THE EFFECT OF SUBTITLED AND STAGED VIDEO INPUT ON THE LEARNING AND RETENTION OF CONTENT AND VOCABULARY IN A SECOND LANGUAGE

by

Iva Baltova

A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy,
Graduate Department of Curriculum, Teaching and Learning
Ontario Institute for Studies in Education of the
University of Toronto

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ABSTRACT

This study investigates how grade 11 students of French as a second language in Ontario (N = 93) learn content and vocabulary in French with authentic video. Students in a Reversed condition watched a brief video documentary with English audio and French subtitles first (reversed format), then with French audio and French subtitles (bimodal format), and finally with French audio without subtitles (traditional format). Students in a Bimodal condition watched the same video in a bimodal format twice, followed by a traditional format, and students in a Traditional condition saw the video three times in a traditional format. Prior to the intervention, all students were assessed for general proficiency in French and prior vocabulary knowledge in order to control for initial differences. Content learning was measured by a Content test, and vocabulary learning by a Vocabulary Knowledge Scale (VKS) and a C-Cloze. The

Content test and the C-Cloze were administered as immediate and delayed posttests, and the VKS was given as a pretest and a delayed posttest. Analyses of covariance revealed that the learning and retention of content in the Reversed and Bimodal conditions were similar and significantly superior to those in the Traditional condition. The learning and retention of vocabulary in the Bimodal condition were found to be significantly higher relative to the other two groups, whose outcomes were similar. Students' preferences for studying French with different kinds of input (text, sound and picture) were assessed in a Background Prequestionnaire. The majority of students in all conditions expressed a preference for reading (books and black-board), and for listening to the teacher (but not to audiotapes). Almost everybody who claimed attachment to watching video or TV (less than a quarter) was also reading-oriented. Students' input preferences did not affect significantly their performance on the tests, however. Finally, a Questionnaire given after treatment, revealed that students who were exposed to French subtitles reacted very positively to their use, and believed that the subtitles not only assisted their understanding of the video, but also helped them do the tests.

ACKNOWLEDGMENTS

CONTENTS

vii

BIBLIOGRAPHY

APPENDICES

LIST OF TABLES

LIST OF FIGURES

xi

CHAPTER ONE

INTRODUCTION

This thesis investigates how secondary students of French as a second language (L2) in Ontario learn vocabulary and content in French with the help of different formats of video input designed to provide increasing degrees of support to students' understanding of the L2 material.

Integrating the teaching of content (i.e., educationally valid and motivating themes) with L2 instruction is based on the belief that L2 acquisition is enhanced through the incidental learning of new language from contextually rich verbal input, while students are focussing on the meaning, rather than the form of the input (Krashen, 1985, 1989). Although there is no consensus that exposure to such input is a sufficient requirement for attaining native-like language knowledge and skills, most researchers today agree that it is a *sine qua non*. As demonstrated by a body of recent research, L2 acquisition is enhanced in environments where language is the medium of communication rather than merely the object of analysis (e.g., Genesee, 1991; Larsen-Freeman & Long, 1991). Comprehension-based L2 programs have also been found to specifically enhance vocabulary knowledge of both content words and discourse connectives (Paribakht & Wesche, 1993).

Different kinds of input (oral speech, written text, and visual cues such as setting, objects, people, actions etc.) have unique qualities of their own that may facilitate the comprehension and learning of L2 vocabulary and content. Video and TV, for instance, provide a wide variety of contextual cues, only some of which can be reproduced by audiotapes, and none of which are available in printed text (e.g., background sounds, intonation, quality of voice, body language, facial expressions,

1

physical actions, costumes, visible objects referred to, setting and more). However, not all these visual cues are necessarily helpful in making unfamiliar accents more accessible, in permitting the correct parsing of speech into distinct words, and enabling the listener to capture the entire ephemeral flow of speech. The ability to see the picture and hear the speech at the same time does not improve knowledge of spelling, either. In written text, on the other hand, speech is already parsed into separate words, and homophones (sometimes ambiguous in oral language) which may have different graphemic representations are spelled out. Moreover, students can have access to textual input relatively longer than to fleeting oral speech. This holds true even in the case of subtitles added to video.

An interesting issue is what will happen if we combine the advantages of three kinds of input (sound, text and picture) in a complementary multi-sensory format in order to introduce new vocabulary and content. Will a video presentation in the L2 combined with subtitles in L2 produce superior results to a video without subtitles? Or will a video in the first language (L1) with subtitles in L2 be even more conducive to learning? Will complete initial understanding of the content (when assisted by L1 oral translation) be more valuable for vocabulary learning (from L2 subtitles) than an attempt to infer the meanings of words from visual contextual cues (i.e., video with L2 subtitles), which will use up more mental space? The present study addresses these questions.

Although the mastery of L2 vocabulary[1] is essential to L2 learning and use in general (Harley, 1995), as far as the study of French as an L2 in Canada is concerned,

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[1] In this study I adopt the view that L2 vocabulary knowledge is layered (see Wesche & Paribakht, 1996), ranging from simple recognition of a lexical form to the ability to use the word in a semantically appropriate and grammatically correct sentence. Although L2 lexical competence undoubtedly extends beyond the level of the sentence and comprises both written and oral skills, for the purposes of the present research, I have limited the object of investigation to five levels of vocabulary knowledge.

vocabulary acquisition remains an area that we know very little about (Lapkin, Harley & Taylor, 1993, p. 19). Knowledge of the lexicon in an L2 is undoubtedly crucial to the learning of academic content through that language. Words are the main carrier of information and conceptual knowledge. Research in L1 reading comprehension (see Curtis, 1987) as well as L2 reading research (Alderson & Urquhart, 1985) has shown that there exists a very close relationship between vocabulary knowledge and text comprehension. At the same time, the understanding of relevant content and increased background knowledge of the subject matter stimulate further vocabulary growth (Ellis, 1994). Therefore, it is evident that both vocabulary growth and content learning are not only essential for language learning, but also tightly intertwined.

The teaching of vocabulary and content are both key aspects of contemporary "core French"[2] programs in Canada as specified by the multidimensional curriculum, designed to enrich these programs (Chatlain, Pineau, Pynch-Worthylake, Sotiriadis, Piccolo, Coutu-Vaillancourt, & Seaward-Gagnon, 1994; LeBlanc, 1990; Tremblay, Duplantie, & Huot, 1990).

The multidimensional curriculum proposed by Stern (1983) is designed to ensure a more educationally sound learning environment for core French students by bringing in important topics and themes other than the L2 *per se* (i.e., cultural content, general language education, and non-trivial communicative activities). The multidimensional curriculum thus has four (rather than only one) syllabi: a language syllabus, a culture syllabus, a general language education syllabus, and a communicative-experiential syllabus.

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2 Core French is a program where French as a second language is taught as a subject. At the Board of Education participating in this study, core French students start learning French in grade 1 with 40 minute daily periods, which amounts to 120 instructional hours per year. In grade 11 core French is an optional subject. At the secondary level, some schools at this board have adopted a "semestered" program, where class periods are 75 minutes long. Students in semestered schools accumulate the same number of instructional hours in French at the end of the academic year, but they have the subject for only one term per year.

Of particular interest for this thesis is the communicative-experiential (C/E) syllabus serving as the "organizing principle" in the implementation of the multidimensional curriculum (Chatlain et al., 1994, p. 5). The C/E syllabus emphasizes learners' participation in authentic communication situations. Exposure to content that is interesting, grade-level appropriate, and educationally valid is at the heart of this syllabus. Attaining the general communicative objectives of the multidimensional curriculum requires the teaching of L2 comprehension and production in a meaningful context; and attaining its general experiential objective entails the development of knowledge through a variety of language experiences (Tremblay et al., 1990, pp. 18-20).

The C/E syllabus emphasizes exposure to authentic texts, where students are expected to use a variety of contextual cues to guess the meaning of words, such as visual aids, the use of titles or subtitles, listening to a text repeatedly, etc. (Tremblay et al., 1990, pp. 43, 45). The video presentations used in the present study contain a wide range of visual cues, and students are exposed to the video three times in a row. Also, the text chosen for this study, which is about a scientific expedition in the Arctic led by a Canadian botanist, relates directly to the C/E syllabus inventory of "fields of experience" that are appropriate for grades 10 - 12, and specifically to the one labelled "Experiences with Science" (p. 42).

Last, but not least, within the framework of the multidimensional curriculum it is also argued that "even within the confines of a second language class, language acquisition can be ensured, at least in part, without conscious attention being paid to the language itself" (Tremblay et al., 1990, p. 86). The notion that L2 vocabulary learning, for example, can occur without conscious attention to the words is challenged in the present thesis, and evidence is presented to substantiate the argument that conscious attention to form is indeed necessary in order for L2 learning to take place

(see section 2.2). Nevertheless, the belief that learning and retention of L2 vocabulary will be ameliorated with the use of an informative and visually enhanced context when processing input for meaning is supported.

The learning of L2 vocabulary and content through video and subtitled video has not previously been researched in a core French setting. Therefore, although the use of contextual support (viz., visual aids and subtitles) in core French to assist content and L2 learning is encouraged by the multidimensional curriculum, we still do not know how to use such support in the most efficient ways. The role of visual aids and video in the core French class has been recognized as an important curriculum issue (among others) in need of research (e.g., Lapkin, Harley & Taylor, 1993). It follows that the potency of subtitled video input deserves to be investigated.

The present thesis addresses the issue of how grade 11 core French students learn vocabulary and content through combined input (picture, text and sound). The theoretical underpinnings of the present study and relevant prior research are described in detail in chapter 2 of this thesis. Chapter 3 presents the specific research questions and hypotheses of the study. It also describes the research design, including the treatments, the sample, and the instruments employed. Chapter 4 reports the data analysis and results. The findings and limitations of the study are then discussed in chapter 5. Finally, chapter 6 outlines the contributions of the thesis to L2 curriculum theory and practice, as well as further research directions.

CHAPTER TWO
BACKGROUND AND RATIONALE

This chapter is primarily concerned with the issue of comprehensible input and its role in L2 comprehension and learning. Emphasis is placed on the informativeness of visual cues in the input. The chapter also describes a number of studies relevant to the present thesis, where researchers have examined the effects of using different kinds of visual support in instructional settings. A short section will also consider how students' L2 proficiency and preferences for different kinds of input (i.e., text, sound or picture) in learning are likely to relate to the instructional appoach used in this study.

2.1 COMPREHENSIBLE INPUT

For over a quarter of a century now, in the era of communicative language teaching, second language teachers have been aware of the importance of authentic language input for the adequate development of their learners' communicative competence. L2 teachers and researchers have also been searching for ways to make input "comprehensible": that is, just beyond the learner's level of language proficiency, but understandable from contextual clues (see Krashen, 1985). Regardless of the arguments surrounding the exact role of comprehensible input in L2 language learning, or what exactly constitutes comprehensible input, many have agreed that comprehensibility of L2 speech is a necessary factor in making language material available for learning (Dunkel, 1991; Lund, 1991; Mendelsohn, 1994; Morley, 1992; Rost, 1990).

The extreme version of this belief has produced language learning theories and

language teaching approaches where listening comprehension is the keystone of instruction (e.g., Asher, 1969; James, 1984; Krashen, 1985; Krashen, Terrell, Ehrman & Herzog, 1984; Lozanov, 1979; Winitz, 1978; Winitz & Garcia, 1986). The proponents of these approaches, called by Vivian Cook the "listening firsters" (Cook, 1986) focus on beginning learners, or occasionally on intermediate learners, of a non-native language (e.g., Winitz & Garcia, 1986) and assume that continuous exposure to that language or to input which is comprehensible to the learner is all that is needed to achieve language acquisition (e.g., Lozanov, 1979; Winitz, 1978).

2.1.1 Visual Cues

In selecting authentic oral materials for L2 teaching, where the L2 speech is naturally fast, varied in voice characteristics or accents, and fleeting in nature, researchers have found that a wide array of visually perceived cues of both a still and a kinesthetic nature (e.g., facial expressions, lip and jaw movements, eye contact, body language, setting, objects referred to, and actions performed by the characters) constitute powerful enhancers of listening comprehension when added to the stream of L2 speech.

Mueller (1980), for instance, carried out two methodologically identical experiments with beginning college students of German of higher and lower proficiency levels. He discovered that appropriate contextual visuals such as professional drawings that were redundant to the text and depicted the situation, the participants, their relationships to one another, and the concepts used in the experiment, promoted comprehension for students with relatively undeveloped language skills. When asked to listen to a brief audiotaped interview in German and write a summary of it in English, the lower level beginners significantly outperformed a control group who were not shown any visuals.

More recent studies have explored the role of visual support in L2 understanding through the use of videotapes. Rubin (1990) investigated how the listening comprehension of high-school Spanish language learners was affected by watching video episodes during 12 consecutive lessons over a period of six weeks. She found that the scores from pretests to posttests on the related comprehension quizzes improved by 50% for those who watched videos regularly for six weeks, and that the scores of those who watched video only during the pretests and posttests improved by 32%. The gain scores of the two groups were significantly different. Rubin concluded that "video can serve as a haven to enhance listening comprehension if it is selected so that it provides sufficient clues for information processing" (p. 315).

In another study, Secules, Herron, and Tomasello (1992) compared video-based instruction in French for English-speaking university students to a more traditional approach with classroom exercises and drills. Results indicated that those in the video condition outscored those in the non-video condition on a comprehension quiz given in the L1. What is more, this gain did not come at the expense of reading and writing skills. Yet another study with Anglophone learners of French at the beginning university level in Ottawa revealed that non-familiar vocabulary which related directly to the situation of the dialogue was understood and retained better when presented with video, as opposed to audio presentation only (Duquette, 1993). Further, according to another experiment, core French eighth-graders in Ontario achieved a better global understanding of a story presented on video than a control group who listened to the same story on audiotape only (Baltova, 1994). Finally, a case study described how Laura, a 10-year-old Finnish girl, developed outstanding listening skills in English by regularly watching video cartoons on her own (Jylha-Laide & Karreinen, 1993). In less than four years the young student surpassed ninth-graders (herself being in the third grade) on a listening test, as well as on a vocabulary test in English.

The evidence presented so far has unswervingly demonstrated that non-verbal visual stimuli have an enhancing effect on L2 listening comprehension. These findings are consonant with a growing body of literature where it is argued that visual cues naturally support human communication, and are tightly intertwined with the processing of both one's L1 and L2 (for extensive literature reviews see Kellerman, 1990; 1992; Pennycook, 1985; Raffler-Engel, 1980; and Riley, 1979).

Teaching with video has demonstrated that visual context such as setting and characters can generate powerful predictions about the type of discourse to follow; that seeing the objects, places and events referred to in the dialogue helps listeners infer the meaning of new vocabulary; and that gestures, actions, setting etc. can replace entire utterances that have been either not heard or not understood. Therefore, informative visual cues which accompany L2 verbal input can bridge gaps in learners' understanding. But, if meaningful visual cues can act as "gap fillers" in the input, can they also act as gap fillers in learners' knowledge structures? In other words, does better comprehension result in better learning of vocabulary and related content?

2.2 COMPREHENSION AND LEARNING

Successful language comprehension depends on lexical access (comprising decoding of input and word recognition). In L2 reading, decoding involves the transformation of a string of letters into a phonetic code (Geva & Clifton, 1994, p. 647); and in L2 listening, decoding involves the analysis of phonemic sequences, pauses, stress, intonation, loudness, and tempo into complete phonological units, as well as recognizing unit boundaries (Rost, 1990, p. 34). The decoded symbol is then matched to a meaning, and (assuming that such a match has already been established by the learner) retrieved from memory, and results in word recognition. The learning of an L2 requires the retention of formal features of the message and the establishment

of links between forms and meanings (Sharwood-Smith, 1986). Both comprehension and learning in an L2 are complex cognitive skills and involve a number of controlled (not automatic) processes and attention-demanding operations (McLaughlin, 1990). Due to less automatized decoding skills and incomplete or unstable lexical knowledge, lexical access in L2 input processing is typically slower and more effortful than L1 input processing.

Although researchers and teachers have succeeded in boosting the comprehension of L2 learners whose reading and listening skills are not completely automatized through the use of visual support (see studies, cited in 2.1.1), it is unclear whether such an approach (without any viewing and/or postviewing tasks which compel learners to engage in the processing and production of language forms) can result in increased L2 learning. A number of studies have empirically demonstrated that simple exposure to contextually rich "comprehensible" input, even when containing abundant and repeated contextual cues, does not necessarily and automatically produce measurable language learning (see, e.g., Harley, 1992; Mangubhai, 1987; Secules et al., 1992; Swain, 1985; and the studies reported in Chaudron, 1985 which show "only an inkling" of a relationship between comprehensibility of input and learning). In reasoning about L2 vocabulary learning from reading, Coady (1993) remarks that the "very redundancy or richness of information in a given context which, on the one hand, enables a reader to successfully guess an unknown word also predicts, on the other hand, that the same reader is less likely to learn the word-form because he or she was able to comprehend the text without needing to know it "(p. 18).

L2 learning where the learners' focus of attention is on the meaning of the message rather than on its linguistic form, and where learners are not deliberately trying to learn new words, is referred to as "incidental learning" (Ellis, 1994). This

kind of learning is contrasted with "intentional" learning, where learners are deliberately trying to retain words or formal features of the language. In the psychological literature, the distinction between incidental and intentional learning has traditionally been based on the type of instructions learners were given prior to completing a task. If learners are instructed to pay conscious attention to specific linguistic forms in the message or to study a list of words out of context, for example, because they are going to be tested on the same forms afterwards, learners are said to engage in intentional learning (Hulstijn, forthcoming). Conversely, if students are given a text to read without being forewarned of a forthcoming test, the learning that may occur is said to be incidental. The difference between the two kinds of learning is not regarded as important in this thesis, however. As Hulstijn argues, the theoretical distinction between the terms incidental and intentional has currently become almost "vacuous", since it is the nature and frequency of input processing activities that determine retention of new language and content, and not so much the fact whether students were forewarned about a posttest or not, or whether they had the intention of learning something or not (Hulstijn, forthcoming).

Today a number of scholars agree that in order for efficient language learning to take place, the learner has to pay attention to the form of the message and notice new formal features of the language (e.g., Gass, 1988; Harley, 1994; Hulstijn, forthcoming; McLaughlin, 1990; Sharwood-Smith, 1986; Schmidt, 1990, 1994; VanPatten, 1994). A growing body of language experts is concerned with the issue of how to make students pay attention to the form of the code in order to enhance L2 learning (e.g., Cohen, 1991; Harley, 1994; Leo van Lier, 1994; Loschky & Bley-Vroman, 1990; Paribakht & Wesche, 1997; VanPatten & Cadierno, 1993). Unfortunately, the human brain is a processor of finite capacity and allotting too much processing time to understanding the input will logically deplete processing capacity

for studying and learning linguistic forms. An interesting and much quoted paper by Faerch and Kasper (1986), for example, reports research which suggests that if students are trying to comprehend the meaning of a spoken text, they may not be able to learn linguistic forms of the L2, and conversely, if they are paying attention to its form, they may not comprehend much of the message.

VanPatten (1990) also addressed the issue of whether L2 learners could simultaneously attend to meaning and form, and under what circumstances. He conducted a study with 202 university students of Spanish at three different proficiency levels who listened to a passage for content. Some students were instructed to attend to formal features in the passage and others were not. Results revealed that simultaneous attention to meaning and to non-communicative, morphological forms (e.g., the article *la*, and the bound morpheme {*-n*}) had a negative effect on the comprehension of content. However, simultaneous attention to meaning and to important lexical items closely related to the story (e.g., the key lexical item *inflacion*) did not affect the comprehension of content. Therefore, based on VanPatten's research it can be predicted that the simultaneous learning of L2 vocabulary and content with subtitled video will be pedagogically effective if the target vocabulary is tightly intertwined with the meaning of the story.

The paying of conscious attention to new vocabulary items may help to explain the improved vocabulary knowledge in addition to improved comprehension found in two of the studies using comprehensible video input that were cited in section 2.1.1 (viz., Duquette, 1993; Jylha-Laide & Karreinen, 1993). We are told that the Finnish girl Laura in Jylha-Laide and Karreinen's case study benefitted from repeated exposure to the video and the ability to control the input in terms of what specific parts she wished to watch again. These parts contained new forms which Laura was trying to make sense of by watching them many times. In other words, she was

consciously directing her attention to selected items and trying to acquire them. It is also significant that Laura frequently engaged in interaction with other speakers of English, and that besides being exposed to comprehensible input, she was also producing "comprehensible output", thought to be an important strategy in L2 development (see Swain, 1985). Of course, one should not forget this girl's strong personal interest in watching English videotapes.

In Duquette's (1993) experiment, students were asked to give English translations of previously unfamiliar French words that were presented in context. In other words, the researcher only tested students for recognition of vocabulary. Those who watched a video in French outperformed students who just listened to the story. The highest gains were observed from pretest to delayed posttest and from immediate posttest to delayed posttest. In other words, vocabulary gains for the video condition were higher on the delayed posttest relative to the gains demonstrated by the immediate posttest. Therefore, while a delayed experimental effect may have occurred, it is also quite likely that intellectually curious and motivated students (much like the Finnish girl Laura) had looked up some of the experimental words on their own accord after completing the immediate posttest. In other words, they consciously noticed new lexical items, which they interpreted and retained.

Further, of definite interest is the issue of how much of the actual language in contextually rich visual environments is comprehended by the learner. It may be hypothesized that in some cases, the meaningfulness of visual cues goes beyond "bridging" occasional "gaps" in understanding, by seriously diminishing or entirely replacing the necessity of language processing *per se*. In Mueller's (1980) experiments, for instance, lower proficiency beginning students of German were able to retell the content of an audiotaped L2 interview in their L1 significantly better when shown supporting still visuals prior to listening. But, there was no difference in the

way higher proficiency students performed on the same task with or without visuals. Since these visuals were completely redundant to the text of the interview, it may be the case that lower proficiency students derived their understanding of the interview entirely or almost entirely from the visual input. It would be interesting to replicate these experiments by adding a control group who are exposed only to the visuals without listening to the text in order to see if such a group performs significantly lower than students who both listen to the text and see the visuals. Under the circumstances, however, we cannot be sure how much of the treatment effect in Mueller's study was actually attributable to enhanced comprehension of the language itself, and how much was derived from visual support alone. Similar misgivings could be expressed about all the cited video studies demonstrating that visual input enhanced listening comprehension, since none of them had a control group who watched the video without sound (e.g., Duquette, 1993; Rubin, 1990; Secules et al., 1992).

Baltova (1994) attempted to throw some light on the distinction between comprehension of the visual context and language-specific comprehension enhanced by supporting visual cues. In the initial study, video was found to boost learners' ability to listen for gist in French L2. Students who watched a brief videotaped story significantly outperformed students who only listened to the same story on an audiotape, but scored very similarly to students who watched the same story on video with the sound turned off. This outcome supported the informativeness of visual cues, but suggested that a fair amount of purely visual interpretation probably took place. Baltova then replicated this experiment by using a more textually-dependent version of the original multiple-choice test in the L1. In the revised version of the test, items that were entirely interpretable by visual input alone without the need of text were discarded and replaced by items that were visually supported but that also required some understanding of the text itself. The results showed that mean scores for the

video condition remained higher than those for the audio condition, but they were not significantly different. Therefore, although visual cues were still informative, they did not necessarily stimulate understanding of text proper.

The power of video in promoting understanding has led teachers to overemphasize the visual element in L2 teaching (see Vanderplank, 1993). Ironically, as Vanderplank puts it, video is "a very verbal medium" :

> The real roots of television lie in sound radio, in the verbal message. Most television programmes actually contain their messages in words, not in images. News programmes are still spoken reports supported by pictures, not vice versa. (Vanderplank, 1993, p. 11)

Unfortunately, in ongoing L2 spoken discourse, even when presented through video, much of the language is lost to the learner, due to a rapid speech rate, slower processing skills, unfamiliar or unstable vocabulary, and difficulty in parsing speech. The overwhelming nature of the task in an L2 cannot be remedied by supporting visual context alone, and sometimes not even by multiple replays of a video segment. So, even though learners are exposed to authentic and contextually rich materials, they receive something "very far from authentic exposure, as it were, in the native-speaker sense of engagement and appreciation" (Vanderplank, 1988, p. 279). Therefore, even if input is considered comprehensible, it is not necessarily accessible for learning.

The decoding of spoken French can further constitute a confusing task for L2 learners of any L1 background, due to a consistent poor correspondence in this language between phonological units (syllables) and semantic units (words) in the string of speech. That is why French is often cited by linguists as the language where phonological criteria provide very little guidance with respect to word divisions in connected discourse (Robins, 1971, p. 188). This is manifested in the following three typical phonetic phenomena: (1) *liaison* (a word ending phonetically with a voiceless

consonant which is immediately followed by a word beginning with a vowel or a silent *h*, syllabifies the consonant and vowel across the word boundary and the consonant becomes voiced), (2) *élision* (some monosyllabic words ending in silent *e* are joined to the following word by an apostrophy if this word starts with a vowel or a silent *h*), and (3) *enchaînement* (a word ending phonetically with a consonant and immediately followed by a word beginning with a vowel or a silent *h*, syllabifies the consonant and vowel across the word boundary). For example, in the French utterance " *...tous les ans, l' été descend sur le Haut Arctique.*" (" ... each year, summer comes to the High Arctic."), taken from the script of the video documentary used in this study, we can observe all three phonological phenomena mentioned above, respectively: *les_ans* (liaison); *l'été* (élision); and *Haut_Arctique* (enchaînement). Therefore, three of the 12 syllables in this French utterance fall on word boundaries (see bold font). This can be transcribed as follows: [tu-lɛ-**zã**-le-te-dɛ-sã-syr-**lǝ-o-tar**-tik].

The hard task of determining word boundaries in listening to French as an L2 has been commented on by Matter (1986). When syllabic boundaries in spoken French override lexical boundaries, the result is frequent and amusing puns, even for native French speakers (e.g., *Il couche a l' hotel au Lion d' Or*. (He is going to bed at the Lion d' Or Hotel.) vs. *Au lit on dort*. (We sleep in bed.), p. 244). According to Matter, for literate learners, oral L2 decoding appears to be a more difficult endeavour than the reading of an equivalent L2 printed text, where word boundaries are clearly marked by orthographic rules and punctuation.

In addition to common difficulties in the acoustic perception of connected speech in any L2, the French language has its own confusing peculiarities for Anglophone learners. Recent phonological research has shown that French is a "trailer-timed" language (i.e., the rhythmic groups are marked by a lengthening in the

final syllable of the group) as opposed to English which appears to be a "leader-timed" language (i.e. the rhythmic groups are delimited by initial stronger syllables) (Wenk & Wioland, 1982; Wenk, 1986). The opposing rhythmic structures of the two languages are believed to account for cross-linguistic influences in pronunciation (Wenk, 1986). But it is quite logical to assume that the same prosodic differences will contribute to perceptual confusion as well, when learners whose childhood language is English are trying to listen to French discourse. Such learners of French are likely to have difficulties in identifying the beginning and end of "breath groups" which will result in imperfect distinctions of word boundaries.

Students exposed to written input also have more time for lexical access, since they do not have to make word boundary decisions, and since they are exposed to the text longer (even in the case of subtitles) than they are to ephemeral oral input. Related to this observation are the findings of an experiment with university students of French L2 in Holland, who listened to authentic French radio broadcasts (Hoeflaak, 1994). Students who were given clues on word boundaries (the first letter of each word in a listening test was provided) performed better than students who were given clues on what grammatical category the word belonged to, or a paraphrase of the word in question, or no clues at all. The researcher did not investigate how these supporting clues may have affected students at different levels of proficiency, but it is likely that students with a weaker mastery of the code would have profited more from this kind of support.

In sum, the evidence presented so far does not provide the necessary basis for concluding that the contextual richness of video input is alone sufficient to produce language learning in addition to enhancing language comprehension, although some incidental learning may occur. What is more, the informative power of visual cues itself can in some instances override the necessity to actually process language input

per se. Learning of L2 vocabulary will occur only if new lexical items are consciously attended to and processed for meaning. Evidence has demonstrated that it is actually possible to simultaneously process L2 input for meaning and for lexical forms which are closely related to the content of the story, provided that students' mental resources are not entirely used in the effort to understand the message (VanPatten, 1990). In this connection, it is believed that improved comprehension will have a positive influence on the process of L2 learning. In ongoing L2 spoken discourse, much of the language is lost to the learners due to their imperfect processing skills, to fast speech rate, and to specific features of the L2. However, there is evidence that the use of prompts in the form of printed text in listening enhances students' listening comprehension and recall of L2 words. It will be further shown in the next section that the addition of printed L2 text (i.e., subtitles) to video serves as a more efficient instructional resource than video alone.

2.3 SUBTITLES

After the National Captioning Institute in the U.S. began transmitting closed-captioned TV programs (electronically imposed subtitles in the same language at the bottom of the TV screen) for the hearing impaired in 1980, a number of language teachers and researchers successfully experimented with the use of captioning for the teaching of ESL or EFL to hearing students. They concluded that closed-captioning was a successful vehicle for improving L2 comprehension and acquisition (Chung, 1996; Garza, 1991; Goldman, 1996; Neuman & Koskinen, 1992; Price, 1983; Vanderplank, 1988, 1993), as well as literacy skills (Goldman & Goldman, 1988; Koskinen, Wilson & Jensema, 1985). Students who were exposed to this approach also demonstrated positive attitudes and confidence in their ability to learn the language (Chung, 1996; Vanderplank, 1988).

In 1982 the National Captioning Centre in Toronto, and its counterpart Centre National du Sous-titrage in Montréal, began generating closed-captioned programs in English and French respectively for TV viewers in Canada. I am not aware of any studies which have targeted the efficiency of such programs for the teaching of French L2. However, the studies of researchers who digitally generated subtitles in French and added them to a variety of French language materials recorded on video tapes (or videodiscs) for L2 learners echoed the positive findings of ESL/EFL captioned studies (Borràs & Lafayette, 1994; Danan, 1995). The merits of graphic support were also corroborated when L2 subtitles were used for the teaching of foreign languages such as German (Gielen, 1988), Russian (Garza, 1991), and Spanish (d'Ydewalle & Pavakanun, 1996).

2.3.1 Some Empirical Findings from Studies with Subtitled Video Input

A number of closed-captioned video studies, or studies where subtitles in L2 were added to L2 video materials, have revealed that this viewing method improves listening comprehension, compels students to do more language-specific processing, and enhances vocabulary learning, verbatim recall, and memory of content.

A pioneer pilot study (Price, 1983) conducted with about 500 ESL learners who watched captioned TV programs, revealed that students' global listening comprehension in English was greatly improved. Also, "viewers, regardless of educational level or language background, benefitted significantly from captioning, even with only one viewing" (p. 8).

In an exploratory study by Vanderplank (1988), 15 university students of English L2 at a high-intermediate and advanced level watched BBC television programs with English language subtitles in nine hour-long sessions. Observation of these students, as well as students' own retrospective reports about the use of subtitles,

and their performance on language-oriented activities, revealed that they were able to follow text, sound, and picture simultaneously, without resorting to reading only. Students were better able to understand "fast, authentic speech and unfamiliar accents" (p. 275), and they appreciated the ability to monitor how well they understood the spoken language against the text. Of particular interest is Vanderplank's finding that the use of captions also helped the students achieve a high level of retention for the language used in the programs.

Vanderplank (1990) conducted a follow-up study with 15 students from the same population, all of whom watched a wide selection of popular BBC programs, subtitled in English, for four hours per week over a period of three months. The researcher fully corroborated his previous findings, but also discovered that a "crucial factor in learners' benefiting from subtitled programs in terms of measurable language and skills development was the degree of conscious attention paid to the language used in the programs" (p. 226). Learners who attended to the subtitles and took notes demonstrated a superior ability to recall both the language and the content they were exposed to. In contrast, learners who chose to view the programs as a source of entertainment, without paying much attention to the subtitles and without taking notes, were hardly able to recall any of the language and frequently used translation or their own words in written tasks and oral discussions. These students also confounded characters, events, and content introduced with the programs.

Similarly to Vanderplank, Gielen (1988) found that subtitled video enhanced students' memory of the language used in the text of the subtitles. In his experiment, Dutch students of German were given an unannounced memory test after watching a video segment from a popular German show. One group watched it subtitled in Dutch, and another watched it without any subtitles. The test presented each original subtitle, accompanied by three distractors (i.e., a grammatically correct sentence

which was syntactically different from the original subtitled sentence; a paraphrase of the original subtitle; and a sentence that had not appeared in the subtitles, but was still contextually possible). Results revealed an overwhelming recall effect for subtitles (93%) in the condition where people had watched the subtitled video. Learners who watched the video without any subtitles were able to recall only 43% of the utterances from the video that corresponded to the subtitles.

Further to the above studies, Garza (1991) conducted an experiment with 70 learners of ESL and 40 learners of Russian as an L2, all enrolled in advanced or upper-level language courses at different universities in Washington, DC. For each L2 he compared an experimental group who watched five video segments with subtitles in the respective L2 to a control group who watched the same video segments without subtitles. All subjects completed content-based comprehension tests (containing 10 questions) after viewing each of the videos twice. Results showed that the presence of L2 subtitles significantly enhanced listening comprehension. Further, five students from each condition were randomly selected for a brief oral interview and asked to provide immediate verbatim recall of a video segment of their choice. In concurrence with Vanderplank (1988), and Gielen (1988), Garza's findings demonstrated that recall of the language used in the segments was superior in the subtitled conditions, not only for ESL students, but for students learning Russian L2, where a different orthographic system (i.e., Cyrillic alphabet) is involved.

In another study, Neuman and Koskinen (1992) targeted 129 bilingual seventh and eight graders of various ethnic backgrounds who were learners of ESL in the United States. These researchers measured the effects of incidental word learning from context when captioned television (i.e., English subtitles added to a children's TV show) was used as comprehensible input for a period of nine weeks. The subjects were randomly assigned to four conditions: captioned TV, traditional TV without

captions, reading along and listening to text, and textbook only. Four measures were used, designed to assess a continuum of vocabulary knowledge ranging from word recognition to a full understanding of word meaning: a weekly 10-word recognition test, a weekly concept question, a sentence anomaly test given at the end of each three-week period, and a multiple-choice test given at the end of the experiment and designed to measure knowledge of all the target vocabulary items. According to Neuman and Koskinen's findings, the subjects in the captioned TV group consistently achieved higher mean scores on all word knowledge tests relative to subjects in the other three conditions. The results of the captioned TV group, however, were not always significantly different from the traditional TV viewing group. Once again, these results confirm that, for students who are beyond a beginning or low level of proficiency, the introduction of language and content through different modalities appears to enhance incidental learning from context, rather than overwhelm attentional capacity.

A further study, conducted by Borrás and Lafayette (1994), investigated the effects of multimedia courseware subtitling in the L2 on the speaking performance of 44 college students of French. These researchers used HyperCard (an "authoring" software package or software which is used to create computer applications) and videodisc technologies. Their French language courseware, although designed for the computer, was very similar to the subtitled video materials employed in the previously reported studies. The instructional method of this study was different, however, since instead of exposing all learners to a video presentation on a single TV monitor, students were each given access to a computer monitor and the option of navigating through the units of the program at their own pace.

Nevertheless, what Borrás and Lafayette, like other researchers, ultimately aimed to find out was how subtitled video exposure compares to video without

subtitles. Students who watched subtitled video segments and students who watched the same segments without subtitles were tested on oral description and narration tasks at two levels of difficulty. Their performance was assessed in terms of global effectiveness, accuracy, organization, and fluency. On both tasks, the researchers found significant advantages for the subtitled condition over the non-subtitled condition. Students in the subtitled condition also included in their narratives more of the original language used in the video.

Last but not least, there is evidence that students who are exposed to L2 subtitled video demonstrate a positive emotional response to this viewing method (see e.g., Borrás & Lafayette, 1994; Vanderplank, 1988, 1990). Chung (1996), in whose qualitative study captioned video was part of an instructional program in EFL, specifically asked students (204 low-intermediate adolescent learners in Taiwan) to comment on the use of closed-captions. According to her preliminary findings, 70% of the students reported that captions in the target language boosted their understanding of the video content.

2.3.2 Subtitled Video and Learners' Proficiency

In Borrás and Lafayette's experiment (1994), unlike the other studies with subtitled video, students were also given the option of controlling the pace of subtitles. This turned out to be a useful learning technique, although achievable only with video disk technology. Consistent with these findings, Zhao (1997) found that if L2 listeners were given the ability to control the speech rate of an audio recording on the computer, their listening comprehension improved. As demonstrated by Borrás and Lafayette, and by Zhao, the rate at which L2 learners read subtitles and/or listened to oral input related directly to their level of L2 proficiency.

It is important to note, however, that in Borrás and Lafayette's study, subtitles

completely duplicated the verbal message in the video. Therefore, successful reading of these subtitles without the need to replay the message would have constituted a very demanding task. Although it is not possible to give individual students control of the replay function or the speed of speech when subtitled video materials are shown to the entire class using a single monitor and a VCR (as is still the state of art in many classroom situations), it is possible to compensate for this shortcoming to a great extent by letting students see the video multiple times. It is also practical to use "partial" subtitles (rather than subtitles which are completely redundant with the script), where only key information is being rendered. For these reasons, in the present experiment only roughly half of the documentary video script was subtitled amounting to about 80 words per minute, or half the reading speed of proficient bilingual readers (see Segalowitz & Hébert, 1990, p. 511), and the video was shown three times.

Lower-proficiency L2 learners do not have the necessary automatic skills to process a spoken message in full, but they nonetheless tend to strain to understand every single word and become really frustrated when they naturally fail to do so (Brown, 1990; Conrad, 1985; Mendelsohn, 1994; O'Malley, Chamot & Kupper, 1989; Rost, 1990; Ur, 1984). Teachers have tried to "retrain" L2 learners to use global listening strategies in order to get the gist of the message, and this approach has been successful in developing learners' global listening skills, as well as in boosting their confidence in the ability to handle difficult authentic texts without the need to comprehend every single word. While this is undoubtedly a useful classroom technique, it is certainly not the only way to make use of authentic video input, particularly when more ambitious objectives than achieving global understanding are involved, such as vocabulary learning.

The tendency of less experienced L2 listeners to process L2 input word by word is parallelled in their heavy reliance on graphemic representation in L2 reading.

Lower-proficiency L2 readers have been found to depend primarily on graphic decoding (Cziko, 1980; Davis & Bistodeau, 1993; Geva & Clifton, 1994; Haastrup, 1991). This is hardly surprising, given the crucial importance of word recognition in L2 reading for comprehension (see Koda, 1996).

Cziko's (1978) experiments with beginning, intermediate, and advanced anglophone learners of French, and a comparison group of native speakers of French, revealed that L2 readers' language proficiency levels corresponded to increasing degrees of sensitivity towards different kinds of contextual cues. Beginners were not able to make use of such information, probably due to unautomatized orthographic and phonological decoding skills. Intermediate readers of French were able to attend to various syntactic constraints (e.g., articles usually precede nouns), and morphological constraints (e.g., a French word ending in -ion is likely to be a noun). Advanced L2 readers of French, much like the native French speakers, were able to attend not only to syntactic and morphological constraints, but also to semantic constraints (e.g., a noun at the beginning of a sentence is most likely to be followed by a verb phrase describing something the noun is likely to do), as well as discourse constraints (e.g., all the sentences in a text are related to the topic of the text). This study suggests that the simultaneous activation of L2 listening and reading skills, as well as exposure to visual contextual cues, can be efficient only if a certain mastery of bottom-up listening and reading skills has been attained, or if a certain "threshold of competence" (Cummins, 1979) in the L2 has already been reached.

All the studies exploring the use of subtitled video already discussed support this threshold assumption. The learners in the studies conducted by Vanderplank, Garza, and Borrás and Lafayette, for example, were all at an advanced level of L2 proficiency. In Neuman and Koskinen's study, only the subjects at a "mastery level of linguistic competence" were able to learn vocabulary from subtitled video input, but

the method did not work for students of limited L2 proficiency. In sum, these studies have an important principle in common: "the rich get richer" principle in simultaneous listening and reading (Neuman & Koskinen, 1992, p. 103), or "the Matthew effect" in reading (Stanovich, 1986), which is to say that in these experiments the more proficient students became even more proficient as a result of the respective treatments, but relatively less proficient students did not benefit from the method as much.

Similar prior research led Danan (1995) to hypothesize that in the case of beginning learners of French, L2 subtitles in combination with L2 audio can give relatively good results in terms of vocabulary gains only when the language is specifically geared to these learners' proficiency level. Subsequent research with less experienced language learners revealed the use of L2 video subtitled in L2 did not enhance their acquisition of the language, but when translation (viz., audio in the L1) was added to video subtitled in the L2, significant vocabulary learning occurred (Danan, 1995; d'Ydewalle & Pavakanun, 1996).

D'Ydewalle and Pavakanun targeted 74 low-proficiency Dutch learners of Spanish as a foreign language enrolled in a technical school. A Garfield cartoon was shown under the following nine conditions: L2 audio and L2 subtitles; L2 audio and L1 subtitles; L2 audio only; L1 audio and L2 subtitles; L1 audio and subtitles; L1 audio only; L2 subtitles only; L1 subtitles only; and picture only. All students were tested for their knowledge of L2 words appearing in the subtitles, their grammatical knowledge of subtitled sentences, and their recall of the video content (content recall was tested in L1). Results revealed that students who watched the video with L1 sound and L2 subtitles (referred to as "reversed" subtitling) scored significantly higher on the vocabulary and the sentence construction tests than students in any other condition. Students who watched the video with L2 sound and L1 subtitles (referred

to as "standard" subtitling) came out second best. Students in both reversed and standard subtitling conditions significantly outperformed the other conditions (not counting the ones which had only L1 input, of course) on the content recall test. There were no significant differences between the reversed and the standard conditions.

In Danan's pilot study (1995), 30 college students enrolled in second-year French classes watched twice a 5-minute video excerpt from a language program specially designed for first and second-year French college instruction ("French in Action"). There were three conditions: group 1 was shown the video with the French audio-track only (the way the original program was designed); group 2 was shown the video with French audio and English subtitles (standard subtitling); and group 3 was shown the video with English audio and French subtitles (reversed subtitling). Students were tested on a fill-in-the-blanks vocabulary test, where all the sentences were taken from the original script. For scoring purposes, only the exact phrases from the original test were accepted. Results indicated that reversed subtitling was by far the most beneficial condition, and that standard subtitling produced the worst vocabulary recall scores.

Danan (1995) then conducted another experiment where 57 first-year college students in French (less advanced than the previous sample) watched the same video excerpt, but the standard subtitling condition was replaced with French audio and French subtitles (bimodal video). Students' performance on the same kind of fill-in-the-blanks vocabulary test, and on a translation test of target vocabulary items, indicated a highly significant effect with respect to vocabulary learning for the reversed subtitling and the bimodal video methods relative to the group who watched the original unsubtitled program. Overall, the reversed condition performed significantly higher than the bimodal condition on the translation vocabulary task, but there were no significant differences between them on the fill-in-the-blanks

vocabulary task, although the reversed group tended to perform relatively higher on that task as well.

Encouraged by the promising results she had obtained when teaching relatively less proficient L2 learners with subtitled video, Danan (1995) carried out yet another experiment. This time her goal was to investigate how relatively more advanced students (but still of generally limited proficiency) learn with bimodal video and reversed subtitling, and whether they still benefit from the use of the "native language crutch" or the reversed subtitling method (p. 273). To this end she followed the exact procedure of the previous experiment with 15 college students attending third-year French classes. This time, there was only a bimodal and a reversed condition. Her analysis of variance did not indicate a significant viewing-method effect for the vocabulary fill-in test, but there was a significant effect on the translation test, where the reversed condition performed better than the bimodal condition, thus replicating the results of the previous experiment.

Based on empirical evidence from her experiments, Danan concluded that reversed subtitling facilitates the passive acquisition of new L2 words and phrases, and hypothesized that with sufficient reinforcement and practice students would be able to use the same words actively as well. She further proposed an instructional approach integrating into a complete curriculum video presentations shown first with reversed subtitling, then in bimodal format, and lastly in a non-subtitled format. In this approach the different kinds of video input become subsequent stages in a language learning process (Danan, 1995, p. 278-279). The first stage in this approach (reversed subtitling) should allow students to gain recognition of a number of new terms. When the learners see the same video in bimodal format soon afterwards, chances are that they will be able to identify and remember the new items. The bimodal input stage would prepare students to later comprehend the video without any subtitles. With

additional practice in class, learners should be able to progress to an active knowledge of the vocabulary in the video. Furthermore, as Danan reasoned, advancing from one stage to another would give students a sense of learning and progressing from the use of L1 crutches to the complete removal of L2 textual support, which is important in boosting students' confidence.

The use of reversed L2 subtitling as an initial stage in the teaching of an L2 seems to match the observation that learners of relatively less developed skills in that language frequently rely on mental L1 translation while reading in the L2 (Danchev, 1978; 1982; Kern, 1994, Prince 1996). Kern, for example, gathered think-aloud protocol data from 51 anglophone students enrolled in third-semester French at the university level who were given reading assignments throughout the entire semester. He found that the use of translation facilitated meaning construction and content recall, and generally acted as an "affective boost" (p. 450) reducing students' insecurity of reading in another language. The less automatic these students' word recognition skills were, the more dependent on mental L1 translation they were. By contrast, it can be expected that as students' L2 reading skills gradually develop, they would resort less and less frequently to the use of mental L1 translation. This in a way echoes Danan's stage model where the provision of L1 audio is intended only as temporary scaffolding.

The staged video approach proposed by Danan has not been researched yet. The present study constitutes a first step in assessing its merits for the acquisition of content and vocabulary in French as an L2. In this study, it served as a model for the "Reversed" video treatment and was contrasted to video exposure in bimodal format and/or unsubtitled French video. The present participants are roughly comparable to the participants in the studies conducted by Danan, and d'Ydewalle and Pavakanun, in the sense that overall, they had relatively less developed French language skills

(compared to L2 learners who participated in all the other subtitled video studies). Given the positive effect of reversed subtitling on similar students, it was expected that exposure to video with L1 audio and L2 subtitles would provide a superior learning environment for relatively less advanced L2 students compared to bimodal video input exposure.

The effect of the two subtitled viewing methods was further explored in a questionnaire asking students to comment on their ability to watch, listen and read at the same time, their perceptions of the subtitled treatments, their ability to follow the subtitles, and their reactions to factors that might have diminished their ability to read them. Asking students to think about their learning experiences is in synchrony with the multidimensional curriculum, which emphasizes a stage of "reflection" on what has been learned (LeBlanc, 1990).

2.4 STUDENTS' INPUT PREFERENCES

One of the research questions addressed in the present study involves students' preferences for different kinds of input (e.g., printed text, oral speech, or visuals) when studying French. Such a question undoubtedly relates to the longstanding issue of learning styles, which have been the focus of much research (e.g., Dunn, 1984; Dunn, Beaudry, & Klaus, 1989; Dunn & Dunn, 1979; Oxford & Crookall, 1990; Oxford & Ehrman, 1993; Reid, 1987). Unfortunately, the impact of learning styles specifically on the acquisition of vocabulary has been given less attention (Huckin, 1998). The concept of learning styles itself has not yet been clearly defined, and there is no satisfactory testing instrument that can determine whether learners are primarily visual, auditory, kinesthetic, tactile, or something else. This is probably so because learning styles are "general characteristics" in approaching the process of learning, rather than "specific behaviours" (Ehrman, 1997, p. 49). Classification into styles

labelled as "visual", "auditory", "kinesthetic" etc. is an oversimplification of complex and overlapping constructs that are often situation dependent (see Ehrman, 1997, chap. 4).

Of particular interest for the present study is that "visual" learners have been mainly identified as learners who prefer to study by reading textbooks and other teaching materials, rather than by watching video or TV (e.g., Reid, 1987). For the purposes of the present experiment, where L2 written text and visual cues presented by video are important separate variables, students attached to reading and students attached to watching video (i.e., "readers " vs. "viewers") need to be teased apart. The encompassing fuzzy concept of learning styles is therefore not a concern here, in that this study seeks to answer a much simpler question, such as what kind of input (textual, oral, pictorial, or some combination of the three) learners prefer to be exposed to when studying French, and how these learning preferences affect their acquisition of content and vocabulary.

2.5 SUMMARY

Oral, visual, and written input all have unique properties that can contribute in different ways to the comprehension and learning of an L2. As corroborated by empirical evidence, comprehensible video input can provide a wide array of visual contextual cues that can assist the comprehension of orally introduced vocabulary and content. Simple exposure to video input alone, however, is not sufficient to automatically produce measurable language learning. The learning of L2 vocabulary is achieved through conscious processing of new lexical items. Evidence has demonstrated that it is possible to pay simultaneous attention to both meaning and lexical forms, when the lexical items are closely related to the meaning of the story.

Recent studies show that closed captions or subtitles added to video can make

fast authentic speech in the L2 more accessible and comprehensible to learners by helping them parse the flow of speech correctly, disambiguate similarly sounding words or phrases, and by giving them longer access to the text relative to language that is only spoken. The addition of L2 subtitles to L2 video has been found to enhance language-specific processing and verbatim recall of L2 vocabulary and phrases. It follows that a combination of text, sound, and picture can be more powerful than a combination of sound and picture for the learning of L2 vocabulary and content. On this basis, it may be predicted that learners who watch an L1 video with L2 subtitles (reversed subtitling) or an L2 video with L2 subtitles (bimodal video) will both exhibit superior L2 learning to learners who watch an unsubtitled video. Further, if students are initially exposed to reversed subtitling, where they can listen to the content in their L1 as a first stage of the treatment, they will attain a native-like understanding of the story. Adequate comprehension of the content is likely to result in higher vocabulary retention. At least two hypothetical reasons for this are that: 1) good understanding of the content will leave more mental space for studying the vocabulary, and 2) good understanding of the content is essential for learning the vocabulary (cf. Henning, 1992). Logically, the greater the understanding of the content, the easier its retention as well. Students who achieve complete initial understanding of the video are therefore expected to be able to concentrate on the L2 better and retain more of the content than students who watch a bimodal video format, where they are not assisted by translation. These students are also expected to have more processing space for the target vocabulary during subsequent exposures to the same video and to learn more words. Therefore, the benefits of different degrees of contextual support ranging from more to less are expected to affect students' performance and retention of vocabulary and content in a predictable way.

Studying an L2 with different video formats is also likely to relate to different

levels of L2 proficiency. Lower proficiency learners are anticipated to benefit more from a higher degree of contextual support than higher proficiency learners. Finally, it is probable that learners' own preferences for one kind of input over another also affect the results of the treatment. On the one hand, learners who exhibit preferences both for watching video and for reading printed text are likely to do better in the subtitled conditions compared to learners who prefer to study language primarily through listening. On the other hand, students who have an exclusive affinity for watching video and TV are likely to do well with any of the treatments.

The present study attempts to test the predictions discussed above in the context of core French. Gaining insight into the comprehension and learning of vocabulary and content through the use of contextual support is consonant with the objectives and instructional approach of the multidimensional curriculum, designed to enrich core French programs. This study can also be regarded as a first step in researching aspects of Danan's (1995) staged video instructional approach, already described.

CHAPTER THREE

METHODOLOGY

3.1 RESEARCH QUESTIONS AND HYPOTHESES

The study seeks to answer the following research questions:

(1) *Research Question One:* How do the following three different ways of presenting a video in the secondary level core French classroom affect students' learning and retention of content and L2 vocabulary:

> (a) a reversed subtitled presentation of the video (L2 subtitles and L1 audio), followed by a bimodal subtitled presentation (L2 subtitles and L2 audio) and then a traditional presentation (L2 audio and no subtitles);

> (b) two bimodal subtitled presentations of the video, followed by a traditional presentation; and

> (c) three traditional presentations of the video?

(2) *Research Question Two:* How do students' preferences for learning through text, pictures, and sound relate to their learning of content and L2 vocabulary?

For convenience, the three treatments/conditions will henceforth be referred to as: (a) the Reversed condition; (b) the Bimodal condition; and (c) the Traditional condition. Sometimes the Reversed and the Bimodal conditions together will be referred to as "the subtitled" conditions, and the Traditional condition will serve as a comparison group.

Based on the reasoning in section 2.3, four hypotheses addressing Research Question One were formulated:

(1) *Hypothesis 1:* Learning and retention of content in the subtitled conditions will be better than in the comparison group.

(2) *Hypothesis 2:* Learning and retention of content will be better in the Reversed condition than in the Bimodal condition.

(3) *Hypothesis 3:* Learning and retention of L2 vocabulary in the subtitled conditions will be better than in the comparison group.

(4) *Hypothesis 4:* Learning and retention of L2 vocabulary will be better in the Reversed condition than in the Bimodal condition.

Research Question Two generated two more hypotheses:

(6) *Hypothesis 5:* Pronounced preferences for watching video will relate to better content and vocabulary learning under any of the treatments.

(7) *Hypothesis 6:* Pronounced preferences for watching video and reading will relate to better content and vocabulary learning under the subtitled conditions relative to the comparison group.

3.2 OVERALL STUDY DESIGN

This section provides information about the general experimental design, and reports on how and when the treatments were administered.

3.2.1 Sample

Six classes of core French students enrolled in grade 11 were shown a video documentary, with two intact classes randomly assigned to each of three conditions.

3.2.2 Treatments

All students participating in this experiment watched an edited video three times, but they were exposed to a different sequence of three video formats, depending on which of the three treatment conditions they were assigned to. The video presentation sequences in each condition are specified below:

(1) In the Reversed experimental condition:

    (a) reversed subtitled format (L1 audio and L2 subtitles)

    (b) bimodal subtitled format (L2 audio and L2 subtitles)

    (c) traditional unsubtitled format (L2 audio, no subtitles)

(2) In the Bimodal experimental condition:

    (a) bimodal subtitled format

    (b) bimodal subtitled format

    (c) traditional unsubtitled format

(3) In the Traditional condition (comparison group):

    (a) traditional unsubtitled format

    (b) traditional unsubtitled format

    (c) traditional unsubtitled format.

3.2.3 Phases

Data were collected in three phases: (1) Phase 1: pretesting; (2) Phase 2: treatment and immediate posttesting; and (3) Phase 3: delayed posttesting. The purpose of Phase 1 was to collect information about students' program and L1 background, their exposure to French outside of classroom time, their input mode preferences, their level of French language proficiency, and their prior knowledge of the target vocabulary items in the study. In Phase 2, the video treatments were administered, related test data were obtained and students' reactions to each treatment and related tasks were elicited via a questionnaire. Finally, the purpose of Phase 3 was to administer three delayed posttests on the video content and target vocabulary. Pilots of Phase 2 and each of the tests used in the study were conducted (see Appendix D). A chart of the three experimental phases is provided in Figure 3.1 with its various elements in chronological order, as well as the time taken to administer each element

and phase.

Figure 3.1: Experimental phases in the main study

PHASES TIME (minutes)	
PHASE 1: PRETESTING	**30**
Introduction *Vocabulary Recognition Pretest* *Vocabulary Knowledge Scale Pretest* *Dictation* *Background Prequestionnaire*	3 2 10 6-7 5-8
PHASE 2: TREATMENT AND IMMEDIATE POSTTESTING (ONE WEEK AFTER PHASE ONE)	**60**
Introduction and pairing up students **First Viewing** *Browsing through Content Test* **Second Viewing** *Content Test completed in pairs* **Third Viewing** *Video C-Cloze* *Questionnaire in version A for the comparison group and in version B for the two subtitled conditions*	3 7.5 2 7.5 15 7.5 10 5
PHASE 3: DELAYED POSTTESTING (TWO WEEKS AFTER PHASE TWO)	**45**
Introduction *Content Test completed individually* *Video C-Cloze* *Vocabulary Knowledge Scale*	2 15 10 15

3.3 VIDEO TREATMENTS

3.3.1 Nature of the Video

In each of the three conditions, students viewed a brief video documentary three

consecutive times, but in different formats, as explained in subsection 3.2.1. This video, published in both English and French versions, is entitled *"À la découverte de l'Arctique tropical"* / "Search for a Tropical Arctic" (Levy & Williamson, 1989). It describes an international scientific expedition to the Canadian High Arctic, led by a Canadian botanist. This expedition was inspired by the sighting of fossilized remains of trees on Axel Heiberg Island a few years before. The resulting investigation led to the discovery that 45 million years ago a lush tropical forest flourished on this very island. But what makes this puzzling is that so far in the past, this forest would have been in roughly the same geographical location as today, just about 1000 kilometres below the North Pole, where no real trees grow. Today, the only tree that has survived is the tiny Arctic willow, which is never taller than a few inches. The mysterious ancient forest and all the animals in it would have had to adapt to the light of polar summers and the darkness of long polar nights. Maybe, it is suggested, this is the place where nocturnal animals originated, such as the lemur-like mammal whose remains were found on the island.

This video was chosen for the present research in light of its interest, educational value, and grade-level appropriateness for the students in the target sample, all being important criteria in the selection of teaching materials, as emphasized by the communicative-experiential syllabus (C/E) of the multidimensional curriculum for core French (Tremblay, Duplantie & Huot, 1990). A video about a scientific expedition was also expected to contribute to students' "experiences with science" recommended by the syllabus as a field of study appropriate for grade 11 in core French programs (p. 42).

The language in the video was expected to be relatively challenging to students in the sample, because it contains vocabulary that was likely to be unfamiliar, and some advanced syntactic structures. In addition, the narrator in the video speaks at

native speed. Exposure to "real" language presented at a normal speed is emphasized by the C/E syllabus even if this sometimes imposes considerable strain on the learners (p. 46). In this connection, it was interesting to test the hypothesis that initial exposure to English audio input and the presence of French subtitles (the Reversed condition) would assist with the processing of otherwise difficult natural oral input.

3.3.2 Video Adaptation

Permission was obtained from the producers of the video, Canadian Geographic and Natural Resources Canada, to add French subtitles to its French and English original versions. Copies of the video in VHS format were purchased from LM Media distributors. The videos were edited and subtitles were created in a professional video editing house by the researcher with the help of an operator, using high technology digital equipment Toaster 4000. The original 26-minute documentary was shortened to 7: 24 minutes for the reversed subtitled format (English audio) and to 7: 33 minutes for the other two formats (French audio). This procedure was necessary in order to avoid overloading the learners, and to permit three consecutive presentations of the video during the same class period (75 minutes long), as well as completion of all the tests. A slight difference of nine seconds in the length of the French and English versions was due to the fact that the original French and English documentaries were edited separately in order for the soundtrack to keep pace with the corresponding shots (single film sequences) of the video perfectly. Had the original English video been simply dubbed in French, a progressive mismatch between sound and picture would have occurred[3]. Therefore, due to the French narration being slightly longer than its

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[3]

It is often the case that due to the specifics of the French language (heavier morphology and longer words relative to English), when the same information is rendered in both French and English, the French text may be 25% or even longer than the English text (D. Stanbrook, National Captioning Center of Canada, personal communication, April 11, 1996).

English equivalent, the edited video formats with French audio track were of a slightly longer duration. When video material had to be extended slightly in order to match the sound in the versions with French audio
track, loops, freeze-frame, and fade out techniques were applied.

The edited videos reflect the original story accurately. Only content that was deemed to be overly detailed or irrelevant to the main story line was deleted. The most important and salient events of the story were put together in a logical fashion in order to create the impression that the short version of the documentary was a complete story in itself. Most of the editing involved chronological removal of detail (e.g. individual interviews with all the scientists participating in the expedition, the scientists taking leave of each other at the end, etc.) and linking across the resulting cuts. In one case, however (introducing the chief of the expedition, Jim Bassinger), a shot of his head had to be inserted earlier on in the video and matched to a piece of the soundtrack taken from another shot.

The original transcript of the video in French was shortened as well, to correspond to the new version of the soundtrack. It was then used as a basis for the creation of subtitles in French (for transcript of subtitles by shots see Appendix B). Courier font in black with grey shadow was used for maximum contrast, since most of the background in the video was light-coloured. The classic caption format of white font against black strips, which can provide maximum contrast, was not available at the video house where the videos were edited.

The subtitles were carefully matched to their corresponding shots, and at first an attempt was made to follow TV industry standards: a maximum of 34 characters per line, a maximum of two lines, and duration extending from 1.5 seconds to 6 seconds. In the process of editing, however, a number of technical difficulties arose and departure from these standards was necessary. For example, the font of the

subtitles had to be enlarged in order to make them readable to an entire class from a regular TV screen. As a result, many of the subtitles had to have three rather than two lines. In some cases, especially when difficult language was subtitled, shots had to be faded or freeze-framed in order to allow the subtitles to linger on the screen longer than 6 seconds and provide the students with a better chance to read them. Such techniques were employed with moderation, however, since each time they were used, the length of the film was also extended, and as mentioned earlier, brevity was essential. As in most subtitled films, the spoken rate in the video was faster than the duration of the subtitles on the screen: an inconvenience impossible to correct by slowing down the visual input, or by adding extra shots, without the risk of producing an even longer video than the original half-hour documentary that the present edit was based on. Because of this general tendency and also because of a couple of rare occasions when particularly long and difficult subtitles required longer processing and had to be extended into a subsequent shot, an overlap of audio and text occurred for about one third of the subtitles. That is to say, spoken and written text were at odds each time the subtitle on the screen referred to something that had already been said, or was about to be said, and did not match the ongoing spoken text at the given moment.

In order to reduce this mismatch of speed and particularly since only highly proficient bilingual readers would be expected to follow written text in the L2 at the same rate as spoken by native speakers (cf. e.g., Segalowitz & Hébert, 1990, p.511), only roughly 50% of the entire edited audio track (498 words out of 1,003 words) was subtitled. In this particular video, the speed of the spoken narration was uneven, ranging from about 130 to 200 words per minute, or too demanding for students in core French grade 11 who do not have advanced automatic reading skills in French. It was anticipated that these students should be able to read 65 - 100 words per minute

(achievable through partial subtitling). This estimate is lower than the expected reading speed for printed texts deemed to be at an intermediate level of difficulty, according to the C/E syllabus: 100 - 130 words per minute (Tremblay et al., 1990, p. 48). It should be noted that a slower speed rate was preferable, given that the speed of subtitles was fixed (with no chance to re-read parts of a sentence) and that reading was to be executed simultaneously with listening to and watching the video.

It is important to note as well that the script of the video was subtitled selectively: only the most important content containing target vocabulary was included, leaving out repetitious, optional, or secondary information. This subtitling arrangement is reminiscent of a pedagogical approach where L2 students are instructed to listen to a passage selectively or to do a task by paying attention only to particular parts of the message. What students had to do in the present experiment, however, was different from a typical "selective attention"" task, where students usually attend to a single mode of input (e.g., audio). In this study students under the experimental subtitled conditions were exposed to three different modes of input simultaneously (audio, video, and text) where text served as a signpost to what they had to pay attention to.

Additional care was taken to avoid superimposing subtitles over the few original captions in the respective templates. Finally, a few minor adjustments to punctuation were made (e.g., adding periods at the end of edited sentences) so that the subtitles would constitute complete grammatical sentences, logically holding together.

Technically speaking, it is possible to edit a ready-made video (provided that rights for changing it have been obtained from the producer), by phasing out some of the audio track and adding background music (since relatively long periods of silence might appear odd to the viewer), or phasing out entire portions of the video to make it shorter and more focussed, but this is time-consuming and it needs sophisticated

equipment and an almost surgical precision in order to match the music or sound to the original track, and to achieve smooth transition between cuts or original track and inserted bits of audio effects. It is also a costly procedure. That is why I did not opt for creating a video format with a perfect match between audio and text, especially since I was doubtful that this would necessarily be pedagogically more efficient. Of course, with multimedia computer technology (the instruction medium of the near future, which provides user-friendly software packages with picture, sound, and text in different combinations) the speed, completeness, or number of subtitles will not cause a problem, since students or teachers will have the option of controlling the input, or any part of it (e.g., Borrás & Lafayette, 1994).

3.4 SAMPLE

Formal permission was obtained from the Office of the Director of Education at a school board in Metropolitan Toronto, Ontario, to conduct the research with grade 11 core French students at that board. Individual oral consent was obtained from the six school principals, the six teachers, and six classes of students who participated in the present experiment. Individual written consent was also received from the parents of each student with no exceptions (see Appendix A for form letter requesting parental consent).

Grade 11 students were selected as the sample for the study, since this research aimed to find out whether students who have already studied French for a few years can learn L2 vocabulary and content via authentic video, rather than via simplified and scripted input. It was assumed that core French students at a lower level of French proficiency than grade 11 would not be able to follow authentic video-text, even when provided with additional textual support and/or audio support in L1, of the kind used in this experiment.

In order to obtain sufficient numbers of subjects to compare three treatment conditions, and to provide some control of the teacher variable, six intact classes participated in the study, with two classes and two teachers per condition (N = 102). Three more intact classes took part in piloting the instruments and procedures of the study (N = 58).

Originally, in the main study, the Traditional condition had 30 students, the Bimodal condition had 40 students and the Reversed condition had 32 students. In the course of the experiment, however, a total of nine students were absent from the delayed posttest session and therefore 93 students out of 102 were included in the statistical analyses of the test data. In the final sample, the Traditional condition comprised 30 students, the Bimodal condition 34 students, and the Reversed condition 29 students.

Data for the main experiment were collected from three classes in the fall of 1996, and from three more classes in the spring of 1997. For each of these two data collection periods, individual classes were randomly assigned to one of the three conditions in the experiment. The necessity to spread the data collection process over two terms occurred because most secondary schools in this school board had a semester system, and a sufficient number of first-term semestered classes at the board in 1996 was not available. Conducting the experiment in semestered classes where periods were 75 minutes long was important, since the treatment for the study itself was 60 minutes long. Thus, in order to control for the time-of-year factor (viz., first-semester students vs. second-semester students), roughly 50% of the data for each condition was collected in the first term of the school year 1996/1997 and roughly 50% of it was gathered in the second term.

Table 3.1 summarizes information about these classes, with a breakdown by class assignment to conditions, gender composition, and number of students in each

class for the final sample (N = 93). Each condition is numbered by either 1 or 2. Number 1 stands for data collected in the fall, and number 2 stands for data collected in the spring. It can be seen that the sample contained predominantly female students, but there was a relatively balanced distribution of male and female students across conditions (i.e., Traditional: 5 males, 25 females; Bimodal: 4 males, 30 females; and Reversed: 5 males, 24 females). The six teachers (one for each of the participating classes in the main experiment) were all non-native speakers of French and only one of them was male.

Table 3.1: Assignment of classes to conditions, gender distribution, and number of students by class and condition for the final sample (N = 93)

CLASS	CONDITION	MALE	FEMALE	N
1	Traditional 1	5	10	15
4	Traditional 2	0	15	15
Total		5	25	30
2	Bimodal 1	1	6	7
5	Bimodal 2	3	24	27
Total		4	30	34
3	Reversed 1	1	12	13
6	Reversed 2	4	12	16
Total		5	24	29
Grand total		14	79	93

In order to find out further details about the sample, and to determine comparability of students in the three conditions on variables that might influence their performance in the experiment (i.e., L1 background, current use of a language other than English at home, proficiency in that language, prior enrollment in French

immersion or French language schools, exposure to authentic French sources, science background, and attitudes towards scientific films), all students completed a Background Prequestionnaire at pretesting (see Appendix F, questions #1 - #6, and #8-#12). Learning about students' background, relevant experiences and attitudes prior to treatment was also necessary in singling out students who should be excluded from the sample (i.e., native speakers of French, students who had been enrolled in French language schools, and perhaps former French immersion students if they were considerably more advanced than their core French peers).

Data from the Background Prequestionnaire, pertaining to the linguistic characteristics of the sample revealed that there was a wide range of first languages among the students (referred to in question #1 as "childhood" languages). Some students indicated they had only one childhood language, but the majority considered English in combination with another language to be their childhood languages. Less than a quarter of the sample in any of the treatment conditions reported English alone as their L1. Across conditions there was a total of 15 different L1s, although ten of them were represented by single students (see Appendix G for a complete breakdown by languages).

The largest group of students in the sample was of Portuguese background (25.8%), followed by students of Italian background (18.27%). Most of these students also provided English as an additional L1. The Traditional group had the largest number of students of Portuguese background (Traditional: 50%; Bimodal: 20.5%; Reversed: 6.9%), and the Reversed group had the largest group of Italian background (Traditional: 10%; Bimodal: 8.8%; Reversed: 37.9%). There were no other major L1 groups across conditions.

L1 information was elicited in the belief that students who are fluent in another Romance language (e.g., Portuguese or Italian) are likely to find the task of studying

French easier (French being a Romance language itself) relative to those who speak a non-Romance language (or a non-Romance language and English), or those who speak only English (see Hart, Lapkin, Swain, Argue, Levy, & Rowen, 1988, chap. 6). Also, students who are fluent bilinguals in both English and another language other than English are likely to exhibit superior metalinguistic skills, and to be more receptive to the French language when compared to their monolingual peers (Swain & Lapkin, 1982; Cummins & Swain, 1986).

Based on the theoretical assumptions in the previous paragraph, responses regarding students' L1s were organized into the following five categories: (1) English only; (2) English and another Romance L1; (3) English and another non-Romance L1; (4) Romance L1; and (5) Non-Romance L1. Table 3.2 below displays the L1 distribution in the sample across the three conditions.

Table 3.2: First language background by group (N =93)

L1	Traditional count	%	Bimodal count	%	Reversed count	%	Total count	%
English	5	16.7	8	23.5	5	17.2	18	19.4
English/Romance L1	12	40.0	10	29.4	15	51.7	37	39.8
Romance L1	7	23.3	3	8.8	3	10.3	13	14.0
English/ non-Romance L1	2	6.7	11	32.4	3	10.3	16	17.2
Non-Romance L1	4	13.3	2	5.9	3	10.3	9	9.7

As can be seen from Table 3.2, distributions of students' L1 backgrounds across groups are not dramatically different, except in the case of the Bimodal condition, where the number of non-Romance L1 speakers (often in combination with English) is larger than in the other two conditions. A chi-square test performed on the distribution of students' L1 did not reveal any statistically significant differences

among the three conditions. Therefore, conditions were considered to be comparable in terms of L1 background.

Following the original rationale concerning the advantage of already knowing a Romance language when studying French, students were also asked if they currently used a language other than English at home (question #2). The majority of the students in the sample indicated that they spoke a Romance language at home (57%), close to 26% of the sample spoke a non-Romance language, and the remaining students spoke only English. Two of the students who reported English as their L1 also indicated that they used another language at home. Table 3.3 below displays outcomes regarding languages used in the home by group (for a complete breakdown by language, see Appendix G).

Table 3.3: Languages spoken at home by group (N = 93)

L1	Traditional count	%	Bimodal count	%	Reversed count	%	Total count	%
English only	5	16.7	6	17.6	5	17.2	16	17.2
Romance L1	19	63.3	16	47.1	18	62.1	53	57.0
Non-Romance L1	6	20.0	12	35.3	6	20.7	24	25.8

The distribution of languages spoken at home across conditions was generally very similar, especially for the Traditional condition and the Reversed condition. English-only speaking students were very similarly distributed across all three conditions. The Bimodal condition, however, contained a smaller percentage of respondents speaking a Romance language and a larger percentage of respondents speaking a non-Romance language at home relative to the other two conditions. According to a chi-square test run on the collapsed distribution of three response categories (see Table 3.3), there were no significant differences across conditions in

terms of language use in the home.

In question #3 students were asked how proficient they were in their L1 relative to English, since research had demonstrated that children from minority backgrounds who are proficient and literate in their L1 learn additional languages easier when compared to their English monolingual peers or students from the same ethno-cultural background, who have not developed literacy skills in their heritage language (e.g., Swain, Lapkin, Rowen & Hart, 1990). Research has further informed us that proficient readers in L1 tend to perform better in L2 reading as well (see Collier, 1989 for a review; Cummins, 1979, 1989; Swain, Lapkin, Rowen, & Hart, 1990).

Question #3 was answered by 77 students out of 93, or the ones who did use an L1 other than English at home (see Table 3.4). Responses relating to the four language skills, ranged from listening as being the easiest skill to writing as the hardest skill. The majority of the students split into two even categories, one claiming that speaking their L1 was as easy as speaking English, and the other that it was less easy than English. Listening to their L1 was found to be as easy as listening to English for the larger part of the sample, and reading and writing in L1 were thought to be either less easy or as easy as reading and writing in English, with preference for the former. For ease of presentation the categories of 'much easier' and 'easier' have been collapsed into the category of 'easier'. Similarly, 'less easy' and 'much less easy' have been collapsed into 'less easy'. Thus, in Table 3.4 below, there are three possible responses to each of the four skills in one's L1.

A chi-square test did not demonstrate any significant differences across conditions in terms of the four L1 skills. Therefore, it can be concluded that the three experimental conditions were comparable in terms of the students' L1 proficiency and literacy skills.

Table 3.4: Use of first languages at home when compared to English by group (n = 77)

Skills	Traditional %	Bimodal %	Reversed %	Total %
SPEAKING				
easier	16.0	14.3	12.5	14.3
same	28.0	32.1	62.5	40.3
less easy	56.0	53.6	25.0	45.5
LISTENING				
easier	20.0	7.1	16.7	14.3
same	52.0	67.9	70.8	63.6
less easy	28.0	25.0	12.5	22.1
READING				
easier	20.0	7.1	4.2	10.4
same	24.0	35.7	41.7	33.8
less easy	56.0	57.1	54.2	55.8
WRITING				
easier	16.0		4.2	6.5
same	20.0	28.6	29.2	26.0
less easy	64.0	71.4	66.7	67.5

Questions #4 - #6 addressed students' program background. According to the responses, the sample contained 11 students (11.8%) who had transferred from immersion programs, almost evenly distributed across the Traditional and the Reversed conditions (i.e., Traditional: N = 5, Reversed: N = 6, but none in the Bimodal condition). Only one of these students had enrolled in an early immersion program at grade 1, nine students had started immersion in grade 5, and one student in grade 8. These students had taken a different number of subjects in French ranging

from two to six in each grade. According to teachers' ratings of proficiency in French, however, none of the immersion transfers were excellent students (seven of them were rated as very good, two as good, one as fair, and one as weak). It was decided that since these students were not outstanding achievers relatively to the sample as a whole, they would not be deleted from the sample. Besides, it is characteristic of many core French classes in Ontario to contain a few former immersion students. Finally, there were no students who had attended a French language school for native speakers of French.

Question #8 inquired whether students watched French TV, listened to French radio, watched French movies, or read French magazines and books outside of school. Students were also required to specify the time they spent on these activities, and to provide the number of movies they had seen, and of magazines and books they had read.

The data regarding exposure to French TV and radio after school revealed that about half of the sample watched French TV after school (ranging from 5 minutes to 4 hours, with the majority spending about half an hour per week on this activity), but hardly anybody ever listened to French radio. These results are summarized in Table 3.5.

Significant differences among conditions were found for TV watching according to the Kruskal-Wallis one-way ANOVA test, $\chi2$ (2, N = 93) = 12.32, $p <$ .01), but not for listening to the radio. In particular, the majority of the students in the Bimodal condition, half of those in the Traditional condition, and only about 20% in the Reversed condition claimed they watched TV programs in French. Also, respondents in the Bimodal condition spent relatively longer periods of time on this activity. Outcomes regarding the watching of French TV by group are illustrated in Table 3.6.

Table 3.5: Percentage of students watching French TV and listening to French radio out of school (N = 93)

Minutes per week	Watching French TV %	Listening to French radio %
0	52.7	94.6
5	3.2	0
10	4.3	0
15	3.2	0
20	4.3	1.1
30	17.2	2.2
35	0	1.1
60	7.5	1.1
90	3.2	0
120	3.2	0
240	1.1	1.1

Although overall, about half of the sample did watch French TV programs, results revealed that very few students actually watched French movies either on TV, video, or at a theatre. The Kruskal-Wallis test found no systematic differences among groups in regard to the watching of movies in French. Similarly, very few students read French magazines and books of their own accord outside the classroom, and according to a KWANOVA, there were no statistically significant differences among groups, either.

Table 3.7 summarizes findings regarding extra-curricular exposure to movies, magazines and books in French.

Question #9 further asked students whether they had ever seen any French movies subtitled in English, and question #10 asked whether they had seen any English movies subtitled in French. Students were also asked to provide the number of movies they had watched. According to the findings, close to 70% of all the students had previously been exposed to French movies with English subtitles, and close to 40% had already seen English movies with French subtitles (see Table 3.8).

Table 3.8: Percentage of students who had watched French movies with English subtitles, and English movies with French subtitles prior to the study (N = 93)

Number	French movies with English subtitles %	English movies with French subtitles %
0	34.4	63.4
1	12.9	15.1
2	20.4	10.8
3	14.0	7.5
4	5.4	1.1
5	5.4	2.2
6	1.1	
10	3.2	
many	2.2	
no number	1.1	

According to a KWANOVA, there were significant differences among groups with respect to French movies with English subtitles seen prior to the study ($\chi2$ (2, N = 93) = 13.08, $p < .001$), but no significant differences were revealed with respect to the watching of English movies with French subtitles. Table 3.9 displays findings regarding subtitled French movies seen in each group.

Table 3.9: Percentage of students who had watched French movies subtitled in English prior to the study by group (N = 93)

Number	Traditional %	Bimodal %	Reversed %
0	30.0	17.6	58.6
1	10.0	11.8	17.2
2	26.7	23.5	10.3
3	13.3	23.5	3.4
4	0	11.8	3.4
5	6.7	2.9	6.9
6	0	2.9	0
10	3.3	5.9	0
many	6.7	0	0
no number	3.3	0	0

It is evident that the vast majority of students in the Bimodal group, and 70% of the students in the Traditional group had previously been exposed to such movies. Conversely, the majority of the students in the Reversed condition had not watched any, and the few who had, had seen significantly fewer movies relative to the other two conditions.

Question #11 inquired whether students enjoyed films about scientific expeditions. Overall, responses to this question revealed that the majority of the respondents expressed a favourable attitude towards such films. When broken down by group, however, a chi-square test revealed significant differences among the groups, $\chi2$ (2, N = 93) = 16.99, $p < .001$. In particular, the majority in both the Traditional and the Bimodal conditions responded positively, while the majority in the Reversed condition responded negatively to this question (see Table 3.10).

Table 3.10: Enjoyment of films about scientific expeditions by group (N = 93)

	Traditional %	Bimodal %	Reversed %	Total %
YES	70.0	79.4	31.0	61.3
NO	30.0	20.6	69.0	38.7

Finally, question #12 asked students to list the science subjects they were presently taking at school, or had just completed. It turned out that about 80% of the sample were taking/had just taken at least one science subject, biology being the most popular one. Responses to this question did not demonstrate any systematic differences across conditions according to a Fisher's exact test. Table 3.11 summarizes these findings.

Table 3.11: Science subjects being taken, or taken recently, by the students (N = 93)

Science subjects	%
None	22.6
biology	29.0
biology and chemistry	34.4
chemistry	9.7
physics	2.2
physics and chemistry	2.2

In conclusion, the three groups were comparable in terms of most of the background factors addressed in the Background Prequestionnaire. Significant differences were observed only for the following: (1) the time students spent watching French TV outside school; (2) the number of subtitled French movies students had seen prior to the study; and (3) students' attitudes towards scientific films. In

particular, findings indicated that considerably more students in the Bimodal and Traditional conditions had been exposed to French TV and French movies subtitled in English relative to the Reversed condition, and that the majority in the Bimodal and the Traditional groups were in favour of scientific films, whereas most students in the Reversed group were not. Section 4.4 will address the issue of whether the above mentioned background differences are related to students' learning of content and vocabulary.

3.5 INSTRUMENTS

This section describes all the instruments used in the study in their order of administration: Vocabulary Recognition pretest (Appendix H), Vocabulary Knowledge Scale (Appendix I), Dictation[4], Background Prequestionnaire (Appendix F), Content test (Appendix J), C-Cloze (Appendix K), and Questionnaires A and B (Appendix L). All original instruments for the study (the Content test, the C-Cloze and all the questionnaires) were initially given to five advanced speakers of French, one of whom was a native speaker of French and four were French teachers. These tests were examined and edited by them for face validity, clarity, and linguistic accuracy. All the instruments used in this study were then piloted in three grade 11 core French classes at two Ontario schools (for a detailed description of the three pilot studies, see Appendix D).

All the tests were first scored by the present researcher. Rescoring of the Dictation, the Vocabulary Knowledge Scale pretest, the Content immediate posttest, and the C-Cloze immediate posttest for a subsample of 20 students (chosen randomly from across the conditions) was subsequently done by a second rater, who was a core

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[4] The Dictation has not been appended for test security reasons.

French teacher and a native-like speaker of French. High interrater reliability was obtained on these four tests, to be reported for each individual test below.

3.5.1 Vocabulary Recognition Pretest

The Vocabulary Recognition (VR) pretest was based on Meara's French Vocabulary Test (Meara, 1994), and was administered in Phase 1, a week before the treatment. It included 30 target vocabulary items (see Appendix H) taken from the video, as well as 20 pseudo (imaginary) words, selected at random from Meara (1994). The 30 target vocabulary items were selected for a number of reasons: (1) these words constitute useful scientific vocabulary for the Communicative/ Experiential (C/E) syllabus domain relevant in this study; (2) this vocabulary is likely to be unfamiliar to students at this level; (3) all vocabulary items are important for the understanding of the main ideas in the video and are represented either directly or indirectly in a salient visual context where it is easy to infer their meaning; (4) the vocabulary exhibits various characteristics: it includes both concrete and abstract words that are either similar or dissimilar to English words, and that belong to different parts of speech (11 nouns, 9 verbs, 9 adjectives and 1 preposition); (5) some of the words occur repeatedly in the video script; and (6) almost all of the words appear in the subtitles (with the exception of *descendre, enfoui* and *scellé*).

The pseudo words look like real French words, since they were designed according to French rules of orthography and phonology. Students were requested to cross out all the words they thought they did not know well enough to explain what they meant. Only words that had not been crossed out were counted (in two categories), which gave the number of real words and imaginary words that the student claimed to know. These numbers were later converted into proportions of the total number of words (n = 30 for the real words, and n = 20 for the pseudo words)

and inserted into the following formula (see Meara & Buxton, 1987, p. 147) for calculating the final score:

$$P(k) = \frac{P(h) - P(fa)}{1 - P(fa)}$$

where $P(k)$ = percentage of words known
$P(h)$ = percentage of "hits" or real words
$P(fa)$ = percentage of false responses or pseudo words

The scoring formula was designed to adjust the scores for guessing. Unlike the original test designed to measure general language proficiency, however, the objective of the VR pretest in this study was to assess students' recognition knowledge of the entire set of target vocabulary at the onset of the study. It was estimated that administering this test one week prior to treatment provided enough time to minimize any possible effects from exposure to the target words.

3.5.2 Vocabulary Knowledge Scale

This test, based on the Vocabulary Knowledge Scale (VKS) originally developed by Wesche and Paribakht (1996), was used as a second vocabulary pretest measure in order to achieve a more complete profile of students' initial vocabulary knowledge by probing their productive, as well as their recognition knowledge of target vocabulary (see Appendix I). The VKS elicited self-perceived and demonstrated knowledge of 12 target words in written form (chosen at random out of the 30 target vocabulary items which were used in the VR pretest). It assesses "depth" of vocabulary knowledge on a 5-point scale, ranging from total unfamiliarity to the ability to use the word in a semantically appropriate and grammatically correct

sentence. The test was also administered as a delayed posttest two weeks after the treatment, but not as an immediate posttest, since it was expected that students would react negatively if asked to complete the same test three times in a row over a relatively short period of time.

The scoring procedure designed by Wesche and Paribakht (1996), which allows a range of scores from 1 to 5 for each item, based on how students respond to the five options or "self-report categories" in the test, was followed to the letter. Each score corresponds to a different level of vocabulary knowledge. Level 1 indicates that the student is not familiar with the word or has skipped the item (option (a): 'I don't remember having seen this word before'). Level 2 comprises instances where students recognize the word but indicate that they do not know its meaning (option (b): 'I have seen this word before, but I don't know what it means') or provided an incorrect translation equivalent (option (c): 'I have seen this word before, and I think it means...'; and option (d): 'I know this word. It means...'). A score of 2 is also given if students fail to provide a translation equivalent, but write either a meaningless sentence containing that word, or a sentence which does not provide a defining context for the word (i.e., in responding to option (e): 'I can use this word in a sentence...'). For example, the sentence *Parmi est un mot.*(Among is a word.) is a non-defining sentence since it does not indicate clearly whether the student knows the word "parmi". Level 3 is given for correct translation equivalents of the word which are either not accompanied by a sentence in options (c) and (d), or if the sentence that follows in option (e) does not make any logical sense. Level 4 is assigned to students who clearly know the word and use it in a semantically appropriate context, but the word itself contains grammatical errors (e.g., an incorrectly conjugated verb). The final and highest level of vocabulary knowledge (level 5) indicates a clear knowledge of the word and the ability to use it in both a semantically appropriate and a

grammatically accurate context (option (e)).

In scoring options (c) and (d), I treated words and parts of speech related to the correct words, but not actually correct, as wrong answers (e.g., 'kingdom' for *régner*). In the case of polysemantic words (viz., *glace, espèce, obscurité, pousser*), only the specific meaning of a word as used in the video context was accepted as 'correct' (i.e., as indicative of relevant word knowledge), since the test aimed to measure the effect of the video treatments on students' learning of these specific meanings, rather than their knowledge of other meanings of the words. The accepted translation equivalents for these words were: (1) *glace* = 'ice' but not 'ice-cream'; (2) *espèce* = 'species' but not 'kind' or 'type'; (3) *obscurité* = 'darkness' or 'the dark' but not 'obscurity' or 'the obscure'; and (4) *pousser* = 'to grow' but not 'to push'. The interrater reliability for this test was very high (alpha = .99).

3.5.3 The Two Vocabulary Pretests

Students' knowledge of the target vocabulary before intervention was assessed by two different pretests: the VR and the VKS pretests (see 3.5.1 and 3.5.2). These measures complemented each other, in the sense that they were quantitatively and qualitatively different. First, the two tests differed in their purpose. The VR test measured recognition knowledge of the full set of 30 vocabulary items, whereas the VKS test measured depth of knowledge for a subset of 12 vocabulary items (see Wesche & Paribakht, 1996). Second, unlike the VR pretest, where students' claims to know a word could not be substantiated, the VKS pretest asked students to demonstrate their knowledge of a word once they had claimed that they knew it. A third difference was that whereas the VR pretest gave credit for whichever of the meanings of a polysemantic target item students' claimed to know, the scoring of the VKS specifically focussed only on word meanings used in the video. There were four

polysemantic words in the VKS test (viz., *glace* (ice or ice-cream), *obscurité* (darkness or obscurity), *espèce* (species or kind), *pousser* (to grow or to push)). This scoring approach made it possible to single out which of the specific word meanings relevant to the video were demonstrably known in advance and whether students improved on these words with respect to the relevant meanings after treatment (the VKS was given both as a pretest and as a posttest). Unfortunately, however, it was impossible to know whether students' initial failure to demonstrate knowledge of the target word meanings for the four polysemantic items was due to an actual lack of knowledge, or to a preference for one meaning over another.

3.5.4 Dictation

Students' general proficiency in French was assessed by a Dictation given a week prior to the treatment. This test was developed by the OISE Modern Language Centre for core French program evaluation at grade 12 (Harley, Hart, Lapkin, Rowen, & Scane, 1990). The Dictation was piloted by OISE researchers with grade 12 students enrolled in core French programs across seven provinces and the Northwest Territories in Canada. According to the baseline data, the results "were generally satisfactory with a good distribution of scores and inter-rater reliability" (Harley, Lapkin, Scane, & Hart, 1988, p. 10). The interrater-reliability check on the Dictation conducted in this study revealed a very high alpha coefficient (alpha = .99).

The Dictation is tape-recorded, and is 60 words in length. The whole text is given once at the beginning of the test. Next students are called on to start writing. Each sentence is read out in turn, and then broken down into phrases which are repeated twice with pauses in between. Finally, the whole text is repeated in full.

According to the original scoring guidelines, followed in this study, the maximum score that subjects can achieve is 30 points, and scores are computed by

subtracting one point for each erroneous word, disregarding incorrect or missing accents and apostrophes. If a word is written incorrectly in the same way on more than one occasion (e.g., *temp* instead of *temps*), then this counts as one error only. Thirty or more erroneous words result in a score of zero. In this study, the scoring procedure for the Dictation was further elaborated on as follows: I also subtracted a point (a) for any extra word not in the original text; (b) for one word written incorrectly as two (e.g., *assez* spelled as *à ci*); (c) for two words written incorrectly as one (e.g., *bouchéedoubles*). A maximum of two points were deducted for an incorrectly spelled word which was erroneously joined to another word, even if the other word was spelled incorrectly too (e.g., *peprendre* or *peprende* instead of *peux prendre*).

3.5.5 Background Prequestionnaire

This questionnaire was designed to tap into important details of background information pertaining to the sample (see 3.4). Students were also asked to indicate their preferences for different input media that offer printed text, picture, or aural speech by checking one of 5 options, ranging from "strongly agree" to "strongly disagree". The questionnaire was given to students in each of the three conditions one week prior to receiving the treatment.

The rationale for eliciting details about students' background was twofold. First, it was necessary to gather data with respect to learners' input preferences in order to answer Research Question 2, asking how such attitudes relate to students' performance on the tests when exposed to different kinds of multi-sensory video input (see 3.1). Second, it was important to explore differences among the three experimental conditions and estimate their initial comparability, since they all comprised intact classes, as well as exclude students who did not fit in the sample (see

3.4). Third, in addition to the two measures of general language proficiency in French used in this study (i.e., Dictation scores and teachers' ratings of the students), students were also asked in this questionnaire to provide self-ratings of proficiency in order to ensure additional concurrent validity. A final incentive for the creation of the Background Prequestionnaire was that none of the studies exploring the effects of subtitled (or even regular) video on language learning (cited in chap. 2) had taken into consideration the above mentioned individual learner factors.

3.5.6 Content Test

I designed this test (see Appendix J) to measure understanding and retention of the content in the documentary video (the piloting of this test is described in Pilot 1 and 3 in Appendix D). The Content test was given to the students both as an immediate posttest after the treatment and as a delayed posttest two weeks later. Each of the ten open-ended questions in French required a short answer in French and focussed on a salient unit of information in the video. Each question aimed to elicit a specific number of "idea units", ranging from one to four units. Each correctly reproduced idea unit was assigned one point. The correct answer to question #9, which involved naming the animal whose remains were found on the island (i.e., *un lémurien* for "lemur") was given two points. This response was considered more precise than only saying *un mammifère* (mammal) or *un animal nocturne* (nocturnal animal), which were worth only one point each. An answer to question #4 asking students to specify the kind of climate where dawn redwood and cypress trees used to grow, was also assigned two points if it included *un climat tropical* (tropical climate), since it contained two idea units (i.e., warm and humid). The total possible score for the entire test was 26. Wrong answers or blanks were given a score of zero. Errors in spelling, grammar, and accents were disregarded, as long as the answers

were given in recognizable French words and phrases that made sense, since the test was designed to measure both the understanding and retention of meaning, and the ability to state it in French.

The full scoring procedure for the Content test is provided in Appendix J, where each content question is listed and the maximum points it can be assigned are provided. Acceptable sample paraphrases for each idea unit, corresponding to each of these questions and taken from actual responses to the test are also given.

The scoring of the Content test in the main experiment was based on eight comprehension questions, rather on all 10 questions, listed above. For reasons to be explained in section 4.2.1, questions #5 and #6 were subsequently eliminated from the scoring and the maximum possible score for the Content test was therefore reduced to 22. The interrater reliability coefficient of the scores obtained for the Content test, using the revised scoring procedure, was high (alpha = .98).

Piloting the Content test revealed that students found it quite hard to complete this test individually even after watching the video twice (see Pilot 1, Appendix D). In order to reduce the level of difficulty, students were asked to answer the content questions in pairs with one of the students writing the answers down on the test sheet (see Pilot 2, Appendix D). For the statistical analyses scores were doubled for each pair.

Collaboration on the Content test was expected to bring about a positive affective response on the part of the students and to enhance their learning of the material (see Lapkin & Swain, 1998). Last but not least, it is believed that the present study will be pedagogically more valid if it allows participants to interact with each other while working on this test, since pair work represents common classroom practice for grade 11 core French students. The delayed Content posttest was completed by the students individually, however, since some of the students were

absent from the delayed posttesting session and it was therefore impossible to pair up students the same way. Nevertheless, it was still interesting to measure individual content retention as an effect of the treatment.

3.5.7 Video C-Cloze

This test is a 369 word-long printed summary of the video in French (see Appendix K) and was designed by the researcher to measure vocabulary learning and retention. The 30 target words, originally part of this summary were deleted and replaced with blanks. There were gaps of at least six words or more in between the blanks. Unlike an ordinary cloze test, however, where entire words are left out, in this test the beginning of each target word was provided as a "textual prompt" in order to elicit the exact vocabulary items. This is why the test is called "C-Cloze", rather than just "Cloze". In addition to the textual prompts, I also used "visual prompts", or still visuals captured from the video. Both kinds of prompts will be described below:

(1) Textual prompts. Two initial letters of each of the 30 missing words in the cloze were provided as prompts with the exception of *fossiles* and *enfoui*, where three letters were given instead of two. According to the five native-like speakers of French who examined the initial version of the C-Cloze, the provision of only two initial letters in the case of these two words did not eliminate potential synonyms that would fit in the same context. For example, the phrase *"... on a découvert des fo_____ d'arbres anciens..."* would elicit both *forêts* and *fossiles*. Similarly, it turned out that the context *"... les traces d'un monde en_____ depuis la préhistoire."* would also favour the word *enterré*, besides the desired target word *enfoui*. To narrow down the choices of words, a third letter was added to the prompts (i.e., *fos____*; *enf____*). For further details about the piloting of the C-Cloze, see Pilots 1 and 3 in Appendix D.

There were two reasons for providing textual prompts in the C-Cloze. First, the study aimed to elicit recall of specific target vocabulary, rather than to measure overall proficiency where any contextually appropriate word would be accepted. It was expected that in most cases two letters would be sufficient to narrow down the possible choices in the cloze without providing too much information. A second reason for choosing this method of testing was that it had been found to enhance performance on a listening comprehension test given to Dutch students of French as an L2 (see Hoeflaak, 1994).

(2) Visual prompts. The Video C-cloze contained nine still visuals captured from the video documentary, using VideoBlaster 100, and each of these images was accompanied by two or more related sentences. This was done in order to stimulate students' memory of the video material and also to make the test more reliable by increasing its consistency with the teaching medium or mode of presentation (see Benson, 1993; Gruba, 1994; Pelletier, 1990).

The C-Cloze was administered both as an immediate recall test and as a delayed posttest in order to measure gains and long-term retention of vocabulary. Two points were given for each correct target word. Since one target word (*fossiles*) was eliminated from the scoring (see Pilot 3 in Appendix D), the highest possible score for this test was 58 for 29 correct answers, as each correct word was assigned 2 points. Wrong spelling, and missing or incorrect accents were disregarded. Similarly, incorrectly conjugated verbs, or the use of infinitives also received full marks, provided that they were forms of the target verb. One point only was given for an anglicized target word; for a distorted French target word which still showed recognition of the original word (e.g., *mammale, *nocturnale, *nocturnel, *nocturnalle, *luxure, *miniature, *glacee, *especimen); or for the use of a semantically related part of speech (e.g. *découvrir*, or *découvre* instead of

découverte). The interrater reliability check of this test demonstrated a very high coefficient (alpha = .99).

3.5.8 Questionnaires A and B

This questionnaire in two formats (see Appendix L) was administered to all students at the end of the treatment session. Format A was given to students who watched the video without subtitles (Traditional condition), and was designed to probe subjects' perceptions of the video, whether they had seen it before, whether they learned any new information or words after watching the video and doing the tasks, how much of the video they understood, and what helped or prevented them from understanding it. Format B was given to students who watched the video with subtitles (Bimodal and Reversed conditions). The first part of Questionnaire B contained the exact same questions as in Questionnaire A, but its second part also asked students to comments on their experience with the subtitles, and whether they found them helpful. Further, question #5 in Questionnaire B required students to list factors that specifically enhanced their comprehension of the "French video", in order to distinguish the bimodal video format (French audio and subtitles) from the reversed video format (English audio and French subtitles) in the case of the Reversed treatment where students saw both video formats. Students in this treatment were not asked what enhanced their understanding of the story when they watched the English video with French subtitles, since it was anticipated that the presence of English translation would have logically been the most popular response or even the only answer to that question.

3.6 PROCEDURES

The present section explains in detail how and when data collection for the

entire research took place, and what procedures were involved in each phase of the main study.

3.6.1 Data Collection

A total of nine grade 11 classes were involved in the present research and data collection extended from May 27, 1996 till April 11, 1997. For a detailed time-table containing this information by class, see Appendix M. The first pilot study was carried out with one class in the spring of 1996, and the other two pilots with two more classes in the fall of 1996. Data collection for the main study started in the fall of 1996 and involved six classes at six different schools. The main data had to be collected during three different phases (see subsection 3.2.3) which implied three subsequent visits to each participating school.

3.6.2 The Three Phases

The experimental design comprised the following three phases: Phase 1 (pretesting); Phase 2 (treatment and immediate posttesting); and Phase 3 (delayed posttesting) (see Figure 3.1 for a chart which summarizes the components and duration of each phase). For details about the testing and timing of the instruments given in each of these phases, see Pilot 1 in Appendix D, and for information about the nature and order of the procedures, see Pilot 2 in Appendix D. Each experimental phase began with introductory remarks, and each activity was preceded by brief instructions. For the sake of consistency across conditions, the opening introduction and all instructions were scripted and followed in every class (for a transcript of these instructions, see Appendix E).

In **Phase 1** all subjects were introduced to the nature and the purpose of the study, and they were assured that the test results from the experiment would be kept

anonymous and would not affect their grades in French. Students were also informed that the first test (VR pretest) they were going to complete contained a list of some real French words and some imaginary French words. Students were then given 2 minutes to cross out any words they felt they did not know well enough to say what they meant. After explaining that the next test (VKS pretest) contained 12 real French words, taken from the previous test, the participants were given 10 minutes to complete it, by checking one (or more) of the 5 options under each word, and following the provided instructions in each of these options. Students were next instructed that they were going to listen to a brief audio-taped Dictation where the whole text was repeated twice (once at the beginning and once at the end), each sentence was read out in full, and each phrase in it was repeated two times. Students were told to wait for the recorded instructions on the tape which let them know when to start writing. They were also advised that the Dictation was scored for grammar and spelling. Finally, the Background Prequestionnaire was handed out. The pretesting procedure (labelled as Phase 1) took no longer than 30 minutes.

Phase 2 was conducted one week after Phase 1 and comprised the Reversed, Bimodal and Traditional treatments, as already described in subsection 3.2.2, as well as the immediate recall tests, and Questionnaires A or B. The duration of this phase was roughly one hour.

Phase 3 took place two weeks after Phase 2. Students were instructed that they had to complete some of the tests that they had already done, since it was important for the study to find out how much of the material they had retained over time. Subjects were tested on their long-term retention of content by individually completing the Content test, previously administered as an immediate posttest in pairs and were given the same time for it (15 minutes). Students' long-term retention of vocabulary was measured with the C-Cloze, which was also previously given as an

immediate posttest, and with the VKS, previously administered as a pretest. Ten minutes were given for the completion of the C-Cloze as before, but for the VKS, this time students were given 15, rather than 10 minutes, since it was expected that they would have more to write about. This phase took about 45 minutes to complete.

CHAPTER FOUR

ANALYSIS AND RESULTS

This chapter is organized in four main parts. The first part reports findings from the pretreatment measures (three tests, teachers' ratings and student's self-ratings of proficiency) and explains the use of a covariate in analysing the test data. The second part addresses the research questions and hypotheses of the study. Part three reports quantitative data gathered from Questionnaires A and B. Finally, part four addresses the role of background factors in students' learning of content and vocabulary.

4.1 PRETREATMENT MEASURES

A number of pretreatment measures were used in order to determine students' proficiency in the L2 and their knowledge of the target vocabulary prior to treatment. Apart from the need to measure improvement in vocabulary knowledge from pretest to posttest, this information was also crucial in establishing comparability of groups at the onset of the study since they contained non-randomized students.

4.1.1 Dictation and Ratings of Proficiency in French

There were three measures of initial general proficiency in French used in this study: a Dictation, teachers' ratings of their students' proficiency in French, and students' ratings of their own proficiency in French. The Dictation (for means and standard deviations, see Table 4.3) was considered to be the most reliable of the three measures, since it did not involve the judgements of six different teachers, or the subjective perceptions of learners's own abilities in the study of French. Furthermore,

the reliability of this instrument was supported by extensive national baseline data (see 3.5.4). A one-way ANOVA revealed that there were significant differences in group means on the Dictation pretest (F(2, 90) = 3.13, $p < .05$). Tukey's HSD (honestly significant difference) post hoc test showed that the Bimodal group outperformed the Traditional and Reversed groups, and that there were no significant differences between the Reversed and the Traditional groups.

Table 4.1: Teachers' ratings of French language proficiency by group (N = 93)

RATINGS	Traditional %	Bimodal %	Reversed %	Total %
1 Excellent	13.3	35.3	10.3	20.4
2 Very good	30.0	17.7	24.1	23.7
3 Good	26.7	17.6	37.9	26.9
4 Fair	16.7	20.6	20.7	19.4
5 Weak	13.3	8.8	7.0	9.7
N	30	34	29	93

Teachers rated students in their own classes on a 5-point scale, where 1 was the highest, and 5 the lowest (excellent, very good, good, fair, and weak). As can be seen from Table 4.1, the Bimodal condition had the highest percentage of students rated as "excellent", whereas the Traditional and the Reversed condition had relatively more students rated as "very good" and "good". Nevertheless, a chi-square test did not reveal any significant differences among conditions with respect to teachers' ratings of students' general proficiency in French.

Students were also asked to rate themselves on a three-point scale: above average, average, and below average (see question #7 in the Background

Prequestionnaire, Appendix F)[5].

Table 4.2 summarizes percentages of students in each of these self-assessment categories by group. Similarly to teachers' ratings, a chi-square test did not find any significant differences among groups with respect to students' self-assessments of French proficiency.

Table 4.2: Self-ratings of French language proficiency by group (N = 93)

SELF-RATINGS	Traditional %	Bimodal %	Reversed %	Total %
Above average	6.7	23.5	31.0	20.4
Average	90.0	64.7	58.7	71.0
Below average	3.3	11.8	10.3	8.6
N	30	34	29	93

Students' performance on the Dictation correlated significantly and moderately well with teachers' ratings ($r = .65$, $p < .001$), but not as highly with students' self-ratings ($r = .43$, $p < .001$). Students' self-ratings and teachers' ratings were also found to correlate significantly and moderately well ($r = .55$, $p < .001$). Therefore, the three measures of general proficiency in French demonstrated a reasonable concurrent validity.

Table 4.3 below provides means and standard deviations for the three proficiency pretreatment measures.

5

Originally, teachers were also asked to do the ratings according to a 3-point scale, but in the course of the main study, five of the teachers insisted on using a more elaborate scale. An agreement was then reached to employ a 5-point scale.

Table 4.3: Means and standard deviations for the Dictation, teachers' ratings, and students' self-ratings of French language proficiency by group (N = 93)

MEASURES	Traditional		Bimodal		Reversed		Total	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Dictation (max.= 30)	11.57	(6.87)	15.53	(5.55)	12.52	(7.52)	13.31	(6.79)
Teachers' ratings (5 - 1)	2.87	(1.25)	2.50	(1.40)	2.90	(1.08)	2.74	(1.26)
Self-ratings (3 - 1)	1.96	(.31)	1.88	(.59)	1.79	(.61)	1.88	(.52)

4.1.2 Vocabulary Recognition Pretest and Vocabulary Knowledge Scale Pretest

The Vocabulary Recognition (VR) pretest and the Vocabulary Knowledge Scale (VKS) pretest were used to assess students' initial knowledge of the target vocabulary in the study. Both measures correlated significantly and positively ($r = .57, p < .0001$), demonstrating a relatively good concurrent validity.

An item analysis on the VKS given at pretest revealed a moderately high reliability, *alpha* = .60, $p = .001$ (a higher reliability was obtained at posttest, *alpha* = .78, $p = .001$). Scores on the VKS pretest tended to be relatively low and consistent (see 4.2.2.2). Results on the VR pretest, however, showed a wide range of scores (from a maximum of 0.95 to a minimum of - 0.15). Although the formula for computing the scores of the VR pretest (given in 3.5.1) was designed to adjust scores for guessing, some negative scores obtained on this test suggest that substantial guessing was employed by these students. The number of real words and pseudo words that students claimed to know on the VR pretest were highly and positively (rather than negatively) correlated ($r = .66, p = . 01$), further suggesting that students' responses were not strictly honest. Roughly one third of the sample fell outside the reliability range suggested by Meara for a recognition test of the same kind with 40 real words and 20 pseudo words (see Appendix 1 in Meara, 1992). This reliability

criterion excludes students who claim to know less than 10 real words and more than 10 pseudo words. When a Pearson correlation coefficient between real and pseudo words identified as "known" was further computed for students in the sample who fell within the reliability range, the correlation remained positive and moderately high (r = . 46, p = .01). In sum, the VR pretest did not yield sufficiently reliable results. Based on this finding, it was decided not to administer the VR checklist as a posttest.

Table 4.4 below shows the means and standard deviations for the two vocabulary pretreatment measures.

Table 4.4: Means and standard deviations of the VR and VKS pretests by group (N = 93)

Pretests	Traditional M (SD)	Bimodal M (SD)	Reversed M (SD)	Total M (SD)	Possible score
VR	0.45 (0.23)	0.62 (0.14)	0.41 (0.30)	0.50 (0.24)	-1 to +1
VKS	25.13 (3.77)	28.35 (4.12)	24.62 (5.62)	26.03 (4.50)	12 to 60

A one-way ANOVA on the VR pretest revealed significant differences between groups ($F(2, 90)$ = 8.20, p < .001). Tukey's HSD post-hoc test showed that the Bimodal group outperformed both the Traditional and the Reversed group on the VR pretest, but there were no differences between the Traditional and the Reversed groups.

A one-way ANOVA on the VKS pretest revealed the same pattern of significant differences between group means ($F(2, 90)$ = 6.40, p < .01). According to the same post-hoc test, students given the Bimodal treatment again outperformed each of the other two groups on the VKS pretest, but there were no statistically significant differences between the Reversed and the Traditional groups. Therefore, the two vocabulary pretreatment measures yielded consistent results with respect to initial

vocabulary knowledge.

4.1.3 Choice of Covariate for Posttest Analyses

As already indicated, the Bimodal group demonstrated a superior general proficiency in French and a better prior knowledge of the target vocabulary relative to the Traditional and Reversed groups at pretest. Therefore it was decided to use a covariate in the analyses of posttests that were not given as pretests in Phase 1 (Content test and C-Cloze), in order to control for these initial differences in the sample.

The Dictation was chosen as the covariate for several reasons: (a) it discriminated among the conditions in terms of general proficiency in French; (b) its reliability was supported by extensive national baseline data; (c) it was preferred to the VKS pretest since the latter did not meet the assumption of parallelism of regression with the Content and C-Cloze tests, which is important for an ANCOVA; and (d) it was believed to be a more reliable measure than the VR pretest which allowed a fair amount of guessing. The Dictation as a measure of French language proficiency correlated significantly, positively, and moderately well with both pretest measures of prior vocabulary knowledge (VR pretest, $r = .42, p < .0001$; VKS pretest, $r = .49, p < .0001$), indicating that prior to treatment, higher proficiency students also tended to know more target vocabulary.

4.2 HYPOTHESIS TESTING

The present section is organized in three parts. Research Question One, asking how the different treatments affect students' learning and retention of content and L2 vocabulary, gave rise to four hypotheses, to be addressed in subsections 4.2.1 (regarding content) and 4.2.2 (regarding vocabulary). Research Question Two, asking how students' input preferences (text, sound or picture) relate to their learning of

content and L2 vocabulary under the different conditions, yielded the final two hypotheses, addressed in 4.2.3.

Different analyses of variance were conducted on the Content, C-Cloze, and VKS tests with 93 subjects. The level of significance was set at $p = .05$. All the results from these statistical analyses are summarized in tables and can be found in Appendix N. Planned contrasts (Helmert) were used to locate any significant differences found among group means. Contrast 1 compared the Traditional condition (the comparison group) to the subtitled conditions (the Bimodal and the Reversed groups), and Contrast 2 compared the two subtitled conditions with each other. Therefore, with respect to content learning and retention, Contrast 1 addressed Hypothesis 1, and Contrast 2 addressed Hypothesis 2. With respect to vocabulary learning and retention, Contrast 1 addressed Hypothesis 3, and Contrast 2 addressed Hypothesis 4.

4.2.1 Content Learning and Retention: Hypotheses 1 and 2

There were two hypotheses with respect to content learning and retention:

Hypothesis 1: Learning and retention of content will be significantly higher under the subtitled conditions (Bimodal and Reversed) when compared to the comparison group (Traditional).

Hypothesis 2: Learning and retention of content will be significantly higher under the Reversed condition when compared to the Bimodal condition.

Hypotheses 1 and 2 were tested with a repeated measures ANCOVA performed on the immediate and delayed Content posttests, and an ANCOVA performed on the delayed Content posttest. The Dictation was used as a covariate for both analyses in order to control for differences in initial proficiency in French.

Observed mean scores and standard deviations as well as adjusted mean scores

on the immediate and delayed Content tests are summarized in Table 4.5.

Table 4.5: Observed and adjusted mean scores and standard deviations for the immediate and delayed Content posttests, maximum score = 22 (N = 93)

Condition	IMMEDIATE POSTTEST			DELAYED POSTTEST		
	Obs. Mean	(SD)	Adj. Mean	Obs. Mean	(SD)	Adj. Mean
Traditional (n = 30)	4.36	(2.56)	4.48	3.40	(2.77)	3.65
Bimodal (n = 34)	8.79	(3.21)	8.62	6.44	(3.18)	6.08
Reversed (n = 29)	7.86	(3.03)	7.91	4.72	(3.17)	4.82

Figure 4.1 below illustrates mean scores for the immediate and the delayed Content posttests in a line-graph.

Figure 4.1: Adjusted mean scores for the immediate and delayed Content posttests
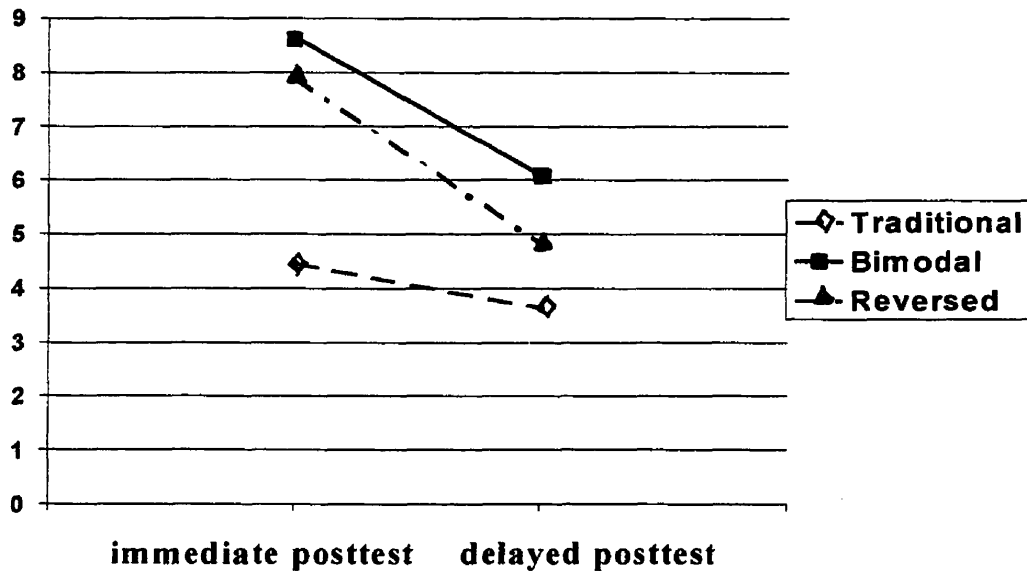
The mean scores of the Content test were based on 8 comprehension questions rather than on the original 10 questions, since two of them were eliminated from the scoring prior to the statistical analyses. These questions were #5 and #6 (see Appendix J), both addressing the growth of different trees as reflected in the size of their tree rings. The necessity to eliminate these questions stemmed from the fact that close to 100% of the students in the final sample were unable to give the correct answers to these questions, or even provide any kind of answer at all. All six teachers agreed that this part of the video was difficult to understand even by more advanced classes than their own.

The statistical design employed in the repeated measures ANCOVA run on the Content test was a two-factor design with repeated measures on one factor. The between-subjects factor was group with three levels (treatments). The within-subjects factor was time with two levels (immediate and delayed posttesting). As part of the repeated measures ANCOVA two new variables were created: *overall performance* on the immediate and delayed Content tests (representing learning) which was computed for each group as the Phase 2 and Phase 3 orthonormalized[6] grand means; and *attrition*, which was computed as the orthonormalized difference between Phase 2 and Phase 3 means. The amount of attrition was one way of examining students' retention of the video content. These variables are displayed in Table 4.6 below.

The main effect of group measured group differences in content learning (overall performance), and the main effect of time determined whether the amount of content attrition for the entire sample was significant. Group differences in attrition

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[6]

In order to run the repeated measures ANCOVA, linear combinations of the differences of the original dependent variables also called *contrasts*, need to be transformed in such a way that they are statistically independent (orthogonal) and so that the sum of the squared coefficients is 1 (normalized). Such contrasts are termed *orthonormalized*.

were reflected in the group by time interaction.

Table 4.6: Observed and adjusted mean scores for overall performance and attrition on the Content test (N = 93)

Condition	Obs. overall performance M	Adj. overall performance M	Observed attrition M	Adjusted attrition M
Traditional (n = 30)	5.49	5.75	0.68	0.59
Bimodal (n = 34)	10.77	10.40	1.66	1.79
Reversed (n = 29)	8.90	9.00	2.21	2.18

In the repeated measures ANCOVA, multivariate tests revealed statistically significant differences among the three conditions with respect to group and time effects combined ($F(4, 178) = 7.74, p < .001$). The corresponding univariate F-tests revealed significant differences both regarding the group main effect (learning), $F(2,89) = 13.32, p < .001$; as well as regarding the group by time effect (attrition by group), $F(2,89) = 4.68, p < .05$. Univariate F-tests also revealed that the main time effect (attrition) for the entire sample was statistically significant ($F(1,89) = 21.58, p < .001$).

Multivariate tests of significance regarding both main effects for Helmert Contrast 1 (when the comparison group was compared to the subtitled conditions) revealed statistically significant differences ($F(2, 88) = 16.33, p < .001$). The corresponding univariate F-tests found significant differences both in terms of the main effect of group (learning), $F(1, 89) = 24.81, p < .001$; and the main effect of time (attrition), $F(1, 89) = 8.69, p < .01$. In particular, students in the two subtitled conditions outperformed the comparison group, but also forgot more content over time relative to the comparison group. When the two subtitled groups were compared with

each other, however (Contrast 2), neither the multivariate tests of significance (F(2, 88) = 1.41, p = n.s.), nor the univariate F-tests for the group main effect (F(1,89) = 2.30, p = n.s.), and the time main effect (F(1,89) = .52, p = n.s.) revealed any significant differences between them. Therefore, when initial proficiency was controlled for, the two subtitled groups demonstrated superior learning of content and a higher amount of attrition relative to the Traditional group. However, no significant differences were found between the two subtitled groups either in terms of learning or attrition of content from Phase 2 to Phase 3.

A further ANCOVA was run on the delayed Content posttest with the Dictation as the covariate in order to compare groups with respect to their level of *content maintenance* in Phase 3. The level of knowledge maintenance was considered a more important aspect of retention than attrition between Phases 2 and 3, since it addressed the issue of whether the Bimodal and Reversed treatments had lasting learning effects in spite of the demonstrated significantly higher amount of content attrition in the subtitled groups relative to the comparison group.

The statistical design employed in the ANCOVA run on the delayed Content posttest was a one-factor design, where the between-subjects factor was group with three levels, corresponding to the three treatments. The main effect of group in this analysis measured group differences in the level of content maintenance at Phase 3.

This ANCOVA revealed a significant main effect for group (F(2, 89) = 5.31, p < .01). According to Helmert Contrast 1, students in the subtitled conditions significantly outperformed the comparison group in Phase 3 (F(1, 89) = 2.76, p < .01). No significant differences between the two subtitled conditions were observed (F(1,92) = 1.68, p = n.s.).

It can be concluded that in the long run, with initial proficiency controlled for, both subtitled conditions demonstrated significantly higher content maintenance

relative to the comparison group. Although their amount of attrition was significantly higher relative to the comparison group, their level of maintenance in Phase 3 was still superior to that of the comparison group.

In conclusion, the results from the statistical analyses supported Hypothesis 1, since as it predicted, students under both subtitled conditions learned and retained significantly more content relative to the comparison group. Hypothesis 2 was completely rejected, since contrary to predictions, both the Bimodal and the Reversed groups performed similarly to each other in terms of content learning and retention.

4.2.2 Vocabulary Learning and Retention: Hypotheses 3 and 4

There were two hypotheses with respect to vocabulary learning and retention:

Hypothesis 3: Learning and retention of L2 vocabulary will be significantly higher under the subtitled conditions when compared to the comparison group.

Hypothesis 4: Learning and retention of L2 vocabulary will be significantly higher under the Reversed condition when compared to the Bimodal condition.

Hypotheses 3 and 4 were tested by the C-Cloze and the VKS. The immediate C-Cloze posttest correlated positively and significantly with the VKS pretest ($r = .66$, $p < .0001$), demonstrating adequate concurrent validity. Results from the two vocabulary measures are reported separately below.

4.2.2.1. The C-Cloze A repeated measures ANCOVA on the C-Cloze tests and an ANCOVA on the delayed C-Cloze test, both identical in statistical design to the analyses conducted on the Content test, were used to address hypotheses 3 and 4. In these analyses, Hypothesis 3 was addressed by Helmert Contrast 1, and Hypothesis 4 was addressed by Contrast 2. The Dictation was used again as a covariate.

Table 4.7 displays the observed means and standard deviations for the C-Cloze, as well as mean scores adjusted for the covariate. Adjusted mean scores on the immediate and delayed C-Cloze posttests are further illustrated in a line-graph (see Figure 4.2).

Table 4.7: Observed and adjusted mean scores and standard deviations for the immediate and delayed C-Cloze posttests, maximum score = 58 (N = 93)

Condition	IMMEDIATE POSTTEST			DELAYED POSTTEST		
	Obs. Mean	(SD)	Adj. Mean	Obs. Mean	(SD)	Adj. Mean
Traditional (n = 30)	11.66	(6.35)	12.60	12.16	(6.10)	13.20
Bimodal (n = 34)	21.85	(6.71)	20.51	19.35	(7.31)	17.88
Reversed (n = 29)	14.55	(9.04)	14.95	11.65	(8.58)	12.09

Figure 4.2: Adjusted mean scores for the immediate and delayed C-Cloze posttests
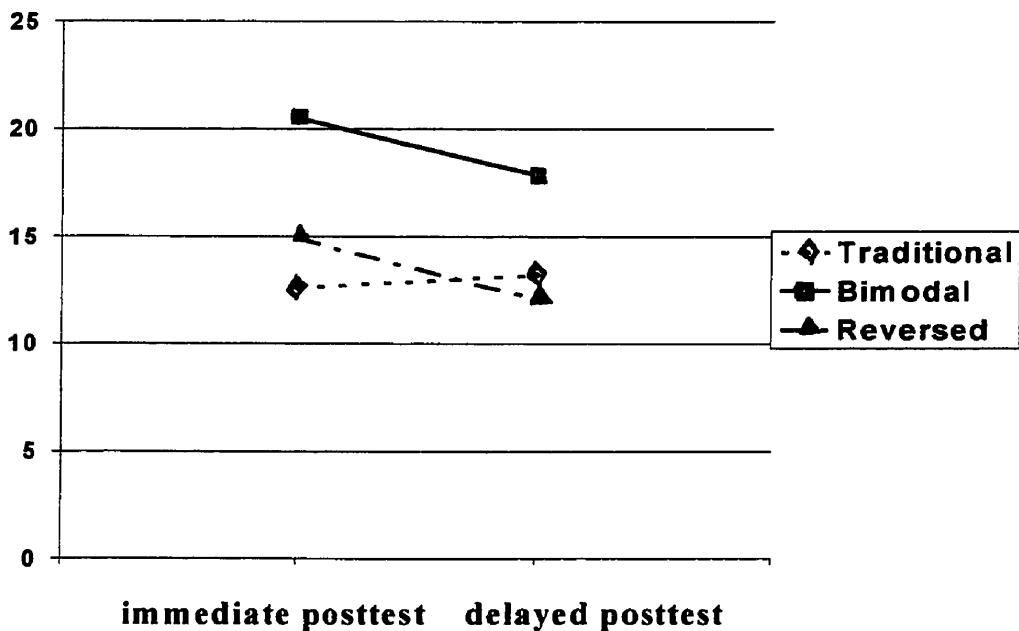
Similarly to the repeated measures ANCOVA on the Content test, in order to measure vocabulary learning and attrition, two new variables were computed. Vocabulary learning was again operationalized in terms of the orthonormalized grand mean of the immediate and delayed C-Cloze posttest means (overall performance), and attrition was operationalized as the orthonormalized difference between these means.

Table 4.8 summarizes observed and adjusted overall performance (learning) and attrition on the C-Cloze test for each of the treatment groups.

Table 4.8: Observed and adjusted mean scores for overall performance and attrition on the C-Cloze test (N = 93)

Condition	Obs. overall performance M	Adj. overall performance M	Observed attrition M	Adjusted attrition M
Traditional (n = 30)	16.85	18.25	-0.35	-0.41
Bimodal (n = 34)	29.13	27.15	1.76	1.86
Reversed (n = 29)	18.53	19.11	2.04	2.02

Multivariate tests of significance for overall performance and attrition of vocabulary combined revealed significant differences among groups, $F(4,178) = 8.34$, $p < .001$. Univariately, significant differences were found both for the group main effect (learning), $F(2, 89) = 10.27, p < .001$; and for the group by time interaction (attrition by group), $F(2, 89) = 7.70, p < .01$.

The time main effect (attrition), was also found to be significant $(F(1, 89) = 7.36, p < .01)$, i.e., there was significant attrition for the sample as a whole. It is clear from Table 4.8, however, that attrition occurred under the two subtitled conditions but not in the comparison group, since the attrition value for that group was negative,

although very low.

Helmert Contrast 1 located statistically significant differences multivariately (F(2, 88) = 10.50, $p < .001$), as well as univariately, both in terms of learning (F(1, 89) = 7.48, $p < .01$), and in terms of attrition (F(1, 89) = 15.28, $p < .001$). That is to say, with adjustment for initial proficiency, the two subtitled conditions together performed significantly better on the C-Cloze tests and forgot more vocabulary between Phase 2 and 3 than the comparison group.

Next, with respect to Contrast 2, the multivariate tests of significance revealed significant differences among the subtitled groups (F(2, 88) = 6.92, $p < .01$), and the associated univariate F-tests showed significant differences only for learning (F(1, 89) = 13.72, $p < .001$), but not for attrition. In particular, the Bimodal group learned significantly more vocabulary than the Reversed group, but the amount of vocabulary attrition under the two subtitled conditions was similar.

An additional ANCOVA on the delayed C-Cloze posttest with the Dictation as a covariate, measuring the level of vocabulary knowledge maintenance at Phase 3, demonstrated a significant group main effect, F (2, 89) = 7.69, $p < .001$. There were no significant differences for Helmert Contrast 1 (F(1, 89) = - 1.29, p = n.s.), indicating that the subtitled conditions together did not outperform the comparison group on the delayed C-Cloze posttest. Contrast 2, however, revealed significant differences between the subtitled conditions, with the Bimodal group outperforming the Reversed group (F(1, 89) = 3.68, $p < .001$).

These results, therefore, demonstrate that when adjustment was made for initial proficiency, significantly superior maintenance of vocabulary knowledge in Phase 3 occurred only under the Bimodal subtitled condition relative to the Reversed condition, in spite of the fact that the two subtitled conditions exhibited a very similar amount of attrition.

4.2.2.2 The Vocabulary Knowledge Scale Since the nature of the VKS allowed for both quantitative and qualitative exploration (Paribakht & Wesche, 1997), three different analyses were performed. First, in order to test for significant treatment effects with respect to vocabulary learning, a repeated measures ANOVA was conducted on the VKS (overall analysis). Second, in order to explore how students under each condition improved with respect to levels of receptive and productive vocabulary knowledge, frequency distributions were computed for students' responses at each of the five levels of vocabulary knowledge by group (analysis by levels). Finally, in order to discover which of the target words were acquired by the students, frequency distributions by group were computed for known and unknown target words at pretesting and posttesting (analysis by words).

Overall analysis. The VKS measured vocabulary learning with respect to 12 of the target vocabulary items, but not their long-term retention, since it was administered once before and once after treatment in Phase 3 (unlike the Content and the C-Cloze tests, completed twice after treatment).

A repeated measures ANOVA was performed on the VKS in order to find out whether treatment affected students' vocabulary learning. The statistical analysis employed was a two-factor analysis. The between-subjects factor was group with three levels (the three conditions), and the within-subjects factor was time with two levels (pretest and posttest). Significant vocabulary learning for the sample as a whole was tested by the main effect of time, measuring vocabulary growth (learning) from pretest to posttest. Significant differences among groups with respect to vocabulary learning were tested by the group-by-time interaction. No covariate was used for this analysis since the VKS was given as a pretest.

Table 4.9 summarizes group means and standard deviations for the VKS pretest and posttest, as well as orthonormalized mean differences between performance at

pretest and posttest (referred to as vocabulary growth).

Table 4.9: Mean scores and standard deviations for the VKS pretest and posttest, and vocabulary growth, possible scores = 12- 60 (N = 93)

Condition	PRETEST		POSTTEST		Vocabulary growth
	M	(SD)	M	(SD)	
Traditional (n = 30)	25.13	(3.77)	31.33	(6.19)	4.38
Bimodal (n = 34)	28.35	(4.12)	38.64	(6.31)	7.27
Reversed (n = 29)	24.62	(5.62)	29.37	(7.47)	3.36

Note: Vocabulary growth is the orthonormalized difference between the pretest and the posttest means

The line graph in Figure 4.3 below illustrates vocabulary growth from the VKS pretest to the VKS posttest for the three conditions in the study.

Figure 4.3: Mean scores for the VKS pretest and posttest
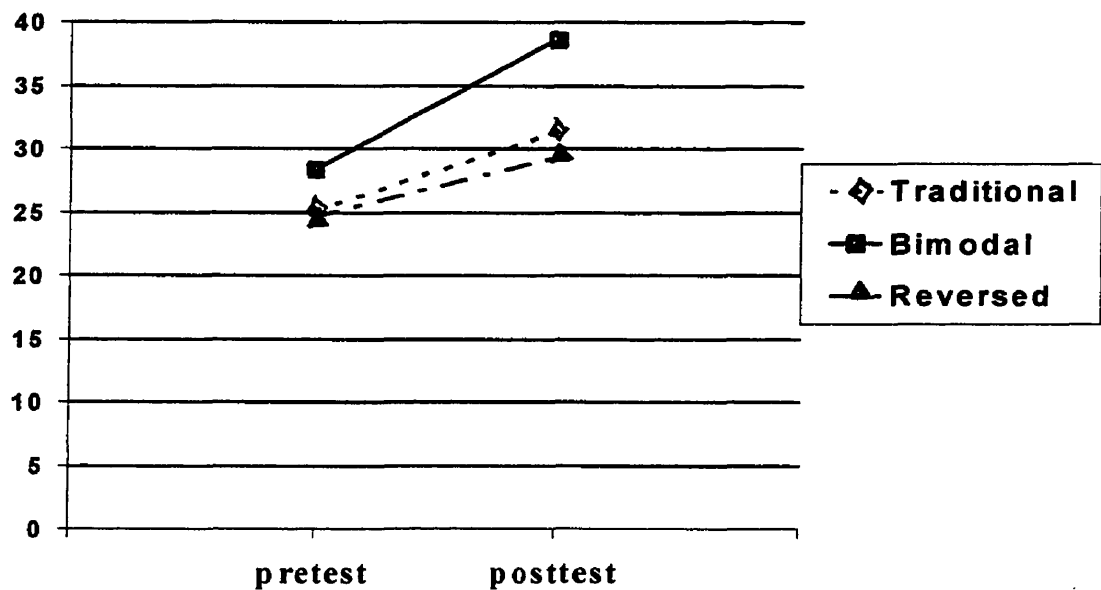
The repeated measures ANOVA revealed a highly significant main effect of time, indicating significant improvement in vocabulary knowledge from pretest to posttest for the sample as a whole. The group-by-time interaction was also significant. However, only Contrast 2 revealed significant group differences, demonstrating that the Bimodal group significantly outperformed the Reversed group. The average of the two subtitled conditions was not significantly higher than the comparison group (Contrast 1).

Analysis by levels. In order to investigate how the three conditions improved after treatment with respect to depth of target word acquisition, five levels of vocabulary knowledge were generated from data obtained on the VKS, based on specific scores assigned to each item (see 3.5.2).

As can be seen from Table 4.10, illustrating frequencies of students' responses at each level of vocabulary knowledge at pretest and posttest by group, the highest improvement for all three conditions occurred mainly at the initial level (recognition knowledge) and the final two levels of vocabulary knowledge (productive knowledge). The decrease of unfamiliar words at Level 1 was highest for the Traditional and Bimodal groups: over 18% for the Traditional, roughly 17% for the Bimodal, and close to 12% for the Reversed. Although students were able to recognize more of the target words after treatment, the number of familiar but unknown words was still high for all three conditions (Level 2). There was even a slight increase at that level for the Traditional group (about 3%). Only results for the Bimodal group demonstrate a decrease of familiar but unknown words at Level 2 following treatment. Next, differences from pretest to posttest at levels 3 through 5 combined show total improvement in word knowledge (roughly 16% for the Traditional group, 25% for the Bimodal group, and 11% for the Reversed group), since these three levels indicate different degrees of actual word knowledge.

Table 4.10: Percentage of responses on the VKS pretest and posttest at each level of vocabulary knowledge by group (N = 93)

Levels	Time	Traditional (n = 30) % Responses	Bimodal (n = 34) % Responses	Reversed (n = 29) % Responses	Total (N = 93) % Responses
LEVEL 1	pretest	29.7	23.0	32.5	28.1
	posttest	11.1	6.1	20.7	12.3
LEVEL 2	pretest	43.0	42.9	44.5	43.5
	posttest	45.9	34.6	45.1	41.5
LEVEL 3	pretest	19.2	18.2	14.0	17.2
	posttest	23.6	19.6	13.8	19.0
LEVEL 4	pretest	3.9	5.9	3.2	4.4
	posttest	9.7	10.0	9.8	9.9
LEVEL 5	pretest	4.2	10.0	5.8	6.8
	posttest	9.7	29.7	10.6	17.3

Most of the vocabulary growth under the Bimodal treatment (close to 20%) occurred at the highest level of vocabulary knowledge (Level 5) which comprises correct knowledge of the words and the ability to use them in semantically appropriate and grammatically accurate sentences. Vocabulary growth under the Traditional and the Reversed treatments were broadly similar with respect to Levels 4 and 5, but the Traditional group gave more correct word translations than the Reversed group at Level 3. As already demonstrated, however, overall these differences between the Traditional and the Reversed groups were not significant.

Performance in terms of vocabulary knowledge levels by group are further illustrated by the bar graphs in Figures 4.4, 4.5, and 4.6, respectively.

Figure 4.4: Levels of vocabulary knowledge at the VKS pretest and posttest for the Traditional condition (n = 30)
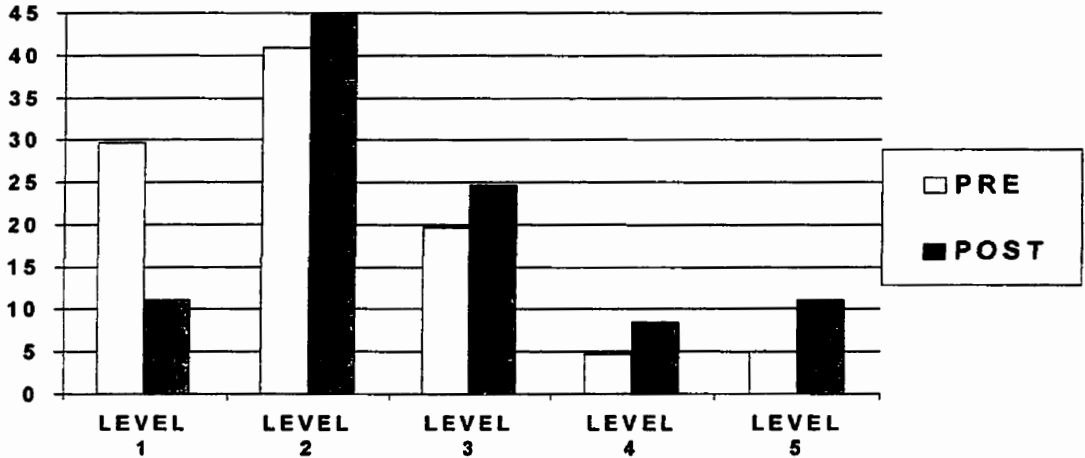
Figure 4.5: Levels of vocabulary knowledge at the VKS pretest and posttest for the Bimodal condition (n = 34)
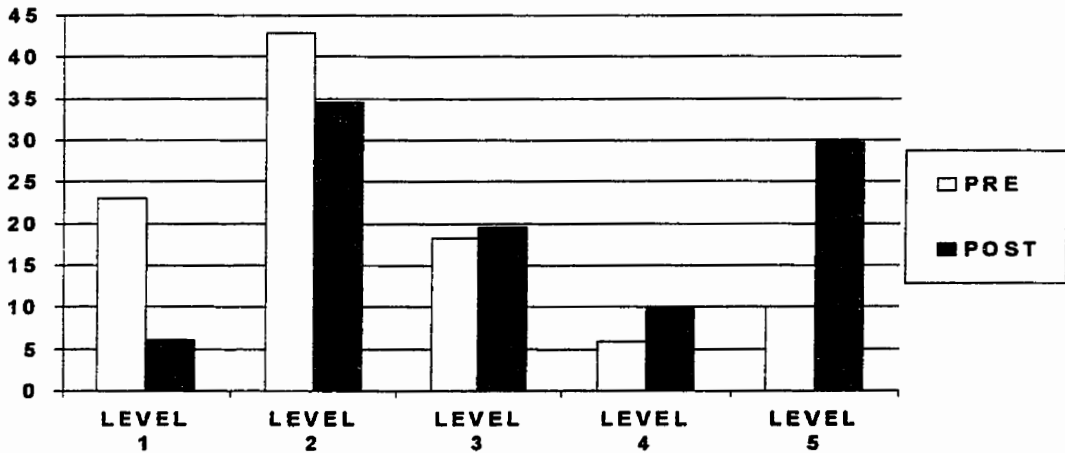
Figure 4.6: Levels of vocabulary knowledge at the VKS pretest and posttest for the Reversed condition (n = 29)
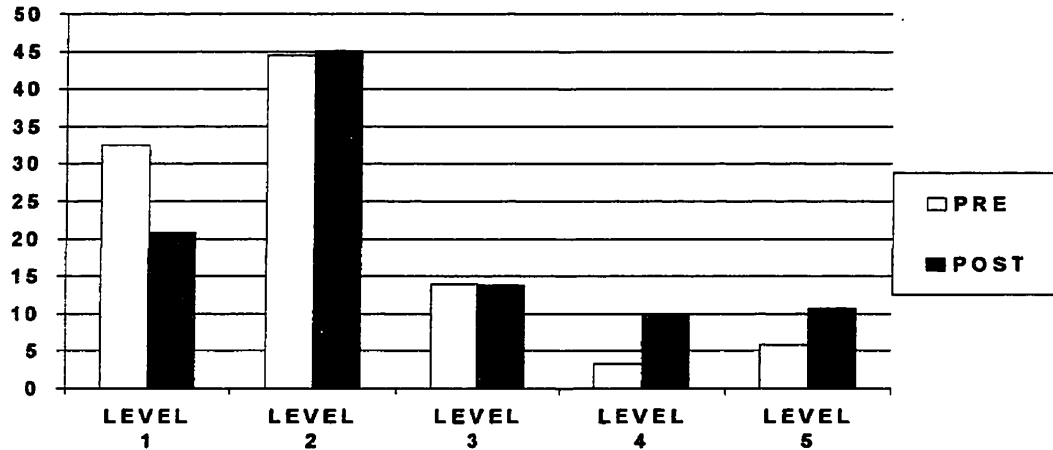
Based on the evidence with respect to vocabulary learning presented so far, it can be concluded that students under the Bimodal treatment advanced not only quantitatively, but qualitatively as well. The analysis by levels of vocabulary knowledge reveals that vocabulary learning in that condition was superior both in terms of receptive and productive competence.

Analysis by words. In order to explore which of the target vocabulary items in the VKS were acquired by the students, frequencies of words known before and after treatment were computed for each group. Responses consisting of correct translations and sensible sentences containing these words (i.e., levels 3, 4 and 5) were deemed to indicate that a word was known.

Table 4.11, where frequency distributions with respect to individual word knowledge are summarized, shows that moderate vocabulary growth was observed for most of the target words. Under the Traditional condition, improvement occurred for all the items, except for the word *pousser*: none of the students in this treatment

condition demonstrated knowledge of the specific meaning of this word as used in the video (viz., "to grow") either before or after treatment. Under the Bimodal condition, improvement was present for all the words, except *descendre* which was already known by the vast majority prior to treatment.

As Table 4.11 further evidences, the highest learning of individual target items took place under the Bimodal treatment, and learning effects occurred with respect to a greater number of words. For three of the words *(obscurité, espèce* and *parmi)* improvement in word knowledge under the Bimodal treatment was close to or higher than 50%, whereas the highest word learning improvement for any of the target items under the Traditional treatment was 30%, and under the Reversed treatment it was roughly 24%.

Students under the Traditional and Bimodal treatments who did not receive any oral L1 video input succeeded in learning French words that were presented in salient and informative visual contexts, even when these words were used only once in the video script, amounting to a total of three exposures per word since the video was played three times (e.g., *lutter, intacte, entier, colline, espèce).* In contrast, improvement on most of these words under the Reversed condition was very low, and there did not seem to be any specific pattern of words that students in this group tended to acquire.

Knowledge of the 12 target words at pretest and posttest in each condition is further illustrated by three horizontal bar graphs (see figures 4.7, 4.8, and 4.9, respectively), and knowledge of these words before and after treatment with respect to the whole sample is shown in Figure 4.10.

Table 4.11: Percentage of target words known on the VKS pretest and posttest by group (N = 93)

WORDS	Phase	Traditional known words %	Bimodal known words %	Reversed known words %	Total known words %
glace	pretest	56.7	50.0	55.2	53.8
	posttest	76.7	73.5	75.9	75.3
lutter	pretest	6.7	26.5	6.9	14.0
	posttest	36.7	52.9	13.8	35.5
intacte	pretest	36.7	44.1	27.6	36.6
	posttest	56.7	67.6	48.3	58.1
obscurité	pretest	3.3	20.6	6.9	10.8
	posttest	13.3	61.8	27.6	35.5
régner	pretest	6.7	41.2	0	17.2
	posttest	36.7	52.9	10.3	34.4
entier	pretest	16.7	17.6	17.2	17.2
	posttest	30.0	38.2	20.7	30.1
survivre	pretest	80.0	91.1	51.7	75.3
	posttest	96.7	100	75.9	91.4
colline	pretest	3.3	0	20.7	7.5
	posttest	20.0	14.7	24.1	19.4
espèce	pretest	23.3	20.6	17.2	21.5
	posttest	43.3	67.6	27.6	47.3
pousser	pretest	0	0	0	0
	posttest	0	23.5	6.9	10.8
descendre	pretest	90.0	94.1	72.4	86.0
	posttest	96.7	94.1	75.9	89.2
parmi	pretest	3.3	2.9	0	2.2
	posttest	10.0	64.7	3.4	28.0

Figure 4.7: Knowledge of target vocabulary at the VKS pretest and posttest for the Traditional condition (n = 30)
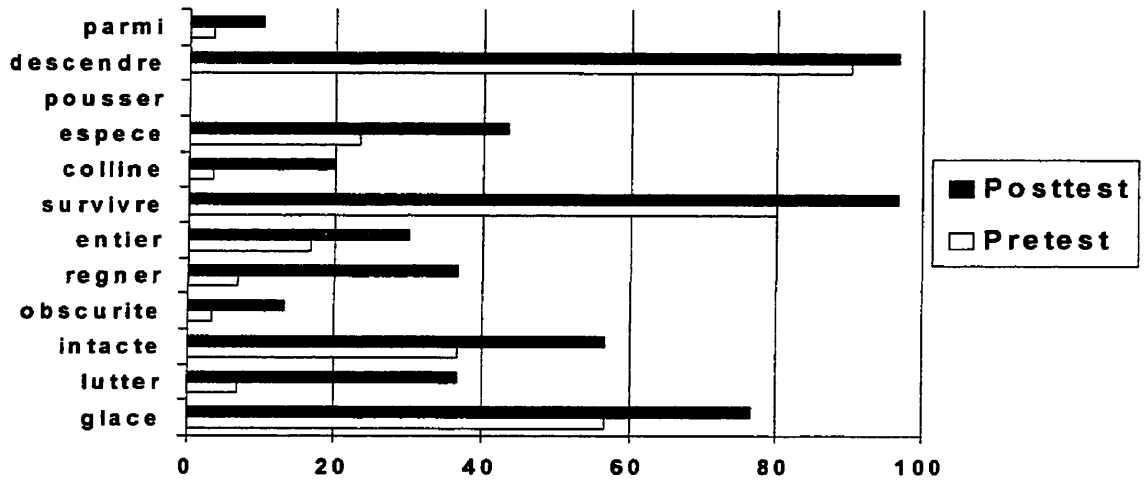
Figure 4.8: Knowledge of target vocabulary at the VKS pretest and posttest for the Bimodal condition (n = 34)
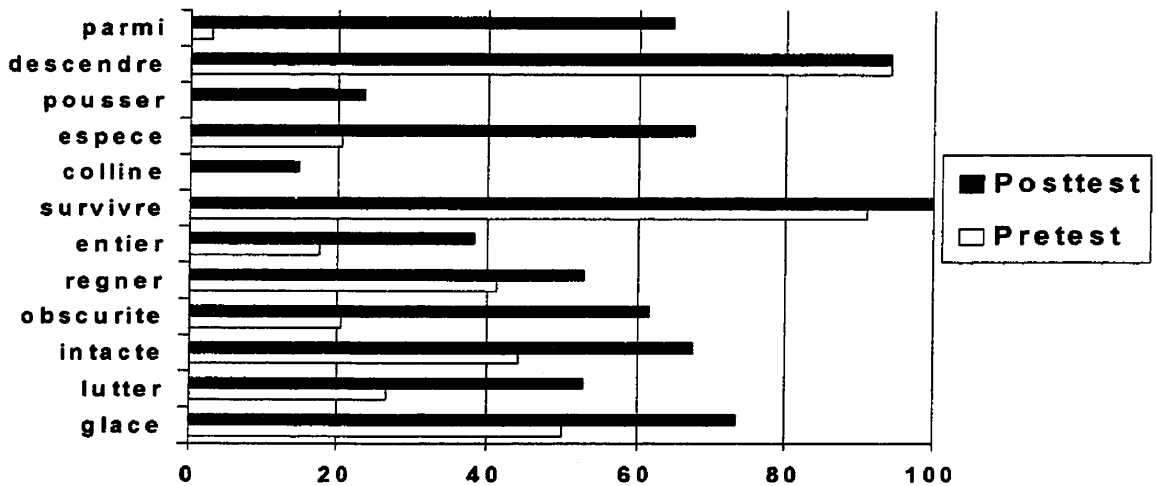
Figure 4.9: Knowledge of target vocabulary at the VKS pretest and posttest for the Reversed condition (n = 29)
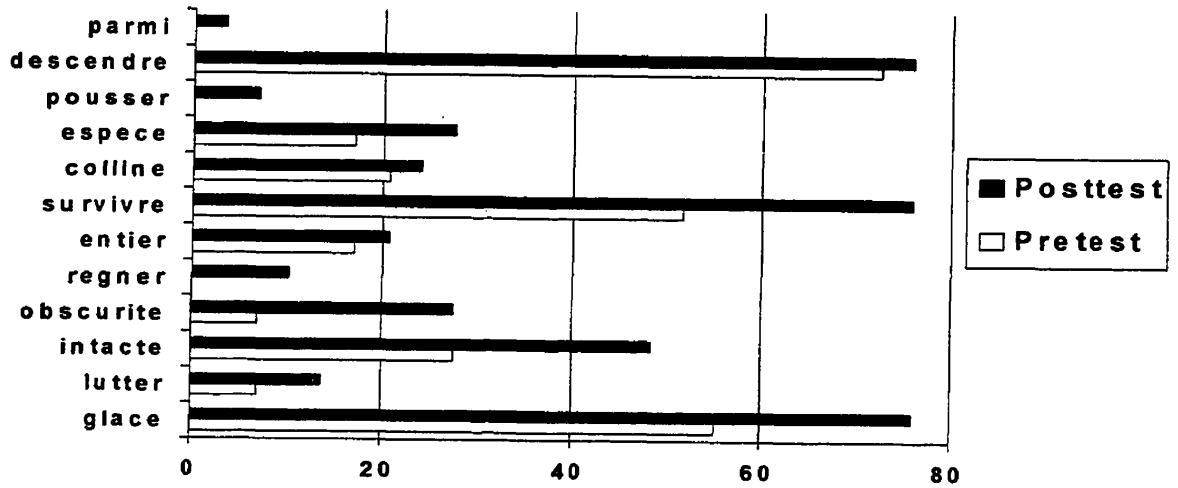
Figure 4.10: Knowledge of target vocabulary at the VKS pretest and posttest for the whole sample (N = 93)
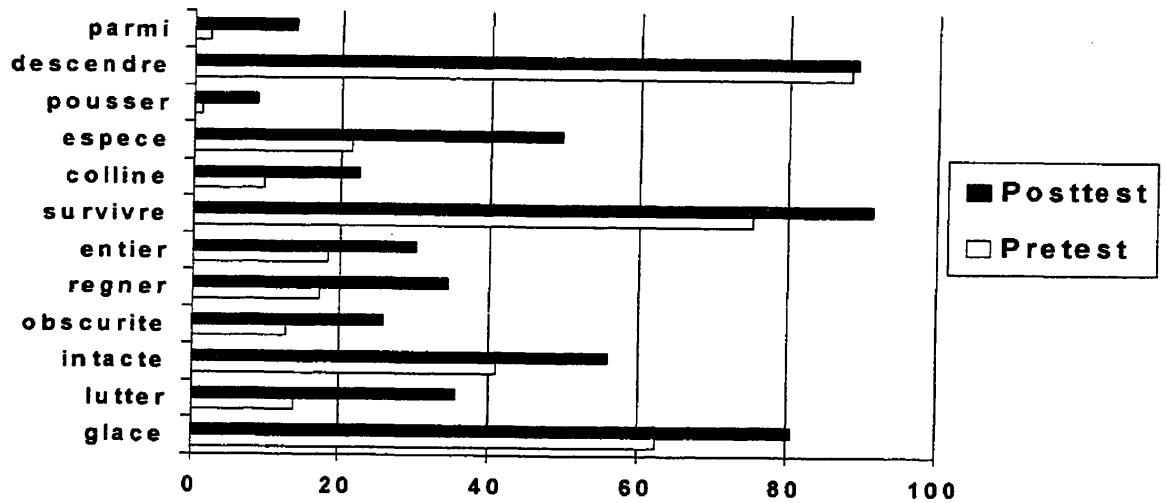
Summary. The statistical analyses on both the C-Cloze and the VKS revealed that the Bimodal group learned significantly more vocabulary relative to the other two groups. Results from the C-Cloze further demonstrated that vocabulary learning and retention under the Reversed and Traditional conditions were similar. According to the analyses on the VKS, the Reversed group tended to perform even slightly worse than the comparison group, although overall, these differences were not significant, either. In particular, the Reversed group demonstrated relatively lower frequency outcomes than the comparison group with respect to vocabulary knowledge levels 1 and 3, and in terms of individual word knowledge.

Based on the present findings, Hypothesis 3 was supported only in part, since students in only one of the subtitled conditions (Bimodal) demonstrated significantly higher vocabulary learning and retention relative to the comparison group. Hypothesis 4 was completely rejected, since it was the Bimodal group that outperformed the Reversed group in terms of vocabulary learning and retention, rather than the other way around.

4.2.3 Input Preferences and the Learning of Content and Vocabulary: Hypotheses 5 and 6

Research Question Two asked whether students' preferences for text, sound or picture were significantly related to the way they learn content and vocabulary under the three treatments. The following two hypotheses were generated to address this research question:

Hypothesis 5: Pronounced preferences for the watching of video/TV will relate to better content and vocabulary learning with any of the video treatments.

Hypothesis 6: Pronounced preferences for the watching of video/TV and

for the reading of text will relate to better content and vocabulary learning under the subtitled conditions relative to the comparison group.

In order to test these hypotheses, it was necessary to explore students' preferences for text, picture, and sound when studying French, or whether they preferred to study the language through reading, viewing (watching video or TV), or listening. Next, it was necessary to investigate what kind of relationship existed between students' input preferences and their scores on the Content and C-Cloze tests. Students' attachment to the different kinds of input when learning French, was measured via questions #13 and #14 in the Background Prequestionnaire (see Appendix F). Each of these questions offered six input-related statements, and students were asked to agree or disagree with them on a five-point scale. As explained in section 2.4, this was not an attempt to establish what kinds of learning styles students exhibited, but only to determine whether there existed any pronounced preferences for one kind of input over another among the participants in the study.

In order to investigate whether the three conditions in the study were comparable in terms of input preferences, outcomes on the questionnaire were first quantified into percentages and presented in frequency tables. Next, chi-square tests of significance were run for each of the response categories by group. On rare occasions, Fisher's exact tests were used when the chi-square assumption for minimum expected frequencies was not met (viz., the distributions contained some cells with frequencies lower than expected) even after collapsing categories. The significance level was corrected to $p = .004$, since according to the Bonferroni estimate of significance, the standard level of significance .05 has to be divided by the number of tests (n = 12 statements).

The statements. Question #13 asked the participants what input media (textbooks, black-board, audiotapes, teacher, videos, and television) helped them

understand French best, and question #14 asked what input media helped them learn French words best. This distinction was justified by the belief that comprehension and learning are two different (although related) processes, as discussed in section 2.2. Each of these questions presented six statements, two relevant to each kind of input (text, sound, and picture), and corresponding to one of the relevant processing modes (reading, listening, and viewing). Thus, in question #13 the statements were: (1) "I understand best when I listen to the teacher in class"; (2) "I understand best when the teacher writes on the black-board"; (3) "I understand best when I listen to a French audiotape"; (4) "I understand best when I watch French shows on video or TV"; (5) "I understand best when I read a French textbook"; (6) "I understand better when I watch French films on TV or on video". Question #14 presented the exact same statements, except that the word "understand" was now replaced by the phrase "learn French words". The statements referring to the same kind of input (two for each) were not listed in sequential order, so as to reduce the probability of biassing towards similar responses. Students were asked to check one of five options for each statement: (1) "strongly agree", (2) "agree", (3) "undecided", (4) "disagree", and (5) "strongly disagree".

Table 4.12 summarizes frequencies of responses to the six statements with respect to listening comprehension in French, and Table 4.13 provides response frequencies for the six statements with respect to vocabulary learning in French. As can be seen from Tables 4.12 and 4.13, the patterns of responses in the two categories (comprehension and vocabulary learning) were broadly similar. With respect to both categories, close to or more than 80% of the sample agreed or strongly agreed that understanding/learning of French was best under the following conditions: (1) when they were listening to the teacher; (2) when they were reading what she was writing on the blackboard; and (3) when they were reading books.

Table 4.12: Comprehension preferences in French (N = 93)

Comprehension preferences	strongly agree %	agree %	undecided %	disagree %	strongly disagree %
Listening to the teacher	22.6	62.4	12.9	2.2	0
Reading the blackboard	30.1	55.9	10.8	3.2	0
Listening to audiotapes	1.1	19.4	34.4	38.7	6.5
Watching TV/video shows	2.2	20.4	49.5	23.7	4.3
Reading books	11.8	57.0	19.4	9.7	2.2
Watching films on TV/video	6.5	17.2	48.4	25.8	2.2

Table 4.13: Vocabulary learning preferences in French (N = 93)

Learning preferences	strongly agree %	agree %	undecided %	disagree %	strongly disagree %
Listening to the teacher	33.3	57.0	6.5	3.2	0
Reading the blackboard	29.0	58.1	11.8	1.1	0
Listening to audiotapes	1.1	12.9	37.6	36.6	11.8
Watching TV/vide shows	2.2	16.9	51.6	29.0	1.1
Reading books	21.5	55.9	12	8.6	2.2
Watching films on TV/video	2.2	17.2	53	25.8	2.2

About half of the sample, on the other hand, were undecided regarding how the watching of films and shows on video or TV affected their comprehension and learning of French. Finally, the majority of the students either disagreed with, or were undecided about, the benefits of listening to audiotapes when studying French.

Attachment to all input media by the three treatment groups was measured via the collapsed response categories of "agree" and "strongly agree", and conversely, lack

of attachment was measured via the collapsed categories of "undecided", "disagree", and "strongly disagree". The main rationale for dichotomizing the full spectrum of response categories was the requirement for meeting the chi-square assumption for minimum expected frequencies, since with the full distribution many of the cells had frequencies lower than the expected. An additional rationale was to simplify the presentation of results.

The chi-square tests revealed statistically significant differences among groups only for one of the 12 statements: listening to audiotapes when trying to understand French (χ^2 (2, N = 93) = 11.4, p < .004). In particular, the Reversed group demonstrated a significantly stronger attachment to audiotapes for the purposes of comprehension (41.4%), although the majority in this group were still not in favour of the medium. The other two groups exhibited a similar lack of attachment to the use of audiotapes for listening to French (Traditional: 10%; Bimodal: 11.8%).

As evidenced by tables 4.12 and 4.13, students in general were not enthusiastic about listening to French audiotapes either when trying to understand French, or when learning French vocabulary. In contrast, most of the students in the sample were pronouncedly in favour of listening to the teacher both with respect to comprehension and learning. Given the overall strong attachment to the teacher as a source of oral input, and the overall dislike of audiotapes, it is clear that the two statements addressing "listening" did not actually tap attachment towards the same kind of input. Most likely they measured students' preference for a source offering both oral and visual input (teachers) over a source offering only oral input (audiotapes). Responses with respect to "reading" and "watching", on the other hand, were much more consistent and therefore reflected attitudes towards text and picture more rigorously.

Combined variables. As presented above, with the exception of students' responses to understanding French with audiotapes, no significant differences among

groups were found with respect to the statements in the category of comprehension (Table 4.12), nor the statements in the category of vocabulary learning (Table 4.13) at the required level of significance ($p = .004$). Overall, responses in both categories were very similar. Therefore, the vocabulary learning category was dropped from the data analysis as redundant. All further analyses are henceforth based on data obtained from Question #13 (the category of comprehension).

The two statements addressing students' preferences for the reading of text, and the two statements addressing students' preferences for TV/video watching were then used as the basis for creating combined variables serving as more robust measures of input attachment. Combined variables for listening to oral input was not computed, since as already shown in Table 4.12, students' general response to "listening to the teacher" was dramatically different from their response to "listening to tapes". Therefore, the two listening statements did not measure the same construct, and compound variables based on them would not measure actual attachment to oral input.

The following two new compound variables were created: (1) *readers* (indicating students who are reading-oriented, and based on the original variables "comprehension through the reading of French books" and "comprehension through reading from the black board"); (2) *viewers* (indicating viewing-oriented students, and based on the original variables "comprehension through watching French shows on video/TV" and "comprehension through watching French films on video/TV").

Since this reorganization of variables involved grouping together students' responses to two different statements, the original five options provided in the Prequestionnaire were also recoded to six new values: (1) "agree with both statements", (2) "agree with one statement and undecided about the other"; (3) "agree with one statement and disagree with the other"; (4) "undecided about both statements"; (5) "disagree with one statement and undecided about the other"; and (6)

"disagree with both statements".

As can be seen from Table 4.14 illustrating frequency distributions of readers and viewers in the sample by group, the majority of the answers fall into "consistent" categories, or categories where students gave the same answer to both indicators (viz., "agree both", "both disagree", and "both undecided"). When these three categories were collapsed for the entire sample, there was 64.5% of consistency for the readers, and 68.9% for the viewers.

Table 4.14: Readers and viewers by group (N = 93)

RESPONSES	READERS				VIEWERS			
	Trad.	Bim.	Rev.	Total	Trad.	Bim.	Rev.	Total
	%	%	%	%	%	%	%	%
Agree both	56.7	64.7	62.1	61.3	13.3	26.5	10.3	17.2
Agree/undecided	20.0	23.5	24.1	22.6	13.3	14.7	0	9.7
Agree/disagree	16.7	5.9	6.9	9.7	3.3	2.9	0	2.2
Both undecided	0	5.9	0	2.2	26.7	44.1	31.0	34.4
Disagr/undecided	3.3	0	6.9	3.2	33.3	5.9	20.7	19.4
Both disagree	3.3	0	0	1.1	10.0	5.9	37.9	17.2

The six recoded values for levels of attachment with respect to readers and viewers were then collapsed into the following two levels: (1) **attached** (comprising "agree with both statements", and "agree with one/undecided about the other"); and (2) **unattached** (comprising "disagree with one statement/undecided about the other", "disagree with both statements", "undecided about both statements", and "agree with one statement/disagree with the other"). Chi-square tests comparing the three treatment groups were run for each of the combined variables. Significant differences among groups were not observed at $p = .01$ (i.e., $p = .05 \div 4$ tests).

Reading and viewing were intentionally kept separate, as it was believed that they involved distinct processes (see 2.4). But since both the reading of text and the watching of video/TV involve the visual senses, it was interesting to establish what kind of relationship existed between readers and viewers in the sample.

Table 4.15 shows how many students were attached to both text (reading) and picture (viewing), to none of them, or to one but not to the other. These results are based on a crosstabs analysis performed on the reading and viewing combined variables.

Table 4.15 Attachment and unattachment to reading and viewing (N = 93)

CATEGORIES	%
attached to both reading and viewing	24.7
attached to reading/unattached to viewing	59.1
attached to viewing/unattached to reading	2.2
unattached to both reading and viewing	14.0

Overall, there were considerably more respondents who claimed to be text-oriented (readers) than picture-oriented (viewers). The vast majority were readers (roughly 84%, counting students who were also viewers as well as readers), about a quarter were viewers, and almost all the viewers in the sample were readers as well. Only two students were exclusively attached to viewing. The relationship between reading-oriented and viewing-oriented learners in the sample is illustrated in Figure 4.11 below.

Figure 4.11: Readers and viewers in the sample (N = 93)

READERS
83.8%
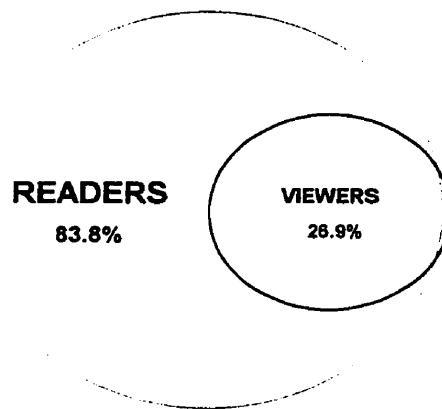
VIEWERS
26.9%

It should be noted that figure 4.11 is mathematically not exact. The proportions are rough estimates and the figure is used for a better visual representation of the overlap between readers and viewers.

The Hypotheses. Due to the overlap of readers and viewers and the fact that the sample contained only two students who were exclusively attached to the mode of viewing (see Table 4.15, and Figure 4.11), it was impossible to test Hypothesis 5. Also, given the small variation in the distribution of response categories, it was impossible to adequately demonstrate a relationship between students' input preferences and their test scores in terms of correlation coefficients. The presence of even a very small number of outliers (as was the case here), was likely to impact strongly on the outcomes and thus produce misleading correlations. For these reasons, correlations between students' test results and their preferences for text, sound and picture were not computed.

In order to test Hypothesis 6, the entire response distribution regarding students' input processing preferences was reorganized into three response groups, as follows:

(1) readers and viewers; (2) readers only; and (3) neither readers nor viewers. The two students who were deemed to be viewers only were discarded from the analysis (n = 91). This distribution is shown in Table 4.16.

Table 4.16: Distribution of readers and viewers, readers, and neither readers nor viewers (n = 91)

Condition	Readers/Viewers %	Readers %	Neither %	N
Traditional	24.1	55.2	20.7	29
Bimodal	41.2	47.1	11.8	34
Reversed	7.1	82.1	10.7	28
Total	25.3	60.4	14.3	91

A two-way ANOVA was then performed on the Content test given in Phase 2 in order to see how attachment to reading and viewing affected students' learning of content. There were two grouping variables (between-subjects factors): group with three levels (the three conditions), and media preferences with three levels (the three response groups above). The findings revealed a significant main effect of treatment, but no significant main effect of input preferences, nor interactions between treatment and input preferences with respect to content learning (see Table 4.17).

Table 4.17: Two-way ANOVA results for input preferences and content learning (n = 91)

Source of variation	df	F (p)
Group	2, 82	13.22***
Input preferences	2, 82	.17
Group by input	4, 82	.14

Note: $*p < .05$, $**p < .01$, $**p < .001$

An identical two-way ANOVA was performed on the C-Cloze (completed in Phase 2) as well, in order to investigate whether input preferences were significantly related to students' learning of L2 vocabulary (see Table 4.18).

Table 4.18: Two-way ANOVA results for input preferences and vocabulary learning (n = 91)

Source of variation	df	F (p)
Group	2, 82	12.11***
Input preferences	2, 82	4.81
Group by input	4, 82	.91

Note: $* p < .05$, $** p < .01$, $** p < .001$

The findings of the ANOVA run on the C-Cloze were very similar to the results of the ANOVA conducted on the Content test.

It can therefore be concluded that students' preferences for text, picture or neither did not affect their learning of content and vocabulary under the subtitled conditions which leads to the rejection of Hypothesis 6.

4.3 STUDENTS' COMMENTS

The participants in the study were requested to provide some thoughts on studying French with subtitled video by completing Questionnaires A and B (see Appendix L). Learning about how students perceived their own understanding and learning of the material was expected to bring more depth into the investigation of treatment effects. This section reports findings from questions #1 - #4 (identical for both questionnaires); questions #5 and #6 in Questionnaire A, given to students in the Traditional condition; and questions #5 through #7 in Questionnaire B, given to students in the subtitled conditions.

Data for the first four questions were gathered from the final sample (N = 93) in order to relate students' responses to their learning and retention of the material. Data from the remaining questions are based on the original sample (N = 102), who were all present in Phase 2, since it was interesting to find out how students in each condition reacted to the treatments, rather than how their comments related to their test results.

Differences among groups with respect to their degrees of understanding or learning with the video were tested by Kruskal-Wallis one-way analysis of variance (KWANOVA) for independent samples, since they were ordinal variables, based on an underlying continuous distribution. In the case of nominal variables (e.g., factors enhancing or preventing comprehension in the video) group differences were tested with chi-squares.

Subsection 4.3.1 reports general comments about comprehension and learning with the three video formats. Subsection 4.3.2 reports comments specifically addressing the use of subtitles.

4.3.1 Responses to the Video Approach

Question #1 asked all students whether they had seen the video before. It turned out that seven students (all of whom were in the Traditional condition) had seen the full version of the documentary in grade 9 geography class. These students had seen the video in English only once (except for one student who had seen it twice). However, in a brief interview after the treatment session, these students claimed they did not remember much of the video they had seen more than two years earlier. This claim seems to be corroborated by an examination of their individual Content test scores which revealed that these students did not have an advantage relative to their peers in the same group, as well as by their responses to question #4 in the same

questionnaire, saying that they understood only "some" or "very little" of the video content. Based on this information, it was decided not to eliminate these students from the statistical analyses.

Question #2 required students to check one of 4 options in order to specify how much new information they had learned from watching the documentary. The majority of the sample (roughly 60%) reported that they had learned "some" information from the video, with more people in the subtitled conditions than in the Traditional group. Also, more students in the Bimodal condition thought they learned "a lot", relative to the other two. There were no respondents in the Bimodal condition claiming that they did not learn any new information at all. According to a KWANOVA, these differences were significant, $\chi2$ (2, N = 93) = 11.98, $p < .01$. In particular, students in the subtitled conditions reported significantly higher learning of new information relative to the comparison group, with the Bimodal group demonstrating a slightly better confidence than the Reversed group (Mean ranks: Traditional: 35.78; Bimodal: 56.43; Reversed: 47.55). Students' comments regarding how much new information they learned from the video (see Table 4.19) correlated positively and significantly with their performance on the immediate Content posttest ($r = .29, p < .01$).

Table 4.19: Perceived learning of new information in the video by group (N = 93)

INFORMATION	Traditional %	Bimodal %	Reversed %	Total %
None	10.0	0	6.9	5.4
Very Little	43.3	11.8	13.8	22.6
Some	36.7	67.6	72.4	59.1
A lot	10.0	20.6	6.9	12.9
N	30	34	29	93

Question #3 asked students how many new words they believed they had learned from watching the video, according to a 4-point scale. A little over half of the sample replied that they had learned "some" new words, and over a third thought that they had learned "very few" words. Only three students responded with "none" (see Table 4.20). A KWANOVA did not reveal any significant differences among groups with respect to students' perceived learning of French words, although mean ranks for the subtitled conditions were again slightly higher (Mean ranks: Traditional: 42.95; Bimodal: 50.22; Reversed: 47.41). Students' comments with respect to their perceived learning of words were significantly and positively related to their performance on the immediate C-Cloze test ($r = .29, p < .01$).

Table 4.20: Perceived learning of new words in the video by group (N = 93)

WORDS	Traditional %	Bimodal %	Reversed %	Total %
None	3.3	0	6.9	3.2
Very few	43.3	32.4	34.5	36.6
Some	50.0	61.8	44.8	52.7
Many	3.3	5.9	13.8	7.5
N	30	34	29	93

Question #4 inquired how well students understood the content of the documentary, and also offered a 4-point scale (see Table 4.21). As can be seen from Table 4.21, about half of the sample felt they had understood "some"of the video, and only one student (in the Bimodal condition) claimed to have understood "everything". This student was labelled by her teacher as "excellent". More than half of the Bimodal group claimed that they understood "most of it", while the Traditional group and the Reversed group contained fewer respondents who claimed to have understood most

of the video, with the fewest students in the Traditional group. Also, the Traditional group contained the largest number of students who thought that they understood "very little" of the content, with no such students in the Bimodal group. A KWANOVA revealed significant differences among cells, $\chi 2$ (2, N = 93) = 23.54, p < .0001: students in the subtitled conditions reported better understanding of the content relative to the comparison group, with the Bimodal condition also claiming superior understanding relative to the Reversed condition (Mean ranks: Traditional: 34.98; Bimodal: 63.32; Reversed: 40.29). Students' comments regarding perceived understanding correlated significantly and positively with their performance on the immediate Content posttest (r = .44, p < .01).

Table 4.21: Perceived understanding of the video content by group (N = 93)

	Traditional	Bimodal	Reversed	Total
CONTENT	%	%	%	%
Very little	36.7	0	24.1	19.4
Some	46.7	38.2	55.2	46.2
Most of it	16.7	58.8	20.7	33.3
Everything	0	2.9	0	1.1
N	30	34	29	93

Question #5 in both questionnaires was addressed only to students under the three conditions who had indicated in the previous question (question #4 in both questionnaires) that they had understood "some", "most of", or "everything" in the video they had seen. These students were asked to comment on what helped them most to understand it. The two largest groups in the sample believed that the presence of visual cues (e.g., scenery, objects, actions etc.), and the availability of subtitles enhanced comprehension the most (see Table 4.22). Interestingly enough, no one in

the Reversed condition suggested that having seen the video in English first helped them understand the French video when they watched it in bimodal format. Not surprisingly, the majority of students in the non-subtitled condition (Traditional group), felt that visual cues helped them understand the most. In contrast, the majority of students in the subtitled conditions favoured subtitles over visual cues.

Table 4.22: Perception of comprehension-enhancing factors by group (n = 94)

FACTORS	Traditional %	Bimodal %	Reversed %	Total %
No comment	34.4	0	4.2	12.8
Visual cues	50.0	15.8	29.2	30.9
Subtitles	n/a	52.6	62.5	37.2
Multiple exposure to video	9.4	21.1	4.2	12.8
Prior knowledge of French	3.1	7.9	0	4.3
Listening with eyes closed	3.1	0	0	1.1
Paying attention to the story	0	2.6	0	1.1
N	32	38	24	94

Table 4.22 also shows that there were more respondents in the Bimodal condition relative to the Reversed condition who claimed to have achieved a fairly good understanding of the video. Note also that more than 30% of the students in the comparison group who believed they had understood some or most of the video failed to comment on what helped them understand it, which suggests that perhaps these students did not think there were specific comprehension factors in the traditional video format.

A chi-square test was run for the two subtitled conditions, where all the reported categories, except for "visual cues" and "subtitles", were collapsed into a

category "other" in order to meet the assumption of expected cell frequencies. No significant differences were discovered between the two subtitled conditions in terms of comprehension-enhancing factors.

Question #6 (Questionnaire A) requested students to comment on what prevented them from understanding the video (see Table 4.23). Question #6 applied only to students in the Traditional group who had indicated difficulty in understanding the video in question #4 by choosing the options "I understood very little" or "I didn't understand any of it". The majority commented that sometimes the rate of the spoken French in the video was a little fast for them to follow the story.

Table 4.23: Factors preventing students in the Traditional condition to understand the video (n = 12)

FACTORS	Count	%
Fast speech	8	66.7
A lot of new vocabulary	1	8.3
Complex language of the video script	1	8.3
No experience with watching French TV	1	8.3
No comment	1	8.3
Total	12	100

In sum, significantly more students in the subtitled conditions reported superior understanding of the video and also claimed to have learned more new information from watching it relative to the comparison group, whereas there were no differences between groups in terms of how many new words they thought they had learned. Of the two subtitled conditions, the Bimodal group appeared more confident with respect to their understanding and learning of the video content. Students' perceptions of comprehension and learning correlated positively with their test results. Not

surprisingly, the most important factor that helped students understand the video in the subtitled conditions was the presence of subtitles, whereas in the Traditional condition, it was the availability of visual cues. Finally, the most important cause that prevented some students from understanding more of the video was the fast native rate of speech.

4.3.2 Responses to the Subtitles

Questions #6 and #7 in Questionnaire B were designed to elicit additional information about L2 subtitles from the Bimodal and Reversed groups. Students' input regarding specific aspects of using subtitled video in class seems particularly useful in light of the finding that subtitles were singled out as the most important comprehension-enhancing factor (see question #5).

Question #6 inquired whether students were able to read the subtitles while watching the video and asked them to check a 5-point scale. Outcomes revealed that the majority of students in both experimental conditions claimed that they were able to read the subtitles "most of the time" (40%) and another large group believed they were able to read the subtitles "all the time" (31.4%). Students in the Bimodal condition found it easier to follow the subtitles relative to the Reversed condition: there were more students in the Bimodal group who reported the ability to read subtitles "most of the time" or "all the time", while there were more students in the Reversed group who reported the ability to read the subtitles only "sometimes". These results are displayed in Table 4.24.

According to a KWANOVA, $\chi2$ (1, N = 70) = 11.1, $p < .001$, students in the Bimodal condition were able to read the subtitles significantly better relative to students in the Reversed condition.

Table 4.24: Ability to read subtitles in the Bimodal and Reversed conditions (n = 70)

	Bimodal	Reversed	Total
RESPONSE	%	%	%
Hardly	0	3.2	1.4
Rarely	2.6	9.7	5.7
Sometimes	7.7	38.7	21.4
Most of the time	48.7	29.0	40.0
All the time	41.0	19.4	31.4
N	39	31	70

Students who answered question #6 with "most of the time", "sometimes", "rarely", or "hardly", were further requested to elaborate on when they were not able to read the subtitles. A wide range of answers was given by the 48 students to whom this request applied (see Table 4.25).

The two largest groups of individuals reported that subtitles became difficult to follow in those instances when the text disappeared too fast for them to read it, and when there was not enough contrast between subtitles and the background of the picture, due to fast movement in the shot or to similarity of colour. Fewer respondents claimed that they had trouble reading the subtitles when they were focussing on the picture, or when the spoken rate was too fast. A chi-square test was run for these four major response categories and a category "other", comprising the less prominent factors. No systematic differences between the two groups were found.

Question #7 (Questionnaire B) asked students in the subtitled conditions whether they felt that subtitles helped them do the tasks. More than 84% of these students believed that subtitles did indeed assist their performance on the tasks. There were only three students (7.7%) in the Bimodal condition, and eight students (25.8%) in the Reversed condition who did not find subtitles helpful. In other words, more

people in the Bimodal condition were in favour of subtitles relative to the Reversed condition.

Table 4.25: Reasons for difficulty in reading subtitles in the Bimodal and Reversed conditions (n = 48)

REASONS	Bimodal %	Reversed %	Total %
Subtitles changed too fast	31.8	26.9	29.2
Background clashing with subtitles	22.7	26.9	25.0
Trying to watch the picture	13.6	15.4	14.6
Speech too fast	13.6	11.5	12.5
Subtitles not simultaneous with speech		7.7	4.2
Listening while looking away or with eyes closed	4.5	3.8	4.2
Subtitles were long	4.5		2.1
Subtitles did not reflect all that was being said	4.5		2.1
Not understanding what was subtitled		3.8	2.1
The font was small		3.8	2.1
No comment	4.5		2.1
N	22	26	48

All students who responded positively to question #7 were further asked to elaborate on when subtitles were most helpful to them. Results indicated a range of seven categories of answers, three of which were given by relatively large numbers of respondents. Close to half of them believed that subtitles were most valuable in deciphering incomprehensible spoken French, either due to the presence of new words, or because students could not make sense of what they heard, even if they knew the words. The second largest group (27.1%) thought that subtitles were most

useful in showing the spelling of words or what the words were, and thus helped them write the tests where the same words had to be used. The third largest group (close to 17%) claimed that subtitles were most supportive when the narrator in the video was speaking rather fast. Answers to question #7 are illustrated in Table 4.26.

A chi-square test on these findings (excluding the category of "watching the English video first" since it only applied to the Reversed condition, and the categories provided by a single student) did not reveal any significant differences between the two subtitled conditions.

Table 4.26: Perceived helpfulness of subtitles in doing the tests in the Bimodal and the Reversed conditions (n = 59)

RESPONSE	Bimodal %	Reversed %	Total %
Understanding incomprehensible spoken French	44.4	47.8	45.8
Writing the tests	27.8	26.1	27.1
Language too fast	19.4	13.0	16.9
Watching the English video first	0	13.0	5.1
Subtitles reflecting important information	2.8	0	1.7
Subtitles preceding speech	2.8	0	1.7
Subtitles simultaneous with speech	2.8	0	1.7
N	36	23	59

In sum, the vast majority of respondents in the subtitled conditions believed that subtitles not only improved their understanding of the material, but also assisted their learning of French. Students in the Bimodal condition, however, claimed to be better readers of subtitles, and also expressed a more positive view towards the use of subtitles compared to their peers in the Reversed condition. The majority in both

subtitled groups agreed that subtitles were most helpful when students were struggling with incomprehensible spoken utterances in French, when they were trying to remember how to spell the words on the tests, and when the spoken language in the video was too fast. Finally, most of the respondents in both subtitled groups believed that the most serious causes for reduced readability of subtitles were the speed with which they changed and the occasional clash between subtitles and background.

4.4 THE ROLE OF SOME BACKGROUND FACTORS

As can be recalled from 3.4, detailed information about the sample was collected in order to investigate if the three groups were comparable with respect to background factors that may have affected students' learning of the material. Significant differences among groups were found in terms of extracurricular exposure to French TV and French movies subtitled in English, as well as in terms of students' attitudes towards scientific films. In particular, the Bimodal and Traditional groups claimed to have watched significantly more TV and movies in French relative to the Reversed group, and the Bimodal group had watched more TV and movies relative to the Traditional group. Also, the majority in the Bimodal and Traditional conditions claimed they enjoyed films about scientific expeditions, whereas the majority in the Reversed condition claimed they did not. Based on these outcomes, it appears that the Bimodal and Traditional groups may have had an advantage over the Reversed group both in terms of prior exposure to authentic TV and films, as well as emotional response to documentaries of the kind they were tested with. Likewise, the Bimodal group may have had an advantage over the Traditional group in terms of prior exposure to French TV and films. It was therefore important to find out whether these background factors were significantly related to students' learning of content and L2 vocabulary.

Pearson correlation coefficients were computed for each of these background factors and students' test scores on the Content test and the C-Cloze, administered in Phase 2. No significant correlations were obtained with respect to the watching of French TV and films subtitled in English. Students' attitudes towards documentaries about scientific expeditions, however, were significantly and positively correlated with their performance on the tests (for the Content test, $r = .19$, $p < .05$; for the C-Cloze, $r = .23$, $p < .05$). Although not very strong, these correlations suggest that students who enjoyed scientific films tended to learn more content and vocabulary.

It was therefore interesting to explore whether significant differences between students' scores on the Content test and the C-Cloze (when administered as immediate posttests) were due to an interaction between the main effect of treatment and the main effect of attitude. A factorial ANCOVA was run on each test, where the Dictation was the covariate and the between-subjects factors were group (corresponding to the three treatments) and attitude (positive or negative).

The results (see Tables 4.27 and 4.28) revealed a similar pattern for both measures: when controlled for proficiency, both main effects were significant, but there was no interaction between them.

Table 4.27: Two-way ANCOVA results for attitude towards scientific films and content learning (N = 93)

Source of variation	df	F (p)
Group	2, 86	14.94***
Attitude	1, 86	9.95**
Group by attitude	2, 86	0.12
Dictation	1, 86	1.14

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Table 4.28: Two-way ANCOVA results for attitude towards scientific films and vocabulary learning (N = 93)

Source of variation	df	$F(p)$
Group	2, 86	8.86***
Attitude	1, 86	4.71*
Group by attitude	2, 86	0.03
Dictation	1, 86	32.96***

Note: $*p < .05$, $** p < .01$, $*** p < .001$

It can be concluded that significant differences among groups with respect to content and vocabulary learning (see 4.2) were due to the effect of treatment rather than to an interaction between treatment and whether or not students enjoyed films about scientific expeditions. Tables 4.27 and 4.28 also reveal that students' level of proficiency (Dictation scores) did not affect significantly their content learning, but it accounted for a significant proportion of the variance with respect to L2 vocabulary learning.

CHAPTER FIVE

DISCUSSION

This chapter is organized in two main sections. The first and largest section discusses the findings addressing the two research questions of the study in relation to students' comments and relevant background characteristics. Its four subsections comment in turn on each of the following issues: content learning and retention, vocabulary learning and retention, input preferences and the learning of content and vocabulary, and students' reactions to the use of video and subtitles. The second section focusses on the shortcomings and limitations of the study.

5.1 INTERPRETATION OF THE FINDINGS

5.1.1 Content Learning and Retention

The statistical analyses conducted on the Content test[7] demonstrated a substantial treatment effect in terms of content learning when initial proficiency in the French language was controlled for. As predicted in Hypothesis 1, both the Bimodal and Reversed groups (subtitled conditions) learned and retained significantly more content than the Traditional group (comparison group). Successful content retention under the subtitled conditions occurred in spite of content attrition over a period of two weeks which was significantly higher than attrition in the comparison group. The minimal amount of content attrition under the Traditional treatment was perhaps due to less initial learning in that group.

Contrary to predictions (Hypothesis 2), students under the two subtitled

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It is believed that the Content test measured actual learning of the video content, since when piloted with students who had not previously seen the video, scores were extremely low (see Pilot 3, Appendix D).

conditions performed similarly in terms of learning and long-term retention of content. There were no significant differences in the amount of attrition between these two groups, either. In light of these findings, it may be concluded that the Bimodal and the Reversed treatments were equally supportive of students' understanding and retention of the information presented in the video documentary.

These results seem all the more powerful when we consider the fact that none of the students in the subtitled conditions had previously seen the experimental video. Ironically, there were seven students in the comparison group (about a quarter of the students in that group) who had already watched the unedited English version of the same video in their geography class two years earlier. Theoretically, these students should have had an advantage over the rest of the participants in terms of content acquisition. In reality, however, an examination of individual scores revealed that the students in the Traditional group who were familiar with the video scored similarly to their peers in the same group who were unfamiliar with it.

It should next be noted that students under the Reversed condition learned significantly more of the scientific documentary video content than students in the comparison group in spite of the Reversed group's pronounced dislike of films about scientific expeditions. As indicated in subsection 3.4, the majority in the Reversed condition reported that they did not enjoy such films, whereas the majority in the comparison group claimed that they did. These differences proved to be significant. The results further indicated that although students who liked scientific documentaries tended to perform higher on the Content test, there was no interaction between students' attitudes and treatment effects, although the effect of attitude was significant (see 4.4). The Reversed treatment was therefore supportive of content learning presented in a scientific documentary even in the case of negative attitudes towards such films.

Test outcomes regarding students' learning of content roughly match their own perceptions of how much of the video they understood and how much new information they learned from it (see questions #2 and #4 in Questionnaires A and B, and subsection 4.3.1). Students in the two subtitled conditions reported having understood significantly more of the video content, and having learned significantly more new information from watching the video relative to the comparison group. In contrast, students in the comparison group not only claimed to have gained substantially less information, but also to have understood less of the video content than students in the subtitled conditions.

Although students in the two subtitled conditions performed similarly on the Content test, the Reversed group appeared less confident in their answers to questions #2 and #4 than their peers from the Bimodal group. In particular, when assessing their own comprehension of the video, students in the Reversed subtitled group reported substantially lower understanding relative to the Bimodal group (not much higher than what students in the comparison group reported, see 4.3.1). This finding is counterintuitive, since in the Reversed condition students were given the chance to watch the video in English first, English being the L1 (or one of the L1s) for the vast majority of the participants in the study, and there were no significant differences regarding L1 background between groups (see 3.4).

In interpreting these findings, it should be noted that question #4 in Questionnaire B specifically asked students to assess their understanding of the video in French. This suggests that although students in the Reversed group were able to understand the content of the video in L1 (as indicated by their test results), perhaps they were less successful in making connections between corresponding vocabulary items the two languages, and much of the L2 still remained incomprehensible to them.

Next, from informal interviews with the participating teachers, I learned that

one of the teachers, whose class comprised the majority of the Bimodal group, occasionally showed students movies in French (without any subtitles) and engaged them in post-viewing activities. In contrast, most of the students in the Reversed group rarely watched French videos in class. This matched the pattern of students' responses concerning prior exposure to French TV and French movies with English subtitles outside school, meaning that the majority in the Bimodal group claimed to have watched significantly more TV and films in French after school compared to the Reversed group (see 3.4). Extracurricular exposure to French TV and subtitled French movies did not correlate significantly with students' learning of the video content, however (see 4.4). Classroom experience with authentic video could not be related to students' learning of content as it had not been quantified. In sum, the present findings do not provide conclusive evidence that the amount of prior experience with French video or TV significantly influenced students' learning of content in the L2.

On the whole, given that most of the students in the sample expressed an interest in films about scientific expeditions (except for 20 students in the Reversed condition who disliked such films), and that they had also chosen to take biology as a science subject (see 3.4), the video used in the present experiment can be considered to have been appropriate for their age and grade-level, since this documentary was not only about a scientific expedition, but also gave rise to hypotheses about animal and plant evolution.

Although the majority of the students enjoyed scientific topics, their scores on the Content test were none too high (there were no ceiling effects) even in the subtitled conditions. This is probably due to the demanding nature of the task and the difficulty of the video text. As might be recalled from 3.3.1, an authentic video-text delivered at a native speech rate was deliberately chosen for the experiment since exposure to

authentic language is deemed necessary in order to meet the global objective of the communicative-experiential (C/E) syllabus which stresses learners' participation in "real communicative experiences" (Tremblay, Duplantie, & Huot, 1990, p. 19). Following this recommendation, the present study investigated whether less advanced students of French would be able to learn content and vocabulary in the L2 with authentic video when assisted by L2 subtitles and/or L1 audio. It is believed that exposure to native discourse accompanied by contextual support is pedagogically more sound than exposure to linguistically simplified language, delivered at an unnaturally slow speech rate which implies distortion of its authentic quality. Another possible cause for the difficulty of the video is that since L2 oral speech was provided by a narrator in the background, students were unable to see the face, lip, and jaw movements of the speaker, all of which are believed to be comprehension-enhancing visual cues (see Kellerman, 1990, for literature review on lip-reading).

The experimental results confirmed, however, that less experienced core French students who received the subtitled treatments were still able to learn and retain significantly more of the video content than students in the comparison group, even when it was delivered through challenging L2 input. It can be concluded that the use of authentic, interesting and educationally valid video materials subtitled in French is beneficial for the teaching of content in core French programs at the secondary level.

5.1.2 Vocabulary Learning and Retention

Results obtained on the C-Cloze[8] and the VKS tests (see 4.2.2) demonstrated

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[8]

Note that the C-Cloze was piloted with students who had not seen the video prior to completing the test (see Pilot 3, Appendix D), and they scored very low. Therefore, it is believed that the C-Cloze measured vocabulary knowledge based on exposures to the video.

substantial treatment effects in terms of vocabulary learning and retention when students' initial L2 proficiency or prior knowledge of L2 vocabulary was taken into consideration. The two vocabulary measures generated consistent patterns of results: the Bimodal subtitled treatment provided the best opportunities for the learning and retention of target vocabulary, whereas the Reversed subtitled treatment assisted vocabulary learning only as much as the Traditional treatment did. Therefore, Hypothesis 3 was supported only in part, since only one of the subtitled groups significantly outperformed the comparison group with respect to the vocabulary measures. Hypothesis 4 was completely rejected, since students under the Reversed condition learned and retained significantly less target vocabulary than students in the Bimodal condition, rather than the other way around.

In interpreting the findings regarding vocabulary learning, it should be recalled that at the onset of the study, the Bimodal group significantly outperformed the other two groups in terms of French proficiency and vocabulary knowledge. Although these initial differences were controlled for in the statistical analyses, the advancement of the Bimodal group is in keeping with "the rich get richer" principle (see Stanovich, 1986), which assumes that students who know more words at the start tend to learn more words relative to students who initially know fewer words. Prior to the intervention, the majority in the Bimodal group had also received relatively more exposure to French programs and films on TV or video than the other two groups. Logically, more experience with these media in French may have helped students in the Bimodal group to learn the target vocabulary better. However, the lack of significant correlations between students' extracurricular exposure to authentic TV/video and their performance on the C-Cloze test (see 4.4) suggests that perhaps this exposure was not sufficient to make a difference with respect to students' vocabulary learning. Students' experience with French video in class was not

measured and therefore it could not be related to their test outcomes. Based on these findings, there is no evidence that students' prior exposure to French TV and video (either in or outside school) significantly influenced their vocabulary learning.

Results pertaining to the C-Cloze revealed that significant attrition of target vocabulary was observed only for students under the subtitled conditions, and that the rate of attrition under these conditions was similar. In this connection, it is important to mention that superior treatment effects under the Bimodal condition occurred in spite of attrition. The Reversed group performed relatively higher than the comparison group at the immediate C-Cloze posttest, but due to attrition they performed a little lower than the comparison group at the delayed posttest. These differences between the Reversed and Traditional groups did not prove to be significant, however.

It is logical to expect that substantial attrition of vocabulary may have also taken place between the administration of the treatment (Phase 2) and the completion of the VKS posttest given in Phase 3. Significant vocabulary growth found on the VKS thus represented long-term retention, rather than immediate recall. This, to a certain extent, explains why posttest scores on the VKS were not very high, but most importantly, it makes the findings with respect to vocabulary growth all the more robust, since two weeks after treatment students still demonstrated significant retention of the target vocabulary.

The overall analysis on the VKS showed that significant vocabulary growth from pretest to posttest occurred for the sample as a whole, although the acquisition of target words in the Reversed and Traditional conditions was similar and significantly lower when compared to the Bimodal condition. Results therefore suggest that some incidental vocabulary learning may take place even when language input is delivered through regular unsubtitled video, provided that words are presented in a salient visual context. The use of video thus proved to be a successful medium for

the teaching of new L2 vocabulary, supporting studies where vocabulary acquisition was enhanced by watching video tapes (e.g., Duquette, 1993; Jylha-Laide & Karreinen, 1993).

Frequency distributions of responses obtained on the VKS in terms of five vocabulary knowledge levels further revealed that besides being quantifiable, superior vocabulary learning effects under the Bimodal condition also implied a qualitative improvement in vocabulary growth. Most of the vocabulary growth under the Bimodal treatment occurred with respect to the highest level of vocabulary knowledge (Level 5), which reflects students' knowledge of the target words, as well as their ability to use these words in both semantically appropriate and grammatically correct sentences. This suggests that students in the Bimodal group (who were more proficient and knew more vocabulary than the other two groups before intervention) developed a more "in-depth" knowledge of the target items (Wesche & Paribakht, 1996; Paribakht & Wesche, 1997) relative to the other groups. In contrast, vocabulary growth under the Traditional and Reversed conditions was more or less equally distributed across levels 4 and 5, as students under these conditions composed similar numbers of grammatically correct and grammatically incorrect sentences. In the case of the Traditional group, some vocabulary learning occurred at Level 3 as well: i.e., in terms of correct word knowledge without the ability to use the words in sentences. Overall, students under the Traditional and Reversed conditions improved less than students in the Bimodal condition with respect to vocabulary depth.

Next, the VKS analysis by levels revealed that students under all three conditions advanced in terms of vocabulary recognition, indicated by a dramatic drop at Level 1. That is to say, after exposure to the video and completion of the tests, the number of unfamiliar (although still unknown) words had substantially decreased. The ability to notice new L2 words after treatment was similar for the Traditional and the

Bimodal groups, and lowest for the Reversed group. Perhaps repeated exposure to input entirely in French is more helpful in attending to and noticing unfamiliar French vocabulary, relative to exposure which is partially in English, even if it is accompanied by French subtitles. Nevertheless, since significant vocabulary learning was present for the sample as a whole, the present findings seem to corroborate the belief that measurable L2 learning will occur when new formal features of the language are noticed (e.g., Gass, 1988; Hulstijn, forthcoming; McLaughlin, 1990; Paribakht & Wesche, 1997; Schmidt, 1990; Sharwood-Smith, 1986).

The VKS analysis with respect to the 12 target items provided two more insights regarding vocabulary learning under the Bimodal condition when compared to the other two conditions: (1) more students improved in terms of word knowledge, and (2) there was substantial learning of a greater number of words. Overall, improvement in word knowledge occurred for almost all the target items, except for the word *pousser* in the Traditional group and *descendre* in the Bimodal group. This occurred for different reasons, however: in the Traditional group, students neither demonstrated knowledge of the specific meaning of *pousser* as used in the video (viz., to grow) prior to treatment, nor were able to learn it after treatment in spite of the high redundancy of that word (highest of all the target words), and its integral importance for the meaning of the documentary. In contrast, the reason students under the Bimodal group did not advance with respect to *descendre* was that the vast majority already knew that word before seeing the video. Similarly, under the Bimodal condition, the lowest improvement occurred for the word *survivre* also due to the fact that most students already knew that word prior to treatment. In the Reversed treatment, there were fewer students who exhibited improvement on the target words relative to the Traditional group (although as shown by the overall analysis, these differences were not significant). In general, students who did not get the L1 audio for

the first video presentation tended to acquire words that were presented in a salient, visually enhanced context where it was easy to infer their meaning, even if these words were used in the video text only once, amounting to a total of three exposures, since the video was shown three times (e.g., *lutter, intacte, régner, entier, colline, espèce, parmi*). In contrast, students who were provided with L1 support under the Reversed condition improved very little on most of these words. This suggests that bimodal video exposure to French, and the presentation of unfamiliar L2 words in a salient and informative visual context are beneficial for their acquisition.

Based on the different analyses performed on the VKS, it can be concluded that with respect to both target word recognition and depth of vocabulary knowledge, the Bimodal treatment gave the best results, whereas the Reversed treatment was as supportive of L2 vocabulary acquisition as the Traditional treatment.

Contrary to expectations, the present research findings did not support studies where relatively inexperienced L2 learners who watched a video in a Reversed subtitled format learned significantly more vocabulary than students who watched a video in a Bimodal subtitled format (Danan,1995; d'Ydewalle & Pavakanun, 1996). Successful vocabulary acquisition with Reversed subtitled video in Danan's study was attributed to the fact that this format assisted students in the creation and retention of links between French words and their English equivalents (Danan, 1995). Prior research has indeed demonstrated that at lower levels of proficiency, linking a new word to its translation equivalent is the most rapid way of ascertaining its meaning, and that the less efficient students are in the use of contextual cues, the more dependent they tend to be on translation links (Danchev, 1978; 1982; Kern, 1994; Prince, 1996). However, as Kern (1994, p. 455) points out, although L1 translation may help with L2 reading comprehension, it may work against L2 acquisition to the extent that the learner who is translating (or in this study, listening to L1 translation)

during L2 reading may be attending to L2 forms very briefly and reserving the bulk of meaning processing for the L1 mental representation. Perhaps this is what happened under the Reversed treatment in this study, where students' comprehension and recall of the content was relatively good, but their vocabulary learning was not better than that in the comparison group.

Students' failure to establish and recall equivalent links between L2 and L1 words was also very likely related to the demanding nature of the video used in this study. Although the sample in the present study consisted of relatively inexperienced L2 learners and was thus roughly comparable to the students in the experiments conducted by Danan, and d'Ydewalle and Pavakanun, the video used for the present experiment was radically different from the videos employed by the other researchers. As indicated earlier (see 3.3.1), the documentary played here is designed for L1 speakers, the narrator in it speaks at a native rate, his face is unseen, and screen time for some of the corresponding subtitles is brief. The observation that studying French with this video constituted a challenging task for most of the participants finds support in their own comments. The majority of students who reported processing difficulties (see 4.3) claimed that they were mainly due to instances in the video where the narration was fast, and where subtitles changed quickly.

In contrast, the video excerpts used in the other two studies were specifically chosen to match students' proficiency level, and delivered at a much slower speech rate. Danan used an excerpt from a scripted video program designed for L2 students in first and second-year level French college instruction (viz., "French in Action"). With Dutch students in secondary school, d'Ydewalle and Pavakanun used a Garfield cartoon translated into Spanish which contained relatively less dialogue, had longer pauses between utterances, and was linguistically less demanding than the video used in the present study.

Perhaps the very fact that comprehension in the Reversed group was painlessly achieved through the L1 reduced the necessity for students in that group to devote much attention to processing the French subtitles. It was undoubtedly easier to follow the English audio while processing the input for meaning in their L1 than to read the French subtitles which changed relatively rapidly, and contained new vocabulary. In addition, the fact that instructions given prior to the first video presentation asked students to try and understand as much of the story as possible (rather than to remember specific words in it) may have further reduced the incentive to process the subtitles for form under the Reversed condition. In the "French-only" conditions (Traditional and Bimodal), students were perhaps compelled to try and infer key word meanings based on the richness of contextual cues in order to understand the content of the video. In this connection, it should be reiterated, that only words that were integral to the understanding of the main events in the documentary content were chosen as target vocabulary, since it was expected that this would push students to notice and to process such key words while trying to understand the content. Successful processing of L2 input simultaneously for meaning and form is deemed possible when both are tightly intertwined (VanPatten, 1990). Therefore, unlike students in the Reversed group, students in the French-only groups were trying to encode new lexical forms while processing them for meaning as well (rather than only trying to retain new lexical forms). Deeper levels of language processing (i.e., for meaning and form) have been found to enhance retention when compared to shallower levels of language processing (i.e., only for form) (see Craik & Lockhart, 1972).

Given the demanding nature of the processing task, perhaps students under the Reversed condition needed more exposures to written and oral formal aspects of the French words in the video in order to make connections between the target words and their English translations. As may be recalled, students in the Reversed group had the

chance to watch the video in the bimodal French format only once. In contrast, students in the Bimodal condition who were assisted by French subtitles during two of the showings with French soundtrack, seem to have been able to catch and process more of the words.

Another important difference between Danan's study and the present study is of a methodological nature. Danan gave students in her Bimodal and Reversed conditions an L1 (English) summary of the French video excerpt prior to playing it. This implies that students participating in her experiment already possessed an adequate understanding of the gist of the content and supposedly had more mental resources at their disposal for processing specific target words for meaning and form (see research cited in Faerch & Kasper, 1986), especially when instructed to do so. In the current study, however, students were not given a summary of the video, since one of the objectives was to explore how they learn content in L2 presented with different video formats. Had the participants in this study been given an L1 summary of the content, and had they been instructed to pay attention to the new words (rather than to the content), students under the Reversed condition may have been able to retain more of the target vocabulary.

A final comment regarding vocabulary learning under the subtitled conditions is that many of the sentences composed by these students (mainly by those in the Bimodal condition) were very similar to the actual phrasing of the subtitles used in the study, some of them being exact verbatim reproductions of subtitled utterances. These results corroborate previous outcomes from studies where students who watched subtitled video demonstrated superior verbatim recall of the language used in the video relative to students who watched the video without subtitles (e.g., Borrás & Lafayette, 1994; Garza, 1991; Gielen, 1988; Vanderplank, 1990). Based on this finding, it can be speculated that bimodal subtitled video can be used to successfully promote the

teaching and acquisition of contextualized word knowledge, and the ability to retain correct syntactic combinations, stylistically appropriate sentences, acceptable collocations, and idioms.

5.1.3 Input Preferences and the Learning of Content and Vocabulary with Subtitled Video

The Background Prequestionnaire (see Appendix F) data showed that with respect to both L2 comprehension and learning, students generally demonstrated an overwhelming preference for reading (books and the black-board), as well as for listening to the teacher (although not to tapes) with a pronounced overlap between these response categories. On the whole, students did not perceive video and TV watching as particularly beneficial for the study of French. Almost all the students who did claim attachment to watching TV/video (about a quarter of the sample), however, were also in favour of reading. Given this overlap between viewers (i.e., TV/video watchers) and readers, and the fact that there were only two students who turned out to be solely viewers, Hypothesis 5 which predicted that attachment to watching TV/video will enhance learning under any condition could not be tested. Hypothesis 6 predicting that under the subtitled conditions students with preferences for both reading and viewing will tend to perform better when compared to students with preferences only for reading, or for neither reading nor viewing was rejected. Failure to demonstrate statistically significant relationships between students' input preferences and their learning of content and vocabulary may, of course, be due to the very low variability in the data, and the substantial overlap of the three response categories. Also (to be addressed in more detail below), one of the statements in the questionnaire did not measure accurately preferences for oral input, which would explain some of the overlap in the data. Therefore, a qualitative exploration of the data

seems useful in making sense of responses to the input preference questions in relation to students' learning of L2 vocabulary and content when presented with subtitled authentic French video.

Although hypotheses 5 and 6 did not receive support from the statistical interpretation of the data, it will be argued that the idea of a positive relationship between demonstrated input preferences and the use of subtitled video should not be dismissed. First, a pronounced attachment to L2 printed text when studying French logically indicates a positive attitude towards the learning of content and vocabulary in French with L2 subtitles, and educators are well aware of how powerful positive attitudes can be for any learning. Therefore, a strong overall preference for reading in itself can be interpreted as an indirect justification for the use of L2 subtitles in the French language class. This is corroborated by students' highly favourable comments regarding the helpfulness of subtitles, already addressed in 4.3.2 (see also 5.1.4).

Second, strong preferences for "listening to the teacher" may not necessarily indicate attachment to oral input *per se*, but to the teacher herself. Attending to the teacher in class typically implies the opportunity to see her face and lips while listening to her familiar voice, and to benefit from her efforts to explain things clearly often through the use of expressive body language and visuals. Seen in this light, the demonstrated attachment to the teacher might actually signify attachment to both oral speech and visual cues, rather than to oral speech alone. This seems to be corroborated by students' general dislike of French audiotapes, and the fact that they hardly ever listened to French radio after school (see question #8 (b) in the Background Prequestionnaire), suggesting that students were not in favour of media that generated only sound. In contrast, video technology can reproduce to a great extent the effect of a live teacher (in the case of some software products with video clips, students can also interact with the videotaped teacher). It follows that strong simultaneous

preferences for listening to the teacher and for reading (as demonstrated by the present data), can be a further incentive for the use of subtitled video in the study of French.

The argument that the category of teacher-oriented students includes students who are attached to both sound and picture also implies that the grouping factor ((1) students attached only to reading, (2) students attached to reading and viewing, and (3) students attached to neither reading nor viewing) in the two-way ANOVA addressing Hypothesis 6 (see 4.2.3) may not have discriminated between categories (2) and (3), since the third category probably contained "viewing-oriented" students, as well (i.e., students who were attached to the teacher). Perhaps this is why significant interactions were not obtained in this statistical analysis.

Strong preferences for the reading of books and the black-board, as well as for listening to the teacher are very likely attributable to students' familiarity with these common classroom activities. In contrast, the majority of the students were generally undecided about the merits of studying French with TV or video (labelled here as viewing), perhaps due to the fact that they had relatively little experience with this particular technology, and not so much because they were less appreciative of visual cues (see 3.4). In fact, participants who tended to express preferences for viewing had received significantly more exposure to visual media in French outside of school.

TV/video was a relatively popular authentic source of French language among other such sources (i.e., radio, books and magazines). Half of the sample claimed that they watched French TV outside school for an average of half an hour daily, and most of the students had seen French movies subtitled in English. In contrast, extracurricular exposure to other French language media was generally extremely limited with no significant differences among groups (see 3.4). Not surprisingly, there were no significant correlations between amounts of exposure to French radio, books or magazines and students' test results (see 4.4). Overall, these findings evidence a

more positive attitude towards video and TV relative to the other media, although extra-curricular exposure to video and TV in French was not found to correlate significantly with students' test results, either. Perhaps after school, students watched mainly entertaining musical shows where following the L2 was optional, or they did not pay much attention to the French language in movies where they could read the L1 subtitles. It is also possible that students claimed to have watched more French TV/video programs than they actually did in an attempt to make a good impression.

On the whole, it can be said that students' study preferences with different kinds of input roughly reflected their prior program experiences in the core French classroom (this information was acquired through informal personal interviews with the teachers, and my own observations). For example, most of the students in the Bimodal group (who tended to favour viewing most) had received occasional exposure to French videos in class, followed by post-viewing activities designed by their teacher[9]. Students in the Reversed condition (who were least in favour of viewing) hardly ever watched any French videos in class. Further, most of the students in the Bimodal group (who demonstrated the strongest attachment to listening to the teacher) came from a class where the level of discipline was fairly high and students were very attentive to the teacher. Finally, most of the students in the Reversed group (whose dislike for audiotapes was significantly weaker relative to the other two groups) used video rarely, but often listened to French on audiotapes.

In conclusion, although statistically significant relationships were not established between students' input preferences and their performance on the tests, pronounced preferences for reading, and for attending to the teacher when studying

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It would have been interesting to measure exposure to French TV and video in the classroom, in addition to such exposure outside classroom time, in order to explore whether a positive relationship existed between students' overall experience with these media in French and their performance on the tests.

French seem to justify the use of subtitled French video for the teaching of content and vocabulary in the L2.

5.1.4 The Use of L2 Subtitled Video

Data gathered from Questionnaire B (see Appendix L) indicated that the vast majority in the Bimodal and Reversed groups (subtitled conditions) felt that the use of subtitles supported their understanding of the French documentary. What is more, of all the possible factors listed as comprehension-enhancers by both subtitled groups, subtitles were by far the most popular (see question #5). Interestingly, not a single respondent in the Reversed condition mentioned that seeing the English video first (reversed format) enhanced their comprehension of the content, although 13% of these students claimed that watching the English version first helped them complete the Content test (see question #7). It is, of course, possible that since the question regarding students' comprehension clearly addressed their understanding of the bimodal video format (rather than of the video in general), they felt compelled to single out comprehension-facilitating factors pertaining only to this format and not to the whole presentation, which included an initial showing of the reversed video format. Whether this happened or not, data from both questions #5 and #7 show unequivocally that students in both subtitled conditions related very positively to the use of French subtitles in the bimodal video format.

In general, students were able to follow the subtitles, but students in the Bimodal condition indicated that they were able to read them significantly better than students in the Reversed condition. Perhaps this occurred due to more developed L2 reading skills in the Bimodal group relative to the Reversed group, since at pretesting, the Bimodal group scored significantly higher on the Dictation than the other two groups, and there is evidence that students who are good spellers also tend to be good

readers (Bruck & Waters, 1988). Nevertheless, since an equally good understanding of the video was achieved in both subtitled conditions (as demonstrated by their Content test results), it appears that students' comprehension in the Reversed condition was indeed complemented by the presence of English audio, although students themselves did not report that. Unfortunately, it is impossible to isolate and quantify the specific effects of subtitles and L1 audio on students' performance in this particular case.

Overall, most students in the subtitled groups claimed that the subtitles also assisted their performance on the tasks, but significantly more respondents in the Bimodal condition favoured this view relative to the Reversed condition. One possible explanation for this difference (as argued earlier) is that in the Reversed condition, students probably did not pay too much attention to subtitles while they were exposed to the reversed video format. Less elaborate processing of the subtitles in this situation probably relates to inferior retention of the graphemic forms of the target words, and consequently to less vocabulary learning.

As anticipated (see section 2.3), students in both conditions found subtitles most helpful when they were struggling with incomprehensible spoken utterances in French (either due to the presence of new words, or to familiar words which they were not able to parse correctly from the rest of the utterance), when they were trying to remember how to spell the words on the tests, and when the spoken language in the video was sometimes too fast to follow. Many of the students' comments presented a combination of two or more of these major factors, as shown in the examples below:

Helpful when the narrator spoke too quickly and said words that I didn't understand.

The subtitles were most helpful when the person spoke too fast and you could then read the subtitles to better understand and also see how it was

spelled.

When I couldn't understand what they were saying, by reading it and looking at the words helped and the subtitles were most helpful to me when I had to fill in the blanks.

When there were words that I did not hear clearly the first time we watched the movie because he was speaking fast or there were new words. I could look at the subtitles after we watched it again and remember how it was written.

These representative comments support theoretical expectations with respect to the helpfulness of subtitles in the study of an L2, and the rationale for adding L2 subtitles to video (Borrás & Lafayette, 1994; Chung, 1996; Garza, 1991; Gielen, 1988; D'Ydewalle & Pavakanun, 1996;Vanderplank, 1988; 1990; Neuman & Koskinen, 1992; Price, 1983). Comments given by participants in the present study are also consistent with evidence from studies where subtitles were found to support learning rather than overwhelm attentional capacity (see Vanderplank, 1990), as well as to invoke positive attitudes to learning (Borrás & Lafayette, 1994; Chung, 1996; Vanderplank, 1988; 1990). Finally, it should be reiterated that almost all previous research regarding the merits of subtitles was conducted with advanced L2 learners. The current study, however, provides evidence that students at a relatively less advanced level of proficiency in the French language are also able to follow L2 subtitles, as well as benefit from exposure to authentic video subtitled in the L2.

5.2 SHORTCOMINGS AND LIMITATIONS

The present study involved certain shortcomings and limitations which, on the one hand, restrict the generalizeability of the findings, but on the other hand, are informative with respect to future research and teaching practices. This section

discusses these issues in light of the experimental design, the treatments, and the instruments used in the study.

5.2.1 The Experimental Design

The quasi-experimental design of the present study involved intact classes rather than a fully randomized sample, thus not eliminating the potential effects of teachers and class-specific prior experiences with the study of French. For example, in one class, a resourceful teacher had used some commercially available (unsubtitled) French videos and self-prepared post-viewing materials. Therefore, these students may have had an advantage over the other participants in terms of learning with French video. Given the fact that this class comprised the majority of the Bimodal group, which as we already know significantly outperformed the rest of the sample in terms of vocabulary learning, it may be that the treatment effect in this case is partly attributable to the effect of the teacher.

In addition, as can be recalled, the Bimodal group also had an advantage over the other two groups with respect to proficiency in French, and knowledge of target vocabulary prior to the intervention. Although initial differences in proficiency and word knowledge were adjusted for in the statistical analyses, better spelling skills in the case of the Bimodal group (as demonstrated by their Dictation scores) imply that these students were perhaps better readers than students in the Reversed group and were therefore able to make better use of the subtitles (see Bruck & Waters, 1988). Similarly, their superior knowledge of the target words at the onset of the study may have also affected their learning of vocabulary in a positive way (Stanovich, 1986).

A further limitation of the study is the failure to administer all the measures at each of the three phases: the VR test was given only as a pretest, and the VKS was not given as an immediate posttest. This, of course, limits the opportunity to assess more

precisely advancement in vocabulary learning from Phase 1 to Phase 2. However, as already argued, the VR test was not given again, since at pretesting it did not yield sufficiently reliable results, and administering the VKS in Phase 2 had to be sacrificed in order to meet the time requirements imposed by the board with respect to the present experiment.

It should also be noted that the immediate Content test was administered in pairs, whereas the delayed Content test was completed by students individually. Although the results from the delayed posttest are still informative about individual retention of the material two weeks after treatment, this methodological inconsistency undoubtedly makes the relevant conclusions more tentative.

Finally, it can be said that final sample size was relatively small (N = 93). It was, however, a practical impossibility to involve a larger sample, since grade 11 class sizes in all the schools at the board were small. This limitation, of course, constrains the generalizeability of the findings.

5.2.2 The Treatment

With respect to flaws in the subtitled video treatments, valuable data was obtained from the participants themselves (see Questionnaire B in Appendix L, and subsection 4.3). Students in the Bimodal and Reversed groups who reported failure to read the subtitles all the time were required to explain what kind of reading difficulties they experienced. Responses given in both subtitled conditions were broadly similar, which, of course, makes these comments more robust and generalizeable. More than half of all the respondents reported the following two factors as the most serious reasons which prevented them from following the subtitles better: (1) sometimes subtitles changed too fast, and (2) occasionally the black text of the subtitles would not be readable against dark backgrounds or backgrounds that

were moving too fast. Two less frequently mentioned factors were that: (3) in trying to watch the picture, students would occasionally miss their chance to read the subtitles, and (4) sometimes the spoken language was too fast and trying to listen to it would distract students from reading the subtitles.

It is clear that the first report category (subtitles changing fast) is related to the fourth report category (fast spoken language). As explained earlier, a challenging authentic video text narrated at a native speech rate was selected for the experiment, since it is recommended by the communicative-experiential syllabus that students are exposed to unadapted language spoken at a normal speed (Tremblay et al., 1990). As already noted, subtitles were designed to be as accessible as possible to students who do not have advanced reading skills in French through partial subtitling of the script which lengthens the screen time for subtitles. Nevertheless, more than half of the students who watched the video with subtitles claimed that at times their speed was still too fast to read. Therefore, it is suggested that students at this level are shown the same subtitled French video in class multiple times, or that they are provided with some control over the process of viewing (e.g., the ability to replay specific segments, to freeze the frame, etc.).

The second largest report category pertaining to the readability of subtitles (viz., the text is obscured by moving or similarly coloured backgrounds) is not surprising. Ideally, dark strips serving as a contrasting background for light coloured subtitles (the standard format for captions) would have isolated the text from the picture and made subtitles more readable. Unfortunately, as already mentioned, this format was not available at the studio where the video was edited. Having in mind that this shortcoming of the treatment was perceived to diminish readability just as much as the speed of subtitles, for future research or teaching purposes, it is recommended to use the classic caption format in editing videos, or already captioned video recordings for

the hearing impaired.

Finally, the report category referring to instances where students were distracted by paying attention to the picture and therefore failed to read the corresponding subtitles, suggests that had students been given the chance to watch the French video without any subtitles the first time, this would not have happened. It also implies, however, that the decision to let students watch the video the first time without giving them a task, apart from just watching the video for gist, was a step in the right direction. Finally, it should also be noted that this report category is indirectly related to the first report category already discussed (viz., speed of subtitles). Therefore, had the subtitles changed a little more slowly, students would have had a better chance to read them while also paying attention to the picture.

In conclusion, it appears that the shortcomings of the video treatments that need to be targeted are the fast pace of subtitles, and the lack of continuous contrast between subtitles and picture, since the remaining two problems reported by fewer of the students seem to be connected to the changing speed of subtitles. Therefore, if the two primary readability problems were resolved, it is justifiable to assume that the secondary problems stemming from them would also be eliminated.

5.2.3 The Instruments

The limitations of the testing instruments in this study further reduce the generalizeability of the present research outcomes. Results from the VKS, for example, are based on only 12 target words. This was due to practical considerations of time limits. It would be interesting to conduct research specifically geared to the acquisition of vocabulary where a larger number of target vocabulary items was employed, and where the VKS was based on the entire set of words. Such an approach would also reveal more completely which of the target words were known

prior to treatment, which of them were acquired best by the students, how the words were learned under the different conditions, and how students advanced in terms of vocabulary knowledge levels. Further, the use of a more complete VKS would make the VR test redundant, which as noted in 3.5.1, generated less reliable results.

Another point with respect to the VKS is that it is not explicitly designed to capture students' knowledge of the multiple meanings of polysemantic words, especially since vocabulary items are presented out of context. In this study, as already mentioned (see 3.5.3), there were four words with at least two different meanings (viz., *glace* (ice or ice-cream); *obscurité* (darkness or obscurity), *espèce* (species or kind), and *pousser* (to grow or to push). On the VKS pretest, students consistently provided only one meaning per word, and the test was scored depending on demonstrated knowledge of the word meanings as used in the video. It can be argued that students failed to provide the required word meaning either because of an actual lack of knowledge, or because one of its possible meanings was more accessible to them at the time of test completion, although they knew both. Not knowing whether students were familiar with both meanings of a word or not, undoubtedly limits findings about vocabulary growth from pretest to posttest. This limitation might have been avoided, however, had students been explicitly advised in the instructions of the VKS pretest to provide as many meanings of each word as they could think of.

Next, it seems that the Background Prequestionnaire needs to be refined with respect to students' input preferences. As noted in 5.1.3, the question regarding attachment to listening to the teacher probably implied attachment to both sound and picture, since theoretically, attending to the teacher involves both auditory and visual perception. Perhaps additional questions addressing different input media which are specifically visual or specifically auditory might have discriminated between preferences for picture and sound more adequately. Based on the present findings,

however, students' undecidedness about video and TV in the L2 should not be interpreted as unwillingness to study French with video, but as lack of sufficient learning experience with the medium. Next, this questionnaire did not ask students to specify what kinds of French programs on TV or video they liked to watch. This is important, since different shows place different demands on the necessity to understand the L2. Concerts with pop stars, for example, can be entertaining to watch even if one does not follow the words.

Finally, information about core French program background and exposure to French videos in class was derived from casual interviews with six different teachers rather than from a survey questionnaire, which could have generated specific and quantifiable data, enabling me to compare outcomes across the six classes. All this, of course, limits the power of assumptions that can be made regarding the relationships between students' exposure to authentic French language video, their input preferences for the study of French, and learning outcomes.

CHAPTER SIX

CONCLUSION

This concluding chapter has two main parts. In the first section I comment on the findings of the present study in terms of their theoretical and practical implications for L2 teaching and learning. The second section presents relevant directions and recommendations for future research.

6.1 IMPLICATIONS FOR L2 CURRICULUM THEORY AND PRACTICE

The present experiment provided empirical evidence that authentic French video subtitled in the L2 can promote content and vocabulary learning and retention even with relatively inexperienced students of the language. Students' own comments further elaborated on how simultaneous exposure to text, sound and picture enhanced their ability to notice, comprehend, spell, and recall new L2 material.

Successful L2 teaching with authentic French video delivered at a fast native speech rate is an important outcome, since the communicative-experiential (C/E) syllabus recommends that core French students be exposed to "real" language, spoken at a normal speed (LeBlanc, 1990; Tremblay, Duplantie, & Huot, 1990, p. 46 - 47). Therefore, adding L2 subtitles to an L2 video seems pedagogically healthier than taking away its authentic quality by "babying" the L2 in order to bring it down to students' level of proficiency.

The results of this study support the view, espoused by the C/E syllabus, that L2 teachers will benefit from exploring the unlimited pool of interesting, educationally valid, and age-appropriate experiential materials designed for native speakers (see LeBlanc, 1990; Tremblay et al., 1990). In this sense, various authentic TV shows, movies, and programs on videotapes and video disks in French constitute an infinitely

147

richer teaching resource compared to a much smaller number of scripted L2 video programs, designed for a specific level of language proficiency. Tapping into such a source is also in keeping with the recommendation of the C/E syllabus to expose students to a wide variety of text types (Tremblay et al., 1990, p. 43).

The outcomes of this study, however, did not support the efficacy of Danan's (1995) "staged" video approach comprising successive video presentations in reversed, bimodal, and non-subtitled formats (corresponding to the Reversed treatment in this study) when relatively inexperienced L2 students were shown a difficult and fast authentic video. Compared to the Reversed treatment sequence, the Bimodal treatment sequence was equally supportive for content learning and retention, but superior for vocabulary learning and retention. These findings suggest that under similar circumstances, students will benefit more from watching French videos subtitled in French rather than English videos subtitled in French, even only as an initial presentation.

Fortunately, these findings have practical implications for French teachers who are interested in supplementing their L2 teaching with subtitled video materials. First, they do not require an English version of the video in addition to a French one. Second, they do not need to purchase expensive hardware, or to struggle with the technical complexities of creating L2 subtitles and adding them to video. All they have to do is select materials from a rapidly growing body of already subtitled bimodal programs designed for native speakers. The most immediately available and potentially valuable authentic resource seems to be videotaped TV shows in French which have been captioned for the hearing impaired. Accessing such programs should not be a problem for schools which have purchased 13-inch or bigger TV sets in Canada during or after 1995, since from that date onward captioning decoders have been built into all TV sets by default (D. Stanbrook, National Captioning Center,

personal communication. May 15, 1997). This is clearly a convenient bonus, considering that before 1995, captioning decoders had to be purchased separately at the approximate retail price of $ 300.00 CAD and installed into the TV set.

Teachers may also consider exploring extensive collections of professionally made educational videos, created for Canadian youths of different ages and produced in a French version. The catalogues of TVOntario, the NFB (National Film Board) and LM Media Marketing (a free video loan service) offer a large selection of such materials on a wide range of educationally valid topics such as science, travelling, friendship, the effect of drugs and alcohol, pollution, recycling, love and sexual awareness, driving, choosing a profession, etc. Teachers can choose from a number of such videos those that are age and grade-level appropriate, and of interest to their students. Many of these materials are already captioned in French for the hearing-impaired.

Next, the relatively new technology of DVD (digital video disks) offers a number of attractive options, including the choice of viewing a film with or without subtitles. With constantly and rapidly evolving computer hardware and software it will also be increasingly easier and cheaper to create and add subtitles to non-captioned videos clips on one's own personal computer (e.g., presently VideoWave is an accessible and user-friendly application, but requires a powerful machine). Needless to say, if teachers edit their own videos for readability purposes, it is recommended that they use a caption format with a contrasting dark strip in the background rather than the format employed in this study (see 5.2.2 for details). Last but not least, permission for the addition of subtitles to ready-made authentic materials should be easy to obtain assuming that teachers are committed to the use of such edited videos for L2 instruction only and not for commercial gains.

Learning outcomes under the Bimodal condition in this study also support the

150

findings in VanPatten's (1990) study, according to which it is possible to process L2 input simultaneously for meaning and lexical forms, when these forms are closely related to the content of the message. Bimodal video in particular, appears to be a promising means for vocabulary learning in an L2, since in their effort to make sense of the video content students are compelled to pay conscious attention to unfamiliar L2 words, and this enhances their ability to notice new lexical features of the language, and guess their meaning from the context (cf. Vanderplank, 1990). Deeper processing of the L2 vocabulary (for both meaning and form) is also believed to produce superior retention (Craik & Lockhart, 1972).

French video in general turned out to be a successful vocabulary instruction medium when L2 target items were presented in salient visual contexts where it was easy to infer their meaning. This was true even for words which appeared only once per presentation. Therefore, video materials abounding in informative visual cues seem beneficial for the incidental learning of L2 vocabulary.

The present study is consistent with a body of research where more elaborate processing of L2 input coming through both the aural and the visual channels (bimodal treatment) was found to produce better verbatim recall of the subtitled utterances containing the new vocabulary (Borrás & Lafayette, 1994; Garza, 1991; Gielen, 1988; Vanderplank, 1990). All this evidence suggests that bimodal video input can be valuable in the teaching of contextual vocabulary knowledge such as semantically appropriate and grammatically accurate new word combinations, as well as different contextual applications of the same polysemantic words. By implication, this approach can also be used to teach stylistic uses of certain words and expressions, as well as idioms and collocational combinations, known to be rather hard to commit to memory (see Nattinger & DeCarrico, 1992).

Students' positive attitudes regarding the helpfulness of subtitles (5.1.4), and

students' comments addressing their input preferences for the study of French (5.1.3) seem to further justify the use of bimodal video in class. The importance of learners reflecting on their own learning process has been emphasized by the multidimensional curriculum (LeBlanc, 1990). In this study, a pronounced attachment to the teacher (but not to tapes) is not only indicative of how important teachers are in the process of learning an L2, but, as argued earlier, also suggests that oral speech and visual cues are both important for L2 learning. The demonstrated overwhelming and broadly similar preferences for reading and for listening to the teacher therefore imply an overlapping attachment to text, sound and picture, rather than a preference for one kind of input over another. Bimodal subtitled video is an accessible means of bringing simultaneously all three kinds of input to the French classroom.

Next, students' ambivalence about video and TV in French as learning tools is perhaps due to their perception of these media as primarily entertaining, compounded by relatively little prior exposure to these sources in French (both in and after school). Nevertheless, the idea that an entertaining authentic source such as video can have considerable educational value is consistent with a growing consensus among educators today that the combination of text, picture, and sound (especially when an interactive element is added) can promote learning. This contemporary view has given rise to the term "Edutainment" in the computer field and refers to educational software which has the appealing qualities of the three types of input. Subtitled video can, of course, be regarded as an older technological brother of computer-based multimedia.

Given that students' responses to the input preferences questions appear to be generally influenced by prior experiences with the study of French, and by extracurricular exposure to French video/TV, it can be hypothesized that regular and successful work with authentic subtitled video in class may influence students' preferences for the learning of French with this approach. Perhaps, it may even

increase their willingness to spend more time watching French video or TV outside school.

Addressing students' comments about the speed of L2 speech and corresponding subtitles in an authentic video, it seems valuable to replay short segments of the whole video multiple times, especially if using captioned materials for the hearing-impaired where the L2 audio is almost completely replicated in the captions. Another option would be to give students more control over the pace of the L2 oral input and the matching subtitles, since there is evidence that it can be an efficient learning technique (e.g., Borrás & Lafayette, 1994, Zhao, 1997). This would also be in unison with the idea that learners should play a more active role in the learning process, as recommended by the C/E syllabus (Tremblay et al., 1990, p. 55). However, controlling a video presentation can ideally be achieved in the context of video disk technology and a computer. If the only resources available in the classroom are a VCR, a regular TV monitor, and video tapes, it might be beneficial if students are sometimes given the chance to work with the VCR in pairs or in small groups which will allow them to replay and stop the video as many times as necessary. At the end, each group can report back to the class on the outcomes of their assignment.

A final incentive for the use of bimodal video for L2 teaching comes from L2 reading research. Koda (1994, 1996) points out that sometimes even fluent bilinguals (English/French) who have a high level of oral proficiency in the L2 are unable to overcome deficient word recognition skills in L2 reading. Geva (forthcoming) also suggests that the development of various aspects of oral and written language processing skills is not synchronous. Therefore, we cannot assume that the development of L2 listening and speaking skills will automatically result in the achievement of good L2 reading skills. Next, given the importance of phonological information in L2 reading for learners with an alphabetic L1 background (e.g.,

English or a Romance language) as opposed to learners with a logographic L1 background (Japanese, Chinese) (see Koda, 1990; 1998), the simultaneous teaching of listening and reading in French to Anglophones should be beneficial. Therefore, contrary to what the proponents of the "listening first" approaches (see Cook, 1986) are suggesting, available evidence implies that it is pedagogically more efficient to teach both listening and reading in an L2 simultaneously rather than sequentially. Bimodal video appears to be a suitable vehicle for the teaching of both skills at the same time.

6.2 CONCLUDING REMARKS AND RESEARCH DIRECTIONS

This closing section will address a number of research suggestions, based on the findings and the limitations of the present study. As mentioned a number of times throughout this thesis, the C/E syllabus addresses the issue of what kinds of teaching materials should be used in core French programs. But it should not be forgotten that this syllabus is an integral part of the multidimensional curriculum (LeBlanc, 1990), and that it is closely intertwined with the language syllabus, the culture syllabus, the general language education syllabus, and their respective goals and objectives (LeBlanc, 1990, pp. 84 - 90). This implies that in choosing or creating French videos, it is important to ascertain that students are exposed to linguistic forms that are considered important, to cultural content that is relevant and useful, and to assess whether some of these videos can be used to raise students' awareness of language, culture, and language learning. In this sense, it will be useful to research what kinds of authentic programs (e.g., feature films, documentaries, talk shows, interviews, comedy shows, newsreels, etc.) will be best suited for attaining various teaching objectives. Also, it will be valuable to explore different ways of achieving teaching goals when working with bimodal video: what kinds of tasks work best with

exposure to such videos; when complete subtitling should be used as opposed to partial subtitling; whether and when lip-reading will be useful for the acquisition of an L2, etc.

With respect to the language syllabus, for example, it will be relevant to investigate what kind of French vocabulary is best introduced with bimodal video. The present study does not provide conclusive evidence regarding this issue, since it targeted a relatively small number of words. A follow-up study with an exclusive focus on vocabulary acquisition could, for example, research a much larger number of vocabulary items differing according to number of occurrences in the video text, degrees of informativeness, importance to the context, part of speech, cognate status, concreteness/abstractness, etc. Another vocabulary aspect of interest for research would be how effective bimodal subtitling is for the acquisition of collocations, idioms, and other fixed lexical phrases (Nattinger & DeCarrico, 1992).

The experimental findings supported the potential of bimodal video only within the context of a single French period. One wonders, however, how effective the present approach would be on a long-term basis? A longitudinal study where students regularly learn French with bimodal video over a whole term, for example, would be able to investigate its effects on the learning and retention of content and vocabulary for a period longer than two weeks. Such a study could also examine how soon a transition from subtitled input could be made to non-subtitled video, and whether and how both L2 reading and listening skills improve with prolonged exposure to this approach.

In conclusion, there is no doubt that bimodal video can be a powerful and versatile teaching tool, especially valuable in a society where the number of dedicated TV watchers and computer users is expanding rapidly. As video technology changes at a galloping speed, our options today are certainly not limited to traditional video

cassettes, although they still seem to be the most practical and accessible resource in many schools. It is inevitable, of course, that more advanced technological "cousins" of the video cassette, such as interactive video CD, DVD, CD-ROM, and web-based multimedia courseware will become increasingly more popular aids in the L2 classroom. The possibility of integrating old and new technologies today also seems very attractive for education, since it gives us the option of displaying Internet-based materials and video disks on our TV monitors, as well as running and manipulating traditional videos and TV broadcasts on our computer screens. In the meantime, research conducted with bimodal video played on a VCR can contribute to our understanding of more advanced video and multimedia technology and how it can best be used for the teaching of an L2.

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156

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APPENDIX A: LETTER REQUESTING INFORMED CONSENT

Dear Parents,

I am a graduate student at the Modern Language Centre of the Ontario Institute for Studies in Education. I am presently conducting a study for my doctoral thesis which is designed to enhance students' learning of French as a second language via the use of video. The study will take approximately 2 hours and 45 minutes of your son/daughter's French class time. It will involve the watching of an interesting French video about a scientific expedition, the completion of some related tasks in French, and the filling out of two questionnaires about students' program background and their reactions to the video.

In order to conduct my research I need your permission for your son/daughter to participate in this study. Participants may withdraw from the study at any given time and full confidentiality will be ensured. Your son/daughter's name will not be used in analysing or reporting the findings. Results will have no effects on students' grades in school and will not be made available to their teachers. Only the researcher and her supervisor at the Modern Language Centre will have access to the research data. At the completion of the research, a description of the study will be made available in the school library to interested students, teachers and parents.

Please indicate your willingness for your son/daughter to participate in this study by signing the consent form below and returning it to the school.

                                        Gratefully yours,

                                        Iva Baltova
                                        Department of Curriculum
                                        Modern Language Centre
                                        Ontario Institute for Studies in Education

****

Please indicate:

_____ **YES,** I give permission for my son/daughter to participate in Iva Baltova's doctoral research study on learning French with video.

_____ **NO,** I do not give permission for my son/daughter to participate in Iva Baltova's doctoral research study on learning French with video.

I understand that my son/daughter is free to withdraw from the study at any time and that adequate steps have been taken to ensure complete confidentiality.

Name (please print): _____

Signature: _____   Date: _____

APPENDIX B: VIDEO SUBTITLES BY SHOTS

SHOT 1_____
1.L'Arctique,
2.froid,
3.hostile.
4.Une terre où l'on doit lutter contre
les éléments pour survivre.

SHOT 2_____
5. Tous les ans, l'été descend
sur le Haut Arctique.
6.La neige et la glace fondent
et découvrent les collines
de sable du désert polaire.
7.L'obscurité des mois d'hiver
fait place à la lumière du soleil
qui brille jour et nuit.
8.C'est le moment qu'un groupe
de chercheurs attendaient avec
impatience.
9.Ils tenteront de découvrir les
traces d'un monde enfoui
depuis la préhistoire.

SHOT 3_____
10.Sur l'île d'Axel Heiberg,
11.un pilote d'hélicoptère
a découvert les vestiges
d'une forêt ancienne.

SHOT 4_____
12.Depuis quand est-elle là?
De quelle sorte de forêt s'agit-il?
HEAD SHOT (as inserted)_____
13.Le chef de l'expédition Jim
Bassinger est un botaniste canadien.
SHOT 4_____
14.Les arbres fossiles ne se sont
pas transformés en pierre.
15.Bassinger établit leur identité:
des méta-séquoias et des
cyprès des marées,
16. arbres disparus de l'Amérique
du Nord.
17.Ces arbres n'auraient pas
pu survivre dans le froid.
18.L'Arctique, aurait-il déjà été
une zone de marée où foisonnait

une végétation luxuriante?

SHOT 5

19.Les premiers fossiles remontent
20.à une époque où d'immenses créatures
regnaient sur la terre.
21.certaines espèces ont disparu
tels les dinosaures.

SHOT 6

22.Petit à petit les vents et le
climat arctique ont usé les couches
protectrices.
23.D'autres choses ont été
conservées:
24.des feuilles, de petites branches,
des pommes de cyprès et de séquoia.
25.Ici le sol forestier a été
littéralement scellé et mis
à l'abri des ravages du temps.

SHOT 7

26.Cette terre a-t-elle dérivé
à partir d'une région plus au sud?
27. l'île d'Axel Heiberg n'a bougé
que de deux à trois degrés.

SHOT 8

28.Comment la forêt a-t-elle pu
survivre dans de telles conditions
extrêmes d'obscurité et de lumière?

SHOT 9

29.Pour la plupart des arbres
ces anneaux indiquent la croissance
graduelle tout au long de l'année.
30.Mais les anneaux des arbres
de cette forêt fossilisée suivent
un tout autre arrangement!
31.La poussée de croissance ne
ralentit guère!

SHOT 10

32.L'expédition a découvert plusieurs fossiles
d'un animal mystérieux:
33.une sorte de mammifère préhistorique.

SHOT 11

34.Ils croient qu'il s'agit d'un mammifère
lémurien, espèce disparue,
35.qui vivait parmi les hautes branches

des méta-séquoias.
36.Leurs immenses yeux leur permettent
de voir dans l'obscurité.
37. Ces animaux ont une caractéristique
commune remarquable!
38. Leurs immenses yeux leur permettent
de voir dans lóbscurité!

SHOT 12_____
39.Nous devons considérer l'Arctique
40.comme une région où nous pourrions
découvrir de nouvelles choses.
41.Il est possible que les premiers
animaux nocturnes soient apparus ici,
42.pour s'adapter à la longue période
d'obscurité de la nuit polaire.

SHOT 13_____
43.Surprenant comment l'Arctique a dû
se transformer!
44.Le seul arbre qu'on voit est
le minuscule saule.
45.Le paysage est rude.
46.Les fleurs poussent comme
par miracle dans le sable et entre
les rochers.

SHOT 14_____
47.Un à un les scientifiques s'apprêtent
à regagner leur coin de terre.
48.L'expédition arrive à son terme.
49.L'Arctique...
50.Plus on y regarde de près,
plus il nous met au défi de
le comprendre.
51.Une équipe de scientifiques a fait
une découverte remarquable
52.changeant à jamais l'idée que
nous nous faisons du Nord
et de son univers de glace.

* FIN *

APPENDIX C: DURATION AND SEQUENCE OF SHOTS
IN THE VIDEO

00:00-0:21	SHOT 1

CANADIAN GEOGRAPHIC SIGN; LANDSCAPE WITH BEAR

00:44-01:34	SHOT 2

SANDY HILLS

02:08-02:26	SHOT 3

MAP PLATE

02:42-02:52	HEAD SHOT

BASSINGER'S HEAD; BASSINGER CLIMBING HILL

06:22-07:11	SHOT 4

TREE FOSSILS; BASSINGER SWEEPING; TREES AT SUNSET

07:23-07:50	SHOT 5

BASSINGER WIPING FOREHEAD AND DIGGING; DINOSAURES

08:12-09:08   SHOT 6

TREE FOSSILS; HILLS; BASSINGER ON ALL FOURS; PALM WITH LEAVES

12:00-12:29   SHOT 7

BLOND WOMAN WRITING; MAP

12:56-13:06   SHOT 8

LAKE

13:55-14:19   SHOT 9

TREE RINGS DIAGRAM

18:28-18:38   SHOT 10

PERSON UNWRAPPING BONE FROM KLEENEX

20:01-20:33   SHOT 11

FIELD WITH CAMP; LEMURS IN TREES

21:31-21:50   SHOT 12

OLD WOMAN TALKING

_____

22:27-23:04   SHOT 13

BLUE LANDSCAPE; PEOPLE TAKING PICTURES; BUFFALOS;
TAKING PICTURE OF TINY WILLOW; FLOWERS - 3 PLATES

_____

24:41-25:20   SHOT 14

AIR PLANE TAKING OFF; SANDY HILLS; BIG TREE FOSSIL

_____

END

APPENDIX D: PILOT STUDIES

PILOT 1

This pilot study focussed on the testing and timing of the instruments used in the experiment, and resulted in several adjustments to these instruments and the experimental procedures. Eighteen grade 11 core French students were shown the video in Reversed and then in Bimodal format. They also completed the Vocabulary Recognition (VR) pretest, the Content test, the C-Cloze, and Questionnaire B. The VR pretest was administered before the video was shown, the Content test was given after the first viewing, and the C-Cloze and the Questionnaire were completed after the second viewing of the video. Students were given 10 minutes to browse through the Content test in pairs, before they actually watched the video and completed this test. Getting familiar with the content questions prior to doing the task was believed to give them purpose in watching and make them more selective in what they were paying attention to. Finally, the entire pilot class was interviewed as a group for additional input on the tasks and the video. The pilot revealed that too much time was given for each of the tasks. Therefore, the original timing of the tasks was shortened as follows: the time necessary to complete the VR pretest was reduced from 5 minutes to 2 minutes; the time for the Content test was changed from 20 minutes to 15 minutes, and the time for the C-Cloze was altered from 20 minutes to only 10 minutes. Further, too much time was given to the students (10 minutes) for browsing through the Content test. As a result, students became fixed on words in the questions they did not know and attempted to answer them while viewing. That is why it was decided to give students only 2 minutes' browsing time for this test and instruct them to turn over their tests while watching the video.

The observation that the timing of the tasks could be reduced was not only a matter of making the procedure more precise, but was also very fortunate, as it made it possible to

173

play the video three times instead of twice and still fit the entire treatment into one 75-minute class period. An additional showing of the video was expected to give the students more opportunities for learning, especially since the video material appeared from the piloting to be verbally challenging for most students at that level. Nevertheless, students in this pilot were able to follow the video and to do all the tasks. The mean scores from the three tests are summarized in Table 1 below.

Table 1: Means and possible scores for the Vocabulary Recognition pretest, the Content test, and the C-Cloze in Pilot 1 (N = 18)

TESTS	M	(SD)	Possible Score
V R pretest	.59	.14	-1 to +1
Content Test	9.39	1.58	0 to 26
C-Cloze	24.10	8.46	0 to 60

The Content test questions, however, presented a few problems to the students. The original wording of question #2 *Sur l' île d'Axel Heiberg qu'est-ce qui arrive à la neige et la glace en été aujourd'hui?* (On Axel Heiberg island what happens with the snow and the ice in the summer today?) was misunderstood by the majority of the students as *Sur l'île d'Axel Heiberg qui arrive à....* (On Axel Heiberg island, who comes ...) where the impersonal *qui* was confused for the subject pronoun, perhaps triggered by the frequent combination of *qui* with *arrive*. Thus, the majority of the answers to that question were *les scientifiques* (the scientists). To avoid further potential confusion the wording of question #2 was changed to *Qu'est-ce qui se passe en ÉTÉ aujourd' hui sur l'île d'Axel Heiberg?* (What happens in the SUMMER today on the Axel Heiberg island?). The upper case was used to alert the distinction between summer time in the Arctic from the severity of its winters, addressed by the previous question in the cloze.

Further, question #3 *Pourquoi est-ce que les scientifiques dans le vidéo sont venus dans le Haut Arctique?* (Why did the scientists come to the High Arctic?) elicited some non-specific (although true) responses which might have been based on common knowledge, rather than on understanding the video (e.g., *pour faire des recherches* (to do research)). In order to elicit answers which were based on knowledge obtained from the video, the wording of this question was made more specific: *A cause de quelle découverte les scientifiques du vidéo sont-ils venus dans le Haut Arctique?* (Due to what discovery did the scientists come to the High Arctic?). Question #4 *Quelle est la première chose qu'on a trouvée sur l'île d'Axel Heiberg?* was subsequently deleted, since now it was redundant with the previous question.

Questions #6 *Qu'est-ce que les anneaux des arbres fossiles sur l'île d'Axel Heiberg indiquent?* (What do the rings of the trees on Axel Heiberg island indicate?) and #7 *Qu'est-ce que les anneaux de la plupart des arbres indiquent?* (What do the rings of most trees indicate?) in the original version (#5 and # 6 in the revised version) were also given more specific wording, since some of their responses were rather general (e.g., *une croissance* (growth)). In order to elicit more specific answers, these questions were altered as follows: #5 *Quelle sorte de croissance indiquent les anneaux de la plupart des arbres de nos forêts aujourd'hui?* (What kind of growth do the rings of most trees in our forests today indicate?) and # 6 *Quelle sorte de croissance indiquent les anneaux des arbres fossiles sur l'île d'Axel Heiberg?* (What kind of growth do the rings of the fossilized trees on Axel Heiberg island indicate?).

Finally, the last question in the original version # 12 *Pourquoi est-ce que la scientifique croit que l'Arctique est une région où nous pourrions découvrir de nouvelles choses?* (Why does the scientist believe that the Arctic is a place where we could discover new things?) was deleted, since nobody was able to provide the answer, although students

watched the video in English first! I was not able to elicit an answer even in the interview with the students, following the piloting. This is unfortunate, since it constituted one of the most interesting speculations in the video: the hypothesis that perhaps nocturnal animals first originated in the Arctic.

Students commented that the Content test was by far the most difficult of all the tests they had to complete. Similarly, students did not score very highly on this test. When asked if it would be easier to answer the questions if students worked with a partner, the vast majority agreed and expressed a positive emotional response to the idea. Therefore, in order to make the Content test easier for the main study, it was decided to let students work on this test in pairs. Also, since pair work constitutes a typical classroom activity at this level, it was believed that the study will thus become more pedagogically sound.

The pictures in the C-Cloze test were perceived by the interviewed students as helpful in contextualizing the task and making it easier to think about possible answers, but they also felt that the pictures did not necessarily enhance the retention of the words. The idea of browsing through the C-Cloze before watching the video, which I originally thought would be helpful in narrowing down students' attention to the missing target words while watching the video, did not receive a positive response. Most students believed that browsing through this test would not make any difference on how they performed on the task, unless they were given about one hour to study the text with a dictionary. Therefore, it was decided not to show the C-Cloze prior to running the video in the actual experiment.

According to the comments of almost all the students in the questionnaires and the oral interview, subtitles were helpful for understanding words, and in some cases for remembering them, particularly in the case of short one-line subtitles which remained on the screen for a relatively long time (e.g., several students at the subsequent interview still remembered the subtitle "froid, hostile" from the opening of the documentary). The majority

of the students commented in the Questionnaire and the interview that the cases when the subtitles were most helpful were those when they could not understand or keep up with the narrator's voice. Some students were not able to see the subtitles well enough due to the physical distance between them and the VCR or because in a couple of instances subtitles would not contrast sufficiently with the background. These problems were reduced, however, when students were seated close enough to the video player. Therefore, for the experiment, it was decided that all students should cluster as close as possible around the TV screen.

PILOT 2

The focus of the second pilot was on the order and nature of the procedure and the instructions employed in the experiment. Twenty three students from the same population were shown the video in a Bimodal, followed by a Traditional format. Students completed the revised Content test, and the C-Cloze test. They were also interviewed for comments about the video and the tasks at the end of the class.

Students were now told to sit as close to the video as possible, and in order to avoid unnecessary confusion after the experiment had started, they were also told to pick a partner in advance of viewing, because the experiment involved working with somebody else for the first task right after the initial watching of the video. The Content test was shown to the pairs for only two minutes before the second showing of the video, and they were instructed not to worry about unfamiliar words, because they were going to find out what they meant when they saw the video. Also, participants were instructed to wait until they had seen the video before writing anything.

Students were able to see the subtitles better this time, but they were still somewhat agitated about answering the questions. Some students commented that they did not actually pay attention to the story, but were only searching for information that was requested in the

Content test and mentally trying to answer them, instead of trying to follow the video. Some students were also trying to write down the answers while watching, even though they were instructed not to do so.

Therefore, a decision was made to show the entire video once, before the students had a chance to see the Content test and to instruct them to just watch and try to understand as much as possible. This decision was also supported by a study where students who watched a video segment with subtitles in the L2 were not able to read the subtitles the first time they saw the video (see Borrás & Lafayette, 1994). This test was to be shown briefly before the second viewing of the video. In order to avoid writing during viewing time, students were to be instructed to flip their tests over and answer questions only after the second viewing.

Although students discussed the comprehension questions in the Content test in pairs, each student was asked to complete a separate answer sheet. After examining those sheets, it was concluded that there was hardly any difference between the two answer sheets of the paired students working together, so for the main experiment it was decided that each pair would be given one sheet and only one of the students would be writing. Each student would receive the same score as his/her partner.

Since, in Pilot 1, the students did not think that browsing briefly through the C-Cloze before watching the next video was helpful, the cloze was not given to the students before the video, but they were told that they would be receiving a summary of the video where some of the words were missing, and would need to fill them in. As in the first pilot, the students thought that the pictures in the C-Cloze test helped in connecting the task to a specific place in the video and in remembering the story. They thought that the pictures were clear and were able to identify all of them.

Finally, all students agreed that watching the bimodal version the first time was a little distracting, since there was a challenging amount of information they were trying to process:

speech, subtitles, and pictures. Many students commented that their first impulse was to read all the subtitles, and when there was "too much to read", they would miss the story, since they would not be able to listen to the narrator, nor look at the pictures at those times. They felt, however, that if they could watch the same subtitled (bimodal) video two times, they would be able to understand the story better, as well as read the subtitles. These comments support the desirability of watching the video three rather than only two times in the Bimodal condition (two of them in bimodal, and one in traditional format) so that the subjects in this particular treatment are not put at an undue disadvantage relative to the Reversed condition.

PILOT 3

The purpose of the third pilot was to eliminate from the scoring any correct answers consistently provided by students who had not been exposed to the video. In this pilot study the Content test and the C-Cloze test were given to a third class (N = 17), where students did not watch the video before they completed the tests, although, for their own interest, they were given the opportunity to do so after doing the tests. None of the students had seen the video prior to the pilot.

Results for the Content test revealed that 100 % of the students in this class answered the first question (*Décrivez l'Arctique en hiver aujourd'hui selon le vidéo*) by *Il fait froid* or an equivalent phrase. Since such an answer could be easily provided from common knowledge, rather than from watching the video, it was decided that points for similar answers would not be given to the students who participated in the actual experiment.

All the students (100 %) in this class also provided the word *fossiles* on the C-Cloze test which was therefore subsequently eliminated from scoring. The word *découverte* which had to be filled in the last sentence of the C-Cloze, appeared in various distorted versions in the tests of 35% of the students, which, however, was not considered high enough to

eliminate this word from scoring.

Performance on both tests in this pilot class was very low. After following the revised scoring procedures, as described above, the mean score for the Content test was $M = 0.47$ (out of 26), and for the C-Cloze Test, $M = 3.76$ (out of 60). It was concluded that after the minor adjustments to the scoring procedures of both tests, these tests would measure learning based specifically on the video.

APPENDIX E:INSTRUCTIONS FOR THE MAIN STUDY

PHASE 1: PRETESTING

INTRODUCTION

Hi everyone! My name is Iva Baltova. I am a doctoral student from OISE at U of T and I am here today to conduct a study which aims at finding out how students like yourselves study French with video. This study is important for my dissertation. There are several other schools already participating in this project. I will be here three times: today, next week and again two weeks later. Next week I am going to show you a very interesting video.

Today you are going to complete three tests and a questionnaire. The results from these tests are not going to affect your grades in French. They will be used only for this experiment. Even though I will ask you to write your names on the tests, I will replace them with number codes as soon as we are finished. Only my supervisor and I will have access to this information, and all the tests will be kept in a safe place! The reason you are doing these tests today is to find out how proficient you are in French, and whether you already know some of the words that I will be teaching next week with the video. The questionnaire is in English, and it asks questions about your background, such as how long you have studied French and what your mother tongue is. If there is anything you do not understand, please ask me to explain it to you.

INSTRUCTIONS

1) Vocabulary Recognition pretest completion

The first test is a list of French words. Some of them are real words and some are not. Please read the list and cross out the words that you feel you do not know well enough to say what they mean. You have 2 minutes to complete this test. Please write your names on the sheet.

2) Vocabulary Knowledge pretest completion

The second test consists of 12 real French words taken from the same list, and there are five options under each word. Please check the right option. If you do the last option, please also do the previous one. Just follow the instructions on the test. You have 10 minutes to complete this test. Please write your names on the tests.

3) Dictation completion

The third and last test is a brief dictation. Here is a blank sheet of paper. Please write your name on it. You will listen to a tape where everything is repeated several times. First, you will listen to the entire paragraph without writing, then you will hear each sentence in full (still without writing). Next, you will hear parts of each sentence repeated twice, and instructions telling you to start writing. At the end, you will listen to the whole paragraph again. The dictation is scored for grammar and spelling, so be careful about mistakes. This will take about 6-7 minutes.

4) Background Prequestionnaire completion

The last thing we will do today is fill out this questionnaire. Please answer all the questions in English. If there is something you do not understand, ask me. You have until the end of the period (about 5 minutes).

PHASE 2: TREATMENT

NOTE: The highlighted text in ≠ 1) was given as an instruction only in the Bimodal and Reversed conditions.

INSTRUCTIONS

Good morning to everybody. As I promised last time, today I am going to show you a video. You will be able to watch it three times. After watching it twice I will ask you to answer a few questions about the video, and then after watching it for a third and last time there will be another task. Finally, you will be asked to fill out a very brief questionnaire in English about your reactions to the video.

1) Pairing up

Now, before we watch the video you will need to pair up with a partner because the first task has to be done in pairs. **Please sit as close to the video as you can. There will be some captions that you have to read.** The first time, just watch and try to understand as much of the story as you can. Do not think about the tests, yet.

2) Viewing the first video

3) Browsing through Content test

Before we watch the video again, I am going to show you the questions you are supposed to answer.

Quickly browse through. If you find unfamiliar words in the questions, do not worry because you will find out what they mean when you watch the video. You have two minutes to look through the questions. Please DO NOT WRITE anything on the tests, yet!

4) Viewing the second video

Now turn your tests over and watch.

5) Content test completion

Please work with your partner now. You can discuss the questions on the test, and decide on the answers together, but only one of you will be writing on the test. You have 15 to work on these answers.

6) Viewing the third video

Now we will watch the video again for the last time. Afterwards I am going to give you a brief summary of the video where some of the words are missing, but the first two or three letters of the words are provided. You need to fill in the rest of these words in the gaps. These words are related to the questions you just worked on. This is an individual task, so I would like you to go back to your old seats before we start watching the video again.

7) C-Cloze test completion

You have 10 minutes to complete this test.

8) Questionnaire

The last thing we are going to do today is answer a few questions in English about what you thought of the video and the tasks. Please answer all the questions. You have 10 minutes.

PHASE 3: DELAYED POSTTESTING

INSTRUCTIONS

Hello everyone! Today is our third and last session together. I hope that you remember the video we watched last time, because I would like to ask you to complete three tests in French which are related to that video. Actually, they are the same tests that you already worked on last time. It is important for the study to find out how much of the video you still remember over a period of two weeks. That is why I am asking you to complete these tests again.

1) Content test completion

This time you will need to work on this test individually. You have 10 minutes to complete it.

2) C-Cloze test completion

You have 10 minutes to complete this test.

3) Vocabulary Knowledge Scale test completion

You have 15 minutes to work on this test.

I would like to thank everyone for participating in this study! Your effort and cooperation is greatly appreciated. I hope that you enjoyed watching the video, and that you did not find the tests too difficult. I will be sending your school a report of the experimental outcomes upon completion of the study. Thanks again and good luck in your exams!

APPENDIX F: BACKGROUND PREQUESTIONNAIRE

Name: ....

*This questionnaire is part of a research project on the learning of French. Please answer all the questions as best you can. You can ask the researcher if you are having trouble answering any of the questions. **Your answers will be strictly confidential.** No one will see them besides the researcher. Thank you for your cooperation.*

1. What was (were) your childhood language(s)? _____

2. Do you now use any language other than English at home or outside school? Yes___ No___

    If YES:
    (a) Please specify which language(s): _____

    (b) Compared to English, how easy is it for you to use this language? Please check the answer that best applies to you below. (If you have written more than one language above, answer the question for the language you know best.)

	much easier than English	easier than English	about the same	less easy than English	much less easy than English
speaking	_____	_____	_____	_____	_____
listening	_____	_____	_____	_____	_____
reading	_____	_____	_____	_____	_____
writing	_____	_____	_____	_____	_____

4. In which grade did you start taking French at school? _____

5. Were you ever in a French immersion or extended French program? Yes _____ No _____

If YES:
Please indicate the number of courses taken in French for each grade: Grade____/____ courses
Grade____/____courses; Grade____/____ courses; Grade ____/____courses.

6. Have you ever attended a French language school for native speakers of French?

Yes____ No____

If YES:
Please indicate which grades:_____

7. Compared to the other students in your class, how well are you doing in learning French?

Above
average _____   Average_____   Below
                                                average _____

8. Outside of school, do you ever do the following IN FRENCH?

(a) Watch French TV?

Yes___ No___   If YES, how much time on average per week? _____ hours

(or_____ minutes)

(b) Listen to French radio?

Yes___ No___   If YES, how much time on average per week?_____ hours

(or _____ minutes)

(c) Watch French movies (on TV, on video or in a theatre)?

Yes____ No____   If YES, how many on average per month? _____ movies

(d) Read French magazines?

Yes___ No____   If YES, how many per month? _____ magazines

(e) Read French books?

Yes___ No____   If YES, roughly how many per year? _____ books

9. Have you ever seen a French movie subtitled in English?   Yes_____ No_____
                              If YES, roughly how many: _____ movies

10. Have you ever seen an English movie subtitled in French?   Yes _____ No _____
                              If YES, roughly how many: _____ movies

11. Do you enjoy films about scientific expeditions?   Yes _____ No _____

12. What science subjects are you presently taking at school? _____

_____

13. How do the following statements apply to your UNDERSTANDING OF FRENCH in the classroom? Please check the answer that best applies to you:.

(a) I understand best when I listen to the teacher in class.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

(b) I understand best when the teacher writes on the black-board.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

(c) I understand best when I listen to a French audiotape.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

(d) I understand best when I watch French shows on video or TV.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

(e) I understand best when I read a French textbook.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

(f) I understand better when I watch French films on TV or on video.

strongly agree____   agree____   undecided____   disagree____   strongly disagree____

14. How do the following statements apply to your LEARNING of FRENCH WORDS in theclassroom? Please check the answer that best applies to you:

(a) I learn French words best when I listen to teacher's explanations.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

(b) I learn French words best when the teacher writes them on the board.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

(c) I learn French words best when I listen to a French audiotape.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

(d) I learn words best when I watch French shows on video or TV.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

(e) I learn words best when I read a French textbook.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

(f) I learn words best when I watch French films on TV or on video.

strongly agree_____   agree_____   undecided_____   disagree_____   strongly disagree_____

<center>* THANK YOU FOR COMPLETING THIS QUESTIONNAIRE *</center>

APPENDIX G: FIRST LANGUAGE BACKGROUND AND LANGUAGES SPOKEN AT HOME

FIRST LANGUAGE BACKGROUND

FIRST LANGUAGES	STUDENTS
English	19.4%
Portuguese	19.4%
Italian and English	14.0%
Portuguese and English	6.5%
Spanish	5.4%
Spanish and English	4.3%
Italian	4.3%
Polish	4.3%
Filipino	4.3%
Polish and English	3.2%
Filipino and English	3.2%
German and English	2.2%
Vietnamese	1.1%
Korean	1.1%
Ukrainian	1.1%
Arabic	1.1%
Amharic	1.1%
Patio	1.1%
Lithuanian and English	1.1%
Lebanese and English	1.1%
Chaldean and English	1.1%

LANGUAGES SPOKEN AT HOME

LANGUAGES	STUDENTS
English	6.1%
Portuguese	29.3%
Italian	23.2%
Spanish	12.2%
Polish	8.5%
Filipino	8.5%
German	2.4%
Korean	1.2%
Vietnamese	1.2%
Ukrainian	1.2%
Lithuanian	1.2%
Arabic	1.2%
Amharic	1.2%
Chaldean	1.2%

APPENDIX H: VOCABULARY RECOGNITION PRETEST

NAME: ....

Please look quickly through the French words listed below. Cross out any words that you do not know well enough to say what they mean.

luxuriant	entier	opétir
manchir	rude	remonter
chausselle	falpeur	feuille
nocturne	parmi	tinquant
mammifère	croitique	minuscule
nuptile	culon	phoneton
colline	demeurer	intacte
anneaux	hostile	enfoui
palitaire	retourbir	ralentir
fondre	rocher	dissuser
descendre	moutardeur	pitaille
prontif	décatiner	pousser
lutter	découverte	listeux
vauche	obscurité	joune
recherches	pantalique	s'adapter
glace	espèce	scellé
régner	fossile	

APPENDIX I: VOCABULARY KNOWLEDGE SCALE

NAME: ....

Please indicate how well you know each of the words or expressions given below. Check off the appropriate box or boxes to the left of the options and follow the instructions for each option. If you check (e), please also do (d).

1. LA GLACE

___ (a) I don't remember having seen this word before.

___ (b) I have seen this word before, but I don't know what it means.

___ (c) I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

___ (d) I know this word. It means ....(give a synonym or translation)

___ (e) I can use this word in a sentence: ....

....(make a sentence in French)

2. LUTTER

___ (a) I don't remember having seen this word before.

___ (b) I have seen this word before, but I don't know what it means.

___ (c) I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

___ (d) I know this word. It means ....(give a synonym or translation)

___ (e) I can use this word in a sentence: ....

....(make a sentence in French)

3. INTACTE

___ (a) I don't remember having seen this word before.

___ (b) I have seen this word before, but I don't know what it means.

___ (c) I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

___ (d) I know this word. It means ....(give a synonym or translation)

___ (e) I can use this word in a sentence: ....

....(make a sentence in French)

192

4. l' OBSCURITÉ

___ (a)   I don't remember having seen this word before.

___ (b)   I have seen this word before, but I don't know what it means.

___ (c)   I have seen this word before, and **I think** it means...
                               (give a French synonym or English translation)

___ (d)   I know this word. It means ....(give a synonym or translation)

___ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

5. RÉGNER

___ (a)   I don't remember having seen this word before.

___ (b)   I have seen this word before, but I don't know what it means.

___ (c)   I have seen this word before, and **I think** it means...
                               (give a French synonym or English translation)

___ (d)   I know this word. It means ....(give a synonym or translation)

___ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

6. ENTIER

___ (a)   I don't remember having seen this word before.

___ (b)   I have seen this word before, but I don't know what it means.

___ (c)   I have seen this word before, and **I think** it means...
                               (give a French synonym or English translation)

___ (d)   I know this word. It means ....(give a synonym or translation)

___ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

7. SURVIVRE

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

8. LA COLLINE

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

9. l' ESPÈCE

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means..

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

10. POUSSER

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means...

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

11. DESCENDRE

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means...

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

12. PARMI

____ (a)   I don't remember having seen this word before.

____ (b)   I have seen this word before, but I don't know what it means.

____ (c)   I have seen this word before, and **I think** it means...

(give a French synonym or English translation)

____ (d)   I know this word. It means ....(give a synonym or translation)

____ (e)   I can use this word in a sentence: ....

....(make a sentence in French)

THANK YOU

VIDEO CONTENT TEST   Name: ....

*The following questions address the most important ideas of the story in the video you are about to
see. After watching the video, please answer briefly in French working with a partner:*

1. Décrivez l'Arctique en hiver aujourd'hui selon le vidéo.

----

2. Qu'est-ce qui se passe en ÉTÉ aujourd'hui sur l'île d'Axel Heiberg?

----

3. A cause de quelle découverte les scientifiques du vidéo sont venus dans le Haut Arctique?

----

4. Dans quelle sorte de climat est-ce que les méta-séquoias et les cyprès des marées ont poussé?

----

5. Quelle sorte de croissance indiquent les anneaux de la plupart des arbres de nos forêts aujourd'hui?

----

6. Quelle sorte de croissance indiquent les anneaux des arbres fossiles sur l'île d'Axel Heiberg?

_____

7. Quoi d'autre a été conservé sur l'île d'Axel Heiberg?

_____

_____

8. Dans quelle condition ont été conservées ces choses?

_____

9. Les scientifiques ont trouvé des fossiles de quel animal?

_____

10. Comment est-ce que cet animal a pu exister pendant la longue période d'obscurité de la nuit polaire?

_____

* THANK YOU*

SCORING PROCEDURE FOR THE CONTENT TEST
(Maximum score = 22)

Note: Acceptable sample paraphrases for each idea unit (most of which are taken from the pilot tests) are given below and marked by the number sign (≠). One point (sometimes two points) is are assigned to each idea unit that represents a correct response to the questions listed below. Any other possible paraphrase of the ones given as examples which reflects the meaning of the same idea are also accepted. Incorrect spelling, accents, and grammar are disregarded, since the test is designed to measure the understanding and retention of meaning alone.

(1) Décrivez l'Arctique en hiver aujourd'hui selon le vidéo. (3 points)

il est froid et hostile (or desert); il fait froid et tout est glacé; tout est couvert de glace et de neige - 1 point (Only saying "il fait froid" or giving a synonymous phrase did not get a point for reasons explained in section 3.5.6).
la nuit reigne dans l'Arctique; il fait nuit; le soleil ne brille pas; c'est la nuit polaire; il fait noir; il n'y a pas de lumière, l'Arctique est obscure - 1 point
il faut lutter pour survivre - 1 point

(2) Qu'est-ce qui se passe en ÉTÉ aujourd'hui sur l'île d'Axel Heiberg? (4 points)

la neige et la glace fondent; la neige fond; la neige disparait; on peut voir les collines de sable - 1 point
le soleil brille jour et nuit; c'est l' été polaire, il y a beaucoup de soleil - 1 point
il y a des fleurs et des plantes, des plantes poussent, il se transforme en désert polaire/toundra arctique - 1 point
l'ete dure pendant un court laps de temps, ce n'est pas trop chaud - 1 point

(3) A cause de quelle découverte les scientifiques du vidéo sont venus dans le Haut Arctique? (2 points)

la découverte des fossils - 1 point
If more precise than above: la découverte d'une fôret fossilisée/des arbres fossilisés; la découverte d'une fôret ancienne/ prehistorique - 2 points

(4) Dans quelle sorte de climat est-ce que les méta-séquoias et les cyprès des marées ont poussé? (2 points)

dans un climat chaud OR climat humide - 1 point
For both idea units: dans un climat chaud et humide; or dans un climat tropical - 2 points

(5) Quelle sorte de croissance indiquent les anneaux de la plupart des arbres de nos

forets aujourd'hui? (2 points)

\# une croissance pendant toute l'annee/un un/tout le temps - 1 point
\# une croissance graduelle/normale/qui ralentit pendant l'hivers, les arbres pussent lentement en hivers - 1 point

(6) Quelle sorte de croissance indiquent les anneaux des arbres fossiles sur l'ile d'Axel Heiberg? (2 points)

\# une croissance qui s'arrete pendant l'hivers - 1 point
\# une croissance constante/vite/qui ne ralentit pas pendant l'ete - 1 point

(7) Quoi d'autre a été conservé sur l'île d'Axel Heiberg? (4 points)

\# des feuilles/plantes/une vegetation - 1 point
\# (de petites) branches - 1 point
\# des pommes (de cyprès et de séquoia). I have accepted only "pommes" or only "branches" - 1 point
\# animaux / mammiferes - 1 point

(8) Dans quelle condition ont été conservées ces choses? (1 point)

\# une condition intacte; très bien conservées; dans une bonne condition - 1 point

(9) Les scientifiques ont trouvé des fossiles de quel animal? (4 points)

\# un mammifère OR singe (but not "monkey") OR animal avec grands yeux - 1 point
\# (Un animal) préhistorique; or disparu; or mystérieux, nocturne - 1 point
\# un lémurien - 2 points

(10) Comment est-ce que cet animal a pu exister pendant la longue période d'obscurité de la nuit polaire? (2 points)

\# il a des grands yeux - 1 point
\# If more precise than above: il est nocturne; il peut voir dans la nuit avec ses grands yeux - 2 points.

VIDEO C-CLOZE   Name : ....

This is a summary of the video you just watched. Please complete the missing words. The pictures should help you do this test.

Au jourd'hui l'Arctique est froid et *ho*............. Le soleil ne brille pas pendant les mois d'hiver. Ici on doit *lu*.............. contre les élements pour survivre.

Pendant un court laps de temps, l'été *de*...............sur le Haut Arctique. La neige et la glace *fo*.............. pendant un court laps de temps et découvrent les *co*................ de sable du désert polaire. Le paysage est *ru*............ . Le seul arbre qu'on voit est le *mi*....................... saule. Les fleurs et les plantes arctiques *po*.................. comme par miracle dans le sable et entre les *ro*.................

Tout récemment sur l'île d'Axel Heiberg on a découvert des *fos*.............. d' arbres anciens qui n'ont pu exister que dans un climat chaud et humide où foisonnait une végétation *lu*................! Une équipe scientifique internationale y est venue pour effectuer des *re*................sur cette forêt, et pour découvrir les traces d'un monde *enf*................depuis

Les vestiges de cyprès des marées et de méta-séquoiasre........................ à une époque où d'immenses créatures _ré_.................... sur la terre. Avec les transformations de l'évolution, certaines _es_.................... ont disparu tel les dinosaures, tandis que les cyprès et les séquoias poussaient dans le monde _en_.................... .

Pour la plupart des arbres, les _an_.................... indiquent la croissance graduelle tout au long de l'année, qui _ra_.................... après la poussée du printemps. Mais, la croissance de ces arbres anciens _de_.................... constante jusqu'au moment où tout s'arrête.

Des choses délicates comme des _fe_.................., de petites branches, et des pommes de cyprès et de séquoia ont été conservées _in_..................sous les couches protectrices. Ici le sol forestier a été littéralement _sc_.................... et mis à l'abri des ravages du temps.

L'expédition a également découvert des vestiges d'un _ma_.................... lémurien préhistorique. On croit qu'il s'agit d'un animal disparu, qui vivait _pa_............ les hautes branches des méta-séquoias. Ce lémurien et ses descendants modernes ont une caractéristique commune: ce sont des animaux _no_.................... . Il y a des gens qui croient que les premiers animaux qui pouvaient voir dans l'_ob_.................... sont apparus dans l'Arctique pour _s'a_.................... à la longue nuit polaire.

Une équipe de scientifiques a fait une _dé_.................... remarquable qui change l'idée que nous nous faisons du Nord et de son univers de _gl_.............. !

THANK YOU

LIST OF 30 TARGET WORDS

hostile	luxuriante	feuilles
lutter	recherches	intactes
descend	enfoui	scellé
fondent	remontent	mammifère
collines	règnaient	parmi
rude	des espèces	nocturnes
minuscule	entier	obscurité
poussent	anneaux	s'adapter
rochers/roches	ralentit	découverte
fossiles	demeure	glace

Note: The target words are listed in the order they appear on the Video C-Cloze test.

APPENDIX L: QUESTIONNAIRES A and B

QUESTIONNAIRE A   Name: _____

*This questionnaire is part of a research project on the learning of French. Please answer all the questions as best you can. You can ask the researcher if you are having trouble answering any of the questions. **Your answers will be strictly confidential.** No one will see them besides the researcher.*

1. Had you seen this video before today's presentation?   Yes _____   No _____

     If YES:

         (a) What language did you see it in?   English _____   French _____

         (b) How many times had you seen it before today? _____ times

2. Do you feel that you have learned any NEW INFORMATION from watching this video today and doing the tasks? Please check the answer that best applies to you:

         A lot_____   Some_____   Very little_____   None_____

3. Do you feel that you have learned any NEW FRENCH WORDS form watching this video and doing the tasks? Please, check the answer that best applies to you:

         Many_____   Some_____   Very few_____   None_____

4. Which of the following statements expresses how well you UNDERSTOOD the video you just watched? Check one, please:

         (a)   I understood everything   _____

         (b)   I understood most of it   _____

         (c)   I understood some of it   _____

         (d)   I understood very little   _____

         (e)   I didn't understand any of it   _____

5. If you answered the question above with (a), (b), or (c), what HELPED you most to UNDERSTAND the video?

_____

_____

_____

_____

_____

6. If you answered question #4 with (d) or (e), what PREVENTED you from UNDERSTANDING more?

_____

_____

_____

_____

_____

* THANK YOU FOR YOUR COOPERATION*

QUESTIONNAIRE B   Name: _____

This questionnaire is part of a research project on the learning of French. Please answer all the questions as best you can. You can ask the researcher if you are having trouble answering any of the questions. **Your answers will be strictly confidential.** *No one other than the researcher will see them.*

1. Had you seen this video before today's presentation?   Yes _____   No _____

    If YES:

        (a) What language did you see it in?   English _____   French _____

        (b) How many times had you seen it before today? _____ times

2. Do you feel that you have learned any NEW INFORMATION from watching this video today and doing the tasks? Please check the answer that best applies to you:

        A lot_____   Some_____   Very little_____   None_____

3. Do you feel that you have learned any NEW FRENCH WORDS form watching this video and doing the tasks? Please check the answer that best applies to you:

        Many____   Some_____   Very few_____   None_____

4. Which of the following statements express how well you UNDERSTOOD the video you just watched? Check one, please:

        (a) I understood everything   _____

        (b) I understood most of it   _____

        (c) I understood some of it   _____

        (d) I understood very little   _____

        (e)   I didn't understand any of it _____

5. If you answered the question above with (a), (b), or (c), what HELPED you most to UNDERSTAND the French video?

_____

_____

_____

_____

6. Were you able to READ the SUBTITLES while watching the video? Please, check the answer that best applies to you:

Yes, all the time____   Most of the time____   Sometimes____   Rarely____   Hardly____

    If you answered with "most of the time","sometimes", "rarely" or "hardly", explain when you were NOT able to read the subtitles:

_____

_____

_____

_____

7. Did you find the SUBTITLES HELPFUL in doing the tasks?   Yes _____   No _____

    If YES, when were the subtitles most helpful to you?

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

APPENDIX M: DATA COLLECTION TIME-TABLE

Time period of data collection for the study

Class	PILOTS	PHASE 1	PHASE 2	PHASE 3
1	May 27, 1996			
2	October 17, 1996			
3	October 23, 1996			
4		October 24, 1996	October 29, 1996	November 13, 1996
5		October 28, 1996	November 4, 1996	November 19, 1996
6		October 31, 1996	November 8, 1996	November 22, 1996
7		February 25, 1997	March 4, 1997	March 18, 1997
8		February 27, 1997	March 6, 1997	March 20, 1997
9		March 21, 1997	March 27, 1997	April 11, 1997

APPENDIX N: CONTENT AND VOCABULARY LEARNING ANOVA RESULTS

CONTENT LEARNING RESULTS

Repeated measures ANCOVA results on the Content test: Group, Time, and Group-by-time effects (N = 93)

Effect	df	F (p)
Group (learning)	2, 89	13.32***
Time (attrition)	1, 89	21.58***
Group by time (attrition by group)	2, 89	4.68*

Note: * $p < .05$, ** $p < .01$, ** $p < .001$

Repeated measures ANCOVA results on the Content test: Source of variation by contrast (N = 93)

Source of variation		
Group (learning)	df	F (p)
Contrast 1	1, 89	24.81***
Contrast 2	1, 89	2.30
Time (attrition)		
Contrast 1	1, 89	8.69**
Contrast 2	1, 89	.52

Note: Contrast 1 compares the comparison group to the subtitled conditions, Contrast 2 compares the two subtitled conditions; * $p < .05$, ** $p < .01$, ** $p < .001$

ANCOVA results on the delayed Content test: Source of variation (N = 93)

Source of variation	df	F (p)
Group (maintenance)	2, 89	5.31**
Contrast 1	1, 89	24.81***
Contrast 2	1, 89	2.30

Note: Contrast 1 compares the comparison group to the subtitled conditions, Contrast 2 compares the two subtitled conditions; * $p < .05$, ** $p < .01$, ** $p < .001$

VOCABULARY LEARNING RESULTS

Repeated measures ANCOVA results on the C-Cloze test: Group, Time, and
Group-by-time effects (N = 93)

Effect	df	F (p)
Group (learning)	2, 89	10.27***
Time (attrition)	1, 89	7.36**
Group by time (attrition by group)	2, 89	7.70**

Note: * $p < .05$, ** $p < .01$, ** $p < .001$

Repeated measures ANCOVA results on the C-Cloze test: Source of variation by contrast
(N = 93)

Source of variation		
Group (learning)	df	F (p)
Contrast 1	1, 89	7.47**
Contrast 2	1, 89	13.72***
Time (attrition)		
Contrast 1	1, 89	15.28***
Contrast 2	1, 89	.05

Note: Contrast 1 compares the comparison group to the subtitled conditions,
Contrast 2 compares the two subtitled conditions; * $p < .05$, ** $p < .01$, ** $p < .001$

ANCOVA results on the delayed C-Cloze test: Source of variation (N = 93)

Source of variation	df	F (p)
Group (maintenance)	2, 89	7.69***
Contrast 1	1, 89	-1.29
Contrast 2	1, 89	3.68***

Note: Contrast 1 compares the comparison group to the subtitled conditions,
Contrast 2 compares the two subtitled conditions; * $p < .05$, ** $p < .01$, ** $p < .001$

Repeated measures ANOVA results on the VKS (N = 93)

Source of variation	df	F (p)
Group	90, 2	14.54 ***
Time (learning)	90, 1	190.99 ***
Group by time	90, 2	10.86 ***
Contrast 1	92, 1	-1.21
Contrast 2	92, 1	4.44 ***

Note: $*p < .05$, $** p < .01$, $***p < .001$