* can be expressed through the organization of content knowledge, graphic semiotics, information processing programs and expository discourse (Mohan, 1989, p.105). Although each knowledge structure has distinctive linguistic realizations, they are different from genres, for they are not specific to text. They are defined on semantic relations and not on the sequential patterns of discourse. *Classification*, for example, "is realized by the logical structure of the nominal group" (Mohan, 1986, p. 104). Of special interest to second language teachers is the claim that they are cross-cultural (Werner & Schoepfle, 1987).

Mohan and van Naerssen (1997) enlarge upon Mohan's view of the relations between language and content. The authors contend that "language is a matter of meaning as well as of form" (p. 23). Other assumptions are that 'discourse creates meaning,' that 'our language development continues throughout our lives,' and that 'as we acquire new areas of knowledge, we acquire new areas of language and meaning.' The authors go on to show how cause-effect meaning is built with language. With examples from students' work, Mohan and van Naerrsen show how students, after reading a text about the Egyptian water cooler, the *zeer*, drew diagrams and developed explanations of how it works. They point out the distinction between event and agent causation reflected in sentence aspect and vocabulary of cause which is more than grammatical items like 'because' and 'so.' They also distinguish between regularity models of cause-effect (in which the causal relation

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exists only in the mind of the speaker) and power models (in which causes have the power to bring about their effects). Mohan and van Naerssen suggest that the subtleties of causal means need to be brought to learners' awareness and that causal discourse should be taught in conjunction with meaning and not just form. The development of knowledge concepts and language go hand in hand. Diagrams could be used to represent concepts and form the catalyst for language development.

2.9.4 Mohan's Key Visuals

Each knowledge structure can be represented graphically by 'key visuals' or graphics (Mohan, 1986). Examples of key visuals include flow charts, webs, diagrams and graphs. According to Mohan, key visuals are useful, especially to second language learners, because they make content available with limited language and make the input of content knowledge more comprehensible. In addition, they display in a simple way both the ideas and the underlying logical relationships among the ideas.

Mohan (1990) reviewed many studies of content learning and suggested that graphic representations could become a visible language, a common currency and a visible basis for integration and cooperation. He seems to claim more than the facilitation effect of graphic organizers on comprehension, referring to evidence that they help comprehension and subject matter achievement (Levin, Anglin & Carnery, 1987; Winn, 1980). Mohan (1991) reiterated the claim made by Abelson and Black (1986) that the organization of knowledge into knowledge structures helps us better to comprehend,

remember and apply knowledge. He also alludes to Armbruster et al.'s (1987) claim that learners can be taught to recognize and use formal schemata (text structure) to improve their ability to read expository prose. He sees his knowledge structures as being useful for learning transfer.

Early (1989) further delineates the virtues of key visuals which she claims lower the language barrier and make visible the knowledge structures which underlie the content. They reduce the short-term memory load and fully exploit opportunities for second language growth. Relevant vocabulary can be taught in meaningful contexts and structures can be introduced to explain the graphic. She gives an example of a key visual and detailed suggestions for making them.

Early, Mohan, and Hooper (1989) outline a large project with the British Columbia Ministry of Education. Teams of teachers, both ESL and content teachers, in eight elementary and four secondary schools were involved in the initial project. Their task was to analyze needs, develop strategies and sample lessons, test them in the classroom, develop methods for teachers to evaluate effectiveness of the materials and produce curricula and resource materials. They interviewed twenty-five ESL high school students to ascertain their views of the experience of learning in the schools and their suggestions. The teams of teachers were preparing materials using key visuals as a tool to integrate language and content for the ESL students. The authors report on a brief exploratory study of the implementation of the material in a unit on "fish" for Grades 4 to 5 students.

Teachers were able to develop materials built around the organizing framework. The students were able to produce expository language based on the key visuals. Yet there was individual variation in their production, an indication of learning beyond behaviouristic drills.

Many case studies grew out of the Vancouver project and have been reported by Mohan and his colleagues in Vancouver. Mohan (1989) described work with knowledge structures used as a bridge between the organization of content knowledge, graphic semiotics and expository discourse in a Grade 4-6 ESL class, in Grade 7 ESL and native speaker science classes and in the writing of an ESL university graduate compared to that of an adolescent native speaker. Early (1990a, 1990b) described the use of the knowledge framework and key visuals in elementary school science classes. Dunbar (1992a) reported on a case study on summary writing in a secondary school English class. Dunbar (1992b) showed how the knowledge framework was used for teaching vocabulary. Tang (1994) described another case study on the use of the knowledge framework in introducing a novel to the students in a secondary school class of recent immigrants to Vancouver. All of the above case studies report success in the implementation of this approach, positive feedback from both teachers and students and improvement in students' expository writing.

A search of the literature revealed that only two controlled experiments had been done on the effectiveness of key visuals for comprehension. The first, Tang's (1992) study, was on reading comprehension and the second by Ruhe (1996) was on listening

comprehension. Tang wanted to explore the facilitative effect of using one kind of graphic representation (tree graph) of one type of knowledge structure (classification) on the comprehension and recall of Grade 7 ESL students and to explore students' attitudes through interviews. She designed a quasi-experimental project with recall as the operational definition of comprehension as is common in this field (Carrell, 1985; Connor, 1984). Intact classes of Grade 7 ESL students of low English proficiency formed the treatment and control groups. The materials were several passages from an alternate social studies textbook for that grade level and partially complete tree graphs. Students in the treatment group were taught the content of a passage through a tree graph representing the semantic relationships of the text. Key vocabulary was inserted in slots and lines used to link the slots. Later, students filled in a partially completed tree graph on their own and wrote a recall of the text. They then practised reading and interacting with tree graphs. The control group spent the same amount of time working on the text materials but were given vocabulary lists instead of the tree graphs and had to answer questions on the text passage rather than complete a tree graph.

The post-test means for the graphic group were significantly higher than their pre-test means. An analysis of covariance of the recall scores showed the difference in means between the graphic group and the nongraphic to be statistically significant. The judges (the researcher and an ESL expert) found marked improvement in structure in a number of graphic group protocols, but no improvement in structure for any of the students of the nongraphic group. Only two students in the graphic group did not seem to benefit in any

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way from the procedure. Thus, Tang concluded that using a graphic to present knowledge does facilitate comprehension and recall in most seventh grade ESL students. From the interviews she learned that 18 of the 22 students found the technique helpful, one found it not helpful and three were undecided. Most students recognized the organizational function of the graphic, but noted the limitations with regard to helping them write a paragraph or spell correctly.

The second controlled experiment which involved lecture comprehension by junior college students was reported by Ruhe (1996). In her experiment students heard four mini-lectures between a minute and a half and just over three minutes in length on four topics: bridges and recycling waste water (presumed to be unfamiliar) and stress and the food chain (presumed to be familiar). The lectures on bridges and stress reflected Mohan's (1986) *classification* structure and the other two lectures were examples of Mohan's *process*. Based on the author's listening pre-test which has been correlated with an Institutional TOEFL listening test, subjects were divided into four equivalent groups, a control group, a graphics group and two vocabulary groups one of which received the list of words from the nodes in the graphics presented in the order in which they appeared in the text whereas the other received an alphabetical list of the words. Participants heard all four mini-lectures in one session under similar conditions which differed only in the task supports provided. There were no training sessions. Subjects were simply given support in the case of the experimental groups or no support for the control group and asked to answer ten questions for each lecture. They were allowed to look at their notes.

For analysis, the questions were categorized into graphic-related and non-graphic-related. Participants' lecture notes were also coded according to the extent of their deliberate linkage to the graphics or word lists. The graphics group did significantly and considerably better on the graphics-related questions than the other groups. Relative differences between the control group and each of the two vocabulary groups were minimal with the exception of the food chain text where both vocabulary groups did better than the control group. There were no significant differences among the groups on the non-graphic questions. The author concludes that "because the mean scores of the vocabulary groups did not differ significantly from the mean scores for the control group, it was the graphics, and not the vocabulary labels on the graphic nodes, that were responsible for the enhanced comprehension in the graphics group" (p. 52). Since the graphics participants had the graphic in front of them when they answered the questions, it is not surprising that they did better than the other groups on the graphics related questions.

As the author suggests, the graphics may have activated content and rhetorical schemata and a visible framework for the lecture, but they must also have provided many clues to the answers to the questions. It is interesting to note, however, that some students noted the design flaw in the fourth graphic and in spite of the problems with the graphic still did significantly better than groups of participants in the other three conditions. The finding that both vocabulary groups did better than the control group on the third text is interesting. The author suggests that this word list was complete enough to allow the

participants to infer that the lecture dealt with the food chain. Of course, the familiarity of the topic would have made this possible and evidence from Lambiotte and Dansereau (1992) would support this explanation. Coincidentally the alphabetical list of words was almost the same as the list in presentation order. Still, the graphics group did significantly better on this task. The author reminds us that her study examined the effects of the text supports at only one level of listening proficiency which she describes as low, although we are not given information on the TOEFL scores.

Mohan's (1986) knowledge framework is of interest to content teachers dealing with second language students who are handicapped by language deficits and to teachers preparing second language students for academic work because it provides an organized way of teaching language and content. Key visuals related to the structures of the knowledge framework are attractive because they can serve as advance organizers for reading and listening comprehension, a vehicle for note-taking and can lower the language barrier for limited proficiency students without diluting the content. The many case studies related to the Vancouver Project have shown that teachers can work with key visuals to organize their content for presentation. Students can learn to communicate their understanding of content by key visuals. Key visuals are useful as stimuli for students' writing and to organize language development. The two controlled experiments offer positive evidence for key visuals to aid comprehension. Key visuals may help learners to remember material because of the deeper semantic processing required (Craik & Lockart, 1972), because of the elaboration of ideas involved in completing the key visual (Craik &

Tulving, 1975) or because the semantic processing undertaken at the encoding stage may facilitate later retrieval of the information (Morris et al., 1977). Key visuals and graphic organizers in general seem to be useful, but can second language students understand and use them?

2.9.5 Understanding Graphic Organizers

Bernard (1990) demonstrated that students may have difficulty understanding graphic organizers. Mohan and Helmer's (1988) study demonstrated that even gestures are not always understood by young children. They suggested parallels might exist between the acquisition of gestures and the development of language. They suggested that further research needs to be done on the comprehension of other visual or contextual information.

We certainly cannot assume that everyone understands drawings or maps. There are conventions which probably are learned in school. Constable, Campbell, and Brown (1988), for instance, found that 11-year-old students had difficulty with certain kinds of sectional drawings taken from published texts aimed at their age group. The researchers found that students were able to identify the cut surfaces of an actual ball and the illustrations of the cut surfaces of the ball, but were far from successful with illustrations in science textbooks. Differences arose from lack of familiarity with pictorial conventions such as shading used to represent texture. Teachers cannot be sure that their students, even native speakers, will interpret drawings in the same way they do.

The problems with the conventions of drawings are compounded for second language speakers. Hewings (1991) found that Vietnamese ESL children in Britain interpreted illustrations in elementary-level course books differently from traditional western views of the drawings intended to represent stereotyped roles. In his study he worked with pictures used to suggest setting, the representation of topographical space (floor plans and maps), symbolic representation (cartoon conventions and symbols) and graphic representations (details of graphs and keys for symbols). The conventions in other cultures may be different from those of the target culture or other cultures may not use graphic organizers at all as Tang (1991) discovered.

Tang's (1991) ethnographic study showed that ESL children in grade 7 have problems with graphic representations. She worked with two Grade seven classrooms of mostly ESL students in Greater Vancouver with one class receiving teacher guidance in interacting with graphics and the other not. The students in the class who were given more guidance in interacting with graphics were able to do the graphic assignments successfully. Although the textbooks were highly illustrated, Tang found that ten out of ten students did not look at a particular graphic in their textbook. In answering a question, students referred to the text rather than a time line which provided the same information as the text. For information on whales, students preferred text representation to graphic representation. In studying for a test too, they depended on the printed word. Few students interacted with a graphic unless their teacher required it. Students did not know how to use graphics to explain, represent or reinforce, organize and interpret knowledge.

Secondly, Tang's students did not attempt to integrate graphics with text, but seemed to consider them as a separate category irrelevant to text. They considered them 'attentional' in Duchastel's (1978) terms, there simply to add interest and motivate the reader rather than 'explicative,' designed to explain, or 'iconic,' designed to aid recall as the textbook authors probably intended. Tang's students had trouble with graphics and tended to avoid them if they could. She concludes that teachers need to draw students' attention to graphics, teach students how to process and produce graphic material, and use them on tests and examinations.

Even adult second language speakers may be unfamiliar with the conventions of graphics used in their target culture. Daniels (1986) writes of her experience preparing ESL students for such tests as those of the Royal Society of Arts which include such visual formats as maps, and tables. She found that training students to understand and process these materials required a great deal of explanation and preparatory work. She devised an instrument designed to answer the question "Can your students read the diagrams?" Her preliminary research on a large number of students indicated that the answer is not an unqualified yes.

The evidence suggests that graphic organizers can help learners to organize new information and integrate it with their already present knowledge structure. In Ausubel's (1968) terms, graphics can serve as advance organizers which can activate students' schemata and provide anchors on which to hang the new information. Organizing new

information can promote Craik and Lockhart's (1972) "deeper processing" and thus reinforce learning. One could also explain their facilitating effect by the extra elaboration involved (Craik & Tulving, 1975) or by transfer appropriate processing (Morris et al., 1977). Experiments by Mayer (1979), Alvermann (1986), Novak (1990), Lambiotte and Dansereau (1992), Schmid and Telaro (1990) demonstrate the facilitating effect of concept mapping. Researchers (Carrell, 1985; Carrell et al., 1989; Meyer et al., 1980; Tang, 1992; Teichert, 1996) claim that they can also facilitate comprehension for both first language and second language readers and listeners. Teachers must make sure that their students understand them (Bernard, 1990; Constable et al., 1988; Daniels, 1986; Hewings, 1991; and Tang, 1991). In addition, it takes some time and effort to learn how to make them (Novak, 1990; Schmid & Telaro, 1990). There may also be an initial decline in learning (Novak, 1990; Schmid & Telaro, 1990), but Bernard and Naidu (1992); Berkowitz (1986) and Novak (1990) demonstrated that they are worth the effort because actually constructing or completing a visual is more effective than just referring to it. Successful learners like them and can benefit from them (Bernard, 1990; Schmid & Telaro, 1990), but mapping is particularly effective for learners with low ability (Berkowitz, 1986; Novak, 1990; Schmid & Telaro, 1990). Mohan's (1986) knowledge structures and related key visuals are of particular interest to teachers of ESL because Mohan provides an organized way of linking language and content.

2.10 Vocabulary and Reading Comprehension

One of the most common procedures of listening and reading teachers in their second language classrooms is to present the vocabulary of a text to students before they read or listen. How important is vocabulary for comprehension? Does it help students more to understand the words of a text than to recognize its structure? We turn now to the research on vocabulary and reading and listening comprehension.

Nation (1993) maintains "good vocabulary knowledge enables good comprehension" (p. 115) although other factors (mental aptitude, knowledge and experience) enter into the equation. Laufer (1989, 1992a) found that for reading comprehension a vocabulary size which provides 95% coverage of the words in written text was necessary to reach an adequate level of comprehension. Her subjects were young second language readers. In a subsequent experiment (Laufer, 1992b), she found that academic ability did not compensate for inadequate vocabulary. Laufer (1997) contends that lexis is the best predictor of success in reading and that it facilitates comprehension more than syntax or general reading ability does. She acknowledges that, although with the help of discourse markers and words like "claim," "argument," "evidence," "opposing view," the reader can deduce that the writer is making a claim, that some supporting arguments are being presented, that some counter-argument is being offered and finally, that the contradictory claims are synthesized. Without knowledge of the content vocabulary, however, the reader will still have only a fuzzy idea of what the claim is.

Earlier research by Pike (1979) on his "vocabulary in context" items on the TOEFL test corroborates this view. These vocabulary items correlated highly with the reading comprehension sections of the test. It is true that the target words were presented in sentences and one might argue that some reading comprehension is involved but the test makers in deciding whether to leave out the vocabulary or the reading sections on this test for admission to university study did not hesitate to opt for deleting the vocabulary items. (In the current version of the test, vocabulary items are integrated in the reading section, thus testing words in the context of the reading passages (Read,1997.) Vocabulary knowledge and reading ability seem to go hand in hand.

World knowledge can help though. It certainly plays a part in the learning of new words. Nagy, Anderson, and Herman (1987) showed that it is easier to learn a new word which is simply a new label for a familiar concept than a word for a new concept. They found that learners' prior knowledge had a more powerful effect on learning from context than did properties of words or texts not directly related to prior knowledge. The interaction between world knowledge and vocabulary knowledge may sometimes be confounding the issue of the importance of vocabulary for comprehension.

Isolating the effect of vocabulary difficulty from other aspects of a coherent text is not easy. Freebody and Anderson (1983) attempted to do this. They conducted two experiments in which they attempted to tease apart the effects of vocabulary difficulty, text cohesion and schema availability on reading comprehension. In the first experiment with

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75 sixth-grade students, they prepared six versions of three passages from a common social studies textbook. The variations consisted of three levels of cohesion (high, low and inconsiderate–with extraneous propositions) and two levels of vocabulary difficulty (one substance word in four was replaced with an unfamiliar synonym for the difficult version). Each subject read three passages, one in each cohesion condition. Comprehension measures included a recall task, a short summary task and a sentence verification task (items which were to be judged as expressing ideas from the text or not).

Contrary to their expectations, Freebody and Anderson found no interaction between vocabulary and cohesion. Vocabulary had a significant direct effect on the recall and summary measures, though not on the sentence verification measure, but did not interact with ability, passage, position, or cohesion levels. Strong manipulation of text cohesion did not, on the other hand, directly affect comprehension.

In the second experiment, this time with 82 sixth-grade students, vocabulary difficulty and topic familiarity were manipulated with four passages constructed: familiar and unfamiliar versions of two themes and two versions of each with familiar and unfamiliar vocabulary. The same comprehension measures were used as in the first experiment. Freebody and Anderson note that, unexpectedly, the vocabulary with familiarity interaction was not significant. Only on the verification measure did vocabulary difficulty have a significant effect although performance was lower on all three measures in the difficult vocabulary condition. The researchers note, however, that a surprisingly

high proportion of difficult vocabulary was required to produce reliable effects. Familiarly of topic affected recall significantly. Text cohesion produced weak and inconsistent effects. The most important factor was topic familiarity. This study underlines the importance of topic familiarity and shows that vocabulary has a role in comprehension although its role is not yet clearly delineated. Text cohesion seems less important for reading comprehension.

Nagy (1997) suggests that it seems plausible that first language learners pick up most vocabulary from context rather than through explicit vocabulary instruction. He observes, on the other hand, that instruction probably plays a relatively greater role in the vocabulary growth of second language learners than it does for native speakers. They do not have the time that first language speakers have to receive the multiple exposures to new words in different contexts that learning from context requires. They have to learn faster than native speakers in order to function in their new language. Furthermore, according to Nagy, they cannot really take advantage of context cues to help them, at least until they are fairly advanced in the language. Liu and Nation's (1985) research on guessing vocabulary from context supports this view.

Parry's (1993) case study of a Japanese university student's acquisition of vocabulary in English showed that it is difficult to grasp the full meaning of a word just from the context. Similarly, Haynes and Baker (1993) found the most significant handicap for college students in Taiwan reading in English is not inflexible reading strategies, but

insufficient vocabulary knowledge. The American students in their study were significantly more successful than the Chinese readers at benefiting from lexical familiarization, the explanation of a word-form and its new concept contained in a text. The Chinese showed more strategic behaviour than the Americans, that is they gazed more at illustrations, examined a flowchart, exhibited backward scanning etc., but often arrived at only partial understanding of the new words. Even when students are trained to use flexible reading strategies to guess words in context, their understanding of new words may be low due to insufficient vocabulary knowledge.

On the other hand, as Nagy (1997) points out, at the advanced stage second language readers encounter unfamiliar words and unfamiliar meanings of words at a greater rate than first language readers and must use context to aid their comprehension. Book flood studies (Elley, 1991) support the notion that second language students' vocabulary knowledge can benefit from extensive reading. Can instruction compensate for second language learners' limited exposure to texts in the target language?

Nagy (1997) based on Stahl (1986) admits that

"comprehension of a text containing difficult words can sometimes be increased by instruction on the difficult words in the text, if beyond providing definitions, the instruction involves multiple exposures to the word in context and requires deep processing of information about the words. Surely this would apply to second language readers and listeners." (p. 73).

Two studies, one long-term and the other short-term, point to the benefits of vocabulary instruction. Beck, Perfetti and McKeown (1982) point out that, based on "the theoretical connection between access to word meanings and understanding texts, ... vocabulary instruction ought to affect reading comprehension" (p. 506). In their 5-month study, they investigated the effect of long-term vocabulary instruction on children's reading comprehension. They used measures of semantic processes at the single word level and the sentence level and examined memory for connected text through probed recall. The instructed Vocabulary Group made gains on all measures. They found that vocabulary instruction significantly affected only recall of noncentral content of the stories tested. (Both groups made gains on central content.) The authors speculate that the improvement on noncentral content might be due to the availability of more processing capacity for understanding noncentral content rather than its being allocated to dealing with unfamiliar words—a worthwhile benefit of vocabulary instruction. Coady, Magato, Hubbard, Graney, and Mokhtari's (1993) experiments showed that students' reading comprehension could be significantly improved through even a one-hour-a-week eight-week computer-assisted instruction program in high frequency vocabulary.

For Stoller and Grabe (1993) vocabulary is both a cause and a consequence of reading abilities. According to Perfetti's (1985) theory of reading comprehension, good readers have to have large sight vocabularies to enable them to recognize words automatically. A consequence of not acquiring fluent word identification is that the reader's comprehension processes are at risk (pp. 57-58). As Hudson (1982) and Johnson

(1982) found, just giving students a list of new or unfamiliar vocabulary before reading does not guarantee the induction of new schemata. Readers need to form associations between new word-forms and concepts with known schemata.

What does it mean to know a word? How well does the reader or listener have to know the words in order to understand a text? Nation (1993) cautions that knowing the vocabulary entails fluency of access and points out that Mezynski's (1983) research explains why in some studies preteaching unknown vocabulary has no significant effect on increasing the amount of information gained from a text. Beck and McKeown (1983) and McKeown, Beck, Omanson, and Perfetti (1983) had found comprehension improves when students are given the opportunity to develop semantic network connections, relating new information to old information. Fluency of access includes the number of associations a word has, the strength of association and the integration of the word within a well-organized system. This can only come through practice. Using a word in personally created contexts results in better learning than repeating a context used by someone else (Hall, 1991). Among the vocabulary teaching techniques outlined by Sokmen (1997) is Visser's (1990) provision of a polysemous word in two or more contexts and asking students to find similar features of meaning and then derive the underlying meaning of the word. This will promote elaboration and deeper or semantic processing and therefore better learning and should foster fluency of access. Nation (1990) recommends pre-teaching words before learners read. For fluent access the words should be taught some time before reading and the teaching followed by collocation activities and others.

2.11 Vocabulary and Lecture Comprehension

Intuitively, and based on theory (Perfetti, 1985), teachers and students feel that vocabulary is essential for comprehension. The faculty in North American tertiary institutions in Powers' (1986) survey highlighted comprehending key vocabulary related to the topic of a lecture and deducing the meaning of words from their context, along with identifying the role of discourse cues among problems with which nonnative speakers were having disproportionately greater difficulty than native speakers. In Flowerdew and Miller's (1992) survey, Cantonese-speaking students in Hong Kong attending their first lecture course at university reported anxiety about new vocabulary and concepts. They wrote that they had difficulty with new terminology and concepts and if they could not understand, would get lost and give up on the last part of the lecture. Lecturers also mentioned vocabulary and specialist terminology as a weakness of their students (Flowerdew & Miller, 1996b) although it was sometimes difficult to tease apart problems with concepts and problems with language.

Grabe and Stoller (1997) concluded that listening comprehension skill followed closely on reading comprehension development. In their case study, based on the personal experience of learning Portuguese in a second language setting of one of the authors, they reported that extensive reading of newspapers (three to four hours per day for eighty days) coupled with access to and use of a bilingual dictionary led to improvement of both listening and reading comprehension. The subject's listening comprehension of news stories developed commensurately with his reading comprehension, but he still had

difficulty with face-to-face conversations, lectures and directions in Portuguese. Since he did not specifically work on conversation skills, the cause of the development of his listening ability with a particular genre (news stories) seemed to be extensive reading and vocabulary development. Reading and vocabulary are reciprocally causal, that is, reading improves vocabulary development and vocabulary knowledge supports reading development.

Comprehension of spoken vocabulary has been under-researched (McCarthy & Carter, 1997). Still, some conclusions are possible. Nation (1990), although admitting that only a small amount of evidence is available, concludes that about half the words needed to understand written English are needed to understand spoken English. Among characteristics of speech that McCarthy and Carter (1997) note are apologies, hedges and smoothovers. The fifty most frequent spoken word-forms cover a higher percentage of text than the fifty most frequent written ones. Spoken word-forms are often elusive and more cryptic than their written word equivalents. Spoken text is often less lexically dense. Vocabulary is deliberately vague because of the need in interpersonal communication to be informal and not seem overly direct. Although spoken English is generally less formal than written, university lectures tend to be more formal. They contain a larger proportion of low frequency words and are therefore closer to written language so vocabulary may constitute a problem for second language learners who need to understand lectures.

We noted that Powers' (1986) professors reported students' problems with the speed of lectures, vocabulary deficits, including idioms and identifying the structure of lectures. This would point to problems with perception, the first stage of the listening process, weaknesses in vocabulary and difficulty sorting out the structure of informal lectures. For Kelly (1991) lexical ignorance is the main obstacle to listening comprehension with advanced foreign learners. Native speakers normally rely on top-down processing and will turn more to bottom-up processing only if there is a problem with the sound signal or if the words are not predictable. He suggests that in the early stages of language learning learners rely mainly on bottom-up processing when listening and it is only when they become more proficient that they can bring in semantic and other knowledge. With regard to vocabulary, the gradually acquired knowledge of a word's register, frequency, meaning, collocation etc. facilitate the listener's ability to predict the lexical item that will be uttered and enable him to exclude alternatives.

Data for Kelly's (1991) study came from transcriptions of BBC news recordings made by a French-speaking teacher of English and by francophone students who had had 5 to 7 years of English language study. Misperception errors made by at least 20% of the participants (including the teacher) were noted and classified as perceptual, lexical or syntactical. Forty-five percent of the teacher's errors were perceptual, 42% lexical and 13% syntactical. In Kelly's view, the teacher's errors resulted mainly from failure to perform top-down processing. The students produced 25% perceptual errors, 62% lexical and 12% syntactical. Of the lexical errors, a large proportion of the students' errors

resulted from a total ignorance of lexical items while the teacher's errors were often due to ignorance of a higher level, such as ignorance of particular institutions or organizations, ignorance of the particular meaning of an item or ignorance of its collocations. When errors were classified according to how they affected comprehension, Kelly found that although perceptual errors mostly led to slight comprehension impairment, lexical errors accounted for 65.5% of all the errors where comprehension was severely impaired.

Kelly's study points to the importance of vocabulary for lecture comprehension. Flowerdew and Miller (1996a, 1996b) acknowledge the difficulty that unfamiliar vocabulary poses for second language students, but they and others (Flowerdew & Miller, 1992; Olsen & Huckin, 1990; and Tauroza & Allison, 1994) also underline the importance of recognizing the structure of a lecture. Familiarity with discourse markers should help students identify the structure of lectures and facilitate their ability to distinguish main ideas from supporting details and relevant from irrelevant information. The work by Chaudron (1983); Chaudron and Richards (1986); Dunkel and Davis (1994) and Flowerdew and Tauroza (1995) shows that familiarity with discourse markers aids comprehension. Yet Laufer (1997) argues that recognizing, on the basis of discourse markers and the vocabulary of argumentation, that a claim is being presented is not much help to the reader or listener if she does not understand the content vocabulary enough to know exactly what the claim is.

Thus, the standard practice of presenting vocabulary before second language learners read or listen to a new text has some justification in theory and in empirical research. Such presentation of vocabulary appears to require more than just giving learners a list of words before they begin the task of reading or listening. There should be some elaboration involved, some attempt to present new words in polysemous contexts and some activities for developing semantic networks so that the learners will have 'fluent access' (Nation, 1993) to the new words as they engage in the comprehension process.

2.12 The Research Questions

This research study is intended to investigate the effectiveness of common practices found in typical classes designed to prepare second language students for integration with native speakers into discipline courses in a university setting. It is a study of listening comprehension, a somewhat neglected area of research, as many more studies have investigated different aspects of reading comprehension than of listening. It focusses on two techniques which should help listeners understand and remember material presented in lectures. The first, key visuals, widely used in schools in Canada by ESL teachers and regular classroom teachers for classes with large numbers of second language learners integrated into the mainstream, grew out of Mohan's (1986) knowledge framework. Mohan developed this framework as an attempt to integrate language and content in an organized way, to make students aware of the structure of knowledge so that they can transfer learning to new situations. Key visuals lower the language barrier because they display the relationships among ideas in a visual rather than a strictly verbal way.

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Research on reading comprehension, and to some extent on listening comprehension, has demonstrated the beneficial effects of awareness of formal schemata on comprehension for second language learners. Experiments have demonstrated the effectiveness of techniques to teach recognition of the structure of expository material. Students trained on key visuals with a certain text type should be able to recognize that structure in other listening passages and use that organization pattern to help them understand and remember new material.

Concept maps in their various forms (graphic organizers, frames, scripts) have been shown to be helpful for students in understanding and remembering expository material. Their success could be explained by Ausubel's idea of advance organizers providing anchors on which to hang new ideas, by deeper processing, by elaboration, or by transfer-appropriate processing. It takes time to learn to make concept maps, but research has shown that manipulating the maps is more beneficial than just studying them. Key visuals training should sensitize students to the structure of a passage, help them to pick out important ideas and organize the ideas in a structure similar to that of other passages of that type. They will group similar ideas and this will help them to make distinctions among ideas. They will have cues which aid in recalling the ideas presented. This processing should facilitate comprehension and improve memory of the material.

A second common technique found in second language classes is vocabulary preparation before students listen to a passage. Lexis has been found to be the best

predictor of success in reading (Laufer, 1997). Vocabulary knowledge has been shown to have a direct effect on recall. Rich vocabulary instruction should give learners the opportunity to develop semantic network connections and relate new information to old. This should promote conceptual or deeper processing, elaboration and appropriate encoding for later retrieval.

This study focuses on problem-solution texts, the most tightly organized text type and probably the most common in academic material. Two groups in an academic non-credit program at a university were exposed to three problem-solution mini-lectures in training sessions while a control group in the same program received no special training. In a university setting, second language speakers are required to understand and learn from lectures. Lectures are extended pieces of discourse, planned in terms of the message to be conveyed, but unplanned in terms of the linguistic content. Especially in the North American context, they tend to be somewhat informal with some interaction with the audience (usually at the beginning and end of the lecture), full of pauses, false starts, nonsequiturs and even errors. The lectures in the experiment simulated that style, but were recorded on audio tape and for that reason there was no actual interaction with the audience.

One experimental group (the visuals group) received training with key visuals as advance organizers and completed a key visual while listening to the problem solution training passages. The other (the vocabulary group) was given rich vocabulary training

before hearing the passages and answered factual questions as they listened. Both groups received the same amount of exposure to problem solution texts. The visuals group focussed on the organization of the passages and the relationships among the ideas. The vocabulary group through the vocabulary preparation work was expected to be doing deeper or semantic processing of the material. The factual questions, however, may have led them to focus on the individual facts presented rather than grouping them and developing appropriate cues to help them in retrieving the information.

The research questions are: Will students who are sensitized to the structure of problem-solution lectures through key visuals (the Visuals Group) better understand and remember a test lecture of that type after than before the training? Will students who are exposed to lectures of the problem-solution type and receive vocabulary instruction (the Vocabulary Group) better understand and remember a test lecture after than before the training? Will a control group in the same program as the experimental groups better understand and remember a test lecture of the problem-solution type after the same period of time but without any special training on the text type? Will the Visuals Group better understand and remember the test lecture after their training than the Vocabulary Group or than the Control Group? Understanding of the lecture was measured by a set of five global or inference questions and a summary cloze task. Understanding and remembering the material from the lecture was measured by an immediate free recall task.

CHAPTER 3

PILOT STUDY AND DEVELOPMENT OF MATERIALS

AND TEST INSTRUMENTS

In setting up the experiment, I wanted to do an ecological study in the university classroom to investigate the effectiveness of two techniques commonly used in the ESL classroom. Beretta (1986) and others have suggested that results from a laboratory experiment cannot necessarily be generalized to the classroom. I wanted the research to take place in the ESL classroom with the kind of material and techniques ESL teachers use with their students to improve their listening comprehension. In this way I was hopeful that the findings would be useful to teachers in the university setting and perhaps, with adjustments, in other settings. This goal affected the selection of materials, groups and measures to be used in the study.

3.1   Pre-experimental Instruments

3.1.1   Background Questionnaire and Consent Form

Participants signed a consent form (Appendix B) in which they agreed to allow the results to be used in a thesis and possibly later on in published articles or a monograph. On this form they were given details of the research including the measures they would be completing. They could refuse to answer any questions or withdraw from the project at any time without risk of prejudice.

Participants also completed a background questionnaire (Appendix C) designed to supply information about their first language, second language spoken, age, sex, country of origin, field of study and place of education.

3.1.2 Proficiency Measure

Because the participants would be in intact classes and not randomly selected, it was important to ensure that groups were not significantly different with regard to characteristics found relevant to the experimental procedures. Spada, Ranta, and Lightbown (1996) recommended that researchers use fairly extensive pre-tests and questionnaires to establish the similarity of groups prior to the experimental intervention to compensate for the use of intact classes.

Although participants were in programs where they had been placed according to their proficiency level, it was desirable to have a common instrument that could be administered to all participants to ensure that groups were not significantly different at the outset. Because of time constraints in classes, it was important to use a reliable instrument that would not take up too much class time. To check on general proficiency level, a *general proficiency cloze task* (Appendix E), part of a standardized proficiency test validated at the University of Ottawa was administered to all participants. This test is in multiple choice format. Each item has three distractors. The particular subtest used has an average reliability of .89 as found in regular post-test item analyses completed after each session's administration of the test. It has been in use since 1986 with approximately 800

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students. The rational cloze passage of 325 words is entitled <u>Culture Shock</u> and has thirty blanks. Approximately every seventh word is deleted with adjustments made to require about 50% content words and 50% function words to fill the blanks. Students were allowed 30 minutes to complete this test.

3.1.3 Visuals Sensitivity Measure

Because we cannot assume that all our ESL students are equally familiar with visuals, a *visuals sensitivity measure* (Appendix D), based on Daniels (1986) was administered to all participants to look for group differences in participants' understanding of visuals, their familiarity with them and their attitude toward them. On this test students were presented with five visuals, two tables, a flow chart and a cycle, all designed by Daniels (1986), and an options chart designed by the researcher. Each visual displayed certain information and subjects were asked information questions about each one and for some visuals were required to put additional information on the visual. They were then asked if they were familiar with each visual and whether they considered it to be a good way of presenting information. This instrument yielded a visuals score, a visuals familiarity score and an attitude to visuals score.

3.2   Test Instruments

3.2.1 Stimulus Material

The original stimulus material for the pre- and post-test consisted of two three-minute mini-lectures of the problem-solution type. The lectures were short so that the

measurement instrument would be sufficiently thorough to provide information about what students understood and remembered from the text, without being too taxing for students to do in class. However, the texts were also designed to be long enough to preclude recall by simple rote memory. Kintsch and van Dijk (1978) (also Meyer & Freedle, 1984) suggest that texts used for recall be well structured in terms of a schema. The problem-solution (Mohan's 1986 *choice* or *decision-making*) text type was chosen because of its high level of organization according to Meyer and Freedle (1984). They place it at the highest end of their organization continuum because it includes not only a causal organization whereby the problem is an antecedent for the solution, but also an overlap whereby at least one element of the solution addresses a particular aspect of the problem. Thus, this text type should be a good candidate to provide a true test of the key visuals. Furthermore, Horowitz (1982) recommends that this pattern and its companion cause-effect be studied because of their increasing use in technical writing for modern, science-oriented societies. Finally, as recommended by Kintsch and van Dijk (1978), each of the mini-lectures, including the training texts, was designed to be related to a different field of study, but was considered non-technical in nature.

One mini-lecture (See Appendix G.) was based on a television interview with a researcher who is a proponent of the psycho-linguistic approach to reading. In the interview she discussed common reading blocks. Her answers to questions in the interview were rewritten into lecture format in a semi-formal lecture style. The second mini-lecture (Appendix L) was based on a radio report on garbage in space and the problems it causes.

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It, too, was rewritten to simulate a mini-lecture. Both lectures were rerecorded by faculty at a university in a quiet office. Audio recordings rather than live lectures were used for consistency across testing sessions. Audio rather than video recordings were used for the experiment because it is technically easier to produce a good quality audio tape than a video and "talking heads" would not add much to the lecture simulation.

Students heard each mini-lecture twice because it was a testing situation and could take notes as they listened (Appendices H and M). They were not allowed to refer to their notes, however, when they did the three listening comprehension measures (Appendices I, J, K and N, O, P).

3.2.2 Measures of Listening Comprehension

Multiple measures of comprehension should probe subjects' representation of the input and provide more insight into subjects' comprehension (See e.g., Flowerdew & Tauroza, 1995.). Three types of instruments were selected to measure listening comprehension and students' memory of the texts: recall protocol, global questions and summary cloze.

a) The Recall Protocol

The first instrument selected was the *recall protocol*. This is the most common measure used in experiments involving text structure in second language reading (Carrell, 1984b, 1985; Connor, 1984; Urquhart, 1984). It has also been used in listening

comprehension (Dunkel & Davis, 1994; Meyer & Freedle, 1984). Furthermore, for listening comprehension, Rost (1994) maintains that introspective or reflective methods provide the best insight into the content of listeners' internal representations. This measure requires proficiency in production as well as comprehension, however, and Rost does admit the limitations of such techniques, pointing out, on the one hand, possible underreporting or avoidance tactics of subjects due to possible limitations of their proficiency in second language expression as well as varying familiarity with topic area, and, on the other hand, possible stretching to show more comprehension than they actually experience. Wolf (1993) encountered this problem in her experiment with one hundred and forty-four university students of Spanish. Her subjects, tested on six comprehension tasks, scored higher on the multiple choice questions than on the tasks requiring more production. Wolf contends that "target language constructed response tasks may mask comprehension because completion requires productive language abilities not involved in comprehension" (p. 484). Shohamy (1984) had similar results. She hypothesized, however, that as subjects became more proficient in the target language, they were less likely to be affected by the type of language assessment task.

A solution is to ask students to do their recalls in their native language. Lee (1986b) showed that students studying Spanish at the university level who were writing recalls in their native language recalled more of a reading passage than those writing in their second language. There is a problem assessing recall protocols though if several languages are involved in the recall protocols. Although Shohamy's (1984) subjects tested

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significantly better on all tasks in their first language than in the target language, she noted that assessment in all subjects' native languages would be difficult as well as impractical to score. Flowerdew and Tauroza (1995) also point out the problems of interpretation of subjects' written summaries. In fact, Dunkel and Davis (1994) ran into even greater problems of interpretation when subjects were allowed to write their recalls in their native language. It was difficult to quantify the protocols when they had been written in different languages even though they were translated into English for analysis. Researchers were left with the unanswered question of whether translating the lecture information into the native language presented subjects with additional information processing difficulties.

In my study in the Canadian university setting, there were many language groups in ESL classes. Multilingual experimental and control groups were expected. For these reasons, and because students were at the advanced level in English proficiency, the recall protocol in the target language (Appendices I and N) was adopted as one of the measures in this study.

b) Global or Inference Questions

The second measure selected for the study was a series of five *global or inference questions*. Key visuals or graphic organizers require listeners to keep in mind the structure of a lecture and to look for the relationships between ideas in the passage. Research suggests that 'deeper processing' (Craik & Lockhart, 1972) leads to learning and memory for material to be learned. On the other hand, elaboration (Craik & Tulving, 1975) is

believed to strengthen the memory trace. A third view is the transfer-appropriate processing explanation (Bransford et al., 1979) based on research which showed that matching the processes used for encoding and for later retrieval improves memory. Further support for this view comes from Hansen and Jensen (1994) who identified two task areas in comprehension: global comprehension and local comprehension. Global comprehension requires understanding the major themes and topics of the lecture, whereas local comprehension calls for identifying specific items within the lecture, such as key terms to make sense of the lecture at the sentential level. Their experiment with the T-LAP (Test of Listening for Academic Purposes) showed that more proficient language users performed better than less proficient language users on global questions, but the difference in performance by high- versus low-level subjects was smaller for detail questions. Low-level listeners relied more heavily on verbatim response patterns than did high proficiency subjects who could paraphrase and synthesize information across clauses. Shohamy and Inbar (1991) who worked with six classes of twelfth grade high school students also found global questions to be more difficult for their subjects than local questions. The authors also explain their results in terms of schema theory according to which comprehension can be performed through local or global strategies.

Thus, a second measure, open-ended *global or inference questions* (Appendices J and O), designed to tap a high level of comprehension, was added to the battery. A series of five questions was prepared for each mini-lecture. Each question was worth two marks.

c) Summary Cloze

The third measure was a *summary cloze* task in which participants are asked to complete a summary of the mini-lecture by filling in fifteen blanks with their choice of items from a list of twenty possibilities. Courchêne and Bayliss (1995) compared the multiple-choice format with the summary cloze format to test reading comprehension. They found the summary cloze format to be a viable alternative to a multiple choice format for testing reading comprehension, often being more reliable in terms of the alpha value than a multiple-choice version of comparable length. They contend that this task requires global understanding of the whole text, the ability to synthesize and evaluate information, the ability to use contextual clues to predict information and, based on student comments, appears to offer more face validity.

To create the summary cloze, Courchêne and Bayliss (1995) (also Courchêne, 1995) recommend that the tester, using a mixture of words found in the original text and synonyms, write a summary encapsulating the main ideas of the text, about one third in length, then transform it into a rational cloze by deleting some cohesive markers and content words. Finally, a list of words with possible choices exceeding the number of answers in the ratio of 5:4 should be supplied. The summary cloze used on the pre-/post-tests had 15 blanks and a word list of 20 items (Appendices K and P).

3.3   Materials for Training Sessions

3.3.1 Stimulus Materials

The mini-lectures for the training sessions were approximately ten minutes in duration. Flowerdew and Miller (1997) recommend using long texts to train students so that they will get used to the vagaries of extended natural speech. The aim was to simulate real lectures of the most common transactional type. The length was limited, however, by what could comfortably be handled in the standard hour and a half time slot of university timetables. There would have to be time to introduce the advance organizer (visual or vocabulary), hear the mini-lecture twice, discuss the lecture after and then do the post-listening tasks (recall protocol, global questions and summary cloze). Secondly, the aim was to reduce rote memory of the passage so that good recall could be attributed to text structure and deeper understanding of the text rather than simply regurgitating facts (Kintsch & van Dijk 1978, p. 376).

Each training lecture represented a different discipline. They were all problem-solution text types, academic but non-technical. The first one, Fortune Cookies (Appendix T), a business lecture, based on a radio report, was a case study of a company with a business problem and how they solved it. The second lecture (Appendix AC) was from the humanities and was based on a lecture by Margaret Mead about fostering creativity in children. She described art forms in different cultures and how societies developed creativity in their children. The problem was matching the art forms to the culture and communicating the society's art forms to the children. The third lecture (Appendix AK)

was from the domain of science. It was based on a television documentary on the greenhouse effect. It was rewritten to simulate the lecture format. The problem, of course, was the greenhouse effect and how to deal with it. Each lecture was rerecorded by faculty members either in the studio or a quiet classroom.

3.3.2 Pre-listening Visuals

The visuals for the training materials (Appendices U, AD, and AL) were first developed with the help of my very advanced francophone students in a vocabulary class. They were piloted in my own advanced listening and vocabulary classes and in two classes at a CGEP in Quebec. They were favourably received by teachers and students, although the second lecture "Children and Creativity" had to be shortened and reorganized to make the organization more patent. The teacher presented the partially completed visual to the class before they heard the lecture. It served as an advance organizer. Students were invited to anticipate what they would hear in the lecture and ask any questions about the visual. They were asked to complete the visual and were encouraged to take notes on the visual during the lecture as they listened. After hearing the lecture twice and completing the visual, the class discussed it and any problems were settled. Their notes and the visuals were collected before students did the post-listening tasks.

3.3.3 Pre-listening Vocabulary Exercises and During-listening Materials

The vocabulary chosen for the exercises was that of the visual. The exercises (Appendices V, AE, and AM) supplied definitions of the words in different contexts, gave

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other members of the word family, asked students to give examples of the concepts described by the words and to make sentences using the words, all in an attempt to develop fluency of access (Nation, 1993).

While they were listening to the lecture, students answered factual questions about the lectures. There were eleven factual questions on the Fortune Cookies lecture (Appendix W), eleven on the Children and Creativity lecture (Appendix AF) and ten on the Greenhouse Effect (Appendix AN). Students' answers to these questions were discussed in class and then collected before they did the post-listening tasks.

3.3.4 Post-listening Tasks

The post-listening tasks were the same as the measures of listening comprehension used on the pre- and post-tests, namely: a recall protocol, a series of global questions and a summary cloze. There were six global or inference questions on each lecture and fifteen blanks on each summary cloze. These tasks were piloted in classes at a CGEP and in my own advanced courses at a university. Students were asked to record the amount of time they spent on each task. Each task was collected after it was completed before the student began the next task.

3.4   Pilot Study

3.4.1   Participants

Because the experiment was intended to be ecologically valid, that is, to simulate the kind of training students receive in the ESL classroom in preparation for integration in academic programs, intact university classes of students who were to receive credit for the course were selected for the pilot study. They were chosen because they were at an advanced level of second language proficiency, would be familiar with the lecture format and, being in credit courses, were assumed to be highly motivated in terms of improving their ESL proficiency.

Initially, classes at the second of three levels in a credit program at an urban university were selected for the study. Six intact classes were needed, two in the visuals condition, two in the vocabulary condition and two control groups. The reason for having two groups in each condition was to control for teacher and other external variables. There was a bank of ten classes at this level from which to choose and so the plan seemed feasible. When one text was tried at that level, however, I learned that the materials would be too difficult for these students and had to turn to the next level, the highest, where there were only seven possible classes. The bank of potential classes had shrunk. The first task was to find teachers who would volunteer to do the experiment. It was clear at the outset that the teachers would have to be sold on the merits of the experiment and its usefulness for their students because the program was a compulsory writing program. It would be necessary to justify nine hours of listening comprehension work in a 49-hour writing

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course. Fortunately, the problem-solution text structure was one students would focus on in their course. There was writing involved in the recall protocols and some focus on grammar in the summary cloze task. Five teachers volunteered. I then asked for volunteers for the visuals or vocabulary conditions, hoping to find two volunteers for each of the experimental conditions so that I could in some way control for teacher variables. The randomness of selection already limited by the use of intact classes was further constrained by allowing teachers to select the treatment they would test, but since it was difficult to get their cooperation in the first place, I had to make it more attractive for them to participate. The benefit of this self-selection was that they were likely to provide treatment fidelity because they were doing something they liked and had chosen. Two teachers, one very enthusiastic about visuals and the other interested in the novelty of the approach volunteered for the visuals condition. One teacher volunteered to do the vocabulary training sessions and the other two would only agree to being control participants. In view of this non-randomness of selection of groups, it was hoped that the pre-experimental testing would ensure that the groups were not significantly different.

In the end, five credit classes were chosen for the study. Each class had about twenty-eight students, all placed in their class according to a placement test. There were two control groups, one Vocabulary Group and two Visuals Groups.

3.4.2 Pre-experimental Measures

After signing the consent form, the students in each class completed the background questionnaire, the visuals sensitivity questionnaire and the general proficiency cloze test.

3.4.3 Listening Pre- and Post-test

The two batteries of testing measures (the recall protocol, the global questions and the summary cloze) each based on one of the three-minute problem-solution mini-lectures (Garbage in Space and Overcoming Reading Blocks in Children) were used as the pre- and post-test in a counter-balanced arrangement with the Vocabulary Group, one Visuals Group and one control group using the Reading Blocks text as the pre-test and the other groups the Garbage in Space text and vice versa for the post-test.

All five classes completed the pre- and post-tests although there was some attrition within each group. In one control class, however, only five students agreed to participate.

3.4.4 Training Sessions

The control groups received no training sessions. Three training sessions were scheduled for each of the three experimental groups (one Vocabulary and two Visuals Groups). Teachers met with some resistance, however, from students in regard to using the materials. One of the reasons was that the credit course was a required course for them, not one they would necessarily have chosen. The materials for the experiment were

essentially listening materials, and the students thought they already were proficient at listening in English. Since the course the students were taking was a writing course, many students, from the outset, did not want to participate, even as control subjects. Others, cooperative at the outset, felt pressured by demands of their other courses as the term progressed and became reluctant participants. The Vocabulary Group did all three training sessions although only sixteen of the twenty-five students completed all the pre-experimental measures, the pre- and post-tests and most of the training sessions. In one of the Visuals Groups, the resistance was so strong that the teacher and I agreed to drop one of the three training sessions. Furthermore, because of student and teacher resistance to using listening materials for a writing class, it was decided that I would give students feedback on their writing in the form of corrections and comments on style and organization in their written recalls for the three training texts. The Visuals Group with the enthusiastic teacher had better participation, with sixteen of the twenty-four students completing the pre-experimental measures, the pre- and post-tests and most of the training sessions.

3.5   Problems with Classroom Research

Beretta (1992) states that 'evaluation reports that give the impression of a smooth professional operation that went off without a hitch are far from the mark' (p. 250). Duff and Early (1996) suggest that 'mysteries and surprises are inevitable when researchers attempt to carry out long-term projects in social settings' (p. 9). This preliminary study was not a long-term project, but it was done in the social setting of real classrooms and

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thus did bring mysteries and surprises. Rounds and Schachter (1996) remind us that 'the researcher is a tolerated guest in another teacher's classroom' (p. 106). Respecting the teacher's right to organize her own classroom can lead to conflicting agendas between the researcher and the teacher. In retrospect, the conflict between a researcher working on listening comprehension and a program focussing on writing seems obvious.

In addition to the problem of the conflict between the research agenda and that of the program, Duff and Early (1996) cite other reasons for having to abandon their study in Hungary. Among these were the difficulty of carrying out research at a distance, the need for renegotiating unreasonable time frames, the belief of some teachers that the research will have little impact on classroom practices, and student attrition or uncooperativeness because they feel what they are being asked to do will have no direct bearing on their school grades. They also note that teachers may not deliver the treatment type intended for their group. They may embrace a more selective approach or introduce elements of the experimental treatment to control groups so that their students will not miss out. Indeed, Spada et al. (1996) discovered that one teacher in their no-form-focus comparison group delivered an even stronger form-focus and corrective feedback approach than the experimental classes. Spada (1987) also reports that from time to time teachers in a communicative classroom would include explicit explanation or provide rules. For this reason, Spada et al. (1996) suggest doing classroom observations of the classroom activities to find out what actually happens in the classroom.

The initial study could hardly be described as a 'smooth operation.' At the root of all the troubles is the problem of the conflict between the researcher's agenda which focussed on improving students' listening comprehension, note-taking and ability to learn from lectures and the teachers' agenda of focussing on improving students' writing and delivering the curriculum of a writing course. Polio (1996) states that what goes on in the classroom and the teacher's role in the classroom may be the most important factors in second language acquisition in an instructed context. It was very important to get the teachers on side.

Another problem was getting the students on side. Rounds and Schachter (1996) remind us that students come with certain expectations and ideas about how language learning and teaching should be done. In the case of this study, they had come, somewhat reluctantly, for a compulsory writing course and in addition, for the experiment they were being asked to do listening comprehension. Only the teachers could sell the research to their students. Gaining the trust and commitment of the teachers was difficult because I was working from a distance. Teachers had commitments in other institutions and face-to-face communication was difficult, if not impossible. For students, participation in the project was voluntary. Many began with good intentions but opted out due to time pressures from other courses and/or fatigue, particularly one of the Friday evening Visuals Groups. It was in this group that one training session had to be dropped.

Among the expectations of students, probably particularly in a writing course, is that they will receive feedback on their writing. Thus, I arranged with the teachers to provide corrections and comments on students' writing in their recall protocols for the training sessions. This feedback was provided to both Visuals and Vocabulary students. Researchers with experience in more controlled laboratory settings would probably feel that this feedback led to contamination of the treatment (Rounds & Schachter, 1996).

Rounds and Schachter (1996) point out that any changes required by research inevitably disrupt the ecology of a teacher's classroom. The balance within a classroom is delicate and adding another individual to the relationship can make things go badly (p. 106). Indeed, things did go badly even in the classroom of the teacher enthusiastic about the visuals with students criticizing the course quite harshly at the end. It is not clear whether this would have happened anyway without the introduction of the research into the equation, but it left the teacher with a negative feeling about participating in research projects.

Finally, it is not clear exactly what happened in the classrooms. One Visuals Group and the Vocabulary Group were taught by teachers who spend time together outside the classroom. It is not hard to imagine some discussion of the materials after or before the training sessions. Teachers commented in writing after each training session. They were given all the materials to use for the training sessions and instructions on how they were to be used. Unable to observe the lessons or tape them, which teachers would have

perceived as a further imposition on them, I was left without concrete information about what actually was done in class.

3.6   Validation of Pre- and Post-tests

A further difficulty with the pilot study was the problem of equating the pre- and post-test measures. A Pearson correlation analysis run on the data of one of the classes compared the Garbage in Space measures with the Reading Blocks measures. The correlations were all modest. For Recall One with Recall Two r = .52 (p < .01), and the correlations between the other measures were more modest, but significant at the < .01 level (Global Questions One with Global Questions Two r = .39, p < .01; and Summary Cloze One with Summary Cloze Two r = .45, p < .01). Because of the impossibility of equating the two batteries of tests, and because the period between pre- and post-test would be ten weeks, long enough to minimize the effects of memory, it was decided to use only one battery of tests as both pre- and post-test in any further experimentation. An item analysis of the global questions and the summary cloze of the Garbage in Space subtests for sixty-five subjects showed an alpha of .78 for the five global questions with item biserials ranging between .58 and .93 and an alpha of .74 for the summary cloze with items showing a biserial range between .33 and .87. The tests demonstrated reliability and internal consistency. Thus, the Garbage in Space battery was retained for the pre- and post-tests in the study.

3.7   Lessons Learned

There were too many problems and confounding factors to make the pilot study usable as the main test of key visuals. Lessons were learned, however, and it was treated as a pilot study. The test instruments and training materials were ready. The actual study could begin. The venue for the experiment moved to my own university where I had contacts with teachers. The participants would be students in a twenty-one-hour a week non-credit intensive program. In this program, there would be time for nine hours of experimentation, listening comprehension was one of the goals of the program and communication with teachers would be much easier. It would take, however, more time because there would be only one top-level class each semester. The summer and spring semesters were only six weeks in duration and so it would take two fall semesters and one winter semester to do the experiment, with one group at a time in each condition.

CHAPTER 4

PROCEDURES

In the main experiment, a quasi-experimental pre-test, post-test design was used to answer the research questions. The independent variable was training type. The first language, country of origin and field of study of the participants were noted. All participants wrote a visuals sensitivity test to identify particular problems with visuals before experimentation. The two training types were vocabulary and visuals as advance organizers for listening comprehension for second language learners. The dependent variable of listening comprehension was operationalized as performance on three measures (global questions, summary cloze and recall), based on a three minute mini-lecture.

4.1 Participants

Participants were in intact classes from a non-credit academically-oriented intensive program offered at a university. In this program, students, in classes of about fifteen, receive twenty-one hours of instruction per week for twelve weeks. It is a four-skills program. The instruction is delivered by two experienced teachers and one teaching assistant. Classes usually spend three one-and-a half-hour sessions per week in the language laboratory for listening comprehension.

This program was selected for the study for several reasons. A considerable amount of classroom time (nine hours over the semester) was required for the testing and

experimentation and the twenty-one hours per week of class time would allow time for this research. Furthermore, listening comprehension development was one of the goals of the program. Students would have to be at the advanced level in order to be able to handle the listening material. Thus, the highest-level group in each of three twelve-week semesters was selected for the experiment so that the proficiency level of the three groups would be roughly equal. Nevertheless, pre-tests were administered to further confirm their similarity.

At the beginning of each semester of the experiment, classes had about seventeen members, but the final number of participants in the experiment was much smaller. The Visuals Group began with seventeen students, but due to external factors, such as level changes, job opportunities and the financial crisis in Asia, the number dropped to twelve by the beginning of the training sessions. Eleven students remained by the end of the experiment, but one student missed the pre-test. Thus, ten students in the Visuals Group participated fully in the experiment. The Vocabulary Group began with sixteen students, but once again, once students who had missed one of the tests were eliminated, the final number of participants was thirteen. The Control Group comprised ten students from a class of nineteen, nine being eliminated because of absences.

The characteristics of the three groups, including sex, age, first language and field of study, are shown in the following Tables (1, 2, 3, and 4).

CHARACTERISTICS OF GROUPS

Table 1   Sex

Group	Male	Female
Control	3	7
Vocabulary	7	6
Key Visuals	3	7

Table 2   Age

Group	18-20	21-24	25-29	30-39	41+	?
Control	2	3	1	3	0	1
Vocabulary	2	2	7	1	1	0
Key Visuals	0	4	5	0	0	1

Table 3   First Language

Group	Romance	Asian	Arabic	Other
Control	4	5	0	1
Vocabulary	7	2	2	2
Key Visuals	4	5	0	1

Table 4   Field of Study

Group	Humanities	Business	Science	Social science	?
Control	4	1	3	1	1
Vocabulary	3	3	7	0	0
Key Visuals	2	3	4	0	1

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4.2   Pre-experimental Procedures

Ethical clearance for the study was obtained from the TESL Centre at Concordia University and from the Ethics Committee of the Faculty of Arts at the University of Ottawa. All participants signed a consent form (See Appendix B.).

Prior to the experiment with the second language learners, the recall protocol task for the test passage was piloted on a group of native speaking university students in an undergraduate program in second language teaching. There were 19 participants. They listened to the passage once, were allowed to take notes and wrote an immediate free recall without referring to their notes. They recalled between eight and twenty-five of the total twenty-seven idea units identified in a check list for the lecture. Their mean score was 17.6 (S.D. = 3.96).

The results scored by second language students on the Placement Test were obtained where possible. In addition, a general proficiency cloze test (Appendix E) was administered to all second language participants (experimental and control). All the participants wrote the visuals sensitivity test. They also completed a background questionnaire (Appendix C) designed to supply information about their first language, second language spoken, age, sex, country of origin, field of study and place of education.

4.3 Listening Pre-test

All second language participants (control and experimental) completed a listening pre-test. Students heard a three-minute problem-solution mini-lecture which presented the problem of garbage in space with several solutions (For text, see Appendix L.). The text was based on a radio report, rewritten in lecture format and rerecorded by one of the teachers at the Second Language Institute. Students were told they would hear a lecture about the problem of garbage in space. They would hear the lecture twice and would be able to take notes during the lecture (See Appendix M.). Afterwards, their notes would be collected and they would do the three tasks assessing comprehension and recall. They would first be asked to write down as much as they could recall from the lecture in as organized a fashion as they could (*Recall Protocol*, Appendix N). Their *Recall Protocols* would be collected and then they would be asked to answer some questions about the lecture (*Global Questions*, Appendix O). Finally, after their answers were collected, they would complete a cloze passage based on the lecture (*Summary Cloze*, Appendix P). Students were given as much time as they needed to complete each task and the amount of time they spent on each task was recorded. The entire pre-test took no more than forty-five minutes of class time (For instructions to teachers, see Appendix F.).

4.4 Training Procedures

All experimental participants (the Visual and Vocabulary Groups) did three one-and-a-half-hour training sessions using three problem-solution mini-lectures. They were

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non-technical lectures, one from the business field (Appendix T), one from the humanities (See text Appendix AC.) and one from general science (Appendix AK).

The Visuals Group received a partially completed visual or visuals (See Appendices U, AD and AL.) as an advance organizer before they heard each mini-lecture. The teacher discussed the visual with the class in a kind of brain-storming session about the topic and what they might expect to hear (For instructions to teachers, see Appendix R.). Any new vocabulary that came up in the discussion was explained at the time. The class then heard the lecture twice and completed the visual. The teacher suggested students could take notes on the visual. After their second listening, the class discussed their notes and the visual with their teacher. Their notes were then collected and students did a written recall protocol (Appendices X, Y, AG and AO) of the lecture in the target language. They were allowed as much time as they needed and recorded their time on the answer sheet. This task was collected and they then answered global or inference questions (Appendices Z, AH and AP) about the lecture. Finally, after their answers were collected, students completed a summary cloze passage (Appendices AA, AI, and AQ) based on the lecture.

The Vocabulary Group did a vocabulary exercise (Appendices V, AE, and AM) designed to focus on and manipulate the words used in the visual. They completed these exercises and discussed them with their teacher prior to hearing the mini-lecture (For instructions to teachers, see Appendix S.). During the actual listening part of the session, students were asked to answer factual questions (Appendices W, AF and AN) based on the

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lecture. After hearing the lecture twice, the class discussed their answers with the teacher. Their answers were then collected and students did a written recall protocol (Appendices AG and AO) in the same manner as the Visuals Group. Similarly, they did the global questions (Appendices Z, AH and AP) and the summary cloze task (Appendices AA, AI and AQ). Thus, the Vocabulary Group spent just as much time on each training passage as the Visuals Group. The difference was that their attention was not called to the organization of the mini-lecture.

The teachers received detailed instructions (Appendices R and S) on the procedures to follow for implementation of both the visual and the vocabulary material. They reported generally after each training session and we discussed any appropriate modifications for the next session. No classroom observations were done because they would have been a further intrusion into the normal classroom.

Control participants completed the listening pre-test but received no training sessions.

4.5 Post-test

The post-test was exactly the same as the pre-test and was administered to all subjects (control and experimental) eight weeks after the pre-test, a sufficiently long delay to minimize the effect of familiarity with the text. In any case, the text familiarity effect should be the same for all groups.

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4.6 Interviews (Visuals Group)

All ten participants in the experimental Visuals Group came to the optional interviews with the researcher. The semi-structured interviews were taped. Unfortunately two were inaudible due to technical problems. In each interview I asked the students how they felt about the visuals in general, whether the visuals helped them to understand the mini-lectures, to remember the ideas in the lectures and whether they would use visuals in their own note-taking. Then we looked at their visuals from the three training sessions and I asked the students how they had done their note-taking, how they had used the visual and whether the visual had helped with their note-taking, their comprehension of the lecture and their memory of the material in the lecture.

4.7 Scoring

A check-list of all the idea units mentioned in the mini-lecture was developed (See Appendix Q.). Idea-units were defined as "the smallest units of knowledge that can stand as separate assertions and that can be judged true or false" (Anderson, 1980). The main ideas were identified with numerals (14) and the supporting ideas, descriptions and examples with letter sub-numbering. This check-list was loosely based on Meyer's (1979) system and the judgement of three experienced ESL teachers. It was compared to the recall protocols of a university class of nineteen native speakers. All written recalls from the pre-test and the post-test were scored for the number of ideas correctly recalled. All variations of answers and the score awarded them were recorded for future reference.

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A random sample of ten papers was scored twice by the researcher with a week-delay in-between. The intra-rater reliability was .99. A second sample of twenty papers was rescored by a graduate student from the second language teaching program. Analysis showed an interrater reliability of .95.

There were five global questions on the pre-/post-test each worth two marks. An item analysis conducted using 65 papers yielded an alpha of .776 demonstrating internal consistency. The item biserials ranged between .58 and .93.

The summary cloze was also analyzed and yielded an alpha of .744 with items showing a biserial range between .33 and .87.

4.7.1 Time on Task

The amount of time each student spent on each pre- and post-test task was examined, but since all tasks were done in class, there was no remarkable difference in individual times.

4.7.2 Students' Notes

Students' notes taken while listening to the lectures were collected. A comparison of their notes with their recall protocols seemed to be of interest. Aside from a statistical comparison, a qualitative analysis of which ideas were recorded in their notes versus what they recalled in their protocols might give some insight into which ideas they had or had

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not understood or remembered. Native speakers' and second language speakers' notes were scored using the same check list as that for the Recall Protocol. As well, they were examined for evidence of the use of key visuals.

CHAPTER 5

RESULTS

5.1 Pre Experimental Measures

Three measures were used to determine if the three groups were significantly different at the outset of the experiment: the Second Language Institute's Placement Test, used to place students in all non-credit and basic courses; the "Visuals Sensitivity Test," a measure based on Daniels' (1986) instrument, used to identify particular problems students might have with visuals; and the Proficiency Cloze Test. Scores from the Placement Test were obtained where possible, but some scores were lost because students arrived late and because of computer problems, their scores were not available. These students were still included in the study because they had been placed in classes according to their scores and it is safe to say that their scores fell within the range of other students in their respective classes. The alpha level was set at .10 to maximize the possibility of noting differences in groups before the experiment began.

5.1.1 Proficiency Cloze

Descriptive statistics for this test are found in Table 5. From the analysis of variance (ANOVA) it was clear that the three groups were not significantly different, F $(2,29) = .03$, p $> .10$.

Table 5   **Proficiency Cloze**

Group	Mean /30	Standard Deviation
Control (N = 10)	21.10	2.92
Visuals (N = 10)	21.11	3.22
Vocabulary (N = 13)	21.38	3.15

5.1.2 General Placement Test

The Visuals and Vocabulary Groups had similar total scores on the Placement Test

and the Control Group was weaker than the two experimental groups (See Table 6.). The

Control Group's scores on all parts of the test were the weakest. The Visuals Group and

the Vocabulary Group were fairly similar to each other (See Tables 7, 8, and 9.). A one-

way analysis of variance (ANOVA) and Scheffe's test for group differences with the level

of significance again set at .10 , indicated that for the total placement score, the Control

Group was significantly different from the two experimental groups, $F (2,27) = 4.76$, p

$<$ .10. It was significantly different from the Vocabulary Group, $F (2,27) = 3.76$, p $<$

.10 on the listening subtest, and from the Visuals Group, $F (2,27) = 3.24$, p $<$ .10 on

the reading subtest. It was not significantly different from either group, $F (2, 27) = 1.57$,

p $>$ .10 on the cloze portion of the Placement Test. Although the Control Group was

different (lower) from the Vocabulary Group on the listening measure and different

(lower) from the Visuals Group on the reading measure, there was some overlap in total

scores (Range 41-55 for the Control Group, 52-65 for the Vocabulary Group and 51-62

for the Visuals Group). Furthermore, the Placement Test cloze and the General

Proficiency Cloze seemed to indicate that the Control Group was at the same level of general proficiency as the other groups. In addition, they were registered in the same program as the other two groups and there is no reason to suppose that they would not improve in their listening comprehension over the 12 weeks of the experiment. Thus, they were included in the study.

GENERAL PLACEMENT TEST

Table 6   **Total**

Group	Mean /70	S.D.
Control (N = 9)	50.56	4.03
Visuals (N = 9)	56.11	4.23
Vocabulary (N = 12)	56.08	5.00

Table 7   **Listening Comprehension**

Group	Mean /25	S.D.
Control	17.78	1.48
Visuals	19.78	1.48
Vocabulary	20.00	2.49

Table 8   **Reading Comprehension**

Group	Mean /20	S.D.
Control	14.33	1.50
Visuals	16.56	1.59
Vocabulary	15.58	2.23

Table 9   Cloze

Group	Mean / 25	S.D.
Control	18.44	3.28
Visuals	19.78	2.44
Vocabulary	20.50	2.24

5.1.3 Visuals Sensitivity Measures

The Visuals Sensitivity Test was designed to measure a) whether individuals understood relevant visuals, b) whether they were already familiar with relevant visuals and c) whether they had any particular aversion to visuals. This information is really only relevant for the Visuals Group although all participants wrote the Visuals Sensitivity Test to provide baseline data. In general, the Visuals Group obtained high scores on the measure testing their understanding of the visuals. (See Table 10.) The analysis of variance, with the alpha level again set at .10, indicated that the Visuals Group was significantly different from the Vocabulary Group and from the Control Group and that the Vocabulary Group was significantly different from the Control Group on the visual knowledge score, $F_{(2,29)} = 9.94$, $p < .10$. The Visuals Group's scores on the familiarity measure were higher than those of the Vocabulary and Control Groups (See Table 11.), but their score on the attitude measure was lower than that of either group (See Table 12.). The three groups were not significantly different on either the visuals familiarity measure, $F_{(2,29)} = 3.94$, $p > .10$ or the attitude to visuals score, $F_{(2,29)} = 4.21$, $p > 10$.

In summary, the Visuals Group knew better how to read and understand visuals at the outset but was not significantly different from the other groups in their familiarity with visuals or their attitude towards them. Although the Vocabulary Group was significantly weaker than the Visuals Group on the knowledge measure, it was not significantly different on the other two measures. The relative weakness of the Vocabulary Group in knowledge of visuals does not jeopardize the study because the Vocabulary Group was not working with visuals. The data showed that the visuals should not pose a problem for the Visuals Group.

Table 10   **Visual Knowledge Score**

Group	Mean /18	S.D.
Control (N = 10)	13.55	2.44
Visuals (N = 9)	17.50	0.71
Vocabulary (N = 13)	15.54	2.05

Table 11   **Familiarity with Visuals**

Group	Mean /5	S.D.
Control	3.90	1.45
Visuals	4.22	0.83
Vocabulary	3.38	1.85

Table 12   Attitude Towards Visuals

Group	Mean /10	S.D.
Control	7.70	2.45
Visuals	6.89	2.93
Vocabulary	7.69	3.57

5.2   Measures of Dependent Variables

5.2.1   Listening Pre- and Post-test

a)   Descriptive Statistics

Three instruments were used to measure listening comprehension before and after the experimental treatment: the Recall Protocol, the Global or Inference Questions and the Summary Cloze. For the recall protocol, 27 idea units (14 main ideas and 13 supporting ideas) were identified for the checklist used in scoring. The range of scores for native speakers was 8 - 25. That is, not all native speakers obtained high scores or remembered every idea in the mini-lecture. However, their mean score of 17.58, with a standard deviation of 3.96, indicates that most native speakers were quite successful at recalling a substantial number of the 27 idea units.

Scores of the Visuals Group increased from pre- to post-test on both the recall protocol (Table 13 and Figure 1) and the global questions (Table 14 and Figure 2) more than those of the other two groups. They also increased on the summary cloze task (Table 15 and Figure 3) although only slightly. The within-group variability, as measured by the

standard deviation, also tended to be smaller in the Visuals Group than in the other two groups. The Vocabulary Group, who received similar exposure to the problem-solution text type but did not focus on organization, also showed gains on the recall protocol although in both the pre- and post-tests their means were lower than those of the Visuals Group. For the global questions, the Vocabulary Group's means on both pre- and post-tests were higher than those of the Visuals Group although the gains were not as great (Table 14). For the summary cloze task (Table 15), the Vocabulary Group's increase was minimal and both pre- and post-test scores were higher than those of the Visuals Group. The Control Group, although at a lower level than the two experimental groups, also improved on the Recall Protocol (Table 13 and Figure 1) and on the Global Questions (Table 14 and Figure 2). They made small gains on the Summary Cloze (Table 15 and Figure 3).

Table 13   Recall Protocol (Raw Scores)

Group	Pre-test		Post-test	
	Mean /27	S.D.	Mean /27	S.D.
Control	5.30	1.25	7.6	3.10
Visuals	11.10	2.23	15.3	2.54
Vocabulary	10.38	4.25	13.5	4.44

Figure 1   **Pre- Post Gains Recall Protocol**
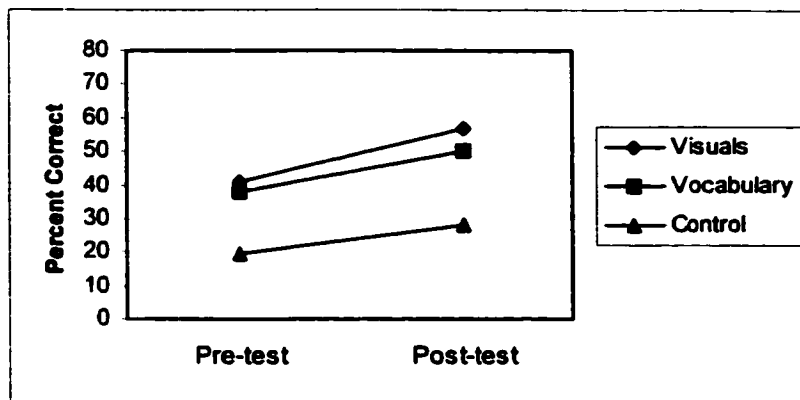
Table 14   **Global Questions (Raw Scores)**

Group	Pre-test		Post-test	
	Mean /10	**S.D.**	**Mean /10**	**S.D.**
Control	1.40	.84	3.90	1.60
Visuals	3.80	2.30	6.20	2.25
Vocabulary	5.54	2.63	6.31	3.01

Figure 2   **Pre- Post Gains: Global Questions**

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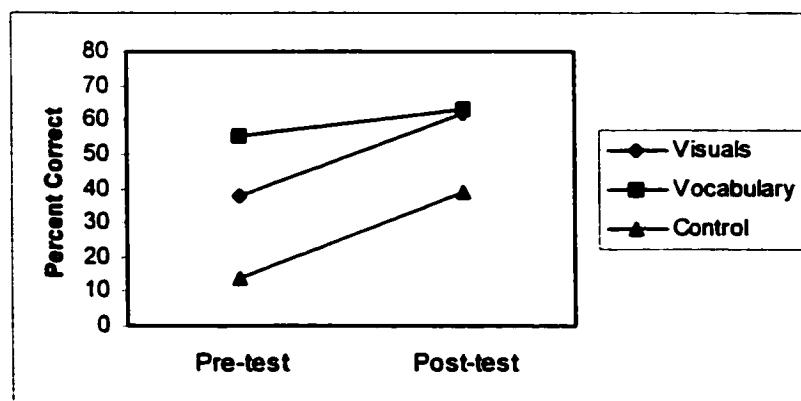
Table 15   Summary Cloze (Raw Scores)

Group	Pre-test		Post-test	
	Mean /15	S.D.	Mean /15	S.D.
Control	5.80	2.62	7.10	3.18
Visuals	9.70	2.67	10.20	2.94
Vocabulary	10.54	2.40	10.92	3.26

Figure 3   Pre- Post- Gains: Summary Cloze
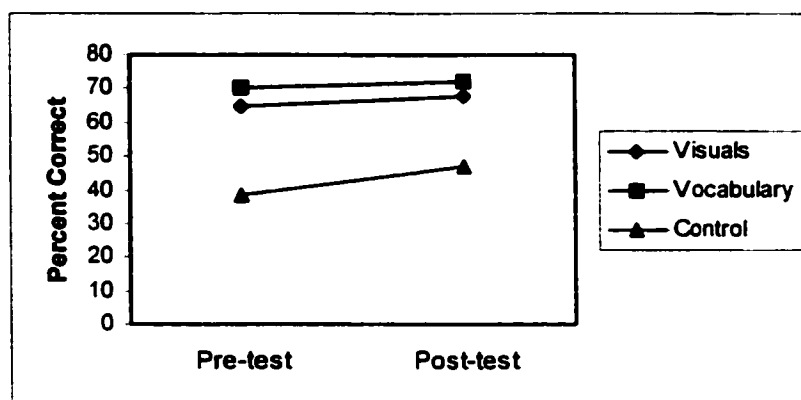
b) **Pearson Correlation Analysis**

A Pearson correlation was done on the three dependent variable measures on both pre- and post-tests to see if they were interrelated and stable as measures of listening comprehension. All second language students were grouped together (N = 33) to increase the numbers for the analysis. All correlations were positive and significant (See Table 16.). All in all, it seems safe to assume that the three measures are interrelated, an assumption which justifies the need for a multivariate analysis of variance (MANOVA) to guard against Type I error.

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Table 16   Pearson Correlations, Dependent Measures

Measure	Pre-test Global Questions	Pre-test Summary Cloze	Post-test Recall	Post-test Global Question	Post-test Summary Cloze
Pre-test Recall	.7637**	.6356**	.6481**	.6906**	.6324**
Pre-test Global Questions		.6591**	.6243**	.6729**	.6032**
Pre-test Summary Cloze	.6591**		.5948**	.6706**	.8323**
Post-test Recall	.6243**	.5948**		.4618*	.5470*
Post-test Global Questions	.6729**	.6706**	.4618*		.6689*
Post-test Summary Cloze	.6032**	.8323**	.5470*	.6689**	

* p < .01   **p < .001

c) MANOVA

A multivariate analysis of variance (MANOVA) was run to check for significant differences among the three groups according to treatment and time. The alpha level was set at .01. The MANOVA revealed a significant difference over time for the three dependent variables, Pillais $F_{(3, 26)}$ = 19.97, p < .01. The univariate F test showed a significant difference over time for the recall protocol, $F_{(1, 28)}$ = 23.82, p < .01, for the global questions, $F_{(1, 28)}$ = 4.76, p < .01, and for the summary cloze, $F_{(1. 28)}$ = 25.12, p < .01. The MANOVA indicated a significant difference for treatment for the

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three measures, F (6, 54) = .68, p< .01. The univariates for the recall protocol were F (2, 28) = 16.95, p < .01, for the global questions, F (2, 28) = 6.74, p < .01 and for the summary cloze, F (2, 28) = 5.88, p < .01. Finally, the MANOVA indicated no significant interaction for treatment by time for any of the three measures, F (6, 54) = .25. The univariate F tests also showed non-significance, F (2, 28) = .64 for the recall protocol, F (2, 28) = .51 for the global questions and F (2, 28) = 3.18 for the summary cloze.

If we run the MANOVA without the Control Group, however, the difference for treatment is not significant. With the alpha level set at .01, the MANOVA again revealed a significant difference over time for the three dependent variables, Pillais F (3, 18) = 9.93, p < .01. The univariate F-test showed a significant difference over time for the recall protocol measure, F (1, 20) = 19.15, p< .01 and for the global questions, F (1, 20) = 11.40, p < .01. The difference for the Summary Cloze was non-significant, F (1, 20) = .004. The MANOVA indicated no significant difference for treatment for any of the three measures, F (3,18) = 1.85. The non-significant univariates for the recall protocol were F, (1,20) = 1.21, for the global questions, F(1, 20) = .54, and for the summary cloze, F (1, 20) = .02. Finally, the MANOVA indicated no significant interaction for treatment by time for any of the three measures, F (3, 18) = 1.23. Again the univariate F tests also showed non-significance, F (1, 20) = .20, for the recall protocol, F (1, 20) = 2.68 for the global questions and F (1,20) = .50 for the summary cloze.

Since there was no interaction effect of treatment by time and since there was no significant difference for treatment when just the two experimental groups were included in the analysis, it is safe to assume that the difference for treatment observed when all 3 groups were included was due to the fact that the control group was different (lower in listening proficiency) from the other two groups.

5.3 Students' Notes and Recall Protocols

5.3.1 Descriptive Statistics and Correlations

The notes that both native speakers and ESL students took while they were listening to the mini-lecture were examined. They were scored using the same check list as that for the recall protocol. The notes give some indication of what students noticed and what they understood as they heard the text.

The mean number of ideas recalled by native speakers was very similar to the number in their notes taken while listening (See Table 17.). The Pearson correlation between scores on native speakers' notes and those on their recall protocols was modest but significant ($r = .59$, $p < .01$).

Table 17   **Ideas Recalled and Noted by Native Speakers**

Group	Mean %	S. D.
Recall Protocol	65.11	3.96
Notes	66.07	2.99

All ESL students noted more ideas correctly in the post- than in the pre-test. The tighter standard deviations for the Visuals Group than for the other two groups indicate less individual variability in this group (See Table 18.). Correlations between scores on students' notes and their recall protocols were non-significant. On both the pre-test and the post-test the Visuals Group noted many more ideas than the Vocabulary or Control Groups and on the post-test recalled a greater percentage of the ideas noted than they had on their pre-test.

Table 18   **Ideas Noted and Recalled by ESL Students**

Group	Pre-test				Post-test			
	Recall Protocol		Note-taking		Recall Protocol		Note-taking	
	Mean %	S.D.	Mean %	S.D.	Mean %	S.D.	Mean %	S.D.
Control	19.6	1.25	35.9	2.31	28.2	3.10	44.0	3.18
Visuals	41.1	2.23	60.0	1.25	56.7	2.54	66.7	1.67
Vocabulary	38.4	4.25	46.3	4.89	50.0	4.44	50.3	5.41

5.3.2 Qualitative Analysis

a) Native Speakers

As seen in the quantitative analysis, a total of 27 ideas (14 main ideas and 13 supporting ideas) (See Appendix Q for checklist.) were identified for the analysis of students' recall protocols and notes. The recall protocols and notes for 19 native speakers were included in the analysis. For this group, the number of participants multiplied by the number of ideas resulted in a possible grand total of 513 ideas recalled or noted. In fact,

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as a group they recalled 335 ideas. (See Figures 4A to 7B.) Seventy percent of the native

speakers recalled almost all the main ideas of the lecture. They recalled most of the ideas

they had written down in their notes. Occasionally they recalled an idea that they did not

write in their notes. These tended to be the most obvious ideas and thus may not have

seemed important enough to write down. This analysis will focus on the ideas generally

not recalled.

Figure 4A   Recalls Pre (1 - 10)

161
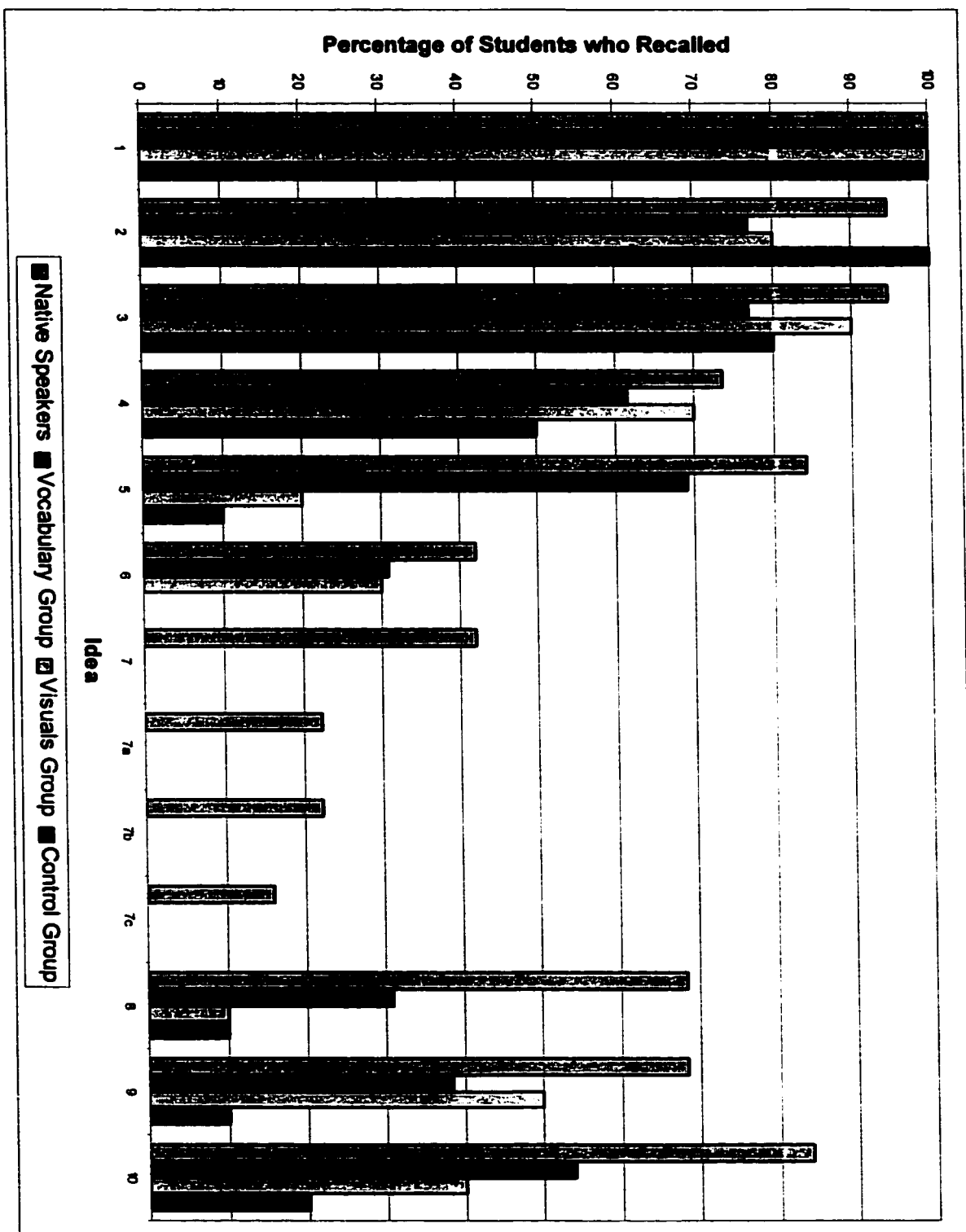
Figure 4B   Recalls Pre (11 - 14b)

162
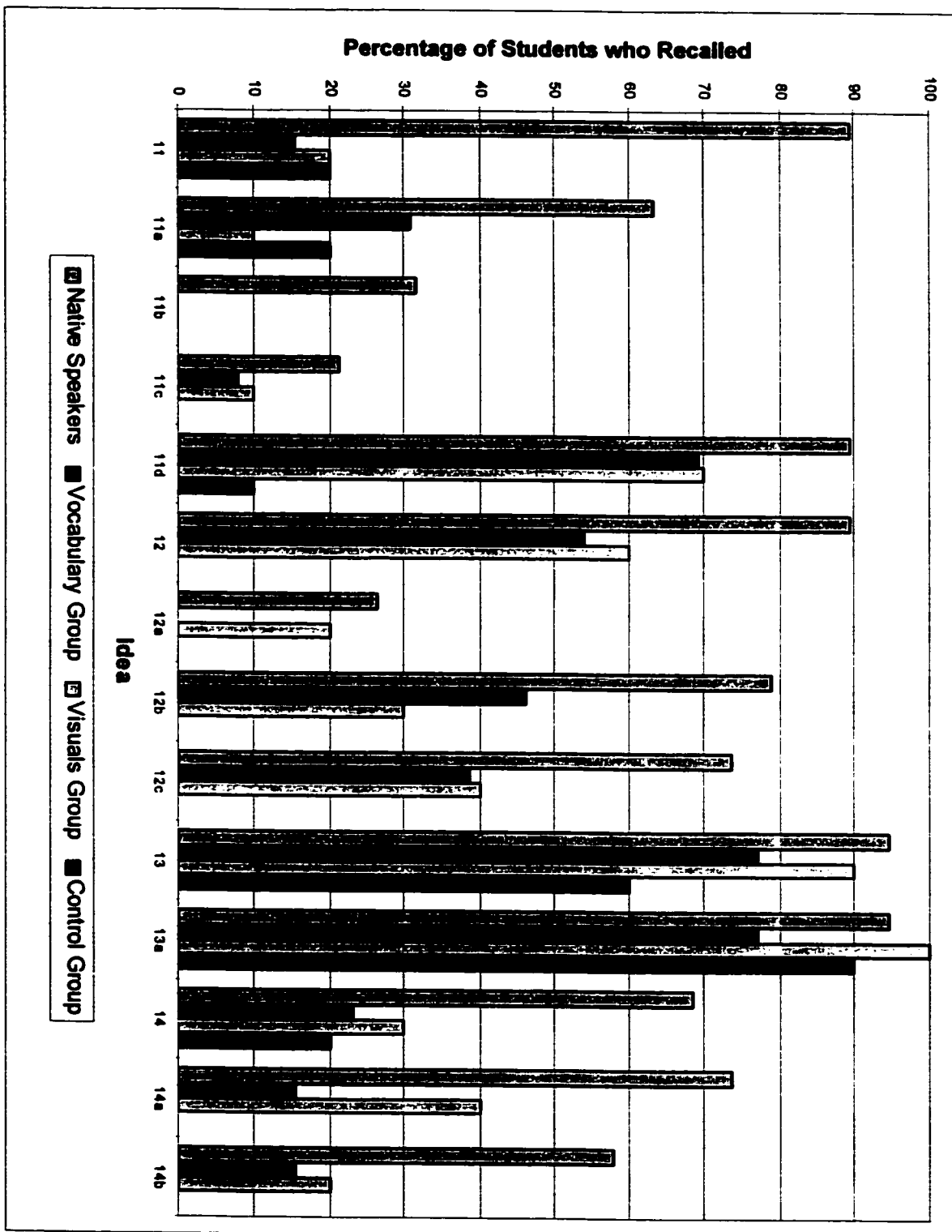
Figure 5A Recalls Post (1 - 10)

163
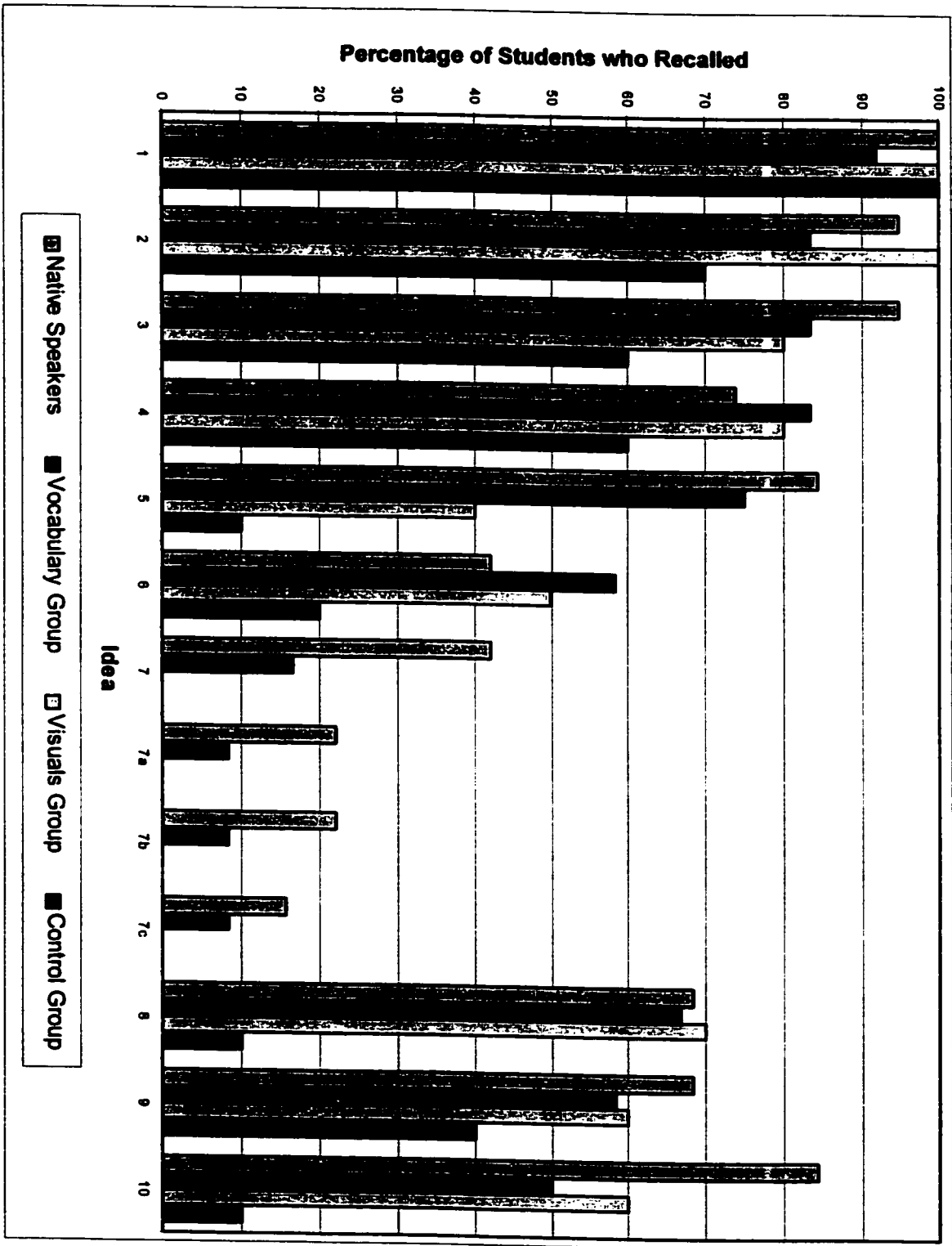
Figure 5B   Recalls Post (11 - 14b)

164
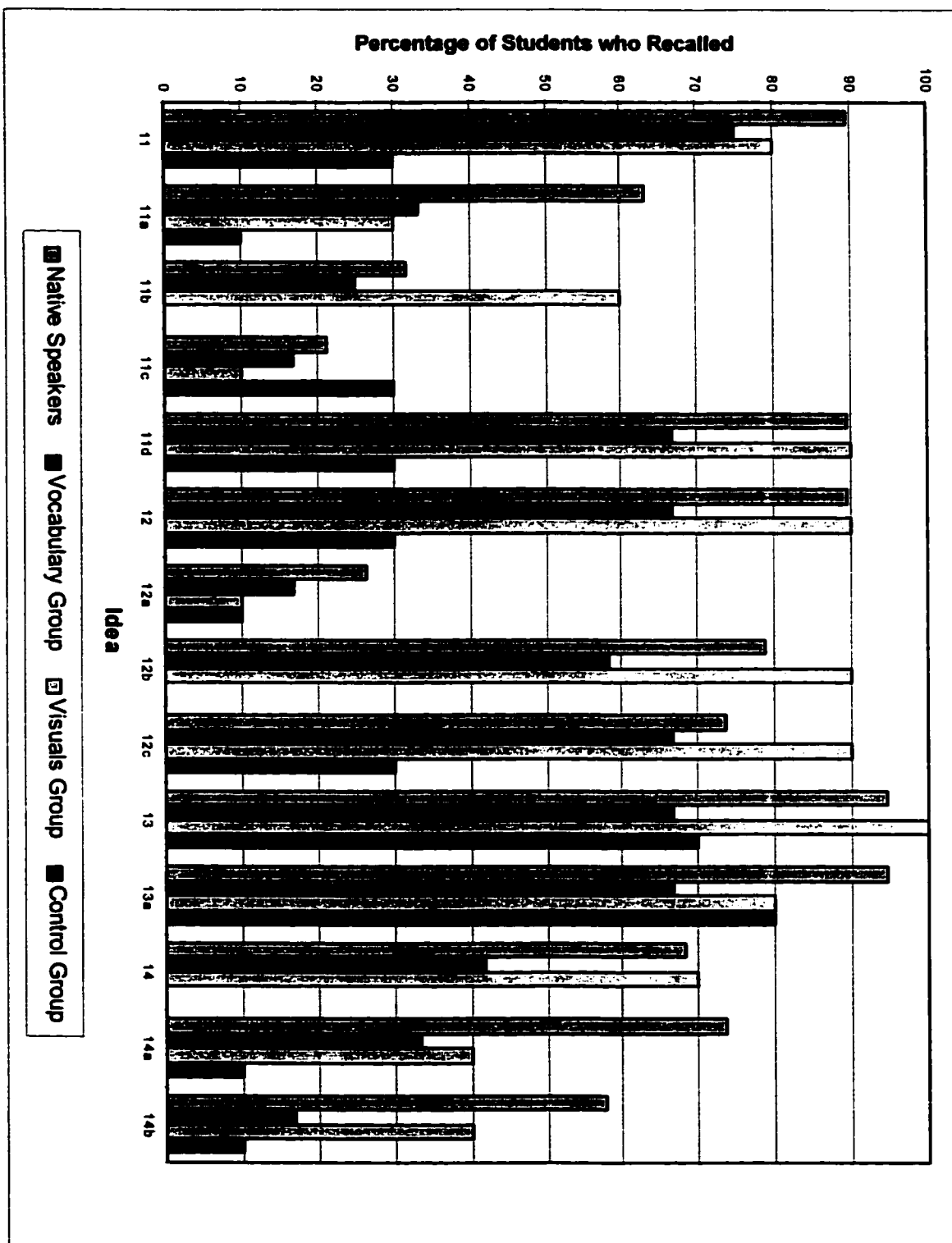
Figure 6A   Notes Pre (1 - 10)

165
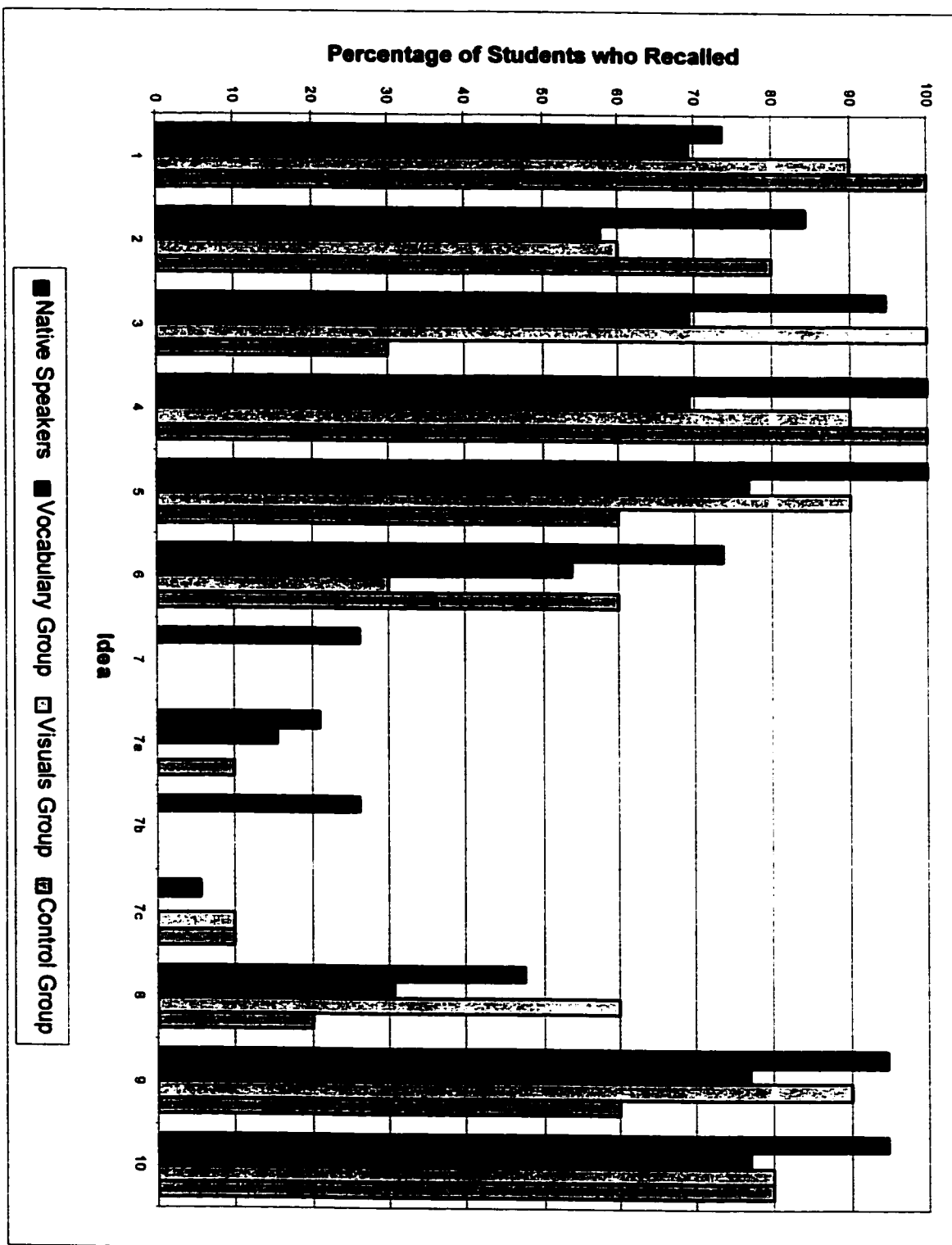
Figure 6B   Notes Pre (11 - 14b)

166
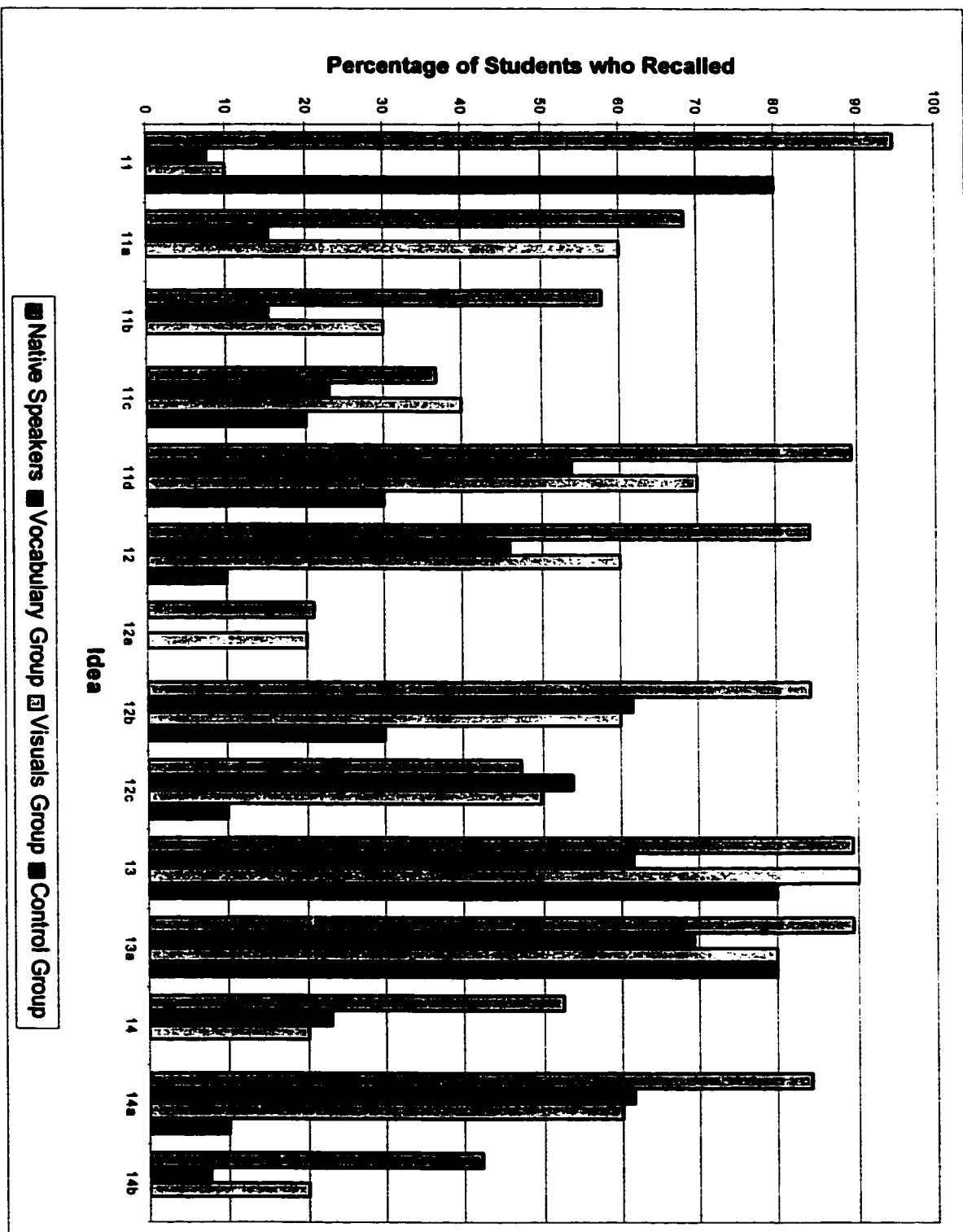
Figure 7A   Notes Post (1 - 10)

167
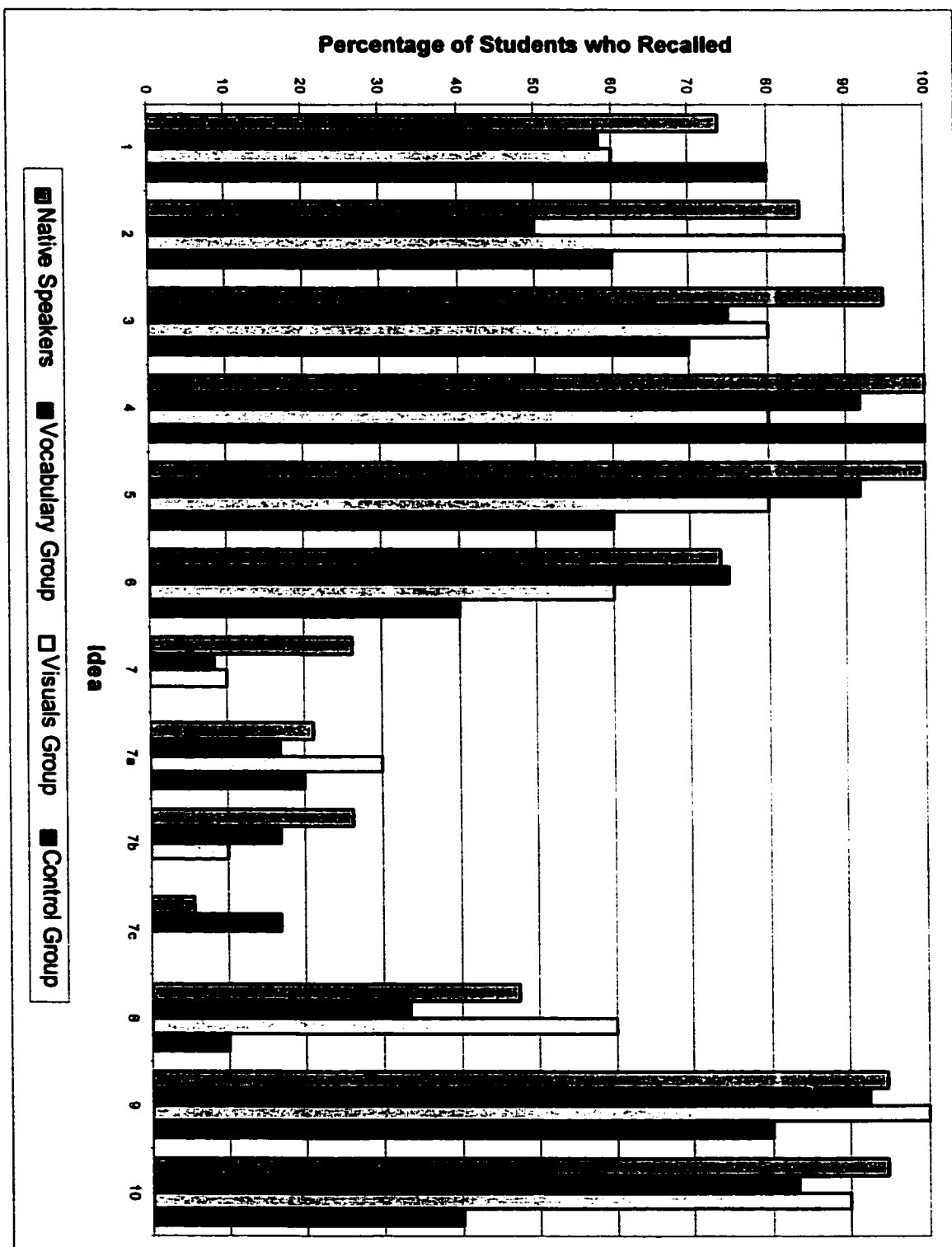
Figure 7B   Notes Post (11 - 14b)
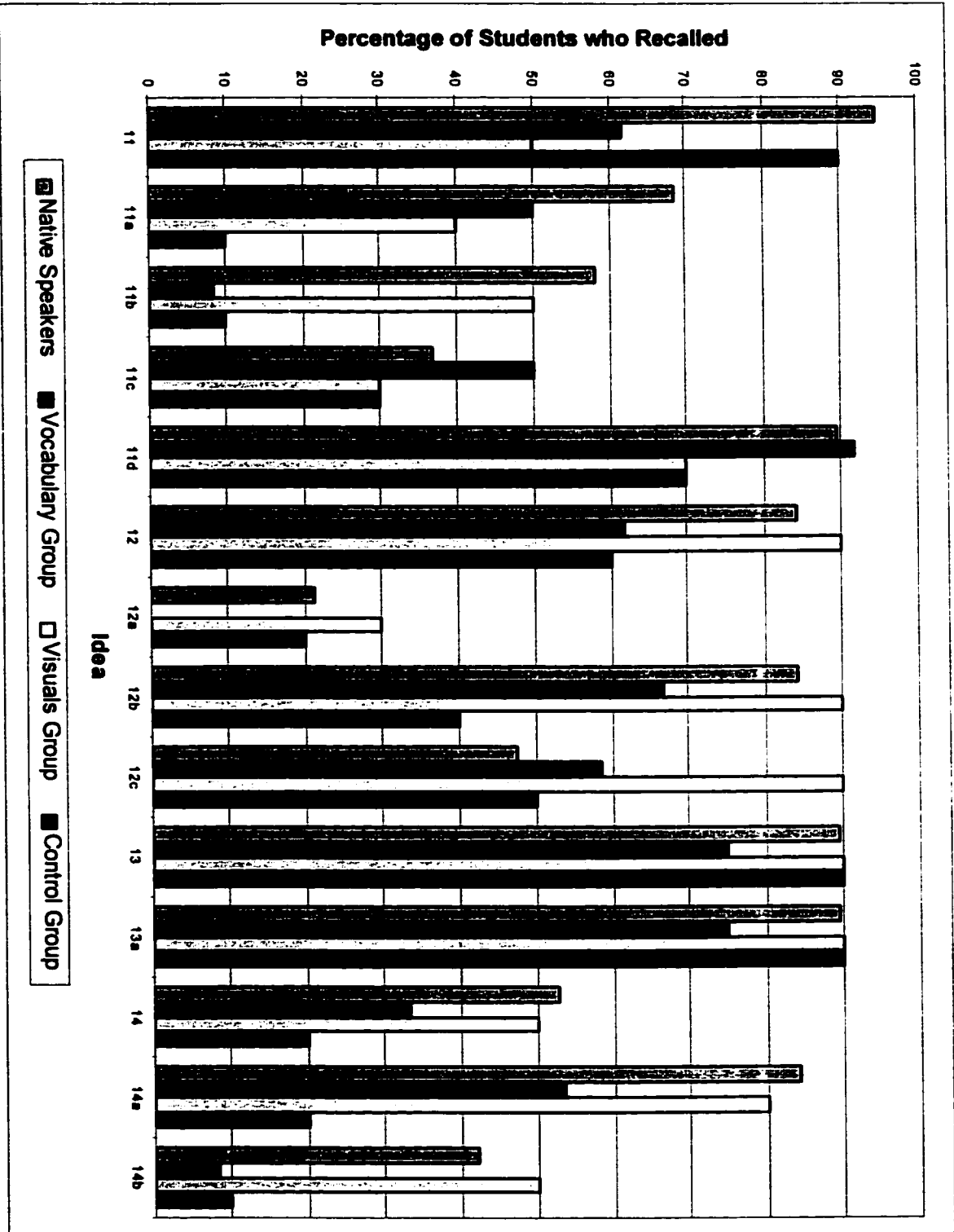
About 75% of the native speakers recalled all the main ideas of the lecture except ideas # 6, 7, 8, 9 and 14 (See Figures 4A and B.). All main ideas except # 7, 8 and 14 were included in most students' notes. The supporting details missing from their recalls or their notes were those related to # 7, 11, 12 and 14. In total, of the possible 513 ideas, native speakers recalled 335 ideas, while they noted 339. These figures are very similar although there were some differences in the actual ideas recalled as we shall see.

The first missing main idea # 6 (the proof of titanium oxide found in a chip from the shuttle window) was noted by about 75% of the native speakers, but only recalled by around 40%. This idea could be considered a supporting detail for idea # 5 which was recalled and noted by over 80% of the participants.

Idea # 7 and its group of three details is really a disclaimer. The whole text speaks of the potential danger of garbage in space and idea # 7 counters that the danger of impact is actually low at the moment. It does, however, support the conclusion that for the moment scientists will do nothing to clean up the garbage. This whole group of ideas was recalled or noted by fewer than half of the native speakers. Research has shown that the comprehender's schema can affect the interpretation of a text (Anderson et al., 1977; Bransford & Johnson, 1972, 1973; Steffenson et al., 1979). Meyer and Freedle (1984) showed how listeners had trouble recalling a text whose conclusion they did not agree with. It could be that this disclaimer was rejected by the listeners as not being important because it contradicted what the rest of the passage was saying.

Close to 70% of the students recalled idea # 14, really the conclusion of the lecture that scientists will do nothing about the problem for the moment and hope for the best, while only 50% of the students included this idea in their notes. This idea, although the conclusion of the lecture, is stated very briefly. Perhaps the listeners did not have time to write it in their notes but recalled it because of its salient role as the conclusion. The recall level was minimally higher and the note-taking level much higher for the supporting idea that earth's atmosphere would take care of most of the objects. On the other hand, fewer than 60% pointed out either in their recalls or their notes that there may soon be too many objects for the atmosphere to clean up. This idea is related to idea # 7 and its group of supporting details. The listeners did not seem to either note or recall the remote potential danger in the future (ideas # 14b and 9) or the reasons the problem is not too pressing at the moment and why, therefore, scientists can afford to do nothing about it for the moment. They seemed to focus on the theoretical problem and theoretical solutions to it rather than the fact that the current danger is minimal.

Ideas # 8 and 9 are related and both were recalled by close to 70% of the native speakers while fewer than 50% included idea 8 (the danger of even small bits of rockets) in their notes. Ninety percent of the native speakers recalled the foam disk (idea #11) as the first solution to the problem of garbage in space, but other than recalling the problem with it, namely that it would catch satellites as well as garbage (idea # 11d), they failed to recall the details of this solution (its size, how it worked and how effective it would be). These details received some attention in students' notes, particularly the size, which about

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70% of the participants noted, but fewer than 60% actually recalled how it worked and how effective it would be.

Over 90% of the native speakers noted and recalled idea # 12, the second solution to garbage in space, the giant windmill, and 75% or more recalled its advantage over the foam disk and the weakness of this solution although fewer than 40% explained, either in their recalls or in their notes, how it worked. This may have seemed obvious to them as it is the same principle as for the foam disk (idea 11b). However, they did not provide this information for the foam disk either.

In general, the native speakers noted more ideas than they included in their recalls. Exceptions were ideas # 1, the problem-solution statement, # 8, the danger of bits of rockets formed by the snow ball effect, # 12c, the idea of rotating the blades of the windmill, idea # 14, the conclusion that scientists will actually do nothing about the problem for the moment and 14b, the potential problem of there being too many objects for the atmosphere to clean up. The first idea may have seemed obvious to students and for that reason, they may not have written it in their notes while it appeared in their recalls. Idea # 8 was related to ideas # 9 and 10, the snowball effect. Students may have been busy writing this information about the snowball effect and simply not had time to note the danger. Since it was important, however, they recalled it. The idea of remote control of the windmill (idea # 12c) was highly signalled in the lecture and furthermore, this improvement contrasted with the weakness of the foam disk solution. Note that Carrell

(1984b); Meyer and Freedle (1984); and Richgels et al.(1987) all found superior recall for comparison-contrast texts. Ideas # 14 and 14b were more frequent in the recalls than in the notes perhaps because, like the first idea, they were self-evident to those students.

b) Vocabulary Group

In total the Vocabulary Group recalled 37% of the ideas (130 of the 351 or 27 possible ideas X 13 subjects) on the pre-test. They recalled 48.8% of the ideas (158 out of the possible 324) on the post-test, both figures much lower than the 65.3% of the ideas recalled by native speakers (See Figures 4A and B and 5A and B.).

The results are somewhat similar to those for native speakers in that as for native speakers, a lower percentage of participants recalled main ideas # 6, 7 and 14. As with the native speakers, the recall of supporting details by the Vocabulary Group for ideas # 7, 11, 12 and 14 was lower than the somewhat arbitrary cut-off (60% for non-native speakers and 75% for native speakers). The reasons for the similarity of results may be the same in both cases although it should also be pointed out that the details for # 7 were presented concisely in the lecture in one sentence in the form of nominalizations, which probably made it more difficult for second language listeners to take in the information. In addition, ideas # 8 on the pre-test, # 9 and 10 on both tests, presented problems for the vocabulary students. Once they had identified the problem of garbage in space and described the example of the paint flake, they tended to move on to the three possible solutions, skipping further evidence of the problem.

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There is a remarkable improvement by vocabulary students on the post-test compared to the pre-test on the recall of idea # 11, the foam disk solution. Even on the pre-test, they had recognized there was a first solution proposed but had been unable to recognize the vocabulary of 'foam disk.' Twenty-three percent wrote 'phone desk' on the pre-test and 38% wrote 'phone disk,' while on the post-test 75% correctly wrote 'foam disk' as the first solution. The second solution of a giant windmill also seemed to be a vocabulary problem although the improvement on the post-test was less dramatic. Fifty-three percent correctly wrote windmill on the pre-test while others wrote 'disk mail' or 'windmilk.' On the post-test 75% correctly wrote 'windmill.'

As for idea # 14, the conclusion of the lecture, only a small number of vocabulary students either noted or recalled it on the pre-test, and there was no improvement in recall of this idea on the post-test. For this group, unlike the others, the conclusion was either not recognized as important or not remembered.

On both the pre- and post-tests, vocabulary students noted more ideas than they had recalled (158 versus 130 on the pre-test and 176 versus 158 on the post). Furthermore, collectively they noted more ideas on the post- than on the pre-test. Not surprisingly, for ideas # 11 and 12 on the pre-test, students' notes seem to reflect the same vocabulary recognition problem as the recalls. Even though many students had not been able to identify the first solution as the foam disk, more students noted that this solution would

destroy everything, good and bad (idea # 12d). Otherwise, the details for ideas # 7, 11, 12 and 14 were not noted by the majority of vocabulary students.

c) Visuals Group

Overall, the Visuals Group recalled 39% of the ideas (106 of the 270 possible total number of ideas or 27 ideas X 10 subjects) on the pre-test and 56.3% of the ideas on the post-test. Both figures are lower than the 65.3% recalled by native speakers but slightly higher than the Vocabulary Group's 37% on the pre-test (See Figures 4A and B.) and somewhat (though not significantly) higher than the Vocabulary Group's 48.8% on the post-test (See Figures 5A and B.).

The pattern of ideas recalled by the majority of visuals students is similar to that of the Vocabulary Group with fewer than 60% of students recalling ideas # 6, 7 and 9 on both pre- and post-tests and ideas # 8, 10 and 11 and 14 on the pre-test only. The pattern was similar for the supporting details of ideas # 7, 11, 12 and 14. One difference was that on both the pre- and post-tests the majority of visuals students failed to recall the idea (# 5) that it was a paint flake that damaged the shuttle window. For some reason, the detail of the cost of the damage had seemed more salient to this group

The Visuals Group had similar difficulties to the Vocabulary Group with the first solution, the foam disk. Sixty percent of them wrote "phone desk" and one student wrote "form disk" on the pre-test. None wrote "phone desk." On the post-test 80% correctly

wrote "foam disk." For the second solution, the windmill, 90% wrote "windmill" correctly on the post-test. More visuals students recalled # 10, the explanation of the snowball effect, on the post-test than on the pre-test which was the reverse of the pattern for the Vocabulary Group. Finally, it is interesting to note that on the post-test a high percentage of visuals students (70%) recalled the concluding idea, # 14, namely that scientists would do nothing for the moment to solve the problem. It was slightly higher than the percentage for native speakers (68%) and much higher than the 33.3% of vocabulary students. The Vocabulary Group did not improve in their recall of their idea and remained the lower than the Visuals Group and the native speakers whereas the Visuals Group showed noticeable improvement on this idea. It could be that the training on preparing key visuals for problem-solution lectures alerted this group more to a solution being presented.

On both the pre- and post-tests, the Visuals Group noted more ideas than they had recalled (136 versus 106 on the pre-test [See Figures 6A and B], and 165 versus 152 on the post-test [See Figures 7A and B]). The difference between notes and recalls was higher on the pre- than on the post-test. Like the Vocabulary Group, they noted more ideas on the post- than on the pre-test. The pattern of note-taking for main ideas was similar to that of the Vocabulary Group with the majority of students not noting ideas # 6, (pre-test), 7, 11 and 14 although more visuals than vocabulary students noted idea # 1 and idea # 8. This last idea, the dangerous effect of bits of rockets had not been noted by the majority of vocabulary students and they had seemed to concentrate more on the solutions to the

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problem. Results of the visuals students' notes of the supporting details for ideas # 7, 11, 12 and 14 were similar to those for the vocabulary students, although a little higher.

When we compare the patterns for notes and recalls, the results are as expected with more students noting ideas than mentioning them in the recall. There are some exceptions to this pattern. Visuals students' handling of idea # 1, the statement of the problem is interesting. Everyone recalled it on both the pre- and post-tests whereas only 60% included this idea in their notes for the post-test, presumably because they did not need to actually write it in their notes. As for the problem with the first solution, idea # 11, the fact that all objects, good and bad, would hit the foam disk and be destroyed, no one in the Visuals Group had noted this idea on the pre-test, yet 30% recalled it. The post-test pattern was more like what we would expect with 60% noting it and 50% recalling it. A third exception was the conclusion, idea # 14, noted by half the class on the post-test, but recalled by 70% of students, again perhaps not included in notes because time and effort were devoted to ideas they expected they would not remember. In contrast, only a small number of vocabulary students either noted or recalled this idea on the pre-test although on the post-test, more (about 41%) noted it. There was no improvement in recall of this idea.

Only one student used the type of chart used in training sessions to tabulate information. This was in his post-test notes. He was the strongest student in the class and

perhaps the only one able to do the on-line processing required to organize the information.

d) Control Group

The Control Group recalled 36% of the ideas (97 of the 270 or 27 possible ideas X 10 subjects) on the pre-test and 44% of the ideas on the post-test, both figures much lower than those for either the native speakers or the experimental groups.

Only the first 3 main ideas on the pre-test and the first 4 on the post-test along with idea # 13 and its supporting detail on both the pre-test and post-test were recalled by 60% or more of the students in the Control Group. There almost seems to be a primacy - recency effect except that idea # 13 was not the last idea, but the second last. The concluding idea, which was actually the current solution to the problem was neither noted nor recalled by the control group. In view of the lower level of this group, it could be that the ideas they recalled were the easiest to understand. There was no striking improvement in recall from pre- to post-test for the Control Group. A few students recalled a few more ideas on the post- than on the pre-test.

On both the pre- and post-tests the Control Group students noted more ideas than they recalled and they noted more ideas on the post- than on the pre-test. Some ideas noted on the pre-test (#6, 10 and 12c) were not included in the post-test notes while other ideas (# 11, 11d, 12 and 13 a) were. There seems to be no pattern to the differences.

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e) Summary of Second Language Students' Notes and Recalls

Every student in the Visuals Group showed pre- to post-test improvement on the recall protocol. Most students noted more ideas than they recalled. One exception was the student who, according to the Institute's Placement Test, was the most advanced in the class (with a Placement Test score of 62). He recalled two more ideas than he had noted on the pre-test and four more than he had noted on the post-test. The student with the lowest Placement Test performance (score of 51) noted the same number of ideas on her pre- and post-tests and recalled a smaller number than she had noted on both her pre- and post-test. The three students with the highest Placement Test scores showed the greatest pre- to post-test gains. It could be that students must reach a certain minimum level of comfort in their listening to be able to handle the visuals and really profit from the visuals training.

For the Vocabulary Group, on the other hand, it was the students with the lowest proficiency scores (Placement Test scores of 52, 53 and for a student whose Placement Test score was unavailable, 23 on the Proficiency Cloze) who showed the greatest pre- to post-test gains on the recall. The stronger students (Placement Test scores of 59 [3 students]) scored more or less the same on the pre- and post- recalls. All the Vocabulary students noted more ideas than they recalled.

It should be noted that the Control Group, with exception of one outlier (score of 41), had quite homogeneous scores on the Placement Test. Their range was 49 - 55, so

it is difficult to find a proficiency-related pattern for the gains other than the fact that one of the weaker students on the Placement Test (score of 49) showed the greatest pre- to post-test gains on the recall. The strongest student (Placement Test score of 55) made substantial gains on the post-test while one student whose Placement Test score was 51 also improved noticeably. In general, the Control Group noted more ideas than they recalled and noted more ideas on their post- than on their pre-test, but it is difficult to find a pattern in the improvements.

Almost all the Visuals students noted more ideas than they recalled with the exception of two students. One was the strongest student in the class and the other recalled more than she noted on her post-test. The latter student showed a dramatic pre- to post-test improvement on her recall. These students may have found it unnecessary to write down ideas they expected to remember for the recall. It could be that once students reach a certain proficiency level in their second language, they are more discriminating about what they write in their notes and no longer feel the need to write down everything they hear. Dunkel (1988) had found terseness of note-taking to be a better predictor of post-lecture quiz scores than copious notes. It could be that these stronger students are reaching that level of discrimination in their note-taking.

All the Visuals students showed pre- to post-test improvement on their recall protocols. What is particularly of note is the fact that they reached a higher level on their recall of all the main ideas than the Vocabulary Group with the exception of idea # 5, the

example of the danger of small objects in space. They did end up with lower scores than the Vocabulary Group on some of the details (ideas # 7a, 7b, 7c, 11a, 11c and 12a), so either because of the memory limitations or the constraints of on-line processing, they may have had to sacrifice memory of details for memory of main ideas. This, coupled with their superior recall of the conclusion of the lecture (idea # 14), (slightly higher than native speakers' recall of this idea) suggests that the organization training with the visuals has made them more discriminating listeners. We may recall that Dunkel and Davis (1994) had found that second language listeners tended to take note indiscriminately.

5.4   Training Sessions

An analysis of students' performance on the tasks used in the training sessions was conducted to see if students had been able to handle the tasks, to check whether the visuals students had had problems with the visuals, to monitor improvement as students progressed through the training sessions and to identify differences between the two experimental groups (Visuals and Vocabulary). (See Tables 19 to 21 and Figures 8 to 10.)

Table 19   Training Session One: Fortune Cookies

Group	Recall Protocol		Global Questions		Summary Cloze	
	Mean %	S. D.	Mean %	S. D.	Mean /15	S. D.
Vocabulary	42.6	4.7	58.0	17.0	12.9	2.3
Visuals	47.3	7.7	51.6	8.0	12.9	1.9

Table 20   Training Session Two: Children and Creativity

Group	Recall Protocol		Global Questions		Summary Cloze	
	Mean %	S. D.	Mean %	S. D.	Mean /15	S.D.
Vocabulary	27.1	9.1	14.2	9.7	10.4	2.3
Visuals	41.1	12.3	31.3	16.5	10.0	2.2

Table 21   Training Session Three: The Greenhouse Effect

Group	Recall Protocol		Global Questions		Summary Cloze	
	Mean %	S. D.	Mean %	S. D.	Mean /15	S.D.
Vocabulary	37.7	13.4	63.3	12.9	12.3	1.8
Visuals	50.8	16.0	59.7	17.8	13.4	1.3

Figure 8   Recall Protocols
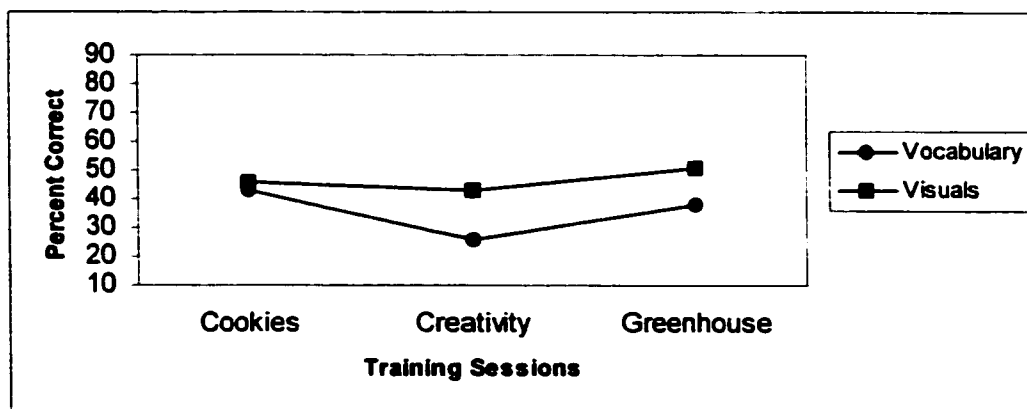
Figure 9   Global/Inference Questions
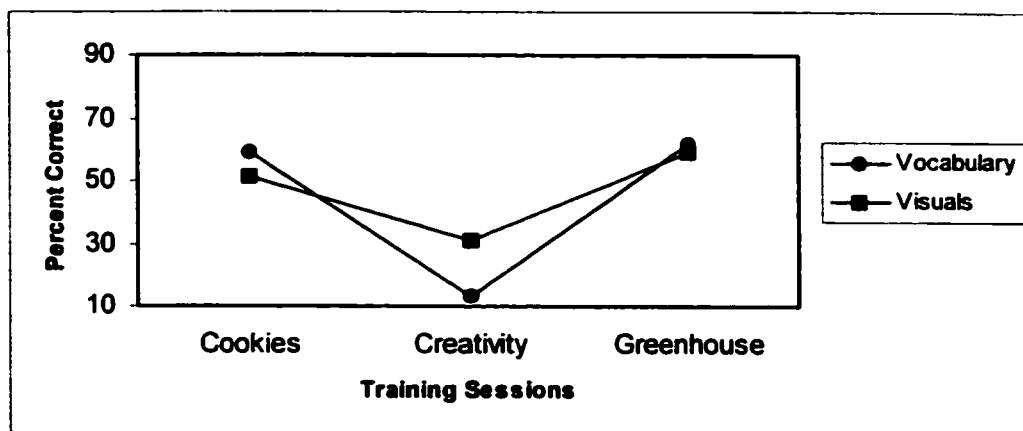
Figure 10   Summary Cloze
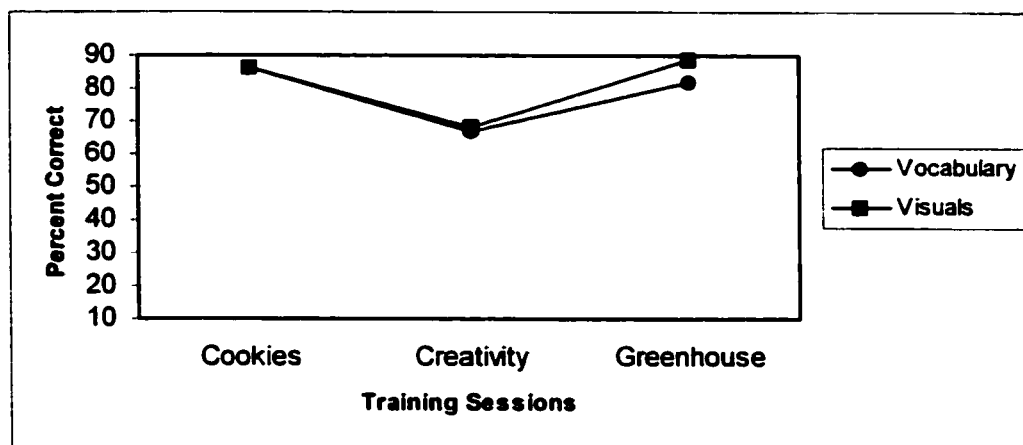
Of the three training texts, the second text was undoubtedly the hardest for both groups. It was based on a text by Margaret Mead. Drawing on her experience in Bali and other parts of the world, she presented unusual ideas for fostering creativity in children. This text was not easy to follow because the logic of Mead's arguments was not always clear. Because this second training session was the most difficult, there was no practice effect across the three training sessions. This difficulty may have been fortuitous because

research on training sessions (Bjork, 1994) suggests that introducing difficulties and challenges for the learner impairs performance during training, but enhances post-training performance. In any case, the Visuals Group did better in the last training session on all three tasks than they did on the tasks for the other two training lectures while the Vocabulary Group's performance was somewhat erratic.

On the memory task, the recall protocol, the Visuals Group out-performed the Vocabulary Group for all three training lectures with the difference most noticeable on the Mead lecture. In this lecture the organization of ideas was less evident than for the other two lectures. Perhaps having to organize the ideas to fit them into the visual helped this group to remember the ideas better than the Vocabulary Group. The standard deviation for this measure is very high for the Visuals Group on all three sessions and for the Vocabulary Group on the last two sessions indicating a great deal of individual variability.

For the global or inference questions, a task thought to measure a high level of comprehension involving understanding the relationship between concepts, the Visuals Group out-performed the Vocabulary Group only for the second lecture, the Margaret Mead passage. Completing the visual may have helped the Visuals Group to organize the ideas in the lecture so they were able to answer the global or inference questions. The standard deviations for this measure were very high for both groups, again indicating a great deal of individual variation.

Finally for the summary cloze task, thought to be a measure of general comprehension, there was little difference between the two groups for the first two training sessions and in the third training session, the Visuals Group did a little better than the Vocabulary Group with the standard deviations for this measure much tighter than for the two measures.

A MANOVA revealed no significant difference between groups on the first training session (Fortune Cookies, $F (3,15) = 2.72$), no significant difference on the second training session (Children and Creativity, $F (3, 14) = 7.8$) and no significant difference on the third training session (The Greenhouse Effect, $F (3,14) = 3.62$).

5.5   Interviews with Visuals Students

All the students in the Visuals Group were interviewed and the interviews recorded for analysis. In the interviews students were asked about their general impression of the key visuals as note-taking tools and whether the visuals helped them to remember the lectures. They discussed each visual briefly with the interviewer.

Unfortunately two of the interviews were not recorded due to technical difficulties. According to what I recall from their interviews, these two students liked the idea of visuals in general although the first student noted on the visual for Fortune Cookies that he found it confusing. The other student made the most progress in the group between pre- and post-test scores on the recall task for the Garbage in Space test and obtained the

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highest score in the group on the post-test. His score on the inference questions declined slightly and his cloze score remained constant. His comments would have been interesting because he was the only student to actually use a visual to organize his notes on the post-test. He made a chart similar to the one used in the second training session.

The comments of the remaining eight students are tabulated in Table 21. Other than the first two categories (helpful, sometimes helpful), the categories are not mutually exclusive. Four of the eight students found the charts generally helpful or useful. The remaining four commented that the charts were sometimes helpful, but sometimes confusing or an obstacle. The problem for three of these students was the fact that the visuals did not cover all the information in the lecture. The fourth student indicated that she doesn't like charts although this aversion had not shown up in her attitude test and that it took some time to learn to use the charts and she would prefer to work with a blank piece of paper and use her own abbreviations. This student was quite strong by the end of the semester and showed strong improvement on both the recall task and the inference questions. In contrast, another student indicated that the class had had enough time to learn the visual technique. This student also said she had used a visual on the post-test but in fact it was not in evidence in either her notes or her recall.

As for the efficacy of the visuals as aids to memory, only three students made specific comments about this aspect. One commented that the visuals sometimes interfered with remembering mainly because they did not cover the whole text. She tended to

remember only the information in the visuals and not the other information. One student said the visuals helped her to remember the order of texts and the other said that when she was recalling the text, her memories were half from her notes and half from the charts.

Table 22 **Students' General Reaction to Visuals**

Comment	Number of Students N = 8
Helpful	4
Sometimes helpful but sometimes confusing/an obstacle	4
Prefers to take own notes first/write everything down	8
Visual doesn't cover whole text (covers only basic ideas)	4
Prefers to organize after with visual	3
Learning the technique took time	1
Had enough time to learn the visuals	1
Would like to do more visuals	1

In the second part of each interview, I asked students about each training session and the visual that they had used for it. The first was the *Fortune Cookies* mini-lecture. The visual displayed five problems and solutions with most boxes partially completed. Five students indicated they found the visual helpful in some way. Two of those five, though, commented that they preferred to take their own notes first and then use the visual to organize the information. These two students indeed took quite detailed notes on the back of the visual. Three of the five students indicated that the visual helped them to recall the information. Of the four students who had not found the visual helpful, one said he had

problems understanding the visual. His reaction to the second visual (Training Session 2) was similar, but by the third session he said the visual was clear and it helped him understand the mini-lecture. There was thus some learning required before the student found the visual useful. Two of the students who did not find the visual helpful commented that there weren't enough words on the visual to help (a reaction similar to what Tang (1991) had encountered when investigating ESL students' use of graphics in textbooks). One of these students commented that when she was recalling the text, she remembered only the visual and not the extra 'things' from the text. The fourth student took lots of notes on the back of the visual and then developed a list of problems and solutions not unlike the visual.

We now turn to the second training session based on the lecture, *Children and Creativity*. There were three visuals for this mini-lecture: a completed visual which showed the problem and two partially completed visuals: one which further delineated the problem and a second which showed the solution. Two students commented that this was the most difficult text. Another student implied it was difficult when she said "The more difficult the text the better the visual key (key visual)." Two students said the chart was confusing while another student commented that the visual was better than the talk and that he understood better after using the visual. Three students said the visual helped them to remember the lecture while one student remembered the chart schema but no details just as she had done with the visual on Fortune Cookies. Again, two students said they took

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notes first and then used the chart to reorganize the information. Nonetheless, many students took notes around the visual as they had been instructed to do.

The third mini-lecture was on the greenhouse effect. Students were given a partially completed visual and a blank visual with six boxes for the possible solutions and six boxes for the feasibility of the solutions. One student commented that she didn't understand 'feasibility' although the teacher would have explained it, had she asked. Six of the eight students found this visual helpful. One student said that the recall task had influenced his note-taking. Had he not been asked to recall as much as he could from the lecture, he might have just used the visual instead of taking copious notes. The other student said she preferred to take her own notes first and then organize them into a visual herself. She liked the blank visual. She acknowledged that sometimes students write too many things, such as dates which are not useful. Three students pointed out that the visual did not cover the first part of the text. Another student, a mathematics student, said she would have liked a third column in the chart to show the causes of the greenhouse effect. These causes were discussed at the beginning of the lecture. Still, three students, including the mathematics student, said the chart helped them remember the lecture. Everyone used the blank visual. Some used both, presumably one for each time they listened. In addition to completing the visual(s), they all took copious notes either around the visual or on the back of the sheet.

It was interesting to hear the students discuss the experience. They used terms such as schema and key visual and discussed text organization and memory. The experiment

developed metacognitive awareness of the comprehension and memory processes. They noted that they had had to learn to use the charts and many had found them confusing at first. One student, who actually had obtained a perfect score on all parts of the visuals sensitivity questionnaire, said she didn't like the charts and wanted to learn 'note-taking.' Most still preferred to take their own notes and then use a visual to organize the information. Some of those who had taken their own notes produced charts not unlike the visuals. Two students commented that they were tired on Monday afternoons and had had trouble concentrating on the lectures. Nevertheless, all students seemed to try very hard to understand the lectures and remember as much as they could from each one.

5.6   Interviews with the Visuals Teacher

In monitoring the progress of the experiment, I had frequent communication (short notes and discussions in the hall) with the visuals teacher. At this time, details like sorting out the similar names of the Korean students, the disappearance of participants and updates about students' reactions were addressed. The difficulty of the second training session became apparent at this time.

Shortly after the end of the experiment and after the course evaluations by students were completed, an interview was held with the visuals teacher. The class had not been totally satisfied with the course in general. The major problem for the Korean students, who actually formed the majority of the class, seemed to be dissatisfaction with the class representative. The original class representative, a Korean, left the program because of an

attractive job. The replacement, a Canadian student, who was quite outspoken, in some ways intimidated them and steered the class agenda in a direction they had not wanted. It seems they liked the "academic work" of the key visuals experiment and would have liked more work of that type and a less "communicative" focus to the group's activities. In general, the teacher had liked the key visuals and although she did not consider them to be "the only way to go" in improving listening comprehension, she found them to be another useful tool for teaching listening skills.

The final interview was conducted after the results had been analyzed. The teacher was pleased to see that the Visuals Group had improved their scores on the post-tests. She did not seem too surprised that the differences between the Visuals Group and the Vocabulary Group (whom she had also taught although the teaching assistant had implemented the vocabulary materials) were not significant. She pointed out that in an intensive course focussing on the four skills as these courses were, there are many factors which feed into students' progress. She continues to use key visuals herself and reported on her recent final listening examination in which students were required to complete a chart for a classification film. An interesting observation made by the teacher is that the intellectually stronger students, rather than the linguistically stronger students, had performed best on this task.

CHAPTER 6

CONCLUSIONS, LIMITATIONS OF THE STUDY
AND PROPOSALS FOR FURTHER RESEARCH

6.1 Conclusions

The research questions were: Will students who are sensitized to the structure of

problem-solution lectures through key visuals (the Visuals Group) better understand and

remember a test lecture of that type after than before the training? Will students who are

exposed to lectures of the problem-solution type and receive vocabulary instruction (the

Vocabulary Group) better understand and remember a test lecture after than before the

training? Will a control group in the same program as the experimental groups better

understand and remember a test lecture of the problem-solution type after the same period

of time but without any special training on the text type? Will the Visuals Group better

understand and remember a test lecture after their training than the Vocabulary Group or

than the Control Group? Understanding of the lecture was measured by a set of five global

or inference questions and by a summary cloze task. Understanding and remembering the

material from the lecture was measured by an immediate free recall task.

All groups in the study showed significant pre- to post-test gains on the measure

of remembering, the recall protocol. On average, the scores of the Visuals Group

increased more markedly than those of the Vocabulary Group or the Control Group. The

Vocabulary Group also improved their pre- to post-test scores although their means on

both pre- and post-tests were lower than those of the Visuals Group. The Control Group, while much lower than either experimental group on both the pre- and post-test made substantial gains over time without any particular training or focus on problem-solution passages. Since the interaction of treatment by time was not significant, the significant difference by treatment between the Control Group and the experimental groups appears due to the fact that the Controls had much lower scores on both the pre- and post-test than the experimental groups. Students in all the groups seemed to understand the problem-solution mini-lecture better at the end of the experimental period and were able to recall more ideas than before. The Vocabulary Group seems to have benefited from exposure to the problem-solution lecture type and vocabulary instruction in the training sessions while the Visuals Group benefited from exposure to the lectures along with instruction and practice on key visuals designed to sensitize them to the organization of the lectures. The Control Group improved over time, perhaps because of their experience with the test or because of the general language training they were receiving in the program. The tighter standard deviations for the Visuals Group, particularly on the Recall Protocol, suggest more common ground for that group than for the Vocabulary Group and point to the possible effectiveness of the treatment. The Control Group showed more variability on the post- than on the pre-test, perhaps indicating that individuals' improvement in various aspects of general second language proficiency was leading to better comprehension of the lecture.

On the global/inference questions, all groups improved significantly on their pre- to post-test scores with the Visuals Group and the Control Group showing greater improvement on average than the Vocabulary Group although the difference was not significant. Their initial score was lower than that of the Vocabulary Group and their final score, although showing more improvement than the Vocabulary Group's, was still a little lower than that of the Vocabulary Group. The Control Group's improvement was roughly parallel to that of the Visuals Group although at a lower level. Their variability increased on this measure as well although the standard deviation for this group remained below those of the two experimental groups. On this measure too, there was no significant difference by treatment.

All three groups, on average, showed slight significant pre- to post-test gains on the summary cloze task. The Vocabulary Group had the highest scores on both the pre- and post test. The Control Group, with the lowest pre-test scores showed the most improvement although the post-test scores remained much lower than those of both experimental groups. The standard deviations increased slightly for all groups on this measure. There was no significant difference for treatment on the summary cloze task. I suspect that this measure, in addition to tapping into overall comprehension, is also influenced by other factors than comprehension, such as knowledge of morphology and syntax. For example knowing that either a non-count noun or a plural must go in the blank after "of" narrows down the choice of words to go in that blank. The Control Group's performance on this measure relative to that of the two experimental groups

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(lower, although not significantly so) was similar to their performance on the other measures of comprehension, the Listening and Reading subtests of the Placement Test whereas their performance on the Placement Cloze and the General Proficiency Cloze was not significantly different from that of the experimental groups. This task must tap into some aspect of comprehension more than general proficiency clozes do.

Research has shown the detrimental effect of lexical ignorance on lecture comprehension. Furthermore, ESL teachers, based on their experience with helping students with comprehension, frequently use vocabulary exercises to introduce reading and listening passages to their students. Therefore, it is not surprising that the Vocabulary Group showed general improvement in their comprehension of the mini-lecture. On the other hand, researchers in first and second language reading and listening comprehension have demonstrated the importance of awareness of text structure (formal schemata) and the effectiveness of various graphic organizers for improving comprehension. Memory research has demonstrated the beneficial effects of deeper processing, elaborating or engaging in transfer-appropriate processing on students' learning of material. Consequently, it was expected that students' comprehension and memory for information presented in the lecture would be enhanced by working with the key visuals.

Qualitative analysis of students' recall protocols afforded some insights into what students understood or considered important in the lectures. The native speaker recalls offer interesting baseline data for comparison with the second language students' work.

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About 75% of the native speakers recalled all the main ideas of the lecture except for five, including the current solution to the problem, which was "to do nothing for the moment". For three of these ideas the recall was close to 70%, leaving only ideas # 6 and 7 with a percentage recall of less than 50%.

The pattern of ideas recalled for the second language speakers was remarkably similar to that of the native speakers. The second language students displayed lower recall of the same three main ideas on their pre-test and on their post-test, with one notable exception. A high percentage (slightly higher than that of the native speakers) of the Visuals students recalled the concluding main idea, namely that scientists would do nothing for the moment to solve the problem. Perhaps their work on re-organizing the material in problem-solution mini-lectures had made them more sensitive to a conclusion being presented even if it was not the main focus of the lecture. The reasons for second language learners not noting or recalling the disclaimer and its associated details may be linguistic, however, because the details were presented in quick succession in the form of nominalizations, a structure known to be difficult for second language speakers. Two additional main ideas gave the second language speakers difficulty on the pre-test, namely, the foam disk and the windmill solutions. The source of this difficulty apparently stemmed from a lexical ignorance problem (Kelly, 1991) because many students seemed to recognize that solutions were being presented but did not have the vocabulary needed to understand just what those solutions were. Both experimental groups improved markedly

in the accurate recall of these ideas on their post-test. The Control Group's recall of these ideas was marginal on both the pre- and post-test.

When we look more closely at which ideas were recalled, we find that on the post-test, the Visuals Group recalled more of the main ideas which represented solutions to the problem than the Vocabulary Group. Their focus on solutions seems to have come at the expense of recall of some of the other details. Their superior recall of the conclusion is particularly noteworthy. Furthermore, since the standard deviation was tighter for the visuals group on the post-test recalls than for the other two groups, the improvement was more uniform in this group. The evidence of the tighter standard deviations on the post-test, coupled with the superior recall of the conclusion and solutions by the visuals group, could indicate the facilitative effects of key visuals for improving ESL students' memory of important ideas in a lecture.

Examination of native speakers' and second language speakers' notes on the test lecture yielded some interesting observations. Chaudron et al. (1994) caution that note quality should not be considered as a direct measure of comprehension because they found no strong or consistent overall relation between their quantity and quality measures of notes taken and students' comprehension. Still, accurate notes must reflect comprehension in some way and, by providing external storage of information, will facilitate the retrieval of that information for later use. The note-taking patterns of the two experimental groups were similar to that of the native speakers although, not surprisingly, they noted fewer

ideas correctly than the native speakers. The note-taking of the Control Group seemed more erratic and it was difficult to find a pattern. There was a modest significant correlation for native speakers between the notes they had taken and their recall protocols. For the second language speakers, the correlation was non-significant, perhaps a sign of the indiscriminate note-taking of second language learners noted by Dunkel and Davis (1994).

Native speakers took marginally more notes than they wrote in their recall protocols. About 75% of the native speakers noted all fourteen main ideas of the lecture with four exceptions. Two not noted were ideas which seemed self-evident (the problem-solution statement and the conclusion) while the third idea was a disclaimer and may not have seemed relevant to them. The fourth was an example and therefore was less important. They included all of these except the disclaimer in their recall protocols. In a couple of cases, they failed to recall details such as the size of the foam disk and how it worked even though they had included them in their notes. The Control Group, even on the post-test, seemed less able to recall ideas they had noted.

The second language participants noted only marginally more ideas than they recalled. On the post-test all groups improved on both recall and note-taking. Students' notes reflected the lexical ignorance problem with "foam disk" and "windmill" that had appeared in their recall protocols. In a few cases, students recalled ideas which they had not noted. These seemed to be obvious items like the statement of the problem (garbage

in space) and the conclusion which they had not noted, perhaps because time and effort were devoted to ideas they expected they would not remember.

The interviews with the Visuals students shed some light on their comprehension and note-taking processes. Some students commented that they preferred to write down as much as they could during the lecture and later organize the information using the key visual. Flowerdew and Miller's (1992, 1995, 1996a, 1996b) Hong Kong students had mentioned that they found it difficult to simultaneously listen, read/decipher a visual and take notes. Some Visuals students complained that sometimes the visuals did not cover all the information in the lectures. This had led to problems in recalling information not in the visual. Generally speaking, the students were positive about the visuals. Their discussion of schemata, key visuals, text organization and memory suggested that the experiment had served to raise their awareness of metacognitive strategies. The teacher too felt the key visuals were useful for improving students' listening comprehension although she was not surprised to find no difference between the performances of the two experimental groups. She felt that there were so many factors which come into play in the Intensive course that it is difficult to isolate the effects of the two training procedures.

Finally, there was no significant difference for treatment between the two groups on any of the measures. I had expected that by the third training session, the Visuals Groups would be comfortable using the visuals for note-taking, that they would easily recognize the problem-solution organization of the mini-lectures and would therefore

perform significantly better than the Vocabulary Group on the three listening measures. We must remember that the groups were small and individual differences play a greater part in the result than would be the case for larger groups. Secondly, we should keep in mind the fact that the experiment formed only a small part of the Intensive program the students were attending. They received twenty-one hours of instruction a week for twelve weeks (252 hours) while the experimentation involved only eight hours of class time. Furthermore, research by others (Bernard & Naidu, 1992; Novak, 1990; Schmid & Telaro, 1990) has shown that it takes time to learn to prepare and use graphic organizers. Perhaps the three training sessions were not sufficient for students to be able to prepare their own visuals to reorganize the ideas of a passage. Finally, because listening is an on-line activity which becomes easier for second language learners as processes become automatized, it is possible that for these learners the listening task was taking up so much processing capacity, that there were not enough resources left over to exploit the key visuals.

6.2 Limitations of the Study

6.2.1 Inclusion / Elimination of the Control Group

It was important to compare the experimental students' results with those of the Control Group to attempt to isolate the effects of the experimental training. Each session of the Intensive Program brings a different group of students. Groups are formed on the basis of scores on the Institute's Placement Test, but all groups have approximately sixteen students and the criterion of group size is pre-eminent. Students normally receive extensive

training and practice in academic listening in the Intensive courses. In their 21 hours of instruction per week, they do a great deal of work on the other three ESL skills, in addition to grammar and vocabulary development. Some do extra work preparing for the TOEFL or CanTEST in preparation for university entrance. Some practise their English outside of class more than others. The elimination of the Control Group from the study would have precluded the availability of baseline data for normal progress in listening comprehension over the course of the twelve-week semester. The Control Group was significantly different (lower) from the other two groups on the pre-experimental comprehension measures and there was some concern about including their results in the analysis. However, the difference lay in their level of proficiency. They were at a lower level than the other two groups. On the other hand, some of these students' scores were within the range of scores of the two experimental groups. They were learning English in the same program as the experimental groups and it seemed justified to expect them to make improve noticeably in listening comprehension over the semester. Thus, it was decided to include this group in the study. Nevertheless, the fact that they were so much weaker than the experimental groups makes interpretation of the effects of instruction harder.

6.2.2 Instruments

One problem noted in the pilot study was the difficulty of equating the two test stimuli (the Reading Blocks lecture and the Garbage in Space lecture). Even if two texts contain approximately the same number of words, are delivered in about the same amount

of time and are academic lectures, they are not necessarily equal in difficulty. One may be more informationally dense than the other. Listeners may react differently to the two because of differing personal interest in the topic, familiarity with it, and perceived usefulness of the information contained within the passage. One way to create equivalent tests is by carefully crafting the question if a multiple choice or other recognition technique is being used, but an open-ended task like a recall protocol is more dependent on the text itself. The use of the Garbage in Space lecture for both the pre- and post-test solved the instrument problem for this study, because there was a suitable length of time between tests, but this meant that results could have been affected to some extent by the fact that students had heard the text before, albeit with an intervening interval of eight weeks. With a larger number of subjects, it might be possible to use two texts, with one text serving as a pre-test for half the students and as a post-test for the other half and vice versa for the other text.

The General Proficiency Cloze Test was intended to be to be the general proficiency measure for this study. It demonstrated no significant differences between the Control Group and the experimental groups. Later analysis of the listening pre- and post-tests, however, showed the Control Group to be significantly different from the other groups. This difference could not be explained by irregularities in the administration of the listening test because later verification of the General Placement Test scores which had been used to place the students in the highest-level group that session also showed the Control Group to be significantly different from the two experimental groups on the

listening and reading comprehension measures but not on the cloze sub-test. Thus, a cloze test, although a good measure of some aspects of proficiency, should not be assumed to accurately reflect all aspects of a student's language knowledge and use.

The Visuals Sensitivity Measure did not identify any students with particular problems with visuals although the Visual Knowledge section was able to show significant differences between the two experimental groups, with the Visuals Group attaining higher scores. They were better able to interpret visuals at the outset but were not significantly different from the Vocabulary Group in their previous exposure to visuals or their attitude towards them. Perhaps the Familiarity with Visuals and the Attitude to Visuals questions could be expanded with more stimuli to see if it would more easily identify significant differences between groups. Actually working with the visual as required in the Knowledge measure probably leads to more informed answers on the part of the students for the Familiarity and Attitude measures, so a few more items could be added to the test overall. In fact, Daniels (1986) had twelve visuals with 36 items on her original instrument, so there is room for additional items, should class time be available for testing.

The Recall Protocol measure was chosen as the measure of remembering ideas presented in the listening passage. It has been widely used in the research on first and second language reading and listening comprehension. It was chosen as a reflective measure which would provide insight into the content of listeners' internal representations. Consequently, it might indicate whether the experimental groups had perceived the

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problem-solution organization of the lecture and had reorganized the concepts with that in mind. Several language groups were represented in the experimental groups. Thus, although requiring the recalls in students' first language might have yielded stronger performance and therefore better reflected students' comprehension of a lecture, recalls in the second language eliminated the problem of equating translations of students' first language protocols encountered by other researchers (Dunkel & Davis, 1994). Furthermore, students in the experiment were at the advanced level, and doing the recall in their second language should not have presented too many problems for them (Shohamy, 1984).

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Recall and recognition measures have also been used in memory experiments. Research on transfer-appropriate processing suggests that encoding procedures which require learners to form associations between concepts or events should help them to recall these events because triggering cues will not be overloaded. Using key visuals at the encoding stage should help the learners to interrelate the ideas being presented and therefore facilitate better recall. Focussing on vocabulary and answering factual questions as the Vocabulary Group did, on the other hand, focusses on item-specific characteristics and leads learners to differentiate among concepts. Memory research (Hunt & Einstein, 1981; Roediger & Guynn, 1996) suggests that this kind of encoding is particularly beneficial for later recognition of the concepts presented but less so for recalling the ideas.

The second listening measure was the set of global or inference questions. These questions were designed to tap a high level of comprehension because they would require understanding the major themes and topics and demand more than local processing of ideas (Shohamy & Inbar, 1991). In the validation study, the global/inference questions instrument had shown a reliability of .78 with item biserials ranging between .58 and .93. Thus, it was a stable, reliable, measure. The visuals were used as advance organizers (Ausubel, 1968), providing anchors on which to hang the new information of the mini-lectures. Organizing new information and integrating it into already present knowledge structures can facilitate comprehension and 'meaningful learning' (Ausubel, 1968). I had anticipated that training in the problem-solution lecture type would sensitize students to the organizing principle of the mini-lecture. I had thought that the similarity between the kind of processing required to organize the information from the problem-solution lectures would foster better performance on the global questions for the Visuals Group. In fact, the Visuals students did improve more in this measure than the Vocabulary students, but the difference was not significant. Larger groups might have made it possible to better assess the role of visuals in facilitating comprehension.

The summary cloze measure was a stable measure. It had shown a high, significant, pre- post- correlation (r = .82). In the pilot study it displayed a reliability of .74 with a biserial range of .33 to .87. However, it correlated only with the global questions on the pre-test and showed no correlation with the other measures on the post-test. Although Courchêne and Bayliss (1995) considered it a measure of reading

comprehension, in this study it did not correlate with the other listening measures and is probably measuring something besides comprehension and recall. The slight improvement by all three groups and the continued superiority of the Vocabulary Group probably reflect general language improvement.

6.2.3 Ecological Validity

The study was intended to be an ecologically valid one with the experimentation taking place in the language classroom. It was hoped that the findings would be seen as relevant to other language classrooms. This very purpose led to one of the flaws of the study, namely, that it was not ecologically valid because, even though it was taking place in a classroom, the treatment was imposed by the researcher rather than a technique normally used by the teacher to cover material that formed part of the regular course. Teachers' and students' cooperation is essential. As Rounds and Schachter (1996) point out, the researcher is "a tolerated guest in another teacher's classroom" (p. 106). Furthermore, in their view, students have certain expectations of the courses they take. The aim of any intervention must be in harmony with the goals of the course students are enrolled in. The problem of conflicting goals was apparent in the pilot study. The relevance of listening materials for a writing course, even if they exploit a text type focussed on in the course, was too hard to sell to both teachers and students. An attempt was made to correct this problem in the main study by finding classrooms more congruent with the research goal of improving listening comprehension, namely four-skills intensive classes where students were devoting all their time to improving their English skills,

including listening comprehension. The solution was still not ideal. In the Intensive Program teachers follow a thematic approach. All activities (listening, reading, speaking, writing) for a six to eight-day period are based on the theme. On the other hand, the materials chosen for the experiment were meant to be representative of different disciplines (science, business and the humanities) and the techniques being presented were clearly not part of the ongoing theme and were the researcher's choice rather than the teacher's or the students'. Furthermore, the involvement of the researcher was evident to the teacher and students, thus constituting an imposition on all.

In the pilot project, the conflicting demands on volunteer students' time and energy between their other course requirements, the requirements of the writing course and the effort required for the research project created obstacles to the focus of the training sessions and weakened students' participation in the research. Those who volunteered were interested in the project, in most cases genuinely wanted to do their best, but by the end of term, being credit students, began to worry about marks, and were overwhelmed and exhausted by the other demands on their time. Conducting the research project in an intensive course which focussed on the four skills of English seemed to solve the problem of the conflict between course goals and the goals of the research project. Since students were totally focussed on improving their English skills and were not taking any other courses, they had fewer outside demands on their time and were focussing mainly on their ESL studies. They were certainly more willing participants than the students of the pilot study. Still, some students were far from their countries of origin and suffered culture

shock and fatigue from trying to function in their new surroundings. Furthermore, they differed in how they organized their out-of-class time and in the goals for their studies.

6.3   Proposals for Further Research

The results of this study support the conclusion that teaching vocabulary for pre-listening preparation is useful in improving listening comprehension. Using key visuals to note and organize the information in a lecture is also useful. Both procedures are valuable tools in the teacher's toolkit. They are not the only tools, however, because students in a well taught four skills academic English program also make significant improvements in listening comprehension.

More classes with larger numbers of students would enable the researcher to have more than one group receiving training on each kind of advance organizer given by different teachers. Results might indicate significant differences between the treatments. Even within the current design larger groups might have minimized the effect of individual differences and the differential effect of the two treatments might have been clearer.

To further explore the role of different types of advance organizers, comparison studies should be carried out within the context of listening courses using material that forms part of the regular course. Two sets of preparation materials (vocabulary and key visuals) could be developed using pre-existing course stimuli. Thus, the students and teacher would be less disturbed by the outside intervention of the researcher. The material

would be integrated into the students' learning agenda and would be the object of their attention and effort. Future research should also investigate other text types (comparison-contrast, classification, cause-effect, etc.) and the effect of key visuals in making them comprehensible and memorable.

Ideally a delayed recall protocol test should be administered at least a week after the immediate post-test. Studies in memory would suggest that the Visuals Group which was required to organize the ideas of the lecture to complete or make a visual would remember the ideas in the lecture better than either of the other two groups.

The constraints of listening comprehension, an on-line activity, make it difficult for second language learners to devote enough attention to learning to make or even use graphic organizers. If there were enough time for training, I would like to train learners to use and make key visuals based on reading passages where they would have time to review the material and reflect on its organization. Once they were comfortable with the key visuals for reading, they could begin using them for listening materials.

Listening comprehension is an under-researched area of second language acquisition. There are many more studies of reading comprehension than of listening. One of the reasons for this neglect is the assumption that listening improves on its own. Another reason is that it is more difficult to research. It takes more time to find good listening texts than reading texts. It is easier to edit reading texts than oral passages. The

fleeting nature of the medium requires the concentration of listeners, a positive attitude on their part enabling them to persist in listening and not be distracted by problems in comprehension, and strategies to compensate for weaknesses in listening ability. There is much work to be done in listening comprehension as we try to understand the processes and how we might improve learners' proficiency. This study has provided some insights into these issues.

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LIST OF APPENDICES

EXPERIMENTAL DESIGN

GROUPS	GENERAL PRETESTING	LISTENING PRETEST	TRAINING SESSIONS	LISTENING POSTTEST
CONTROL N=15	PROFICIENCY BACKGROUND Q VISUAL Q	RECALL INFERENCE Q SUM. CLOZE	→	RECALL INFERENCE Q SUM. CLOZE
EXP. VISUALS N=10	PROFICIENCY BACKGROUND Q VISUAL Q	RECALL INFERENCE Q SUM. CLOZE	1 2 3	RECALL INFERENCE Q SUM. CLOZE
EXP. VOCAB N=13	PROFICIENCY BACKGROUND Q VISUAL Q	RECALL INFERENCE Q SUM. CLOZE	1 2 3	RECALL INFERENCE Q SUM. CLOZE

MINI LECTURES
1.FORTUNE COOKIES 2. CHILDREN 3.GREENHOUSE
TEST: GARBAGE IN SPACE

APPENDIX B
Consent Form

Project: The Role of Key Visuals in Improving Comprehension and
Recall of Oral Passages in a Second Language.

Investigator: Sandra Burger   Supervisor: Dr. P.M. Lightbown,
Second Language Institute   TESL Centre,
University of Ottawa,   Concordia University,
600 King Edward Ave.,   Montreal, Quebec.
Ottawa, ON. K1N 6N5   Tel: (514) 432-2593

This project is conducted as part of the requirements for the Ph.D. in Humanities at Concordia University. The results of this research will be used in a thesis to be submitted by Sandra Burger. Publication in the form of articles and/or a monograph may also ensue.

The objective of this project is to study the effectiveness of key visuals versus vocabulary preparation in improving ESL students' comprehension and recall of lecture-like passages in English.

This project involves no physical risk. Experimental subjects will be asked to participate in pre-testing of their general second language proficiency, their listening comprehension and recall of a short oral text, their familiarity and attitude towards visuals, in training sessions based on lectures organized according to Mohan's (1986) knowledge structure, *choice or decision making*, in post-testing of their listening comprehension and recall of a short oral text and to complete a questionnaire about their first language, educational background, gender and age. They will also be asked to meet with investigator to answer questions about their impression of the training materials. The interview lasts about 10 minutes. Control subjects will be asked to participate in pre-testing of their general second language proficiency, their listening comprehension and recall of a short oral text, in post-testing of their listening comprehension and recall of a short oral text and to complete the background questionnaire.

Subjects may refuse to answer any question or to withdraw from the study at any time without risk of prejudice.

No compensation will be given for participation in this project.

The investigator may quote from interviews or use the interviews and test and training results in other accepted forms in educational research, but the subjects' anonymity will be ensured at all times. Subjects will be identified only by a pseudonym and all personal data that could identify subjects will be omitted from transcriptions and quotations. The tapes of interviews will be kept under lock in the office of the investigator for five years after completion of the thesis Only the investigator and the research supervisor will have access to these tapes.

Questions concerning the ethical performance of the research may be addressed to the Secretary of the University Human Research Ethics Committee, c/o School of Graduate Studies and Research, University of Ottawa, Ottawa, Ontario, K1N 6N5.

Investigator's Signature: _____

I have received a copy of this form and I agree to the conditions stated above.
Subject's Signature: _____ *Date:* _____

NAME: _____

CLASS (Section): _____

YOUR DOMINANT LANGUAGE: _____

OTHER LANGUAGES: _____

FIELD OF STUDY: _____

AGE (Circle):   18-20   21-24   25-29   30-39   40+

SEX (Circle):   M   F

COUNTRY OF ORIGIN: _____

HOW MANY YEARS OF EDUCATION? _____

WHERE DID YOU GO TO SCHOOL? (Circle)

      university   CGEP   secondary school

      Quebec   Other province: _____

      Other country: _____

WHERE DID YOU LEARN ENGLISH? _____

HOW MANY YEARS OF ENGLISH STUDY? _____

WHERE? (Circle):   at school   at CGEP   in a summer program

      at university (before this course)   other (Specify): _____

HOW MANY HOURS A WEEK? _____

APPENDIX D
Visuals Sensitivity Questionnaire

VISUAL INFORMATION TEST

Students have to use many different kinds of diagrams and graphs.
This is a test to see how many diagrams and graphs you have learnt to use and also to see how difficult they are.
It is testing the diagram and graphs—It is not really testing you! So don't worry if you can't answer a question—Go on to the next one.
I hope you enjoy the test and work hard at it!

Here is a specimen question to look at with your teacher

Pictograms

1977	◇
1978	
1979	◇◇◇
1980	◇◇◇
1981	◇◇
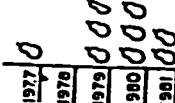
Question 1
How many pears did France sell in 1978?
Answer _____

Question 2
How many pears did France sell in 1979?
Answer _____

◇ = 1 million pears sold by France

Question 3 Put this information on the second pictogram
In 1975 Britain bought 3 million apples. In 1970 Britain bought 2 million apples. In 1980 Britain bought 1 million apples.

1970	
1975	
1980	

○ = 1 million apples bought by Britain
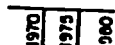
Question 4
(a) Have you used pictograms at school (in you own country)? YES   NO
(b) Have you seen pictograms outside school (in your own country)?
      YES   NO

Now try to do the same with the other questions ⟶

---

1. TABLES

☼ Sun

PLANET	YEAR	DAY
1. MERCURY	88 days	88 hours
2. VENUS	223 days	30 hours
3. EARTH	365 days	24 hours
4. MARS	687 days	23 hours
5.		
6.		

Question 1
Which planet has the longest day?
Answer _____

Question 2
What is different between the year on Mercury and the year on Mars?
Answer _____

Question 3 Put this information on the table in the correct order
Saturn's day lasts 9 hours and its year lasts 30,688 days.
Jupiter's day lasts 15 hours and its year lasts 4,333 days.

Question 4
a)   Have you used tables like this before?   YES   NO
b)   Do you like using tables like this?   YES   NO
c)   Do you think this is a good way to present information?   YES   NO

---

2. TABLES

	BIRD	BUILDING
TOWN	pigeon	church
FARM	hen	barn
SEA	seagull	lighthouse
RIVER	swan	mill

Question 1
Which building do you find near a river?
Answer _____

Question 2
Where do you find a hen?
Answer _____ and _____

Question 3 Put this information in the second table
A rabbit is an animal which eats grass;
An eagle is a bird which eats mice.
A duck is a bird which eats grass.
A fox is an animal which eats mice.

Question 4
a)   Have you used tables like this before?   YES   NO
b)   Do you like using tables like this?   YES   NO
c)   Do you think this is a good way to present information?   YES   NO

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3.

FLOW CHARTS

Planting		Growing
2 Months		2 Years

Drying		Picking
2 Weeks		2 Months

Fermenting		Packing
1 Month		2 Weeks

		Selling

1. Tea production

Question 1
Which stage lasts 1 month?
Answer _____

Question 2
How long does it take from Planting to Selling?
Answer _____

Question 3
a) Have you used flow charts before?
                   YES   NO
b) Do you like using flow charts?
                   YES   NO
c) Do you think they are a good way to present information?   YES   NO

---

4. CYCLES

1. Refrigerator cycle
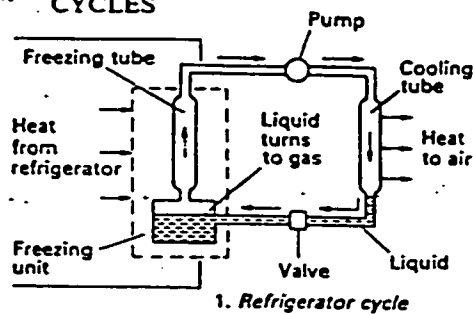
Question 1
Where does the gas change to liquid?
Answer _____

Question 2
Why does the refrigerator stay cool?
Answer _____

Question 3 Put this information on the second cycle

Plants take carbon dioxide from the air in Photosynthesis (using the Sun's energy).__ Animal and plant respiration returns carbon dioxide to the air. Dead plants and Animals help form Fossil fuels like oil. Burning fuel returns carbon dioxide to the air.
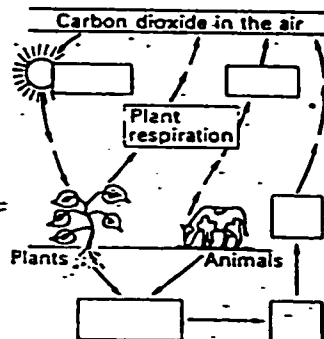
Question 4
a) Have you used cycles like this before?   YES   NO
b) Do you like using cycles like this?   YES   NO
c) Do you think this is a good way to present information?   YES   NO

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5. OPTIONS CHART

Problem	Solutions	Results/ Effectiveness
Killer bees (respond quickly and aggressively to a threat)	run away	success
	quarantine the bees	no pollination of crops
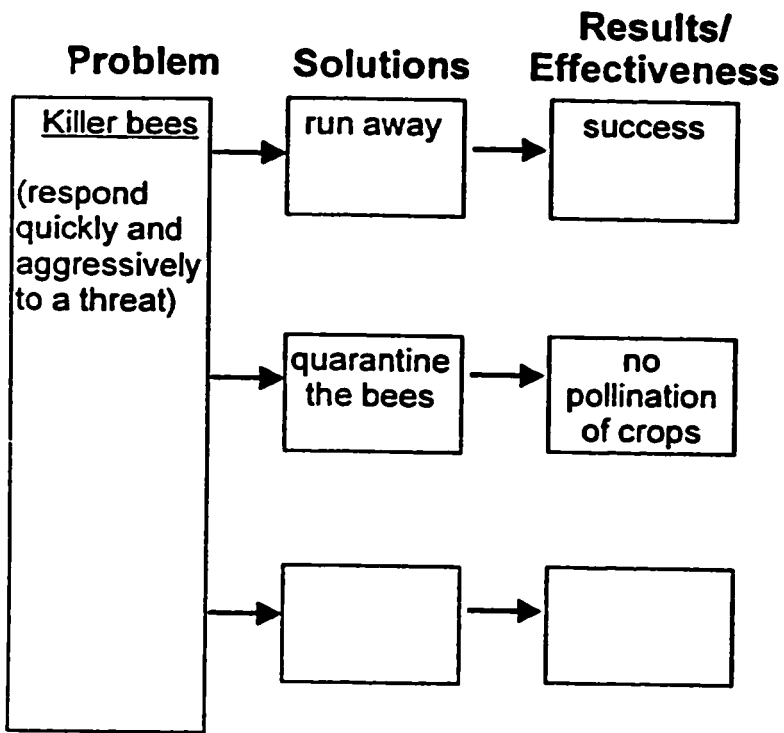
Question 1
What is the problem with quarantining the bees?

Answer _____

Question 2
Put this information in the chart:
Genetic engineering may solve the problem, but the changes will be slow.

Answer _____

Question 3
Which is the best solution?

Question 4
a) Have you used charts like this before?
        YES   NO
b) Do you like using charts like this?
        YES   NO
c) Do you think this is a good way to present information?
        YES   NO

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Fill in the blanks in the following passage with words chosen from the lists on Page 2.

CULTURE SHOCK

Different societies live almost literally in different worlds, not just the same world with different labels attached. The barriers between cultures would, perhaps, be relatively unimportant if only a handful of people were crossing international borders. But people the world over are _____(1) the move today as never before, _____(2) for business and, more and more, for _____(3) sheer fun of seeing and experiencing _____(4) ways of life. All of this has _____(5) obvious benefits. At the same time, _____(6) there are some well-known _____(7), particularly for a person who _____(8) to spend any appreciable amount of time _____(9) another culture. One of these is the sense of _____(10) and misunderstanding that social psychologists _____(11) culture shock.

Culture shock is precipitated by distressing _____(12) of uncertainty and anxiety that result _____(13) not finding all the familiar signs, symbols _____(14) cues that guide people through their _____(15) culture. People find themselves having to _____(16) a different "design for living". They don't know _____(17) is expected of them and what they should expect of _____(18). They are not at all _____(19) when to shake hands, how much _____(20) tip, how to buy the things they need, _____(21) what to say to waiters and they _____(22) that the social etiquette they have _____(23) is no longer of use to _____(24). Culture shock is usually accompanied by _____(25) linguistic shock that makes even more _____(26) the crossing of cultural barriers. Other _____(27) that account for the anxiety that _____(28) culture shock include the strangeness of _____(29) customs, of food, and of living patterns _____(30) table manners and mealtime schedules.

The extent of culture shock will depend, first of all, upon the amount of change people can experience without having to feel that their personal identity is being threatened and secondly, on their degree of involvement in a foreign experience and how much it differs from what they have been used to. The value of a foreign experience depends entirely on the individual.

ILS/Version A/1994

1. a) doing
    b) experiencing
    c) making
    d) on

2. a) changing
    b) doing
    c) travelling
    d) wishing

3. a) having
    b) only
    c) such
    d) the

4. a) other
    b) some
    c) their
    d) vary

5. a) any
    b) been
    c) its
    d) no

6. a) also
    b) however
    c) obviously
    d) therefore

7. a) dangers
    b) facts
    c) reasons
    d) situations

8. a) plans
    b) prepares
    c) projects
    d) promises

9. a) at
    b) for
    c) in
    d) with

10. a) confusion
    b) experience
    c) lost
    d) newness

11. a) call
    b) get
    c) named
    d) related

12. a) notion
    b) expectation
    c) feelings
    d) fear

13. a) from
    b) in
    c) of
    d) when

14. a) and
    b) because
    c) or
    d) whenever

15. a) other
    b) own
    c) past
    d) second

16. a) accept
    b) ask
    c) give
    d) want

17. a) how
    b) which
    c) who
    d) what

18. a) it
    b) others
    c) them
    d) this

19. a) knowing
    b) safe
    c) sure
    d) well

20. a) for
    b) give
    c) to
    d) will

21. a) either
    b) knowing
    c) neither
    d) or

22. a) complain
    b) deny
    c) discover
    d) wonder

23. a) found
    b) learned
    c) sought
    d) understood

24. a) do
    b) help
    c) practice
    d) them

25. a) any
    b) some
    c) such
    d) that

26. a) difficult
    b) hard
    c) nervous
    d) serious

27. a) disadvantage
    b) factors
    c) psychologists
    d) ways

28. a) give
    b) increase
    c) occurs
    d) produces

29. a) changing
    b) others
    c) social
    d) the

30. a) in
    b) like
    c) of
    d) ruling

APPENDIX F
Instructions to Teachers (Pre- and Post-test)

1) Please hand out the note-taking sheet to the students. Have them write their name on the page. Read the instructions to them before you start the tape. Remind them that you will be collecting their notes before they begin the first task.

2) Play the tape twice allowing a little time (2 min.) between presentations for them to update their notes before they listen again.

3) Collect all students' notes and distribute the Recall Protocol sheet. Ask the students to put their names on this page and the starting time.

4) Tell the students to work at their own speed and to come up to you for the next task when they have finished this one. When you collect each sheet, make sure the student's name is on it and that they have indicated the time when they finished.

5) Distribute the global sheet and follow the same procedure as for the recall protocol.

6) Distribute the cloze passage and follow the same procedure as for the recall.

7) Please return all materials to Sandy Burger.

Thank you for your help with this project.

You are about to hear part of a lecture by Dr. Yetta Goodman, a professor of psycholinguistics at an American university. She is an expert on the teaching of reading. As you listen to the lecture you may take notes. After you have heard the lecture twice, you will be asked to write down as much information as you can recall about the lecture <u>without</u> referring to your notes. Then you will answer some global or inference questions about the lecture and complete a cloze passage.

The passage begins now. LISTEN CAREFULLY.

Today, we're going to look at ways of overcoming reading blocks in children learning to read in their first language. The most important thing, I think, is to let kids read. We spend too much time in school talking about teaching reading. We teach about reading rather than let kids read. And that's an important beginning step. I also think that we spend much too much time worrying about skills of reading. Again this comes from test information. We find out that kids who can read can do the skills and we therefore assume that in order to read you have to do the skills, but we don't know which came first. Maybe you learn the skills after you read, learn to read. So we spend so much time on the skill area. From the research that we've been gathering we feel that kids are much too focussed on the skills. Kids are much too concerned about sounding out words, making sure they put *ed*'s on words, making sure they put *s*'s on words, you know making sure they know where the syllables are. And if you focus on that kind of surface information, there is no way that you can begin to understand what you're reading. And there is no reading without meaning. Reading is a communicative process. It's...You know the author is saying something and the reader wants to extract from that information something from that information. If kids don't focus on that as the important part of the reading, as the most important part of reading, then they get hung up on all kinds of other things that in a sense almost stand in their way. And so we've got to help kids focus on meaning. We have to let kids ask themselves, you know, what's important in this? Does this make sense to me?

Now. Uhm, in a sense, I think everybody intuitively is aware that you can't read something that you know absolutely nothing about. That sounds almost simple. Yet we do have kids reading many many things that they know nothing about. They can't get involved in it. So they don't even know if it's supposed to make sense or not. If you put a kid down with a book and say read this, answer the questions at the end and that's an assignment and the kids don't know why they're supposed to do this or how it's going to affect them. They can read meaningless materials and keep functioning at some kind of level without getting involved. If a student become involved in what he reads, then he can deal with the material. Then, he's bringing something himself to the material. This deals with the whole area of allowing kids to talk about the things that are most important to them, the critical issues. And sometimes we're a little afraid to talk about the controversial issues that kids are involved in. But yet those are the things that excite kids. Go Ask Alice is one book--you know, it's a book about the drug scene. I've seen teenagers pick that up who supposedly couldn't read anything and they're sitting there reading that. The Exorcist was another book that I saw many junior high school kids reading avidly and these were kids in classes where supposedly they were supposed to be reading at the second and third grade level. But they had something they were interested in, they could be involved in that...it related to their lives or their experiences in some way and that's the kind of thing you can read and understand and care about too.

Now, getting back to technique. I guess, basic to the whole psycholinguistic nature is the nature of the reading process itself and how it operates. And there's no question that in order to read, we have to deal with the graphic information. We have to relate the sound system of a language to the visual or graphic system. But on the other hand, we also have the grammatical system and we have to deal with that. Kid come to school with the grammar and the display in front of a youngster is in grammatical display because we put

our language into grammar situations and the meaning system at the same time. If we don't interrelate all these systems, then meaning does not function. Communication does not take place. So in a sense, what I mean is that we need to help the youngster to interrelate these, especially the youngsters who have been focussing on one system as opposed to the other. And, of course, we find that because of our emphasis on skills that the kids focus on the graphophonic system as opposed to focussing on meaning and it's really not so difficult to get kids involved in meaning. If we allow kids to do a lot of reading, if we have a lot of reading material available for them, a variety of reading material, so that they can select and choose something that's of interest to them, this kind of thing is very helpful to move them along towards reading for meaning.

APPENDIX H
Note-taking: Overcoming Reading Blocks

NAME: _____

You are about to hear part of a lecture by Dr. Yetta Goodman, a professor of psycholinguistics at an American university. She is an expert on the teaching of reading. As you listen to the lecture you may take notes. After you have heard the lecture twice, you will be asked to write down as much information as you can recall about the lecture without referring to your notes. Then you will answer some global or inference questions about the lecture and complete a cloze passage.

NOTES

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APPENDIX I
Recall Protocol: Overcoming Reading Blocks

NAME: _____
Starting time:_____
Finishing time:_____

Without referring to your notes, write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

NAME: <u>Answer Key</u>
Starting Time:_____
Finishing Time:_____

After you have completed your recall protocol and written down as much information from the lecture as you can recall, answer the following questions.

1.   What has led educators to focus on teaching the skills of reading?

   The assumption that because kids who can read can do the skills, if we teach the

   skills, kids will be able to read.

2.   What is the problem with having kids focus too much on reading skills?

   It is making kids focus on surface information and not on understanding the

   meaning of what they read .

3.   What is wrong with just giving kids a book and asking them to answer the questions at the end?

   Kids don't know why they're doing it and they don't get involved in what they

   are reading.

4.   Why does Yetta Goodman refer to the book <u>Go Ask Alice</u>?

   It's a book that teenagers, even those who can't read, will read because it

   interests them.

5.   Why should we have a variety of reading material available to children?

   So that they can pick and choose what interests them. It will help them to read

   for meaning.

APPENDIX K
Summary Cloze: Overcoming Reading Blocks

NAME: _Answer Key_____

Starting Time: _____

Finishing Time: _____

The text below is a summary of the passage _Overcoming Reading Blocks._ From the following list, choose the words that fit the spaces in the text. Use each word only once.

NOTE: You have 20 words and only 15 spaces in the text.

LIST

a) assigned	b) background	c) choose	d) connection
e) emphasized	f) example	g) good	h) graphic
i) interested	j) lead	k) learn	l) level
m) meaning	n) neglected	o) purpose	p) significance
q) skills	r) sound	s) surface	t) variety

For Yetta Goodman, on of the reasons why kids can't read is that schools have focussed too much on reading 1) _skills_____, having kids pay attention to 2) _surface_____ information rather than get the meaning from texts. This emphasis on skills have happened because tests show that 3) _good_____ readers have the skills. But, Goodman wonders whether skills 4) _lead_____ to ability or vice versa. She further notes that all readers need 5) _background_ Knowledge to read, but students are being given texts to read and questions to answer without any explanation and so the assignments have no purpose or 6) _significance_ __ to the kids. On the other hand, using the 7) _example___ of the books _Go Ask Alice_ or _The Exorcist_, Goodman points out how kids who were supposed to be reading only at the grade two or three 8) _level___ __ were reading books that 9) _interested___ them. Goodman acknowledges that the reading process involves interacting with the 10) _sound____ system, the visual system and the 11) _meaning__ system of a language, but the child has to see the 12) _connection_ among the systems.. meaning has been 13) _neglected___ in the teaching of reading. We need to offer kids a large 14) _variety___ of reading material so they can 15) _choose_ __ what interests them They will then understand what they are reading and the reading blocks will be overcome.

APPENDIX L
Script: Garbage in Space

You are about to hear part of a lecture on garbage in space. As you listen to the lecture you may take notes. After you have heard the lecture twice, you will be asked to write down as much information as you can recall about the lecture without referring to your notes. Then you will answer some global or inference questions about the lecture and complete a cloze passage.

The interview begins now. LISTEN CAREFULLY.

Today, I want to talk about garbage in space. By garbage I mean things that astronauts or cosmonauts leave up there. Things that aren't useful any more, things they don't have room to bring back to Earth. And this garbage is a problem because it's dangerous. You know, over the years, they've had to replace something like 30 windows on the space shuttles because they've been hit by tiny particles. And these windows cost about $50,000 each. On the STS7 mission the crew noticed a large chip on the window. Of course, when the shuttle returned to Earth, that window had to be replaced. NASA brought the window into the laboratory and did a chemical analysis on the pit to find out what caused it. They were able to determine that the chip contained titanium dioxide which is the white pigment that is used in paint. They also found traces of carbon and potassium which are some of the binders in paint. So it was literally a paint flake that hit the shuttle window.

Now, that little paint flake did a lot of damage to the shuttle window. So what about something bigger? Actually scientists and presumably astronauts are pretty blaséabout this. You see, while the potential for these impacts is real, the present probability is negligible because of the size of the shuttle, the limited time it's in orbit and the small amount of garbage there is in space so far. A bigger concern, however, is something they call the snowball or cascading effect. Let's assume there are two large rocket bodies, dead, but still tumbling around in Earth's orbit. O.K. Let's say that these two collide. This is not totally against the odds because if they're up there long enough, it becomes more probable that they will collide. Now the collision is going to change these two large pieces of debris, these two rockets, into thousands of smaller bits of exploded rocket, right? And each of these is as dangerous to other satellites, missions and shuttles as the large rockets were themselves because, remember a little piece of stuff can do real damage. At the speeds these things are travelling, it really doesn't matter what you get hit by. Now one advantage is that the earth's atmosphere acts as a natural vacuum cleaner and will eventually suck many of these particles out of orbit and they'll burn up on re-entry into the earth's atmosphere. However we could reach a critical situation. And we have the snowball effect when these collisions start happening faster than the atmosphere can clean itself. Remember after each collision you have thousands more bits of debris to initiate the next collision. That's why scientists have begun to dream up ways to clean up space.

One of these ideas is quite far out. One way of getting rid of particles out of space would be to build a foam disk that's about 10 km. across, about a centimetre thick and it could orbit, say around the earth's equator, on its edge. And then of course, everything that orbited the earth at that altitude would eventually have a certain probability of passing through that foam disk and within a period of about 10 years this would reach about 90%. These objects would then fall out of orbit and presumably burn up on re-entry into Earth's atmosphere. It is an elegant idea, but it has one fatal flaw. The problem is that everything that's in orbit would hit the disk, even the good stuff like working satellites would be brought back to Earth too and you don't want that.

So other scientists have modified this idea. And the most elegant modification was done by a scientist at the Johnson Space Centre, named Annie Clark. Her idea is to make something like a windmill, so that some objects would hit the panels and be slowed down and removed. Other objects would pass between the blades. The blades would be several kilometres long. They would rotate slowly through space

and as they did, the bad stuff would hit the arms of this windmill, but any time you had a satellite coming along that you didn't want to remove from space, you would just manipulate the windmill by remote control so that the satellite could go by. Of course, this, too, is a far out idea, difficult and expensive to execute.

A more obvious solution of course is to just go up there and pick all that stuff up in a garbage shuttle. The problem with that is that it's just too expensive. It'd be millions and millions of dollars for each recovery. So for the moment, we just have to hope there aren't too many collisions.

APPENDIX M
Note-taking: Garbage in Space

NAME: _____

You are about to hear part of a lecture on garbage in space. As you listen to the lecture you may take notes. After you have heard the lecture twice, you will be asked to write down as much information as you can recall about the lecture without referring to your notes. Then you will answer some global or inference questions about the lecture and complete a cloze passage.

NOTES

APPENDIX N
Recall Protocol: Garbage in Space

NAME: _____
Starting time:_____
Finishing time:_____

Without referring to your notes, write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

NAME: __Answer key__
Starting time:_____
Finishing time:_____

After you have completed your recall protocol and written down as much information from the lecture as you can recall, answer the following questions.

1.   Why was the space shuttle window brought into the lab?
         _To analyze what had damaged it._____
         OR _To see what had caused the chip in it._____

2.   Why does the speaker talk about a paint flake?
         _The chemical analysis showed that it was a paint flake that damaged the window.__
         OR _To show how a small particle can cause a lot of damage._____

3.   What does the speaker mean by the snowball effect?
         It occurs when bits of debris (objects) in space collide and break up into many
         _more smaller bits of debris._____

4.   Why are small pieces of debris as dangerous as large ones?
         _It doesn't take much to cause damage because objects are travelling fast._____
         OR _Speed. (2 points)_____

5.   How are space scientists most likely to deal with the problem of garbage in space in the near future?

         Do nothing and just hope there aren't too many collisions. OR _____
         _Not adopt any of the expensive solutions until the problem gets bigger._____

Total: 10

NAME: __Answer key__
Starting time:_____
Finishing time:_____

The text below is a summary of the passage <u>Garbage in Space</u>. From the following list, choose the words that fit the spaces in the text. Use each word only once.
NOTE: You have 20 words and 15 spaces in the text.

LIST

a) analyzed	b) atmosphere	c) big	d) blades
e) collisions	f) critical	g) debris	h) destroy
i) displaced	j) edge	k) hit	l) long
m) paint flake	n) replaced	o) satellites	p) small
q) smaller	r) shuttle	s) truck	t) vacuum

The garbage in space, just things left up there by astronauts, could be very dangerous. Even something as small as a 1) _paint flake_ can damage a spaceship window enough that it has to be

2) _replaced_. Up till now there isn't too much garbage, the space shuttle is not too 3) _big_ and it's not up in space too 4) _long_, so the probability of 5) _collisions_ is relatively small. The snowball effect, however, could be dangerous. This occurs when bits of 6) _debris_ in space collide with each other and break up into thousands of 7) _smaller_ bits which could then 8) _hit_ the space shuttle and damage it. The danger becomes 9) _critical_ when there are more bits of garbage in space than the earth's atmosphere can suck in and 10) _destroy_. Scientists so far have proposed three solutions to the problem: a giant foam disk rotating on its 11) _edge_ around the earth at the equator to catch the garbage and send it into Earth's 12) _atmosphere_ to burn up; a huge remote-controlled windmill whose

13) _blades_ would catch the garbage and let other objects, like 14) _satellites_ pass through; and a garbage 15) _shuttle_. All three are expensive, and the first two rather far-fetched, so for the moment, the garbage will stay up there.

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RECALL PROTOCOL/NOTES

1.   Problem: garbage in space & solutions: to clean up space.   ____
2.   Cause: garbage in space . Effect: causes damage to space ships.   ____
3.   Description: Garbage in space (def'n): things no longer useful left up there in space.   ____
4.   Example: (30) shuttle windows had to be replaced @ $50,000 each.   ____
5.   Example: paint flake damaged one window.   ____
6.   Proof: titanium oxide found in chip from window (also found in paint)   ____
7.   Description: Probability of impact--low (effect)   ____
7a.   because   shuttle is not so big (cause   ____
7b.   short time in orbit (cause)   ____
7c.   small amount of garbage in space (cause)   ____
8.   Example: bits of rockets (effect) can cause damage   ____
9.   Cause: snowball or cascading effect   ____
10.   Description: 2 rockets collide and create numerous small bits of debris (which can cause damage).   ____

11.   First man-made solution: foam disk   ____
11a.   --10 km. wide & 1 cm thick orbits Earth on edge   ____
11b.   --objects hit disk, fall out of orbit and burn up   ____
11c.   --will clean up 90% of garbage in 10 years   ____
11d.   Problem: will destroy everything, not just garbage.   ____
12.   Second man-made solution: giant windmill   ____
12a.   --objects hit huge blades or panels, fall out of orbit and are
12b.   destroyed.   ____
12c.   --blades are rotated by remote control to let good objects (satellites) pass
                              through.   ____
12d.   Problem: expensive and difficult to make.   ____
13.   Third man-made idea: garbage shuttle   ____
13a.   --expensive   ____
14.   Probable solution: do nothing and hope for the best.   ____
14a.   Earth's atmosphere burns up objects that fall out of orbit (like a vacuum cleaner)   ____
14b.   Problem: potentially too many for Earth's atmosphere to keep up.   ____

TOTAL   _(27)_

TRAINING SESSION: CHILDREN AND CREATIVITY

1) Please tell students they will hear part of a lecture on fostering creativity in children.

2) Please brainstorm with students about the arts--how children learn to express themselves artistically, how they learn to draw, to produce music, what makes artists etc.

3) Hand out the key visuals. Talk about the first one with them. Don't spend too much time on the first visual. It is simply intended to show how the child learns to understand the world through the patterns that are passed on to him or her by the society in which he or she lives. In turn, the child later influences the patterns of society. Deal with any vocabulary that comes up in the discussion.

4) Then turn students' attention to the second visual. Try to get them to predict what will go in some of the boxes, for example, simple patterns of expression with a complex society and complex patterns of expression with a simple society which provides no explanation (no mediation) of the complex world the child meets. Try to get them to fill in the boxes under type of children as well. See how much they can predict for the final column (artistic expression).

5) Then turn to the third visual. See how much they can predict for the blanks. Tell them to verify their predictions later when they listen to the tape.

6) Ask them to complete the visual <u>as</u> they listen to the tape and take notes on it to help them remember. Tell them you will ask them later to write down as much as they can remember from the text.

7) Play the tape <u>twice</u> with some time in-between for writing/thinking.

8) Discuss the visual with them and talk about the text. Answer any questions.

9) Collect their key visuals and all their notes and then ask them to do the Recall Protocol from memory. Ask them to put their name on it and note the times. Collect them.

10) Then do the Inference Questions (Name and times). Collect them.

11) Then do the Summary Cloze (Name and times). Collect them.

N.B. Instructions were similar for the three training sessions.

APPENDIX S
Instructions to Teachers: Vocabulary Group

TRAINING SESSION : CHILDREN AND CREATIVITY

1)   Please tell students they will hear part of a lecture on fostering creativity in children.

2)   Please brainstorm with students about the arts--how children learn to express themselves artistically, how they learn to draw, to produce music, what makes artists etc.

3)   Hand out the vocabulary sheets. Discuss the vocabulary with the class and do the activities. Correct the answers with the class.

4)   Hand out the factual questions. Give students time to read them over. Tell them to answer the questions as they listen. Play the tape twice with some time in-between for writing/thinking.

5)   Discuss with the class their answers to the questions.

6)   Collect their answers and any other notes. Ask students to do the Recall Protocol. Please ask them to put their name on it and the times. Collect them.

7)   Then do the Inference Questions (Name and times). Collect them.

8)   Then do the Summary Cloze (Name and times). Collect them.

N.B. Instructions were similar for each of the three training sessions.

Today we're going to do a study of restructuring and efficiency. To do this we're not going to look at the resource sector, or the automotive sector or the communications sector. No we're going to examine a small and often overlooked sector of Canadian business, the fortune cookie industry. In this case study, we will look at a problem and then possible solutions and finally the solution which the company actually used to solve the problem.

The company we're studying today is called Far East Fortune Cookies. Eight years ago the company was at a cross-roads. They had been operating for a number of years with the same machinery, baking cookies in three ovens which you might call semi-automatic. The product was baked by the machines but taken off by hand and folded by hand. Then, the cookies were cooled and packaged by hand. This process required 30 people, two people per machine and the other employees were for the packaging.

The cookies come out of the oven flat and round like a Ritz cracker, like a little pancake. When they first come out of the oven they're soft and pliable. Someone would pick each little pancake out of the oven by hand. They placed a fortune in the middle of each one and then they folded them over by hand into that crescent moon shape that we're used to. And then they let them cool and they crisp up as they cool.

One of the problems with these semi-automatic, somewhat antiquated ovens is that they were powered by electricity. And electricity is expensive. So the cookies were expensive to make because a bit of each electric bill had to be factored into the cost of each cookie. Not only were the ovens expensive to run, but these machines were also, comparatively speaking, slow. And because you couldn't make a lot of cookies quickly, you couldn't buy a lot of raw ingredients in bulk. And that doesn't only include flour and sugar, it also includes packaging material, fortunes, and other incidentals. Now of course, the more goods you can buy at once, the greater your chances of negotiating lower prices for your raw materials and therefore lower the cost of raw materials per cookie.

But the Far East company had another problem, a delivery problem. If someone ordered, say 50 cases of fortune cookies on Wed. and the company only made 50 cases a day, they couldn't ship all their cookies to one company. Other customers would get upset. So to keep the guy who orders 50 cases happy, they'd maybe ship him 10 cases on Thurs. and 20 on Friday and maybe another 20 on the weekend. The trouble was that that kind of delivery schedule created more problems. The company had to maintain more vehicles than were required by the business. And they had to employ more drivers to cover the same geographical area. There was a never-ending cycle of going back to the same clients dropping off part shipments. It impacted on delivery costs by more than probably 800 percent. It just wasn't efficient.

Now since the shelf life of fortune cookies is 6 months, you might think the company could just make a delivery every six months. But the problem is that the companies you're delivering to don't have the storage capacity to handle a six-months supply. So that won't work. Still, you should be able to do better than 3 deliveries per week to one customer. You should be able to get it down to one delivery per week.

So, to sum it up. The company is working with outmoded equipment, the ovens which require a lot of human input and are consequently slow. And that impacts on packaging costs, ingredient costs, the fortunes, the delivery costs. And that's what's pushing up the cost of the cookies. This wouldn't be so bad if Far East were the only duck on the pond, but there is a competing company in town producing fortune cookies and they're doing it cheaper. In fact, they've always been able to produce their cookies cheaper, but some customers have been prepared to pay a premium to have the Far East cookies. The problem is that the premium, the difference between the Far East cookies and the competitor's is starting to get so wide that it's starting to affect sales.

Now you may say, why don't they just get another machine? Now, that would increase production. You could buy your ingredients in bulk and therefore, more cheaply, and you could deliver more at a time and save on delivery costs. The problem with this solution though is the labour. If you add another machine, you're going to have to add 2 more machine operators on each shift. There are 3 shifts a day, so that makes 6 people just to fold the cookies plus a few more for packaging and mixing ingredients. You'll probably have to add an additional 10 people to the payroll for each machine you'll add.

Oh yes, there's one more problem: the labour force isn't happy. It's not a lot of fun peeling those little pancakes out of the ovens, inserting a fortune and folding them. First off, you tend to get a lot of burns. It's a boring, unskilled, low-paying, dead-end job. Workers are paid minimum wage and they have no room for advancement. There's not a lot of job satisfaction in putting a fortune in a fortune cookie. All you do is stand by the oven folding cookies, one every three seconds, all day long, day after day after day. And an unhappy work force brings nothing but problems. In this case, they would leave the machines unattended and there would be breakdowns. The employees weren't working with the company, they were working against the company. They didn't care about the quality of the product going out, the production levels or anything.

When things came to the crunch, the owner of the company took out a bank loan for 250,000 dollars to develop a fortune cookie folding machine. It took 8 years to come up with the prototype, a machine about the size of two zambonis, with the batter going in one end and cookies kind of flying out the other. The batter is pumped onto a hot metal plate, somewhat like a waffle iron. It passes through an oven. After it is fully baked, it is scraped off the metal pan, placed into a mechanical folding device where a piece of paper is placed on top. The cookie is then folded and cooled. Now, this machine can be run by one person. Instead of 30 people required to match the production by the old model this machine is run by one person. The operator seems to run around like a one-armed paper hanger, but the operators seem to enjoy the work. The result. Profit per cookie is down, but they are making a lot more cookies. The company can sell their cookies for less money now, wholesale, than eight years ago. But volume's up. And all the costs are down. Packaging is down. Ingredients are down. Delivery is down as well. Bottom line, profits are up 148% year to year just on one year. The bank loan will be paid back in a year.

Conclusion: the restructuring was necessary or the company would have gone bankrupt. You have lost the 30 or so jobs that went with the old machines, but they were boring, crummy jobs and by staying in business and growing they way the company has, it's supporting a number of jobs in spin-off industries, helping the people they buy from and sell to. And the company will survive.

**ORIGINAL
OPERATION:
antiquated
machines**

**PROPOSED
SOLUTION:
automated
machines**

High Energy Costs (_____)	?
Too Much Human Input (labour)	One Worker per Machine, Lower Human Input
Frequent Partial _____	More Complete _____
High _____ Costs (cannot buy in bulk)	Lower _____ Costs (Bulk Purchasing Arrangements)
Low Job _____	Greater Job _____

MAKING FORTUNE COOKIES

ORIGINAL OPERATION: antiquated machines
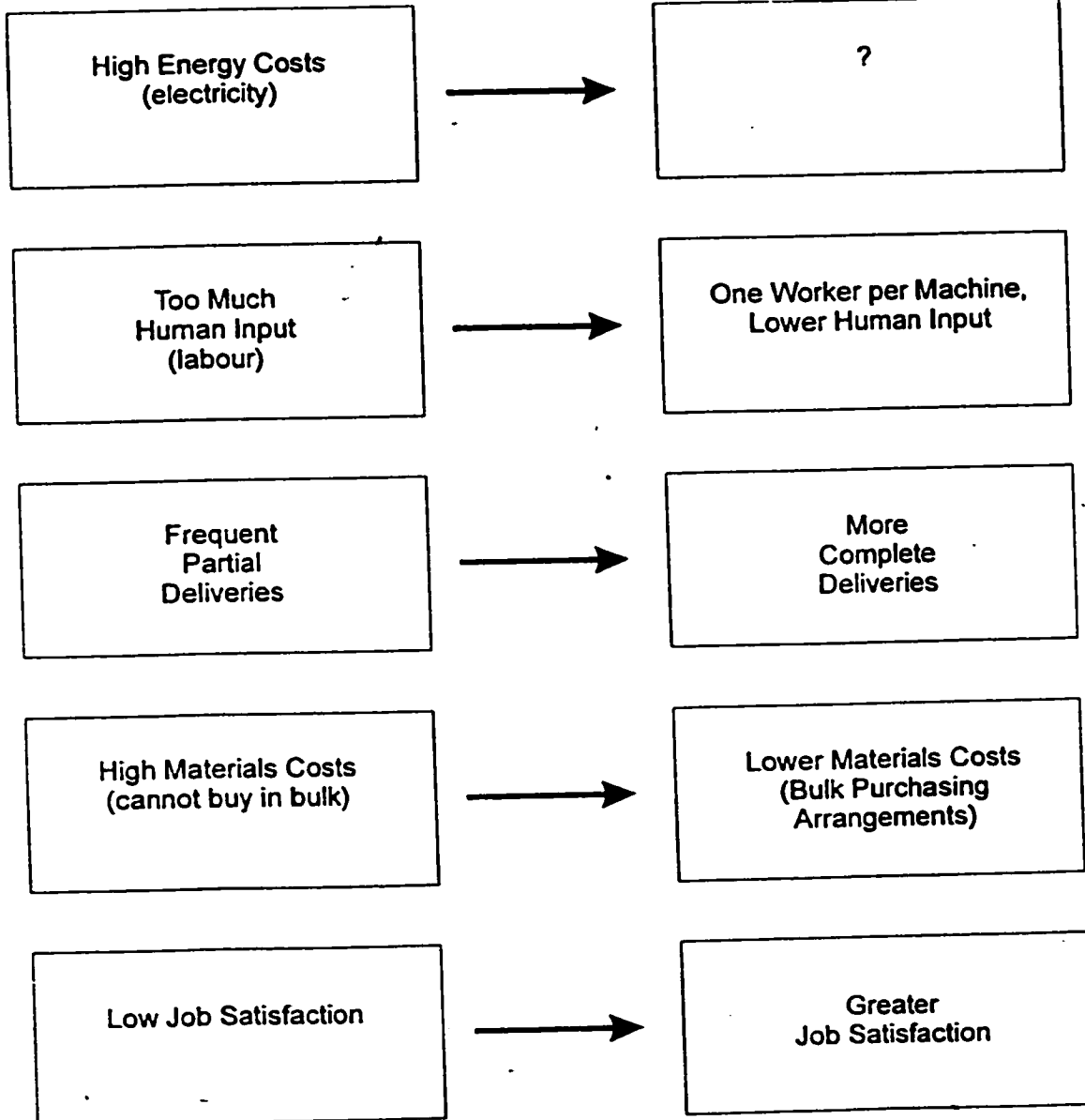
PROPOSED SOLUTION: automated machines

High Energy Costs (electricity)	?
Too Much Human Input (labour)	One Worker per Machine, Lower Human Input
Frequent Partial Deliveries	More Complete Deliveries
High Materials Costs (cannot buy in bulk)	Lower Materials Costs (Bulk Purchasing Arrangements)
Low Job Satisfaction	Greater Job Satisfaction

> You are about to hear part of a lecture on solving a business problem. The lecturer presents a case study. Below, you will find some of the words in the lecture. Do the following exercises and discuss them in class before you listen to the lecture.

1)   operation

NOUN	VERB	ADJECTIVE	ADVERB
operation	*operate*	*operable* antonym: inoperable	

operation   General Meanings
      1) the act of operating or an instance of this
      2) the way in which a thing works (the operation of the valves needs improving)
             In Mathematics
    the process of altering a number or quantity by some procedure
    e.g. *addition, subtraction, multiplication, division*, etc.
             In Medicine
    an instance of the work done by a surgeon
    e.g. *appendectomy, coronary by-pass*
             In Computing Science
    one of the specific processes or actions in a sequence (computer)
    e.g. *search, compute, add*
           Other Meanings You Might Like to Exploit
--(pl.) work, activity (operations on the site begin tomorrow)
-- a financial transaction esp. a complex speculative one
-- the action indicated by a single instruction
-- a military action on a large scale
in operation = functioning or in working condition
operational = of or connected with an operation esp. a military one.
operable = can be operated on

2)   antiquated

antiquated   =   obsolete, out of date (from a Fr. and Latin root *antiquare* to make obsolete)

    Give an example of something antiquated.
      The regular post is becoming an antiquated communication system.
antique: something old and precious,
antiquarian: someone interested in or concerned with the study of ancient times or with ancient objects.

3)   automated

NOUN	VERB	ADJECTIVE	ADVERB
automation	automate	automated	
		automatic	automatically

automation: the process of making automatic
automated = converted to automation
automatic : self-controlled, able to run without (usually human) intervention.

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automated teller machine (ATM): banking machine which can process money transactions
Give an example of an automated service. *automatic withdrawals, voice mail*
Is it different from an automatic service? *In practice no.*
(Why do we have 2 words? Automatic can also mean able to be activated without thought.)
4) **outmoded**
the prefix "out" has 3 possible meanings.

        1) out (as opposed to in)
        e.g. outboard, outflow, outdoors, outbuilding
        What is an "outhouse"? *An outdoor bathroom.*
        2) without, not included in
        e.g. outcaste (a person without caste)
        outdated (out of date or obsolete)
        outmoded: out of fashion, no longer acceptable or usable
        3) beyond, more
        e.g. outbid, outgrow, outrun
        Give two more examples: *outlast, outlive, outdo*
        outdo = surpass, do better than
Other variations:
outbid = offer a higher price than, esp. at an auction sale
outgrow = grow too big for
outlast = last longer than
outlive, outmanoeuvre, outplay, outsell, outrun
outdated: out of date or obsolete
5) **energy**

NOUN	VERB	ADJECTIVE	ADVERB
energy	energize	energetic	energetically

        energy: the capacity for vigorous activity, available power.
        In modern times it has come to mean the source of usable power, e.g. fossil fuels.
        Give 3 examples: *electricity, oil, coal, natural gas, the sun.*
6) **input**
        Antonym: output
        --something put in, esp. power or energy supplied to a machine or storage system
        --effort put into any project
        --data fed into a computer
        Use the expression "human input" in a sentence. *The new computerized accounting system requires*
less human input than the old system we used to use.

        input-output tables: the amount of output that goes to each industry as raw materials or semifinished
                products and amounts that go to final markets
                (only listed as a noun in the dictionary)
output: the total product of a factory, mill etc.
        --the amount produced of a specified product
        --the amount produced by an individual or by one machine
        --the amount of energy delivered by a machine
        --the creative work of an artist (a large output of film music)
7) **partial**

NOUN	VERB	ADJECTIVE	ADVERB
part	part	partial	partially
		antonym: whole, complete	

        Give an example of part as a noun. *the large part of the cake, the part in her hair*

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Fill in the blank with the correct form: a ___*partial*___ solution would be.....

8)   **bulk**

NOUN	VERB	ADJECTIVE	ADVERB
bulk	bulk (out)	<u>bulky</u>	
bulkiness	bulk (up)		

bulk: --the largest part (the bulk of the nation)
        --food taken in to help digestion rather than for nutritional value
        --not packaged or bottled
in bulk = in large amount. (bulk food stores)
What kinds of food can you buy in bulk food stores? _Flour, nuts, sugar_____
Why would people buy food there? _It's cheaper._____
Why would a business want to buy material in bulk? _To save money._____bulkiness: the state
or quality of being bulky
bulk out: to increase the size of (usually by adding something of little intrinsic worth (to bulk out a journal
       with advertisements)
bulk up: to increase one's weight and size often through the use of steroids.

9)   **job satisfaction**

NOUN	VERB	ADJECTIVE	ADVERB
satisfaction	satisfy	satisfying	

satisfaction: the state of being contented or fulfilled;
              --a source or cause of pleasure, fulfilment or gratification
              --a payment or other compensation for damage, injury etc.
What do you think job satisfaction means? _happiness with one's job._____
What factors lead to job satisfaction? _an interesting job, a well-paying job, security, good work conditions
etc._

As you listen to the passage, answer the following questions.

1. What kind of ovens were used by the Far East Fortune Cookie Company?
    Electric, semi-automatic ovens.

2. How many people were required per machine to process and package the cookies?
    Ten.

3. What kind of power did the ovens use?
    Electricity.

4. What is the advantage of buying your materials in large quantities?
    You can negotiate lower prices.

5. Why did the company have to deliver cookies several times?
    They couldn't make enough cookies to fill all the orders.

6. How did this affect the number of employees required?
    The Company needed more drivers to cover a geographical area and make these partial deliveries.

7. Why is the Far East Company so concerned about saving costs?
    The difference between the cost of their cookies and that of their competitors is getting too big.

8. Why does it not help to buy more machines?
    They require more operators and labour is expensive.

9. Why do workers not like the job?
    It is a boring, dead-end, low-paying, unskilled job.

10. What was the solution?
    Develop an automated machine.

11. What problems (four) did this invention solve?
    Delivery, materials cost, labour cost, job satisfaction.

APPENDIX X
Recall Protocol: Making Fortune Cookies (Visuals)

NAME: _____

Starting time: _____

Finishing time: _____

After you have discussed the completed visual with your teacher and your fellow students, the teacher will collect your completed visual and your notes. Now write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

APPENDIX Y
Recall Protocol: Making Fortune Cookies (Vocabulary)

NAME: _____

Starting time: _____

Finishing time: _____

After you have discussed your answers to the factual questions with your teacher and your fellow students, the teacher will collect your answers and your notes. Now write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

APPENDIX Z
Global/inference Questions: Making Fortune Cookies

After you have completed your recall protocol and written down as much information from the lecture as you can recall, answer the following questions.

1. Which problem was not addressed by the solution (the automated machine)?
    The high energy costs.

2. How did the employees show their dissatisfaction with their jobs?
    By leaving the machines and causing breakdowns.

3. How did the solution affect profits for the Company?
    Profits were up considerably. Cookies were cheaper too.

4. How was this result accomplished?
    Materials cost less. Delivery costs were down. The labour force was reduced. The volume of cookies was up.

5. What was the result for the payroll of requiring only one worker per machine?
    Workers were laid off. (Jobs were lost.)

6. How can this be justified?
    The jobs which were lost were boring, low-paying unskilled jobs and the Company managed to stay in business, thereby providing better work for some employees and for employees of companies they serve.

TOTAL: 8

APPENDIX AA
Summary Cloze: Making Fortune Cookies

NAME: _____

Starting time: _____

Finishing time: _____

> The text below is a summary of the passage **Making Fortune Cookies**. From the following list, choose the words that fit the spaces in the text. Use each word only once.
> **NOTE:** You have 20 words and 15 spaces in the text.

LIST

a) boring	b) borrowed	c) breakdowns	d) bulk
e) competition	f) costs	g) demanding	h) Furthermore
i) However	j) improvements	k) inefficient	l) operation
m) partial	n) profits	o) remove	p) replaced
q) size	r) speed	s) whole	t) workers

The lecturer presents a case study describing a small company that makes fortune cookies. Eight years ago it had been an inefficient 1) _operation_ employing many unskilled workers whose job was to 2) _remove_ the cookies from the oven, insert the fortune and fold the cookies, all by hand. These jobs were 3) _boring_ and low-paying. So workers, lacking concern for production levels and product quality, tended to add to the company's problems by creating machine 4) _breakdowns_. The whole process was slow and only 5) _partial_ orders could be prepared at a time. Since raw ingredients including the fortunes and packaging could not be bought in 6) _bulk_, the process was expensive. 7) _Furthermore_ _, the delivery system was 8) _inefficient_ because multiple deliveries were required to deliver the partial orders. Therefore, more vehicles than normal for a business of that

9) _size_ were required, adding to the costs. The company was losing business to the 10)_competition_ because the price difference between their products and that of their competitor's was becoming too great. Adding another machine to the operation would not help because you would still need many costly workers. So the company 11) _borrowed_ money to develop a fortune-cookie-folding machine. The new machine, which can be run by one person, performs the

12) _whole_ operation. The large number of crummy jobs has been 13) _replaced_ by one more satisfying job. All the 14) _costs_ are down and because of increased production, 15) _profits_ are up. The company will survive and so will the companies who do business with it.

1)   A problem in the fortune cookie industry + some possible solutions   _____
      & the company's solution.
2)   Semi-automatic ovens   _____
      A) Slow   _____
3.   Hand processed cookies   _____
      A) Taken out by hand   _____
      B) Packaged by hand   _____
      C) 30 People (2/machine + packagers)   _____
      D) Fortune inserted by hand   _____
4.   Electric power – expensive   _____
5.   No bulk buying   _____
      A) Ingredients expensive   _____
6.   Delivery problem   _____
      A) Partial orders delivered   _____
      B) More vehicles   _____
      C) More drivers   _____
      D) Expensive   _____
7.   Can't deliver only every 6 months   _____
      A) Limited storage space   _____
8.   Competition produces cheaper cookies   _____
      A) Price differential growing   _____
9.   Solution: another machine   _____
      A) More production   _____
      B) More workers (10 / machine)   _____
10.   Unhappy labour force   _____
      A) Boring work   _____
      B) Minimum wage   _____
      C) Dead-end jobs   _____
      D) Sabotage the machines   _____
      E) Sabotage the cookies   _____
11.   Bank loan of $250,000 to develop an automated machine   _____
      A) Run by 1 person   _____
      B) Interesting job   _____
12.   Profit/cookie down   _____
13.   More cookies   _____
      A) Packaging costs down   _____
      B) Ingredients down   _____
      C) Delivery costs down   _____
14.   Profits up   _____
15.   Loss of terrible jobs   _____
      A) More jobs in spin-off industries   _____
16.   Company will survive.   _____

One of the things that distinguishes human beings from other members of the living world is the need to order the natural world, the world that is seen and heard and touched. You see, the child needs to have an order out of all the things that impinge on it, some kind of way of looking at the world around them. This cosmic sense is one of the important roots of artistic creativity.

Now, there are many societies that produce this order ready-made and they tell the child moment by moment what this is. This is day and this is night. This is the sun and this is the moon. Everything is settled and categorized and if the child wants to draw the sun, it's taught how to. It knows that the sun is yellow and it knows that the sun must be placed in the sky. And in many societies you know it has to have sort of pointed things around it, turning it into the sun. In the same way the moon is stylized for the child. Everything that you could possibly want to think about is already explained. And if their society has a simple and adequate way of naming time and space and colour, it doesn't have to be very interesting what they do with colour, but they have to know some way of differentiating some colours from others. They'll be quite contented to take this pattern and carry it on. And if they're born in a society with elaborate and beautiful patterning, you will think that they are extraordinarily sensitive and artistic people. For example, the Balinese. Their art is more elaborate than ours, but they're just meeting the patterns that are set by their society. On the other hand, you may have children for whom this particular style is inadequate, who are trying to burst through it, who find it boring and who may possibly, given a little help or a little encouragement, and even in the face of criticism, nevertheless burst through it and do something new. Now we tend to call the people that burst through and do something new, if they also have ability, artists. And the other people, the people that merely learned to understand it, we just call ordinary people. They do nothing themselves with the patterns handed down by artists of the past.

Now...if you could conceive of several kinds of societies. You would have societies in which children are presented with an artistic version of life that is pretty dull. It's duller than any of us who are annoyed with our current culture can possibly imagine. Their art is confined to scratches on the edge of pots, folk tales and rhythmic drum beating. Now if this is all that children need to live in that society, they may be quite happy and quite well adjusted because the patterns from their society are very simple and all they have to understand is very simple.

But, on the other hand, you can have the sort of society in which the things that happen to children are such that no scratches on a pot and no simple beatings on a drum and no second-rate folk tale is going to be enough to fulfill the kind of stimulation that they receive. They're taught to ask questions they can't answer. They're made to wonder about a world and then given no way of dealing with their wonder. They want to draw terror or beauty, but there are no designs of any kind. And such children and especially the most gifted among them are doomed to a life which at best is frustrating and at worst is the life of the mentally ill. This is to some extent true, almost always with children in our society because our society changes so rapidly that the art forms we have are never adequate to meet the experiences of the generation that comes next.

And we also have another kind of society. This is the one where the art style has become so elaborate and so complicated and so complete that the growing child does not understand it. And there's no mediation between the child's growing perception of the world and all this extraordinary elaboration around him. In such a situation sometimes the child simply withdraws. This is too rich. There's too much of it. If you're presented with too elaborate and complicated things as a small child and there are no steps to mediate the child's image of the sun and the moon and the stars and the world around him and it's given too quickly a very complex picture, then it's unable to respond and a kind of boredom and apathy set in.

Now let's look at the different kinds of children. Sometimes there are children who just need to see how someone else has painted something, how someone else has shaped it or formed it and once they've found that, they are contented. They don't need to be original. They weren't looking for the desire to create something new. If you can give that to them, that is all they need. They're contented, dignified people who from now on know enough about the world around them so that they can understand it and move through it. And an ability to repeat or reproduce a traditional form which is satisfying we tend to call talent. They can play as other people have played. They can dance as other people have danced, that's talent. And it in a sense has absolutely nothing to do with being an artist, but it is a mechanism through which children can come to participate in the art forms of their own society.

And then there is the other end of the scale, the children who want the most highly patterned forms that can be given them, who will never be satisfied no matter what you give them, but will want to make something for themselves and want to change them. But if we look over the world at different sorts of societies, one of the things we find is that the society that gives every individual the chance to be traditional, to paint the kind of picture that everybody is painting, to carve the kind of puppet and play the kind of music and dance the kind of dance everyone is dancing is the society in which there is most originality. Bali which is one of our modern outstanding examples in the world of both things, enormous amounts of totally traditional art and free creative originality.

Now, the only way for most children to assimilate art is to participate to some extent in it, to learn to make some versions of it. If it's poetry, they learn to recite it. If it's a design, they learn to reproduce it in some form or to give some variation of it that makes them feel that they've mastered it. They understand it and so when they look up at the moon, they can draw the moon. When they look at a river, they can draw a river. When they feel sad, they can draw the appropriate symbols of sadness within their own society. They can translate their own experience in ways that the society has already set up.

It looks at present as though we should ground our art education on the assumption that its purpose is to bring to every child what we have in a tradition for understanding and patterning the world aesthetically and this is the safest medium within which the specially original child may be able to cultivate its originality. In other words, it isn't as if we arranged children on a curve and down here we have the absolutely flat-out non-perceptive dull ones and then in the middle we have the ones that can use the traditions whatever they are and suddenly at the very end of the curve we had specially gifted and strange people. But rather if you take your whole group and expose them to the same situation, out of this group, there will come those who, once they've mastered the media within which other people in their society are patterning their world, will want to go beyond it. They will be original and creative.

You are about to hear part of a lecture given by the late Margaret Mead on fostering creativity in children. You will discuss the visuals with your teacher before you hear the lecture. As you listen to the lecture, complete the visuals and add any notes you wish on the same page.

THE WORLD

describe and teach

SOCIETY

the CHILD

need to order the world

perception
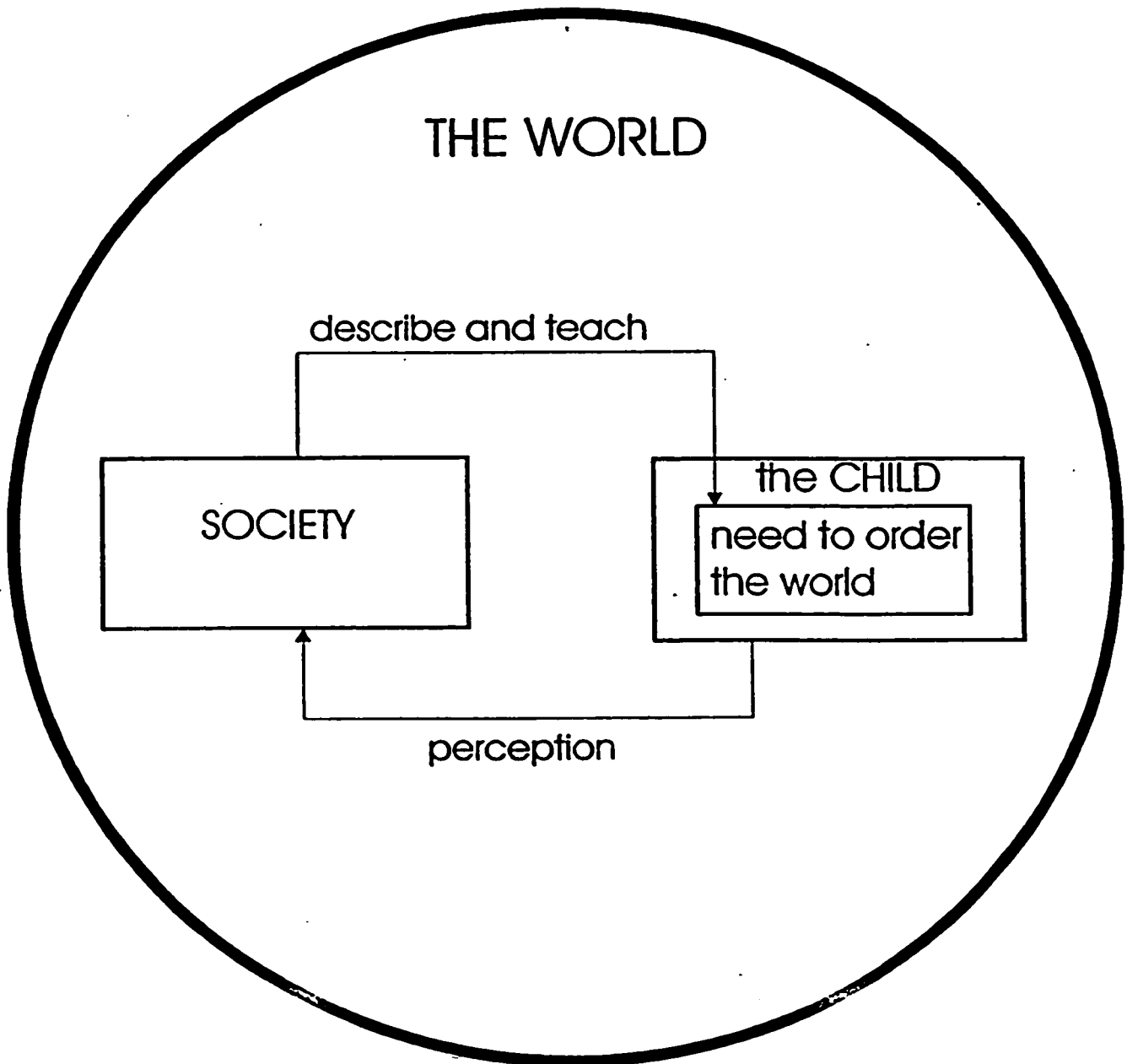
TYPICAL ART EDUCATION

PATTERNS OF EXPRESSION	+	SOCIETY	+	TYPE OF CHILDREN	→	ARTISTIC EXPRESSION
SIMPLE		SIMPLE		ORDINARY →		SIMPLE
				CREATIVE →		SIMPLE, ORIGINAL
COMPLEX		COMPLEX		ORDINARY →		COMPLICATED
				CREATIVE →		_____, ORIGINAL
SIMPLE		COMPLEX		ORDINARY } CREATIVE }	< →	FRUSTRATION _____ _____
COMPLEX		SIMPLE (NO MEDIATION)		ORDINARY } CREATIVE }	→	BOREDOM, _____

visual 2

IDEAL ART EDUCATION
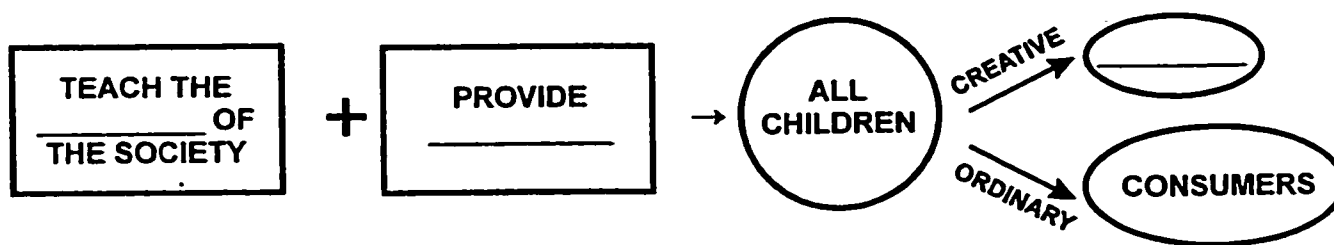
TEACH THE _____ OF THE SOCIETY + PROVIDE _____ → ALL CHILDREN → CREATIVE → (_____) → ORDINARY → CONSUMERS

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> You are about to hear part of a lecture given by the late Margaret Mead on fostering creativity in children. Do the following exercises and discuss them in class before you listen to the lecture.

1) order

NOUN	VERB	ADJECTIVE	ADVERB
order	order	orderly	

order (v.)   General Meanings
      1) to put in order, arrange, systematize
      2) to command
1)   Example: *The gym teacher ordered the class from shortest to tallest in the line-up.*
      Example: *The teacher ordered students' responses in order to arrive at a consensus.*
Give another example of order used in this sense: *Many of us order our world in terms of stereotypes.*

2) pattern

NOUN	VERB	ADJECTIVE	ADVERB
pattern	pattern	patterned	

pattern (n.)   General Meanings
      1) a coherent system of component parts.
      2) a form or model proposed for imitation. e.g. a dressmaker's pattern.
Complete: The home economics class followed a pattern to make their *aprons*_____.
                       In the Arts
      1) an artistic, musical, literary or mechanical design or form.
      Example: *The sonnet follows a particular rhyming pattern.*
      Example: *A symphony is recognizable by its musical pattern.*
Give another example: *Haiku poetry has a pattern of 3 lines.*
                       In Sports
      1)   A prescribed route to be followed by a pass receiver in football. e.g. a post pattern.
Write a sentence: *The receiver ran a post pattern and scored a touchdown..*
                    In Social Science
      1) frequent or widespread incidence. e.g. a pattern of dissent.
      Example: *The voting showed a pattern of dissatisfaction with the former government.*
Give another example: *There seems to be a pattern of increasing violence in modern society.*

3) complex

NOUN	VERB	ADJECTIVE	ADVERB
complex		complex	
complexity		antonym: _____	

complex (adj.)   General Meaning
      1) complicated, elaborate
      Example: *A snowflake has a complex pattern.*
Give another example: *Computer circuits are complex.*

4)   mediation

NOUN	VERB	ADJECTIVE	ADVERB
mediation	mediate	mediated	
		mediatory	
		mediational	

mediation (n.)   General Meaning

1) the act of reconciliation, settlement or compromise

Example: *Through mediation, the union and management settled their problems.*

2) connection, relation, explanation.

Example: *Through the mediation of diagrams, students were able to understand how the pump worked.*

Give another example: *The mediation of the teacher's explanation clarified the problem for students.*

5)   boredom

NOUN	VERB	ADJECTIVE	ADVERB
boredom	bore	boring	boringly

boredom   General Meaning

1) the state of being restless and not interested.

Example: *The professor's flat voice induced boredom in his students.*

Complete: I experience boredom when *I have to practise the same piano piece many times.*

6)   apathy

NOUN	VERB	ADJECTIVE	ADVERB
apathy		apathetic	apathetically

apathy   General Meaning

1) lack of feeling or emotion.

Example: *After the death of her father, Muriel's apathy was evident.*

2) lack of interest or concern; indifference.

Example: *Children who are bored show apathy.*

Complete: Apathy can be caused by *working on boring jobs such as working on an assembly line in a factory.*

7)   practise

NOUN	VERB	ADJECTIVE	ADVERB
practice	practise	practising	

practise (v.)   General Meaning

1) perform repeatedly so as to proficient.

Example: *We need to practise our irregular verbs until we master them.*

2) do or perform often, customarily or habitually.

Example: *We should practise politeness at all times.*

3) be professionally engaged in.

Example: *Dr. Smith has practised medicine for twenty-five years.*

Give another example of the first meaning: *We need to practise listening to the news until we can understand almost everything.*

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NAME: ___Answer key____
Starting time: _____
Finishing time: _____

As you listen to the passage, answer the following questions.

1. What distinguishes human beings from other members of the living world?
    The need to order the natural world.

2. What is every child looking for as it looks at the world around it?
    Some kind of order, a cosmic sense.

3. Give an example of a pattern that some societies pass on to their children.
    How to draw the sun.

4. What kind of patterns do ordinary children born in a society with elaborate and beautiful patterning pass on?
    Elaborate, beautiful patterns.

5. What do we call children with ability who burst through the patterns of their society?
    Artists.

6. What kind of patterns do ordinary children born in a society with simple, adequate patterning pass on?
    Simple, adequate patterns.

7. What leads to the frustration of gifted children in a complex society with very simple patterns of expression?
    The patterns are too simple to deal with the complexity of their experience.

8. What is the problem for the child if the patterns of its society are too rich and are not explained?
    They smother the child and it withdraws or gives up.

9. Why do all children need to learn the art forms of their society?
    So they can understand the world and move through it.

10. How do artists differ from ordinary talented people?
    They take the traditional patterns of a society and burst through them to create something new.

11. How do most children learn the art forms of their society?
    They are exposed to the forms and they practise them.

Recall Protocol: Children and Creativity

NAME: _____
Starting time: _____
Finishing time: _____

After you have discussed the completed visual with your teacher and your fellow students, the teacher will collect your completed visual and your notes. Now write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

APPENDIX AH
Global/Inference Questions: Children and Creativity

NAME: _Answer key_____
Starting time: _____
Finishing time: _____

After you have completed your recall protocol and written down as much information from the lecture as you can recall, answer the following questions.

1. Why do some societies represent the sun with pointed things around it?
*It is the tradition of that society.*_____

2. What kind of patterns do Balinese children receive from their society?
*Rich and complex patterns.*_____ _____

3. For Margaret Mead, what is the problem with the patterns of our society?
*They are too simple to deal with the complexities of our society.*_____

4. For Margaret Mead, how do talented people who have been given adequate traditional forms of expression feel?
*Contented and dignified.*_____

5. According to Margaret Mead, how should we teach creativity?
*We should teach all children the patterns of our society and the artists will take these patterns and make new ones.*_____

6. For Margaret Mead, why is there so much original expression in Bali?
*Children are given many opportunities to participate in the culture which is very rich and complex.*_____

TOTAL: 12

APPENDIX AI
Summary Cloze: Children and Creativity

NAME: __Answer key__

Starting time: _____

Finishing time: _____

> The text below is a summary of the passage <u>Children and Creativity</u>. From the following list, choose the words that fit the spaces in the text. Use each word only once.
> **NOTE:** You have 20 words and 15 spaces in the text.

LIST

a) adequate	b) apathy	c) artists	d) Bali
e) complex	f) copy	g) deny	h) dull
i) gifted	j) ill	k) new	l) order
m) ordinary	n) ours	o) overwhelm	p) patterns
q) practise	r) satisfied	s) simple	t) western

For Margaret Mead, the roots of artistic creativity are found in our cosmic sense, our sense of

1) _order_____ about the world. Some societies produce this order ready-made with specific

2) _patterns__ that are passed on to children. These patterns may be 3) _simple_ as in primitive societies or

complex like those of 4) _Bali____. If the society is simple, the simple patterns will be 5) _adequate___ and

children will be happy with them. If the society, however, is very complex, such as 6) _ours_____, and the

patterns are too 7) _complex_, children, especially 8) _gifted__ ones will be frustrated and may even become

mentally 9) _ill_____. Complex patterns, however, that are not mediated will 10) _overwhelm_ the child

and result in boredom and 11) _apathy___. Some children are content simply to 12) _copy____ the patterns

they receive from their society. Others, the artists, will take those patterns and move beyond them to create

something 13) _new_____. All children should learn and 14) _practise_ the patterns of their society. From

this group the 15) _artists____ will emerge and create new patterns and all children will be given the means

to move about in the world.

1. Humans (children) need to order the natural world. _____
   (A cosmic sense; way of looking at the world around them)
2. Society may present this order ready-made _____
   A)   e.g. how to draw the sun (or other example) _____
3. A simple society doesn't need complicated conventions. _____
   A)   Humans are content with it. _____
4. Some societies have complicated patterns _____
5. Some children find it inadequate (the artists) _____
   A)   Ordinary people just understand the patterns _____
6. Dull art + dull society   possible _____
   A)   e.g. scratches on pots (rhythmic drum beating) _____
   B)   If adequate patterns, children happy. _____
7. Complex society, but inadequate patterns _____
   A)   Gifted children ➡ frustrated. _____
   B)   Gifted children ➡ mentally ill. _____
   C)   e.g. our society. _____
8. Very elaborate patterns that child doesn't understand _____
   A)   Child withdraws. _____
   B)   Boredom and apathy. _____
9. Some children happy to understand patterns (not original) _____
10. Ability to repeat a pattern = talent. _____
11. Some children who want to change patterns. _____
12. Ideal society gives every child the chance to be traditional. _____
    A)   Children learn by participating _____
    B)   The artists will emerge from the group. _____

TOTAl   _27_

Today we're going to look at what some experts say is the most important environmental question of our time, the greenhouse effect. This phenomenon will affect our planet in a way no natural phenomenon has affected the earth to date.

The greenhouse effect is analogous to the basic principle of the glass-skinned garden structure, the greenhouse. Sunlight passes through the glass shell. The heat created as ultraviolet and visible radiation of the sun warms the interior and is kept in by the same walls that allow it to enter. The glass also contains the moisture of the verdant environment through the cycle of evaporation and condensation. Over the centuries the earth's atmosphere has acted beneficially as the greenhouse glass does. The amount of heat absorbed from the sun is balanced by heat radiated back out into space. But suddenly scientists have become concerned with sharply increased levels of one of our atmospheric gases, carbon dioxide, increasing levels which some fear could lead to a disruptive warming trend. The analogy of the heat-trapping skin of the greenhouse with the growing envelope of carbon dioxide around the earth is a good one.

There is a common misconception that our atmosphere is heated directly by the sun, but that's not true. What actually happens is that sunlight shines right through the atmosphere and is absorbed by the ground. It's the ground that gets hot and gives off heat in the form of infrared radiation that heats our atmosphere actually from the bottom-up. Things like cars, factories, oil heating, in other words, the burning of fossil fuels adds carbon dioxide to the atmosphere. Carbon dioxide has a different way of reacting to infrared radiation. Right now there's a balance. The amount of radiation that's coming out is the same as the amount of radiation that's going in, but if we put too much carbon dioxide in, in effect, what we are doing is putting a dome over the entire world. Carbon dioxide absorbs infrared light. It can be heated directly. So what happens is that the radiation that's coming out cannot escape. We haven't changed the amount going in, but the temperature begins to rise because it's being trapped. The greenhouse effect.

At the same time as the temperature goes up, water vapour which is not only in our ponds, it's in our lakes, our rivers, our oceans, it begins to evaporate a little faster. As the water vapour gets into the air it condenses and forms into clouds. Now the clouds play a dual role. The first: they help to insulate the earth and they contribute to that build-up of heat, but as they get thicker and because they're white, there comes a point when they'll stop letting the light get through to the ground and they'll start reflecting light back out into space before it even gets to the surface. So what you have is rising temperature, but then you come to a new equilibrium. The earth is a little bit warmer. It's a little bit cloudier and probably has a lot lousier weather.

The sharp increase of carbon dioxide in the atmosphere can be traced back to the beginning of the Industrial Revolution. The factories and engines were all driven by the burning of fossil fuels. This worthless and seemingly harmless by-product of combustion was pumped into the atmosphere. Billions of tons of carbon dioxide gradually accumulated as a thermal blanket around the earth.

Cutting down trees compounds the problem because trees take carbon dioxide in as they breathe. They breathe in carbon dioxide. They take the carbon out of it to make the wood and they breathe out oxygen which is very useful for us. So if you destroy forests, you alter the balance towards more carbon dioxide. If you burn coal which is just fossilized wood, after all, you're putting back carbon dioxide which used to be there a long, long time ago.

The world's forests moderate the growing volume of carbon dioxide. Trees need to absorb carbon dioxide for photosynthesis but the forests of the world are shrinking. Far more trees are being cut than planted. Compounding the tragedy of the commercial forests is the continuing cutting and burning of third

world forests to provide farmland for crowded populations. In all, an estimated one thousand million tons of carbon dioxide are put into the atmosphere every year as the result of deforestation. Still, that's less than one fifth of the carbon dioxide produced by the burning of fossil fuels. The amount burned increases every year.

Now, what will be the effect of global warming? Most seem to agree on these basics. As atmospheric carbon dioxide and other greenhouse gases continue to accumulate, the global temperature will rise. Current estimates suggest a 2 degree Celsius rise by the middle of the next century and a 5 degree increase by the year 2000. Temperatures will rise the most at the poles, the least at the equator. A 2 - 5 degree increase doesn't sound like much but it represents an unprecedented rate of atmospheric warming. Dramatic changes in precipitation and storm patterns would occur and the global average sea level would rise. Areas that presently provide a great deal of the world's food tend to lose--the great plains, the middle west and probably the Canadian prairies. And a considerable percentage of the world's available export wheat and corn comes from those regions. These areas will probably dry out as well as get hotter. And it's the drought which is likely to be the big problem if this effect goes on as people expect it to.

Other areas may have improved growing conditions. Longer warmer grain-growing summers in northern Canada. Sub-tropical growing conditions perhaps in central Canada. The Soviet Union may also benefit by being able to grow more of its own food in northern regions, reducing its political vulnerability to the west.

Improved growing conditions in some countries of the third world could make them food-self-sufficient. But many other regions like North and Central Africa are expected to experience increasing drought and a tragic increase in desertification.

As the oceans warm, the water will expand. Greater evaporation of water from the landmasses will also add to the oceans' volume. But the greatest increase will come from the melting of the polar ice caps. Scientists predict the sea will rise at least a metre within the next 100 years, up to 5-6 metres within 3 centuries. Those rates could accelerate if land- supported portions of the antarctic ice cap were to melt into the ocean. As the oceans warm, sea life will relocate to stay in appropriate water conditions. Fishing will be affected. Furthermore, the world's coastal cities such as Vancouver, London, Venice and the U.S. eastern seaboard could find themselves under water. The state of Florida would be reduced to a shadow of its current self. It wouldn't happen overnight. No one is going to get killed by it. Everyone's going to have plenty of time to move away.

Still, can we head off the problem? There are no quick fixes. What about imposing a 300% world-wide tax on fossil fuels? Well, coal is just so incredibly cheap that it would have very little effect on delaying the warming trend.

What about a ban on fossil fuels then? A ban is not feasible because of the international political consequences. Fossil fuels are the lifeblood of the developing and industrial society. None of the alternate energy sources being developed are likely to significantly reduce that carbon fuel dependency in the foreseeable future.

What about smokestack scrubbing? No, it would triple the price of energy.

How about planting more trees? Enough to absorb the carbon dioxide? Sounds great. Everyone's for more trees, but it would take up a landmass the size of Europe and require several-fold increases in fertilizer production which in some cases we don't have and enormous costs in irrigation.

So what is the solution? Scientists generally agree that rather than trying to stop the phenomenon by abandoning fossil fuels, the peoples of the world are going to have to learn to adapt. Adapt our economies

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to make good use of the change. People in dry areas such as the U.S. mid-west might think about moving up to Canada if the climate there is more favourable. It will be expensive and disruptive, but there will be time to plan for such changes.

Another possibility is weather modification. The Alberta government has had some success with a modest hail suppression program using cloud seeding techniques to suppress crop-destroying hail storms. Some scientists believe similar techniques might be used in a future drier world to milk the atmosphere of moisture. The cost of such programs would be enormous. On the other hand the cost of moving large populations is also enormous and weather modification would be less disruptive. Building sea walls around coastal cities such as New York City is also prohibitively expensive. They already have elaborate defenses in Holland and London. They would have to build more. It would be expensive, but feasible.

There may be beneficial side effects of global warming for food production. Future high levels of carbon dioxide in the atmosphere may have a beneficial side effect for plants, stimulating the growth of some crops as well as raising temperature and changing rain patterns. Irrigation, although desirable may not be feasible for certain areas such as the great plains and the Canadian prairies.

Clearly some areas will benefit from the changes and others will lose. This leads to another potential problem. The people who may win from the changes caused by the greenhouse effect will have to live with those who are losing from it. And the people in the winning areas are going to have to pay for the damage done in the losing areas. And that kind of strife is the kind of thing that leads to disruption, population dislocation, a lot of stress and potentially war as the changing resources are fought over. Still with careful planning and international cooperation solutions can be found.

**POSSIBLE
SOLUTIONS**   **FEASIBILITY**

POSSIBLE SOLUTIONS

FEASIBILITY

tax _____ _____

➜ would not much affect the cost, since coal is so _____

_____ fossil fuels

➜ _____ infeasible

install smokestack _____

➜ too _____

plant more _____

➜ requires too much _____, fertilizer and irrigation

modify the _____

➜ very _____

_____ to changing conditions

➜ people can move; build sea _____; enjoy _____ effects; plan for change

THE GREENHOUSE EFFECT

POSSIBLE SOLUTIONS
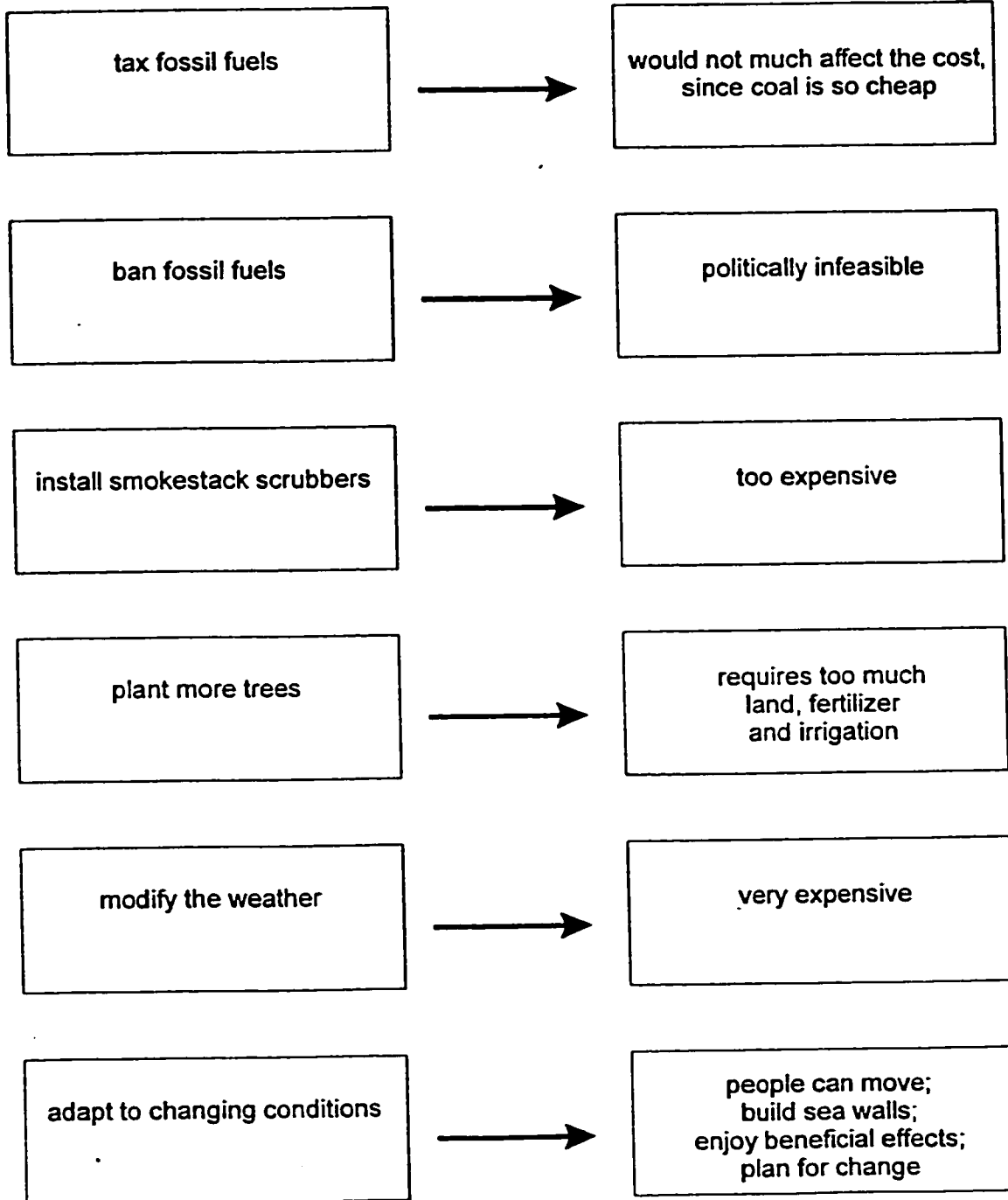
FEASIBILITY

tax fossil fuels	→ would not much affect the cost, since coal is so cheap
ban fossil fuels	→ politically infeasible
install smokestack scrubbers	→ too expensive
plant more trees	→ requires too much land, fertilizer and irrigation
modify the weather	→ very expensive
adapt to changing conditions	→ people can move; build sea walls; enjoy beneficial effects; plan for change

> You are about to hear part of a lecture about the greenhouse effect and possible solutions to the problems it might cause. Do the following exercises and discuss them in class before you listen to the lecture.

1)   Feasible

NOUN	VERB	ADJECTIVE	ADVERB
_feasibility_____		feasible	feasibly
	antonym:	infeasible	

feasible   General Meaning

1) capable of being done/carried out;

Example: *Capturing energy from the ocean's tides is feasible, although not yet practicable.*

Questions:
a) Since we have just 10 minutes before class and we live 3 kilometres from campus, which is the more feasible way of getting there in time--taking the bus or walking?
       *Taking the bus.*_____

b) If you want the parcel to arrive in 2 days, the most feasible solution is to
       *Send it by courrier.*_____

2.   affect

NOUN	VERB	ADJECTIVE	ADVERB
effect	affect	_____	_____

affect (v.)   General Meaning

1.   to produce an effect upon, to influence;
       Example: *The jet stream affects weather patterns across the continent.*

Affect or effect? Complete the following:

a)   We don't know what the *effect*_____ of the new leader will be on votes for the party.
b)   How will inflation rates *affect*_____ the economy?
c)   The *effect*_____ of the volcano's eruption will be felt for many years.
d)   Downsizing is *affecting*_____ the lives of many working Canadians.
e)   The burning of fossil fuels has enormous _*effects*_____ on air quality.

3)   **Fossil fuels**

General Meaning

fossil fuels: fuels derived from living things; examples include coal, natural gas and
         _oil_____.

Complete: Examples of energy sources not derived from fossil fuels are ocean tides,
              windmills and _solar power_

4)   **Ban**

NOUN	VERB	ADJECTIVE	ADVERB
ban	ban	banned	

banned   General Meaning
       1)   prohibit the use, performance or distribution of something.
       Example: _The pesticide DDT is banned in Ontario_.

a)   Another example of a banned substance is _marijuana_____.
b)   The University has decided to ban smoking in _all classrooms_____.

5)   **smokestack scrubbers**

smokestack: a pipe or funnel through which smoke or gases are discharged.
Example:
_Steam engines have smokestacks. So do steel factories_____

smokestack scrubbers: devices for removing impurities, or undesired substances from gases.

Complete: Smokestack scrubbers will help to reduce _air_____ pollution.

6)   **Irrigation**

NOUN	VERB	ADJECTIVE	ADVERB
irrigation	irrigate	irrigated	

irrigation: the provision of water by artificial means;

Complete the following examples:
In order to grow fruit in very dry areas, farmers must provide _irrigation_____ for the land.

A built-in _irrigation_____ system was installed in the strawberry fields to ensure a reliable crop.

It is too dry in this region for crops to grow without _irrigation_____.

7)   **Beneficial**

NOUN	VERB	ADJECTIVE	ADVERB
benefit	benefit	beneficial	beneficially

antonym: deleterious, _____

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beneficial: helpful

Rephrase the following sentences to use the word **beneficial**.
1)   The health system brings great benefits to most of the population.
        The health system is greatly beneficial for most of the population.

2)   Staying in the sun does not benefit our health.
        Staying in the sun is deleterious to our health (not beneficial).

3)   Reading week is good for both professors and students.
        Reading week is beneficial to both professors and students.

8)   Adapt

NOUN	VERB	ADJECTIVE	ADVERB
adaptability adaptation	adapt	adaptable	

adapt: adjust, accommodate.

Complete the following:
1)   We can adapt to cold weather by *wearing winter clothes.*
2)   We can adapt to computers by *learning how to use them.*
3)   We can adapt to a new country by *learning its social customs.*

APPENDIX AN
Factual Questions: The Greenhouse Effect

NAME: __Answer key_____
Starting time: _____
Finishing time: _____

> As you listen to the passage, answer the following questions.

1. The greenhouse analogy is often used to explain the greenhouse effect. How is the carbon dioxide envelope similar to the glass of a greenhouse?
   Just as the glass of a greenhouse keeps in the heat of the garden, so the carbon dioxide keeps the earth's heat in as well as the radiation.

2. What drove the factories and engines of the Industrial Revolution?
   The burning of fossil fuels.

3. What was the by-product of this burning?
   Carbon dioxide.

4. How do trees affect the level of carbon dioxide in the atmosphere?
   They reduce the levels by breathing it in.

5. Give 3 effects of global warming.
   Temperatures will rise as much as 5 degrees C. by the year 2100.
   Precipitation and storm patterns will change.
   Some areas will get hotter and drier, while some cold areas will get warmer.
   Ocean levels will rise.

6. Why will water levels rise? (3 reasons)
   The warmer water will expand.
   There will be greater evaporation of water over landmasses.
   The polar ice caps will melt.

7. Why would a high tax on fossil fuels not solve the problem?
   Coal is so cheap that people would use it anyway.

8. Why is planting more trees not a solution? (3 reasons)
   It would require a huge landmass, much more fertilizer and expensive irrigation.

9. Give 3 examples of ways people could adapt.
   They could move to better areas.
   They could change the weather.
   They could build sea walls to protect coastal cities.
   They could enjoy the beneficial effects.

10. Why will there be strife as a result of global warming?
    Some people will benefit and some will lose, but they will have to live together./People will be fighting over changing resources.

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APPENDIX AO
Recall Protocol: The Greenhouse Effect (Vocabulary)

NAME: _____
Starting time: _____
Finishing time: _____

> After you have discussed your answers to the factual questions with your teacher and your fellow students, the teacher will collect your answers and your notes. Now write down everything you can recall about the information in the lecture. Try to organize your recall as clearly as possible, but completeness is more important.

APPENDIX AP
Global/Inference Questions: The Greenhouse Effect

NAME: __Answer key____
Starting time: _____
Finishing time: _____

After you have completed your recall protocol and written down as much information from the lecture as you can recall, answer the following questions.

1. How will the world's food supply be affected by the greenhouse effect?
   Food-producing areas such as the Canadian prairies and the great plains of the U.S. will become too hot and dry, but there will be new food producing areas farther north, such as in Canada or in Russia.

2. Why will a high tax on fossil fuels not head off the greenhouse problem?
   Coal is so cheap that people would still use it.

3. Why is a ban on fossil fuels politically not feasible?
   The powerful industrial world is too dependent on fossil fuels for energy.

4. How could planting trees affect the greenhouse effect?
   Trees take the carbon dioxide out of the air and produce oxygen for us.

5. Why would New York City need sea walls?
   As the oceans warm, they will expand and flood coastal cities such as New York.

6. What are the dangers for areas that will benefit from the greenhouse effect?
   People in areas that are suffering will want them to share their wealth. This could lead to war.

TOTAL = 9

NAME: _Answer key_____

Starting time: _____

Finishing time: _____

The text below is a summary of the passage The Greenhouse Effect. From the following list, choose the words that fit the spaces in the text. Use each word only once.
NOTE: You have 20 words and 15 spaces in the text.

LIST

a) alternative	b) absorb	c) adapt	d) benefit
e) burning	f) cheap	g) conserve	h) destruction
i) drought	j) expansion	k) expensive	l) harmless
m) irrigation	n) land	o) modification	p) resources
q) rising	r) suppression	s) taxes	t) total

The growing envelope of carbon dioxide around the earth traps the sun's heat and is causing a warming trend that will affect our planet in unprecedented ways. The sharp increase of carbon dioxide in the atmosphere caused by the 1) _burning_ of fossil fuels is compounded by the 2) _destruction_ of our forests which would 3) _absorb_ carbon dioxide during photosynthesis. Global warming will mean increases in temperatures, changes in precipitation patterns, 4) _rising_ seas, improvements in growing conditions for some areas and 5) _drought_ for others. There is no simple solution to the problem. Imposing high 6) _taxes_ on fossil fuels will not help because coal is incredibly 7) _cheap_. Industrial and developing societies will not submit to a 8) _total_ ban because there are no viable

9) _alternative_ sources of energy. Smokestack scrubbers are too 10) _expensive_. Planting more trees to absorb the carbon dioxide would take up too much 11) _land_ and require expensive fertilizers and extensive 12) _irrigation_. The solution seems to be to 13) _adapt_. People in hot, dry areas will have to move away to more hospitable places. Weather 14) _modification_, although very costly would be possible. We may have to build sea walls to protect coastal cities. Some areas will 15) _benefit_ from the changes, while others will lose. Unless we cooperate and help each other, there will be stress and even war as we fight over changing resources.

APPENDIX AR
Recall Checklist: The Greenhouse Effect

1.   The greenhouse effect – a problem _____
2.   Definition: an envelope of carbon dioxide around the earth which traps
     heat from the sun. _____
     A)   Analogy of the glass greenhouse _____
3.   Increase of carbon dioxide (effect) caused by the burning of fossil fuels _____
     A)   Began during Industrial Revolution _____
4.   Cutting down trees increases carbon dioxide _____
     A)   Trees take in carbon dioxide during photosynthesis. _____
5.   Global temperatures will rise. _____
     A)   2 degrees Celsius by 2050. _____
     B)   5 degrees Celsius by 2100 _____
6.   Dramatic changes in precipitation and storm patterns. _____
7.   Global sea levels will rise. _____
     A)   Greater evaporation of water from land masses _____
     B)   Polar ice caps will melt _____
     C)   Rise of 1 m. + in 100 years and 5-6 m. in 3 centuries _____
8.   Effects of global warming _____
     A)   Current food-producing areas will get hotter & drier _____
     B)   e.g. great plains, middle west, Canadian prairies _____
     C)   Cooler areas will get warmer & produce food. _____
     D)   e.g. Central Canada & Russia _____
     E)   Current drought ridden areas will remain drought ridden _____

Solutions
9.   300% world-wide tax on fossil fuels _____
     A)   Coal is still too cheap _____
10. Ban fossil fuels _____
     A)   Industrial societies would not permit it. _____
     B)   Alternate energy sources do not provide solution. _____
11. Smokestack scrubbers _____
     A)   Too expensive _____
12. Plant more trees _____
     A)   Requires too much land _____
     B)   Requires too much fertilizer _____
     C)   Requires too much irrigation _____
13. Solution: adapt _____
     A)   Move from dry areas to more favourable areas. _____
     B)   Expensive _____
     C)   Disruptive _____
14. Weather modification _____
     A)   e.g. Alberta government's success with cloud seeding _____
     B)   Expensive _____
15. Build sea walls around coastal cities _____
     A)   e.g. New York _____
     B)   Expensive but feasible _____
16. Beneficial effects of global warming for food production. _____
     A)   Stimulate growth of some crops. _____
     B)   Irrigation may not be feasible in some areas. _____
17. Problem: strife between winners and losers. _____
     A)   Potentially war _____
18. Careful planning will lead to solutions. _____
TOTAL   **47**

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Student # 3

Int.:   Now, you did the first text on Making Fortune Cookies... Looks like you filled...well, you did pretty well. You missed a couple of spots. And here you took a lot of notes on the side. So what did you think of the visual for taking notes?

Stud.   Achievement?

Int.:   Was it a good way for taking notes? Did it help you to understand?

Stud.:   Yes, it helped me to organize whole story. To understand more.

Int.:   Wow. That's good. And did it help you to remember when you had to write about ?

Stu.:   Yes, it. In the order. It thinks its...Anyway it's helpful to organize whole story.

Int.:   And you missed the second one on Fortune Cookies (Children and Creativity). That one was harder to organize, so ... The third one was the Greenhouse Effect.

Stu.:   Yes.

Int.:   And which one did you work with first?

Stud.:   I did ?????   about this and I did the blank.

Int.:   So, the first time both of you looked at this one. It's partially filled in. And what did you think of that for organizing and taking notes?

Stud.:   Before listening to the tape we had a little bit of schema, so it was nice to understand.

Int.:   Did you already know something about the greenhouse effect?

Stud.:   Yes. But there is something new.

Int.:   So it was an interesting text. New ideas for you?

Stud.:   But actually in scientific field I'm not good understanding or ????

Int.:   That's O.K. But did you understand what happens, what causes the greenhouse effect?

Stud: Uhm. 70.

Int.:   70%? So a little diagram. That's the greenhouse. Then you have the plants. ..the heat..Because you've got the glass all around, the moisture comes back in and heats .... So, how about that kind of visual. That helped you with organization..

Stud.:   Actually it was easier than Fortune Cookies because we learned greenhouse effect in high school.

Int.: So you're familiar with it. You didn't add a lot to the notes. You didn't take extra notes other than ..Oh they're on the back. Oh yes.. Lots of notes.

Stud.: I used the back page.

Int.: Now I wonder what you put down here.

Stud.: It's very complicated. I tried to take a lot, almost everything I heard, but I couldn't.

Int.: Does that happen . Do you usually take notes. Do you usually write everything down?

Stud.: Almost. Especially when there's something that I really cannot understand. It's very nice to take a note.

Int.: You write it all down and then you read it?

Stud: Yes.

Int.: When it came time to remember what the text was about, which did you think about the chart or your notes?

Stud.: Mmmm. Half and half.

Int.: Half and half? So the chart helped a little bit.

Stud.: Still when I record the story, I think I forgot too many things. First I remember more about the chart.

Int.: Did you?

Stud.: Yeah.

Int.: O.K. So the chart helped you to remember. I haven't looked at what you wrote yet. I'll get those corrections to you for Mon.

Stud.: Usually our lab is Mon. Afternoon. It's Monday it's very tired, especially afternoon. You're tired and especially afternoon. Do you remember the first thing? The garbage space? Oh my mark was very terrible. I understand because I was very sleepy. And I couldn't understand at all. First time I didn't do my best. After that I was really disappointed, but usually every Mon. afternoon lab class I feel bad.

Int.: Do you speak English all weekend or Korean? Is that why it's hard on Mon.?

Stud.: Of course.

Int.: You're too busy on the weekend?

Stud.: Mmm. But usually I'm busy to do homework, to do presentation.

Int.: Are you coming back next semester?

Stud.: No. Next semester I'm going to Korea.

Int.:　　Sept.?

Stud.:　　December. I'm waiting for.

Student # 4

Stud.:　　I've finished. I graduated in June., last June. And I studied business. And first history.

Int.:　　I see. I've got the Fortune Cookie one. Did you like that one?

Stud.:　　Yes, I was interested. I don't know if I did better on this one than on the others, but it was my favourite.

Int.:　　It was your favourite?

Stud.:　　Yes. And I like cookies too, so...

Int.:　　I haven't marked the last one, but you did better on the second one than the first, so..

Stud.:　　Well the children. It was not a scientific really, it was more psychology or sociology.

Int.:　　Yes.

Stud.:　　But I didn't like the first one (Garbage in Space) and the greenhouse effect.

Int.:　　You didn't like the greenhouse effect. You didn't like the garbage in space.

Stud.:　　Oh, I mean I was really surprised because I didn't hear anything about the text before and I didn't understand that it was in space. I understood it was the garbage we send, our garbage that we need to send somewhere because we have too much garbage and I believe it is our garbage and not the garbage of the astronauts. So I was quite confused and I didn't understand quite well what was happening.

Int.:　　But the fortune cookies, you understood?

Stud.:　　Yes. Yes.

Int.:　　O.K. And how about the visual. Did that help you to take notes?

Stud.:　　First not. I would say that if I had it on the second, I mean for the second listening, it would have helped me.

Int.:　　Didn't you have it for the second time?

Stud.:　　Yes, but for me I prefer

Int.:　　And take your own notes.

Stud.:　　Yes because that's what I did. Because I didn't use the boxes at the first time. And after yeah. After one listening I feel more comfortable, I mean it's easier for me to use the boxes. It's helpful, but not very first. I need to hear it once before.

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Int.: O.K. So you like to take your own notes and you like a lot of detail.

Stud.: First.

Int.: You like to get as many details?

Stud.: Mmmm. First yes. I realize that the second time I really understand more than the first time. I am always afraid of my first listening because I ..Oh my God I didn't understand anything. Second time I O.K. I understand that and that, but when I did my remembering without any notes I think I used your visual but at the same time I remembered only the boxes and not the things that I heard before. So I think it's helpful and it's tricky because you remember that and nothing else. So I don't know if it's good or not.

Int.: How about the Children and Creativity? It was a complicated text wasn't it?

Stud.: Yes. Yes. I'm not sure I understood everything.

Int.: You have lots of notes on the back of this page.

Stud.: Yes.

Int.: Was that the first time you listened?

Stud.: Yes. First time I used that.

Int.: And did the chart make sense to you?

Stud.: Yes, but it's the same thing. I remember this more than the notes I had taken before. So I was. I think I was disappointed because I couldn't...I was blocked with that. It's like...It was like...I remember the scheme, schema and there were no notes, there was a few details. There were more details on my first draft, but I was confused because I couldn't remember my first draft because of the second one.

Int.: Oh. So the second one interfered..

Stud.: Maybe. Yes I think. And I realize that when I take my notes, without my first notes, I mean , when I do the report, usually I try to forget the details and to make out quite a summary and I don't know if it's what you need or if that's what you want. Yeah. To have an organized report with the main points and because I don't remember the details.

Int.: Not the third one was The Greenhouse Effect and it looks as if you worked with the blank chart mostly or...?

Stud.: Oh well we had one sheet for two...so...I think it was really helpful that

Int.: Helpful.

Stud.: Helpful. Yes.

Int.: The partially completed one was helpful.

Stud.: Yes. Because when we correct...between the two Bianca helped us and we did that. I understood. I realized that my first notes were quite inaccurate or completely wrong.

Int.: Your first notes?

Stud.: Yes. You will see that. At first I ..all the beginning of the text I couldn't put in on the boxes because it didn't make sense for me. The solution came only on the middle of the text.

Int.: That's true.

Stud.: So I didn't know where I could put the first notes. I think it didn't help me the first time.

Int.: I see.

Stud.: I would have preferred a blank sheet and after that to ...

Int.: The visual.

Stud.: Yeah.

Int.: And then when it came time to write up your recall...

Stud.: Uhm.

Int.: To write up your recall...

Stud.: Uhm which part?

Int.: After we took away your notes, you write...

Stud.: I remember the schema again.

Int.: The schema again.

Stud.: I'm really visual. When I learn my notes for an exam, I usually, during the exam I remember really where the things are on my pages. Yeah. I see on the top, on the ..So I think I am really visual., but I'm not sure because it's not my language, my mother language, my mother tongue, so maybe in French it will have helped me, the visual, but..

Int.: I see. Well that's an interesting idea.

Stud.: But in English it confused me more than it's helped me.

Int.: Do you think you would have maybe taken your notes and organized them....

Stud.: Differently?

Int.: Differently. If you hadn't had the visual, and you listened to the text twice, what would you have done?

Stud.: Probably what I did. On the report, I mean on the recall. Not a schema like that. That one. Solution-problem. It's wouldn't be really different I think. No it will be that. That's...I think I would prefer making my own schema.

Int.: Sure. That's good. And that's

Stud.: Not the first time because one it's not enough. I need three listening I think.

Int.: Mmhmm.

Stud.: Two it's not quite enough.

Int.: Well this is very helpful.

Student # 5

Int.: So, generally speaking, how did you feel about the visuals?

Stud.: About this one?

Int.: In general.

Stud.: is hard because they express about things, but sometimes is not useful for me. I cannot a l m o s t understand what's on the visual.

Int.: They didn't get at enough information. Is that it?

Stud.: No. You feel a little bit confused about that. And I prefer listen first and take my notes and after I can see that. Is better.

Int.: O.K. It's a way of organizing things after you've heard them.

Stud.: Yeah.

Int.: After you've got the notes. I see. So the first one was about Fortune Cookies.

Stud.: Yeah.

Int.: And did it help you after you took your notes?

Stud.: After yeah. But before I didn't understand almost anything. And I had to listen and take   m own notes.

Int.: You took your notes on the back here, didn't you?

Stud.: Maybe because my eyesight can understand better. Yeah.

Int.: Did Bianca talk about the visual before you listened the first time?

Stud.: Mmm. I don't remember.

Int.: You don't remember. O.K.

Stud.: No.

Int.: That's alright. So your notes, you seem to have organized it by the problem and then, these arrows must show solutions do they? So it was sort of the same idea, but

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Stud.: Yeah. But in different order.

Int.: How about this one? Do you remember it?

Stud.: Yeah. I remember this one.
That's always I have to take notes before I had.

Int.: So your notes are on the back here.

Stu.: Yeah. Sometimes it's difficult for me that kind of schemas.

Int.: Schema.

Stud.: Yeah.

Int.: But you seem to have talked about society and children. So it's something like the chart. But it's organized in a different way.

Stud.: In a different way.

Int.: O.K. And how about this chart at the bottom here. Did that ...

Stud.: Yeah. That help.

Int.: It made sense of what you...

Stud.: Yeah, but after listen. You feel.

Int.: After listening and note-taking.

Stud.: Yeah.

Int.: Now you said that this one was the hardest?

Stud.: Was maybe because I was tired or I don't know what. This part possible solution and feasibility. At the beginning they didn't say anything about that. They only talk like a story. And after they began to confuse.

Int.: O.K.

Stud.: Because they all cross and arrows cross. Was hard.

Int.: I see.

Stud.: But after you can find something.

Int.: Do you think that should have had another label maybe for you to understand it?

Stud.: Yeah.

Int.: You've written something there haven't you? How realistic eh.

Stud.:   I don't know what that's the meaning.

Int.:   Maybe that word was too hard.

Stud.:   Yeah.

Int.:   And then when you wrote your summary afterwards when we took your notes away, do you think the visual helped you to remember and..? organize part of the information?

Stud.:   In my writing, yeah, but not this one.

Int.:   Not that one. Not the greenhouse.

Stud.:   No. Maybe because I did my ...I remember a little bit.

Int.:   So you seem to remember the words of the text maybe more than

Stud.:   Yeah, but I could remember the order. I can understand is important.

Int.:   The order of the text itself rather than what was on..

Stud.:   Yeah. After I wrote and .you feel that and you say I remember the order and I think that was good to remember more things. If you only listen and don't take notes.

Student # 6

Int.:   In general what did you think of the visuals?

Stu.:   I think it's a good way, but sometimes I got confused because I think this is a kind of resume or and as we were listening, we have to think about what is here and what is a listening because at first we thought it was all the listening here, but not. It just basic things.

Int.:   Yeah. It's the main ideas.

Stud.:   So for example, in this one I don't remember. In this one, in The Greenhouse Effect, I started to write in this side of the paper because I realized later these will come.

Int.:   So. O.K. What you like is to take your own notes first,

Stud.:   Yes.

Int.:   And then use them to organize...

Stud.:   Yeah. I think that when I wrote with my words or like in recall I almost write with my notes, not anything else.

Int.:   No. Not organized that way or anything?

Stud.   Yes. But I don't know. Maybe it's my way of recalling things, but for example this was nice.

Int.: That's the Greenhouse Effect?

Stud.: Yes. Because it was very clear. Solution and

Int..: Whether it would work or not.

Stud.: Yeah.. But I had problems with the fortune cookies.

Int.: That was the first.

Stud.: Yes. Maybe because it was the first one.

Int.: Yeah. Maybe. Though I do think you need to learn to use these kind of visuals.

Stud.: Yeah.

Int.: and of course what we like ultimately is for you to make your own.

Stud.: And also I think we are used to graphics but not with numbers.

Int.: I see.

Stud.: And when they change the subject to words and ideas, you get a little confused, but just for the first time.

Int.: Yeah.

Stud.: Then. It's easy to write. It's like a note.

Int.: Now you've filled in all the boxes here. You've added a couple at the bottom for the greenhouse effect. So what happened was when you listened the first time, you wrote on the back of the page?

Stud.: Yes because the first time I saw this paper I think maybe we will have an introduction and then these will come. So I started to write because... Then we have to write what we recall. And if I wrote these only, maybe I forgot the other things. And we had also to know what was the green effect—the greenhouse effect.

In.: Yeah. Good. How about the Children and Creativity?

Stud.: Ah...That's...I think...No. No. Because I think it was...I didn't understood very well this one.

Int.: I see. What is your background? What are you studying?

Stud.: I study..My major was industrial engineering.

Int.: O.K.

Stud.: And this..I thought it was very confused. No. Because I like...

Int.: You're interested in art?

Stud.: Yes. But I thought that the way the woman was talking. It was very confused.

Int.:   She didn't do it A.B. C.

Stud.: Aha. She moved back and forth.

Int.:   That makes it hard.

Stud.: Yeah.

Int.:   Maybe that's a good case where you want to take your own notes and then afterwards organize it.

Stud.: Yeah.

Int.:   So it didn't help for me to organize it for you. It would have been better if you could have organized it yourself. Is that what you're saying?

Stud.: Maybe. But this is organized, I think. This is organized and the lady was talking from here to here.

Int.:   You're right. So did that help you to understand or not?

Stud.: After? When we were talking about? That's when I understood. And I think this was better than

Int.:   Better than the talk?

Stud.: Than the talk. Yeah.

Int.:   And when you went to write your notes, is that what you remembered too?

Stud.: Yes. Mostly. Because of this. Not because of the talk.

Int.:   Good. So do you think you might use visuals yourself?

Stud.: Yes.

Int.:   When you study?

Stud.: Yeah.

Int.:   So you'd probably take your notes and then afterwards organize

Stud.: Yes. Organize.

Int.:   O.K.

Stud.: Maybe it's like when you want to show the basic thing that you are talking about, but also you have to know a lot of things around it. So if we didn't have to write what we recall, maybe I would just look at this not take notes, but write as much as you recall, so I wrote

Int.:   O.K. Anything else you would like to say?

Stud.: No. I think that this is a good because sometimes you understand everything that a person is talking, but the problem is when somebody asks you to write as much as you can recall and then you ooey. I

understood, but I didn't intentionally, oh I don't know memorize intentionally. Because you are just like watching TV, you don't care if someone is going to ask you "what did He say" or...

Int.:   No.

Stud.:   But when you are supposed to write about something you hear, you put more attention and try to memorize.

Int.:   Sure. Try to remember. So try to organize it too.

Stud.:   Yeah.

Int.:   It'll help you remember.

Stud.:   Yep.

Int.:   O.K. Thank you very much.

Student # 7

Int.:   So, generally speaking, what did you think of the visuals for listening?

Stud.:   I think the visuals are useful, but I find it a little bit difficult to understand sometimes. And I prefer really to write all the things that I heard or that I think is important.

Int.:   O.K.

Stud.:   and not with the visuals.

Int.:   So for your note-taking you wanted to take your own notes.

Stud.:   Yes.

Int.:   You think the visual helped you at all to see how the text would be organized or...?

Stud.:   Sometimes it confused me.

Int.:   Did it?

Stud.:   Yes.

Int.:   O.K. Let's see for the Fortune Cookies you took notes on the back of the page here and I guess you described the situation first and then you put a list of all the problems.

Stud.:   Yes.

Int.:   And the solutions. Now that was the order it was presented, wasn't it? In the text.

Stud.:   Yes.

Int.:   They talked about all the problems and then they talked about the solutions. O.K. and then you talked about the final solution to the problem. O.K. Now for the Children and Creativity text, it looks like you

came up with something quite similar. Did you make this..Well you read this chart I guess. The chart I gave you.

Stud.:   Yes.

Int.:   Did you keep that in mind while you were taking the notes?

Stud.:   No because it was only for me. I didn't plan to give this to Bianca.
Int.:   That's fine. But how did you

Stud.:   But she ask...

Int.:   How did you come up with the same thing? You..

Stud.:   Because I want this for the questions after.

Int.:   Oh I see. You didn't realize you couldn't have them.

Stud.:   Yes.

Int.:   I see. So you just made a copy. O.K. But your notes are a little bit different. You talked about creativity in general at the beginning, but you seem to have organized part of it the same way as the chart. This text was harder, wasn't it? Children and Creativity.

Stud.:   Yes. I think all were hard.

Int.:   Were they all hard?

Stud.:   Yes.

Int.:   Really? And did you think the chart helped you to understand this part?

Stud.:   Yes.

Int.:   Because Margaret Mead jumped all over the place. And yeah? O.K. And what when you came to write your recall, how did you think about what you were going to say? Remember you had to write the summary after? How did you go about doing that?

Stud.:   Well because I remember the...the

Int.:   The chart?

Stud.:   The chart. And with that I started writing.

Int.:   O.K. So it helped you to remember it?

Stud.:   Yeah.

Int.:   Well that's good. How about in the Fortune Cookies. Or you were referring to your own notes..

Stud.:   Yes.

Int.:   And that was your first text. The first time you tried it. How about the third time? This time it looks like you took your notes right on the...

Stud.:   On the

Int.:   On the visual. So did you find that visual more helpful or...?

Stud.:   Yes. Only it was blank.

Int.:   Ah, so you like it blank. So you like to do it more yourself?

Stud.:   Yes.

Int..:   O.K. So do you think now if you were doing a listening comprehension, if you were doing lectures , you know, if you were studying in English, do you think you would use visuals at all or would you still try to write down everything they said?

Stud.:   I think I would try to write everything. Yes.

Int.:   Do you think you might afterwards organize it into some kind of visual?

Stud.:   Yes. Yes.

Int.:   so you have an idea how it's done now? Would you like more practice on visuals? You already know.

Stud.:   Yes.

Int.:   Enough was enough.

Stud.:   Enough.

Int.:   O.K. And really you'd like to do your organization yourself. Take your notes yourself. Oh do you write down everything the professor says?

Stud.:   Not everything. But I think the main points. Because sometimes

Int.:   Good. Good.

Stud.:   we write too many things, too many dates and after it is not useful.

Int.:   Helpful.

Stud.:   Yes.

Int.:   Yes. Exactly. Very good. O.K. And you found the texts quite difficult. What area are you studying or what are you interested in?

Stud.:   I am interested in hotel management.

Int.:   Hotel management. I see.

Stud.: All the topics were scientific.

Int.: Even the Fortune Cookies?

Stud.: Hm Not .

Int.: That was kind of interesting.

Stud.: But I think that the whole class thinks that the topics are too scientifics.

Int.: Too scientific. Oh. Anything else to say?

Stud.: No.

Int.: O.K. Well thank you.

Student # 8.

Int.: Mona, what did you think about using the visuals for listening comprehension? In general?

Stud.: In general.

Int.: Did you find it helpful or...?

Stud.: It's sometimes very confused. If I have only just the plain sheets, it's more easy to taking notes or something.

Int.: O.K. And what kind of notes do you take when you usually, if you're doing it on your own? What would you write? Did you write on the back? No.

Stud.: I usually use the very simple, simple signs or signals. I usually make Oh my own signal.

Int.: I see. So you usually use your own abbreviations. Do you do it in English or in Korean?

Stud.: In Korean.

Int.: You do it in Korean! So you didn't like the chart in English! That's the problem.

Stud.: That's the problem. And for me then, taking note is very difficult because I can't just concentrate on listening. When I listen to something, I can't do any other things. So...

Int.: I see. So you like to listen the first time then and then what would you do? Take notes after you heard it?

Stud.: Yes.

Int.: Take your notes right away.

Stud.: Yes.

Int.: What if you were in a class and it was an hour class could you still...Would you still do that?

Stud.:   Yes.

Int.:   You're able to take your notes at the end of class.

Stud.:   Yeah.

Int.:   You must have a good memory.

Stud.:   No. So sometimes I miss the some important thing, but I prefer taking note after class.

Int.:   O.K. How . You did fill this in. Did you fill it in when you listened the second time?

Stud.:   Yes. At first I just listened everything. And the second...that time I just think maybe this one is important. Maybe I have to take notes this part. And after that second time I write everything.

Int.:   And I guess Bianca talked about the visual in class?

Stud.:   Yes.

Int.:   When it came time to write the recall, you remember when we took the notes away, did this help at all or did you still think of your own notes?

Stud.: This time? That time I mixed my own notes and your key and I used that also.

Int.:   O.K. How about the next one was Children and Creativity.

Stud.:   It was thing for me because I like scienctic parts so Yeah. So it depends on what kind of subject.

Int.:   It was too much about art.

Stud.:   Yeah. So. I can't understand this one.

Int.:   O.K. It was actually the hardest text. Did you think so?

Stud.:   For me it was the hardest one.

Int.:   It's because she didn't follow the order. All over the place. Well did that help? Did the chart help you?

Stud.:   No. It didn't.

Int.:   Even after that? And when Bianca discussed the chart?

Stud.:   That time I was more confused.

Int.:   Oh really? And how about the last one at the bottom of the page?

Stud.:   This one wasn't helpful for me.

Int.:   So you don't like charts then? Do you remember things by words rather than by charts?

Stud.:   Yes.

Int.: I see. And what is your background? Your field of study?

Stud.: Mathematics.

Int.: Mathematics! I would have thought a math major would like charts.

Stud.: Yeah but I like charts from mathematics, mathematical background. Not English.

Int.: Certain formulas I guess..

Stud.: Mhm. Yeah formulas.

Int.: And you felt the same way about this one. This is the Fortune Cookie chart.

Stud.: this one was more helpful than the others.

Int.: Sorry. The Greenhouse is what we're talking about.

Stud.: Yes. Because I know the...

Int.: You have the background for it.

Stud.: Yeah.

Int.: So you knew the answers already. You knew...

Stud.: Yes.

Int.: It was all.

Stud.: I remember this one. I take good notes when I listen it first.

Int.: So when you don't have to concentrate so much on the listening, then you can take notes at the same time. I see. And when it came time to do your recall, did it help to know that there were 2, 4, 6 solutions suggested.

Stud.: Yeah.

Int.: That helped you to remember did it?

Stud.: But first I remembered the greenhouse effect. They say another thing not possible solutions. And this is a possibility, so at first I was a little bit confused because here we have only 2 division of visual key, but at first they say another thing like what is the greenhouse effect or what is the event, something so.

Int.: The causes.

Stud.: Yeah so that's why I write from here to here it's another thing.

Int.: I see.

Stud.: From here to here is another thing. From here is the solution

Int.: You took notes on that and causes and the description of the greenhouse effect.

Stud.: Mhm.

Int.: So generally speaking are you going to change your note-taking at all or are you still going to do it your way?

Stud.: Ah...

Int.: Or did you learn anything?

Stud.: Yes. I want to learn note-taking. Because it's very helpful to understand what...not miss important thing while I listen something. So I want to know where I want to learn. How to take note while I listen something.

Int.: Do you think you might use visuals yourself?

Stud.: .... (End of side 1)

Int.: You felt there wasn't enough time to learn to use visuals?

Stud.: Yes. And our class say, after last our class we are more used to using this method. So.

Int.: So. That's helpful.

Stud.: The last, maybe was yesterday we did another thing. We did Catherine, our teacher, she told us our recording ability, our memory is very nice. So we thought maybe it

Int.: The visuals..

Stud.: Yeah the visual key training was improve our memory.

Int.: O.K. I'll have to talk to Catherine about that.

Stud.: Yeah.

Int.: O.K. Well thank you very much

Student # 9

Int.: Maybe you could just tell me generally what you thought of the visuals. For listening. Was it helpful for listening or....?

Stud.: Sometime useful. Sometimes uselly. I mean the visual keys are just concentrated on some few parts so when...

Int.: I see.

Stud.: So when

Int.: You had to pick out what was important or what was on the visual and what wasn't.

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Stud.: Yes. I can see what is the topic and important part of this lecture, but because of this I cannot concentrate on the first part. I mean I was waiting for when you will say ..

Int.: I see.

Stud.: Sometimes it was an obstacle, but

Int.: Some students have said that they would have preferred to take their own notes the first time and then use it the second time.

Stud.: Yeah.

Int.: Is that how you felt?

Stud.: Yeah. It's better.

Int.: Now the first one was Fortune Cookies. And you didn't take too many, you didn't write too much on there, but on the back....Whoops. So you probably wrote the back part first, did you? So you took your own notes first, right? And then the second time, or maybe during the discussion.

Stud.: Maybe this is the first time.

Int.: The first time was the visual.

Stud.: Yeah and then I...

Int.: Then you decided you'd do it your own way.

Stud.: I didn't get too much so I will do it myself. And then write it down.

Int.: And you did your notes in English. Is that what you would do or...? You wouldn't use Korean for your notes. Or would you?

Stud.: I don't know but When I listen to English, to write down in English is better.

Int.: Yeah. Because you know you're going to have to, to... use it in English.

Stud.: And it's easy. It's easy to remember the phrase with the exact verb or exact words. So that's better.

Int.: Is that the problem with the visual, maybe. There aren't enough words to help you remember. You'd like to write down more, more ...exactly what the speaker said.

Stud.: Yeah.

Int.: Do you think you used the visual...When you had to do the recall task, what did you think of to remember it?

Stud.: Maybe what I wrote down.

Int.: What you wrote yourself?

Stud.: Yeah.

Int.:   O.K. So there's something about writing it yourself that helps to remember. How about the second one? That was Children and Creativity.

Stud.:   Actually, I didn't understand this lecture because you know this experiment . I'm very sorry because sometimes I was very tired and then the lecture is a little bit long.

Int.:   Ten minutes.

Stud.:   Yes.

Int.:   You found ten minutes a long time. It was Mon. afternoon wasn't it?

Stud.:   So. This one is the most difficult.

Int.:   That was the most difficult. What is your background?

Stud.:   Background?

Int.:   Are you in science? Or..?

Stud.:   French literature.

Int.:   French literature. Well then you should have like it. This one was about art.

Stud.:   But, it was difficult. And then I didn't understand.

Int.:   Did you talk about that in class before you listened?

Stud.:   Maybe. Yeah!

Int.::   O.K. Good. And you still didn't understand what it was.

Stud.:   Because I was sleepy.

Int.:   Ah I see.

Stud.:   That's another factor.

Int.:   Sure. It is. Do you think that, the second chart helped you to remember?

Stud.:   But maybe, I'm not sure, but this is not the order of the lecture. So it's more difficult.

Int.:   The lecture was hard because it jumped all around.

Stud.:   Yeah.

Int.:   And the chart was trying to give you a...

Stud.:   Yeah but

Int.:   a logical order.

Stud.:   But the more difficult the text is, I think the better, the better to use the visual key.

Int.:   Mhm. Do you think so?

Stud.:   Yeah. Because in this case I mean, making the fortune cookie we can understand according to the order, so we don't need this.

Int.:   You don't need it? Well O.K.

Stud.:   But if the lecture is very difficult, without this maybe I couldn't...

Int.:   I see. And the last one, did you understand that?

Stud.:   Maybe not.

Int.:   You didn't fill in the last blanks so maybe you didn't know what...

Stud.:   I didn't know.

Int.:   O.K. And the last one was the Greenhouse Effect. You have a lot of notes there. But they're not necessarily in the boxes.

Stud.:   Laughs.

Int.:   That's O.K. though. It's all around. Do you think the chart helped there or...?

Stud.:   Yeah because maybe without..., if there was not Bianca's explanation, maybe with this visual key I can predict it. So visibility so Maybe I can predict the order and the context.

Int.:   You know he's going to say six solutions.

Stud.:   Yeah.

Int.:   And then he's going to talk about whether they're feasible or not. And when you went to do your recall after, did the chart help you to remember?

Stud.: Yeah. Because the text itself was divided clearly so..

Int.: Uhmhm.I guess we could say it's better organized than the last text.

Stud.:   Yeah.

Int.:   It's a scientist speaking I guess. O.K. Any other comments on the experiment? Not Mon. afternoon?

Stud.:   This very important. Because maybe the score is very unstable.

Int.:   Yes? Depending on how tired you were?

Stud.:   Yes.

Int.:   O.K. Well thank you very much.

Stud.: Thank you.

Student #10

Int.: Could you just tell me generally what you thought of the visuals for listening   comprehension?

Stud.: I like your project because at first ESL, sometimes whenever I take the class, I don't feel I'm learning what I really want to. So, but your project, this is more academic and I can concentrate very much in short time.

Int.: So it was challenging and...

Stud.: Yes!

Int.: and academic?

Stud.: Yes.

Int.: And what is your background Yonnie?

Stud.: My background?

Int.: Your major.

Stud.: My bachelor is business administration and I graduated from university last Feb.

Int.: Good. And you decided that English would be helpful.

Stud.: Yes and at the first I planned to go to English school. Actually I have been preparing for GMAT.

Int.: Have you?

Stud.: Yes. I took twice already. In Korea and in Canada. Now.

Int.: How are you doing? Are you close?

Stud.: I losed my scores here in fact because I didn't study all that and I was very frozen because   I took the test with Canadian native speakers.

Int.: It made you nervous.

Stud.: Yes.

Int.: So you're going to try it again I guess, are you?

Stud.: Ah, yes I want to.

Int.: How many times can you try it?

Stud.: I don't think I will study right now. I need job experience.

Int.: That's a good idea.

Stud.: I need more English. I need more English skills. Well the schedule doesn't match to me very well.

Int.: I see. Are you staying in Canada next semester?

Stud.: Next semester. Yes. I'm going to change to another school to take business course or computer course.

Int.: Still in Ottawa or??

Stud.: Yes.

Int.: So you like Ottawa o.k.?

Stud.: Yes. Except for cold weather.

Int.: It's colder than Korea isn't it. Well the first text was about fortune cookies and it was about a business, so you probably liked that text, did you?

Stud.: Yes.

Int.: Talking about business problems. And what did you think of the visuals? For note-taking.

Stud.: It was very confusion for me. Really. And there were lots of information that the teacher key was not enough to write the information.

Int.: Yeah. You had to select what you were going to write down. You didn't take any other notes on the back or anything.

Stud.: I take the note with different, on another paper.

Int.: On another paper? O.K. And when you were asked to write the recall—remember we took away your notes. We took away those notes, did we? You didn't have your other notes.

Stud.: No, no.

Int.: O.K. That's good. And what helped you to remember the text then? Your own notes or the visual when you had to write what you remembered?

Stud.: The other things except for this were very helpful for me.

Int.: The visuals for the other texts you mean?

Stud.: Yes.

Int.: But not this one. Maybe it's because you knew too much about this subject.

Stud.: Ah no. I didn't know. Especially I like the greenhouse .

Int.: The greenhouse effect. You found that visual helpful?

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Stud.: Yes and..

Int.: You took nice notes right in the boxes. Nothing on the back.

Stud.: Garbage in Space, I liked it.

Int.: There you had to take your own notes.

Stud.: Yes.

Int.: I haven't looked at your notes yet. Did you use a visual?

Stud.: Yes.

Int.: You did! Great.

Stud.: Really when I finished this project and teacher she gave us whole sentences article, I found I missed a lot.

Int.: Even so. But you remembered quite a lot. I remember marking your papers and they were good.

Stud.: The first time I was just stumped.

Int.: Yes. The fortune cookies.

Stud.: I could feel I am getting better.

Int.: Good. That's nice. And do you think the visuals helped you to get better or?

Stud.: Yes. Absolutely I like these subject. The one thing is we don't have enough for that class in whole ESL.

Int.: I see. You just had the one lab a week, is that all?

Stud.: Each teacher has one lab.

Int.: Each teacher has one, so you went three time. And that's not enough. You like the lab.

Stud.: I need listening skills. I want to do this for additional class. After class or...

Int.: We do offer a listening class in Jan. And it's just listening. It's three hours a week. Listening practice. If you're still around...How about the second text. Do you remember that one?

Stud.: The round one?

Int.: The round one. Right. Let's look at your notes. Not too many notes there. Did you have another piece of paper again?

Stud.: I think so.

Int.: Did that chart, this is the second chart—did that chart help you to see how the text was organized?

Stud.: Ah. This is culture?

Int.: Yes.

Stud.: It was really difficult.

Int.: It's a difficult text isn't it.

Stud.: Yeah. Really difficult. This visual key was good.

Int.: It was good? It helped you to organize it?

Stud.: Yes. Very clear.

Int.: Because the text wasn't clear was it? It jumped all around. It was hard for me to make that visual to see what order, what organization

Stud.: This key visual help me well organized. The informations.

Int.: That's good.

Stud.: Also I missed lots of information.

Int.: Yes. She said a lot in her talk.

Stud.: Yes. Well when I fill out the key visuals, I don't fell very very difficult. I miss many informations.

Int.: A lot of details.

Stud.: Yes.

Int.: I guess it's like...I was trying to simulate a lecture if you were studying business and it was, you know if a person talked to you for an hour and a half, you wouldn't be able to catch everything they said. And you wouldn't write everything down either.

Stud.: I like this project really.

Int.: Good. Well thank you.

Stud.: It's very different subjects.

Int.: I tried to make them all different.

Stud.: Very refreshed.

Int.: Ah. Well thank you very much.

Stud.: You're welcome.

Int.: O.K. Thanks.