

The Role of Rhythm and Intonation in the Silent Reading of French as a Foreign Language

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Three experiments were conducted to investigate the effects on silent reading comprehension (in French as a foreign language) of two methods. The experimental method consisted of reading-training based on a listen/read approach using perceptually enhanced intonation and rhythm. The control method used normal intonation and rhythm. A statistical analysis of the results of silent reading comprehension tests administered upon completion of the experiments consistently indicated the superiority of the experimental method. An overview is also provided, in which evidence from a variety of disciplines is presented as a theoretical basis for the experimental method.

INTRODUCTION

In "Listen and Read" (L/R) methods of teaching reading comprehension (cp. Daly, Neville and Pugh 1975), the reader is provided with a simultaneous auditory counterpart to the written text. The theoretical basis of the L/R method rests heavily on the claim that since initial language experience is wholly oral for the native speaker, the transition to silent reading should be aided by not divorcing the auditory from the visual too soon in the acquisition of reading skills. Moreover, theories and investigations of inner speech in silent reading suggest that such an auditory element continues to be important and necessary even in some forms of skilled reading behaviour.

In the traditional L/R method, the auditory counterpart simply consists of recorded readings, at normal speed, of the texts used in class. What is present in these recordings? Clearly there *is* prosody (= rhythm and intonation), but the prosodic content of the recordings is not made explicit. My hypothesis is that L/R methods can be made more effective in teaching foreign-language reading, by making the prosodic features of the language explicit to the learner/reader, so that they can then internalize those features. In other words, by sensitizing readers to the prosodic system of the language in question, their decoding strategies will improve and this will therefore lead to improved silent reading comprehension.

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SUPPORTIVE EVIDENCE

But first, what contributory support is there, in the relevant literature, for the hypothesis that the acquisition of the prosodic system of a foreign language might enhance silent reading comprehension?

The Role of Short-Term Memory in the Reading Process

One such line of support comes from the important role played by short-term memory in the reading process. For readers to be able to comprehend a text, they must be able to retain long enough in short-term memory the visual information obtained from their fixations (= 'photographs' taken by the eyes as they traverse the line of print), for it is in short-term memory that the black squiggles must somehow be made sense of. In reading, as in speech perception, this making sense of language items depends initially on such items being organized or appropriately chunked in short-term memory (Cromer 1970).

In Miller's historic (1956) paper, the optimal processing unit for short-term memory was estimated to be a chunk containing seven items (± 2). If, in the prosodic system of a language, we interpret an item as being a syllable, then we may infer from Miller's study that the optimal unit in short-term memory is seven syllables (± 2), which we may refer to as a prosodic chunk. It is my contention that the prosodic chunk is a unit that is tailor-made for optimal decoding strategies, due (in particular) to its correspondence in terms of both temporal and information capacity to the constraints of short-term memory, which plays a key role in the initial stages of reading comprehension.

To elaborate - In temporal terms, it takes about 1.5 seconds to utter a seven-syllable string (Craik and Levy 1976). Further, Hitch and Baddeley (1978) refer to a rehearsal loop in silent reading of about 1.5 seconds for speech (generated via inner speech). And according to Jaffe and Feldstein (1979), the average temporal span of a chunk of language (characterized by rhythmic and melodic cues, so here we are talking about a prosodic chunk) is about 1.5 seconds. Finally, drawing on findings concerning errors of anticipation (slips of the tongue, intonation patterning and speech segment durations) and research into speech intelligibility, Nooteboom and Cohen (1975) suggest there is a 'decision unit' for auditory perception of 1.5 seconds, corresponding roughly to seven syllables during reading.

If we put all this information together, we arrive at the following formula:

$$\left. \begin{array}{l} \text{Prosodic chunk} \\ \text{and} \\ \text{temporal and information} \\ \text{capacity of short-term} \\ \text{memory} \end{array} \right\} = 1.5 \text{ seconds/seven syllables}$$

The bulk of this data derives from English and Dutch. I know of no studies concerning the temporal and syllabic dimensions of the French syllabic chunk. However, since all three languages have a common origin, it seems reasonable to assume that the same formula would equally apply to French (and may even be a language universal). The evidence cited above suggests, therefore, that prosody provides the learner with a non-syntactic means of organizing words - whether spoken or written - into optimal chunks for processing in short-term memory.

Syntax - Not the only Organizing Cue in Reading Comprehension

My reason for stressing that prosody provides the reader with a non-syntactic insight into the optimal organization of words for processing in short-term memory is to suppress the popular misconception that syntactic cues *alone* contribute to the perception of optimal decoding units in speech. I allude here to the click experiments of the 1960s, which gave strong support to the importance of such syntactic cues (e.g. Ladefoged and Broadbent 1960; Garrett, Bever and Fodor 1966; Bever, Lackner and Kirk 1969). Many investigations - including Dittman and Llewellyn 1967; and Martin 1970 - subsequently showed that prosody contributed just as much as syntax to the perception of the optimal decoding unit in speech.

Prosody - Its Role in Short-Term Memory Recall, Retention and Recognition

There is also abundant evidence to support the claim that prosodic information aids the recognition, retention and recall of stimuli presented in the auditory mode. Various investigations comparing the effects on short-term memory of normal intonation, as opposed to a monotone or anomalous intonation, support this claim (e.g. O'Connell, Turner and Onuska 1968; Wingfield and Klein 1971; Glanzer 1976). Marslen-Wilson and Tyler (1976) showed in fact that in reading, prosody aided the retention not only of the last chunk of words fixated by the reader, but of the whole preceding sentence. One may infer from this that since visual material entering short-term memory must remain there long enough for it to be semantically integrated, prosodic information actually *contributes* to that integration process by lengthening the life of written words by means of an acoustic image. The reader therefore has more time available for processing the visual input.

In the light of this, some theoretical proposals can be put forward. First, explicitly providing readers with the prosodic patterns of the target language will enable them to *generate* internal prosodic contours (via some form of inner speech, perhaps) which will contribute to the comprehension process in the manner described above, i.e. through better organization/retention of visual input. Second, it is conceivable that some form of inner prosody may even be generated at a purely mental level, without any overt articulation, or muscular/laryngeal activity (Crowder and Morton 1969; Crowder 1972). (While the bulk of the evidence concerning the effects of prosody in short-term memory involves the perception of prosody through the ears, one cannot discount the possibility of such prosodic information having the same beneficial effects via an abstract, covert pathway.)

In short, the acquisition of the prosodic patterns of a target language may lead to the internal generation of such contours. These in turn aid the organisation and retention of visual items in short-term memory via the setting up of an echoic image (an acoustic echo of the written text).

The Role of Prosody in Cognitive Expectancies

I now turn to the level of cognitive expectancies, and will attempt to explain how the acquisition of the target language's prosodic system may facilitate the decoding process at a non-sensory level.

Put briefly, the acquisition of the prosodic characteristics of the language will help to set up organizational expectancies in the reader's long-term memory. The extent to which these organizational expectancies (on any level) match the prosodic characteristics of the target language is a factor determining the efficiency of the reading process. The types of expectancies I refer to are spatio-temporal ones. As already outlined: a) in visual-spatial terms, the reader will have internalized a "feel" for optimal chunking - seven (± 2) syllables; b) in temporal terms, the reader will be guided by an internal "rhythmic clock" which will aid the production of temporally-optimal prosodic chunks (1.5 seconds, stress). The acquisition of the temporal aspects of the target language is particularly important, since it can provide the reader with insights into the manner in which information is most likely to be distributed in stretches of natural language, whether spoken or written. For instance, it has been found for English (Hamill 1976) that the recurrence of stress is linked to the distribution of information along the prosodic contour, i.e. content words tend to be stressed; function words, connectives and affixes tend to be unstressed. This means that rhythmic patterns delimit syntactic choices. Halliday (cited in Kress 1976) refers to an information unit, which is a tone group corresponding approximately to a clause. This ties in with the claim made by various authors (e.g. Wingfield and Klein 1971) that prosody facilitates the resolution of syntax. Prosody therefore aids the comprehension process, since it is an effective organizing principle for - and a clue to - syntactic structure.

It would appear, then, that explicitly-provided knowledge of the rhythmic patterns of French (or any foreign language) will provide the learner with a set of valuable prediction strategies.

Evidence from Developmental Child Psychology - "Motherese"

Further support (although indirect) for the inclusion of explicit prosodic content in a reading program comes from studies of "motherese". This is the name given to the language used by adults generally - and mothers in particular - when speaking to infants, especially in their pre-verbal stages (e.g. Cross 1977; Garnica 1977; Newport, Gleitman and Gleitman 1977). The main features of motherese are the following: repetition, use of a slower speech, short simple phrases and sentences, pauses after phrases, use of high pitch and falsetto, exaggeration of intonation, and emphasis of key words through stress and intonation. The similarities between the cognitive needs of the infant and the beginner-reader are striking:

- Maternal self-repetition, aid the retention of items in short-term memory and provide more processing time (Snow 1972). The beginner-reader also needs more processing time (i.e. a means of retaining for a longer period the information gained in one fixation). This can be done via the internal repetition of the input by means of a prosodic trace.
- The use of short, simple phrases and sentences ensures that the input of parents corresponds to the perceptual and memory limitations of the child (Friedlander 1970). In the same way, the reader must be able to regulate the amount of visual intake so that short-term memory capacities are not overloaded.

- Moreover, the short-term memory input must be chunked appropriately; this can be done if both child and reader internalize the prosodic contours of the language. (It will be recalled that a prosodic contour is equal, in temporal terms, to the optimal chunk for efficient processing in short-term memory.) By emphasizing the prosodic features which envelope sense groups, such chunks can be more easily recognized, analyzed and internalized. Both the reader and the child need such explicit emphasis to acquire an adequate analyzing system.
- Also in Motherese, the use of stress and other intonation devices to emphasize key words aids the retention of words and their meanings in short-term memory. For the beginner-reader, it would seem that stress and intonation also assist in the identification of information-carrying content words.

Evidence from Aphasia Therapy

Further (but again indirect) evidence to support the inclusion of explicit prosodic information in a reading program is found in the literature on aphasia therapy. In very general terms, aphasia results from damage to the language hemisphere, i.e. the left (dominant) hemisphere. It is interesting to note that the symptoms of one particular type of aphasia - Broca's - seem to describe the same types of problem encountered by learners of a foreign language especially in the initial stages. These include non-fluent speech; problems with syntax - speech usually contains major lexical items only; poor comprehension if meaning depends on syntax; speech with impaired or absent prosody; inability to produce at the inner level - i.e. lack of inner speech - the effects of which also carry over into reading; and poor verbal memory span - loss of pertinent syntactic content and retention of lexical items only (Goodglass and Kaplan 1972).

One approach to aphasia therapy places the emphasis on explicit exposure to rhythmic and melodic structures of the aphasic's mother-tongue as a means of restoring the patient's linguistic capacities by activating the dormant linguistic capacities of the *right* (non-dominant) hemisphere, which is the primary processor of melody (Robinson and Solomon 1974). This is called Melodic Intonation Therapy (Sparkes, Helm and Albert 1974; Berlin 1976; Sparks and Holland 1976).

What have aphasics and foreign language learners in common? At the risk of oversimplification, let us say that foreign language learners are 'handicapped' in their attempts to acquire the target language due to the dominance of the already-acquired mother tongue. It is conceivable, therefore, that (as with aphasics) intense exposure to the melodic qualities of the target language diminishes the dominance of the mother tongue. Hence for the foreign language learner, as well as the aphasic, it is contended that melody provides a global means of integrating perception, aids the retention of auditory information, sets up an echoic image, establishes inner speech, and aids the assimilation of the grammatical system. The hypothesis underlying the research described in this article is that all these effects facilitate the reading comprehension process.

METHOD

Subjects

To put this hypothesis to the test, three experiments were therefore conducted, to compare the effects on silent reading comprehension of explicit (perceptually enhanced) and implicit (normal) prosodic input. Subjects were beginner-learners of French as a foreign language:

- Experiment 1: a university group (17+ years of age) who had done two semesters of introductory French (control $n=7$, experimental $n=8$)
- Experiment 2: a university group (17+ years of age) who had done one semester of introductory French (control $n=8$, experimental $n=7$)
- Experiment 3: a Grade 8 class (12-13 years of age) with zero-level French (Control $n=28$, experimental $n=31$)

In experiments 1 and 2, subjects were undergraduates who had assigned themselves to tutorial groups for French language, which happened to be taken by the same tutor. (The tutor's name was not known to the subjects before commencement of the course.) Similarly, the high school subjects (experiment 3) happened to be the Grade 8 classes taken by the same teacher in the same school.

Pre-tests were administered to the subjects in experiments 1 and 2 to ensure that there were no significant differences in the Control and Experimental groups' reading comprehension skills in French at the outset of the experiments. In experiments 1 and 2 these pre-tests were French texts, read silently once only, at the subjects' own speed. Subjects were then required to answer a series of English questions based on each text, with answers to be written in English. This type of test is essentially one of cued recall, and an example is provided in Appendix A. The questions were designed to extract literal information and had to be answered without referring to the text. A score of 'one' was given for each correct answer. Cunningham (1972) argues that verbatim or literal recall is equivalent to substance recall (i.e. is not simply rote recall without understanding), and can therefore be considered a valid indication of comprehension. Analysis of the test results showed that comprehension and reading times for the Control and Experimental groups were not statistically different. No pre-test was necessary for experiment 3, since subjects had zero-level French.

Materials and Design

A variety of 50-80 word French texts were used to teach reading comprehension in the three experiments. The texts were taken from a variety of sources, and suited to the reading proficiency of the subjects. Examples are provided in Appendix B.

For recording of the texts for the Control groups, a (subjectively-assessed) normal reading rate and normal prosodic patterns were used, i.e. a 'lecture scolaire' (as opposed to an expressive intonation). The texts for the Experimental groups were read at a slower than normal rate, with melodic patterns greatly exaggerated, and longer than normal pauses between chunks. The texts were segmented (i.e. pauses inserted) at the same points as in the Control texts. However, for the Experimental texts the first two or three sentences (depending on their length) of each text were segmented into the smallest possible prosodic units at first, and then linked together to form larger chunks

closer to the optimal size where possible, e.g.

Marcel/est le frère/de Denise → Marcel est le frère/de Denise

1 2 3 1 2

These same introductory sections of text, chunked in the manner described above, were then filtered using a SUVAG-LINGUA (a complex series of electronic filters) so that only the prosodic information was retained. (i.e. No phonetic information remained.) A sequence was composed consisting of (i) a non-filtered chunk, (ii) the same chunk, filtered, followed by (iii) a pause for repetition equal to about 2.5 times the immediately-preceding chunk. This recording was then added on to the complete experimental reading.

Procedure

Groups in Experiment 1 were involved in reading sessions over a period of 12 weeks, during which 15 x 20-minute sessions were completed. Groups in Experiment 2 were involved in sessions over a period of 10 weeks, during which 13 x 10-minute sessions were completed. Groups in Experiment 3 were involved in reading sessions over a period of 15 weeks, during which 12 x 10-minute sessions were completed. The following procedures were employed:

Experimental Groups

1. Listened to tape while reading silently
2. Listened to tape while reading aloud
- 3.1 Listened to non-filtered chunk
- 3.2 Listened to filtered chunk
- 3.3 Pauses, during which subjects hummed as often as possible the non-filtered chunk

} first two
or three
sentences
of each
text

Control Groups

1. Listened to tape while reading silently
2. Listened to tape while reading aloud
3. Listened to and read aloud the same 2-3 sentences used in 3.1 of the Experimental group's sequence.

In the Experimental procedure, the normal rhythmic structure of the text (i.e. the regular recurrence of stress) was maintained, despite the exaggerated pauses, by having subjects engage in either mental or choral repetition of the chunk that had just preceded a pause.

On conclusion of each session, subjects in both groups gave oral answers to questions that required literal information from the text just read. These same questions had been perused before the beginning of each session, as well as before sequence 3 for both groups. In addition, any unfamiliar vocabulary items were explained (in French or English) before each session.

Post-Testing and Scoring Procedure

On conclusion of Experiment 1, subjects were given a cued recall reading comprehension test, as at the pre-testing stage.

For experiments 2 and 3, it was decided to use uncued recall as the test of reading comprehension, because this procedure was considered a more stringent measure of silent reading ability (Fraik and Tulving 1975). Reading comprehension was therefore tested by giving each group of subjects a French text (see Appendix B) to read silently, once only, at their own speed. They were then required to recall in written English, as much as possible and as coherently as possible, what they had read - using complete sentences and without referring to the original text. (English was used because what was being tested was subjects' comprehension, not their ability to reformulate the meaning of the text in the French language.) Scores were made of all literal information, non-contradictory and contradictory inferences, as well as reading times.

Since subjects in experiments 2 and 3 were required to recall the text as coherently as possible, using only complete sentences, only such sentences were accepted for scoring. An analysis of the subjects' uncued recalls was made based on the following two categories:

- (i) literal and paraphrased information and non-contradictory inferences i.e. inferences which were compatible with the text;
- (ii) contradictory inferences or incompatible information.

The unit chosen for analysis of recall performance was similar to the measure used by Stein and Glenn (1979) for the analysis of the comprehension and recall of stories by elementary school children. This unit is based on the semantic content of a base level grammatical unit, the proposition which "roughly corresponds to a simple sentence" (Stein and Glenn 1979: 55).

In the present investigation, propositions consisted of a variety of base level grammatical units such as the following:

- *Subject + Verb*
- *Subject + Verb + Indirect Object*
- *Subject + Verb + Direct Object*
- *Subject + Verb + Indirect Object + Direct Object (or vice versa)*
- *Subject + BE + ...*
- *Subject + Verb + Verb*

(Embedded sentences were scored separately and in the same manner as non-embedded sentences.) Each of these units was assigned a value of 'one', under category (i). In order to allow for a more detailed analysis of the protocols, a number of smaller grammatical units were assigned to this category, with a value of 'one' as well. These included:

- prepositional phrase

- conjunction (other than 'and' implying temporal co-existence or sequence)
- adverb
- adjective

A range of values was also allowed for people and places, depending on the degree of detail, for example:

- Madam Desgranges = 3
- Madame = 2
- Une femme = 1

In cases where a subject, object, preposition, conjunction, adverb or adjective was associated with an otherwise acceptable proposition (e.g. a confusion between two female protagonists, an incorrect preposition relating to place such as 'under' instead of 'behind') and so on, a value of 'one' under category (ii) was assigned to that incorrect part of the text, but a 'one' under (i) was still assigned to the proposition associated with it, if the coherence of the text was not greatly distorted.

Because this method of scoring the protocols allows for literal and paraphrased recall and non-contradictory as well as contradictory inferences, it measures not only the explicitly-given propositions, but the implicit logical inter-relationships among propositions which naturally arise out of the subjects' processing of text. This method can also be justified in terms of the theory of depth of processing expounded by Craik and Tulving (1975). Implicit in their theory is the notion that the quantity of discourse retrieved from long-term memory can be taken as a valid indication of the depth or quality of the comprehension. Moreover, discourse retrieved *uncued* from long-term memory as opposed to *cued* retrieval indicates that deeper processing (or comprehension) of the discourse has occurred. It can further be argued that uncued recall does not allow any possible retrieval difficulties to be by-passed, as could occur with cued recall.

RESULTS AND DISCUSSION

Data was analysed using simple t-tests. In Experiment 1, comprehension was found to be superior for the university Experimental group at the .05 level of significance ($t = 2.20 > 1.77$). Reading times did not differ ($t = 1.54 < 1.77$). Degrees of freedom were: Experiment 1 = 13, Experiment 2 = 13, Experiment 3 = 57.

Comprehension was also found to be superior for the university Experimental group in Experiment 2, at the .05 level of significance (post-test 1 : $t = 2.00 > 1.77$; post-test 2* : $t = 1.92 > 1.77$). There was no difference in the amount of contradictory information recalled in post-test 1 ($t = 1.29 < 1.77$, $\alpha = .05$); but in post-test 2, the Control group recalled significantly more contradictory information ($t = 1.52 > 1.35$, $\alpha = .1$). Reading times did not differ (post-test 1 : $t = .68 < 1.77$ $\alpha = .05$; post-test 2 : $t = .98 < 1.77$, $\alpha = .05$).

*Two post-tests were administered in Experiment 2. Also, because the pre-test (cued recall) was different to the post-test (uncued recall), analysis of co-variance was carried out on the pre- and post-test scores. This showed that the experimental treatment was effective even after correction for the effect of the pre-scores on the post-scores.

In Experiment 3, comprehension was found to be superior, too, for the high school Experimental group, at the .001 level of significance ($t = 3.34 > 3.26$). There were no differences in the contradictory scores ($t = .73 < 1.30$, $\alpha = .05$) or reading times ($t = .81 < 1.30$, $\alpha = .05$).

However, one indisputable weakness of the scoring procedure is the fact that it does not account for the possible difference in the information value of each sentence and its parts. An attempt was therefore made to complement the statistical measure, by carrying out a less rigid, more qualitative analysis of the protocols. This was possible only for Experiments 2 and 3.

Analysis of subjects' protocols arising from Experiment 2 showed that although there was no difference in recall for the first part of the texts, the Control group generally failed to recall information from the middle and latter parts of the texts. On the whole, recall of the Control group was impaired as sentences became longer; and information contained in embedded sentences, for example, tended not to be recalled. The Experimental group displayed a tendency towards a superior recall of specific details (e.g. adjectives) which were not superfluous but which were crucial to the coherence and development of the text.

In general the Control group in Experiment 3 failed to impose any coherent structure or organization on the text, and were merely able to recall isolated parts of the text. No attempt was made to semantically integrate these parts. For the majority of the control subjects, recall was limited to unstructured lists of vocabulary items. The Experimental group, on the other hand, were able to recall the text in meaningful, coherent sentences. Further, the Control group were not able to recall any information beyond the first part of the text, while the Experimental group displayed superior recall of details which contributed to the logical sequence of events.

The protocols for Experiments 2 and 3 are currently being analysed according to a macrostructure analysis based on the work of Stanley (1984) and Zuck and Zuck (1984).

PEDAGOGIC IMPLICATIONS

These findings have provided evidence for the existence of an important sub-skill in silent reading - the ability to impose an appropriate intonation and rhythmic structure on a visual text. Together these provide a useful cue to how a text should be chunked, which is a pre-requisite for efficient reading. Intonation and rhythm may also provide readers with the means for creating an acoustic image of the text as they read it (through subvocal speech, perhaps), which facilitates the holding of text in short-term memory so that it can be processed.

What is significant is that the findings strongly suggest that this subskill can be explicitly taught and should be incorporated into existing reading methods. The findings also give justification for sensitizing learners of a foreign language to the supra-segmental system of the target language from the outset. Traditionally, foreign language teaching has been concerned more with the individual sounds of a language, at the expense of intonation and rhythm, which can become powerful organising tools for the reading as well as the listening process.

Because few teachers are likely to have access to a SUVAG-LINGUA, a number of less sophisticated 'common sense' but equally valuable suggestions are provided below as to how existing materials and resources can be utilised in the teaching of this reading subskill:

1. Students could be trained to listen for the intonation, rhythm and pausing in normal recordings of texts, and could then mark the chunks on the corresponding version.
2. Teachers could read texts out aloud emphasising the intonation, rhythm and pausing and have students repeat chunks of text by *humming* them several times and then moving on to the next chunk.
3. *Pacing* (in a circle or across the room) while reading a text can help the students acquire a 'feel' for the rhythm of the language.
4. Reading material could be recorded as described in the Experimental procedure, with the use of *humming* to focus on the intonation and rhythm. Texts recorded in this manner could then be used by students in class with teachers, on their own at home, or in language laboratories.

APPENDIX A

Example of Cued Recall Test (Experiment 1)

La fille non-mariée de 25 ans - une tragédie?

Pour Danielle, ce mois de novembre est un mauvais moment à passer. Pourquoi? Elle n'est pas malade. Elle a un petit appartement qu'elle adore arranger elle-même. Elle fait du bon travail ; son employeur est content d'elle. Alors quel problème peut-elle avoir?

Danielle a vingt-cinq ans. Elle est blonde ; elle a les yeux bleus ; elle est assez jolie. Mais elle a vingt-cinq ans et elle n'est pas mariée.

Le 25 novembre, c'est la fête de la Sainte-Catherine. Sainte Catherine est la patronne jeunes filles, et dans toute la France, les filles qui ont vingt-cinq ans et qui ne sont pas mariées portent, ce jour-là, un beau chapeau spécial. La légende dit que celles qui portent un de ces chapeaux trouveront un mari dans l'année à venir.

Cette fois, c'est Danielle qui est la "catherinette" dans son bureau. On va lui faire un beau chapeau. Il y aura du champagne et on dansera. Les gens avec qui elle travaille lui feront des compliments ce jour-là. Elle sait déjà ce qu'ils diront : tu es si gentille, et tu n'es pas encore mariée ; espérons que tu trouveras bientôt un mari.

Est-ce un si grand crime de ne pas avoir de mari à vingt-cinq ans? se demande Danielle. Est-ce que la société a raison de me dire "Attention, mademoiselle, vous avez vingt-cinq ans! Dépêchez-vous donc si vous ne voulez pas être vieille fille." Mais vingt-cinq ans, ce n'est pas vieux. J'ai tout l'avenir devant moi! Les garçons ont de la chance... on les laisse tranquilles. Ils peuvent se marier à trente ans s'ils veulent, ou à quarante, ou pas du tout.

Danielle a raison. "Coiffer la Sainte-Catherine" (porter le chapeau spécial qui veut qu'elle a vingt-cinq ans sans être mariée) n'est plus une tragédie dans la vie d'une jeune fille, car le mariage n'est plus aujourd'hui sa seule possibilité. Les jeunes filles reçoivent une bonne éducation ; elles travaillent avec les hommes, et elles ont souvent les mêmes responsabilités que les hommes. Beaucoup de jeunes femmes ne veulent pas se marier trop jeunes. Elles préfèrent connaître, au moins pendant quelques années, la vie indépendante, avec ses bons et ses mauvais côtés.

Et puis, quand elles voudront se marier, elles auront un avantage certain : dans la partie de la population française en âge de se marier, il y a plus de garçons que de filles!

1. Who is Saint Catherine?
2. Who wears the special hat at the party on St Catherine's feast day?
3. According to legend, what is supposed to happen to the girls who wear the special hat?
4. Why is Danielle happy with her life?
5. Is Danielle happy to be the "catherinette" in her office?
6. What will the people working in Danielle's office do on the 25th of November?
7. Why doesn't Danielle want to marry yet?
8. When she does get married, what advantage will she have?

APPENDIX B

Examples of texts used in reading training

La famille française

La société, en France, est basée sur la notion de "famille". Au sens large du mot, cette notion comprend tous les parents du même sang ou par alliance : frères, soeurs, beaux-frères, belles-soeurs, oncles, tantes, cousins et cousines, neveux et nièces, etc. qui se réunissent encore de temps en temps, surtout en province, pour les fêtes de famille : baptêmes, premières communions, mariages, anniversaires, et aussi, hélas, pour les enterrements. (Experiments 1 and 2)

The elephant's revenge

Tous les jours un éléphant va boire dans la petite rivière qui coule à côté du cirque où il travaille. Sur la route il passe toujours devant la boutique d'un tailleur qui lui donne chaque fois un biscuit.

Un jour il tend sa trompe pour recevoir son biscuit, mais le tailleur, pour s'amuser, la pique avec son aiguille.

L'éléphant, très en colère, court à la rivière et remplit d'eau sa trompe. Puis il retourne à la boutique du tailleur et lui lance au visage toute l'eau qu'il garde dans sa trompe. (Experiment 3)

APPENDIX C

Examples of uncued recall tests

The Crafty Well-Digger*

Il fait très beau et il fait très chaud. Un ouvrier est en train de creuser un puits. Il a déjà atteint une profondeur d'environ six mètres quand, pendant qu'il est assis au bord du trou à prendre quelques instants de repos, une grande partie du puits s'écroule. Il regarde avec précaution autour de lui, et voyant que personne ne l'observe, il prend sa veste et son chapeau et les place sur le bord du puits. Enfin il se cache derrière un arbre et attend l'arrivée de quelqu'un.

Peu de temps après des passants découvrent que le puits s'est écroulé et, remarquant la veste et le chapeau au bord du trou, ils imaginent que l'ouvrier doit se trouver au fond. Ils se mettent immédiatement au travail et en très peu de temps enlèvent toute la terre écroulée. Au moment où ils viennent d'arriver au fond du puits et sont en train de se demander où est l'homme mort, l'ouvrier apparaît et les remercie de lui avoir épargné une si lourde tâche. (Experiment 2)

Le Petit Déjeuner*

Chaque matin Claudette entre dans la cuisine. Elle entre dans la cuisine où Madame Marsaud prépare le petit déjeuner. Madame Marsaud pose une nappe sur la table. Sur la nappe elle pose des assiettes et des croissants. Claudette regarde les croissants. Elle aime beaucoup les croissants. Madame Marsaud prépare le café. Il y a une tasse de café pour Claudette. Elle aime le café. Claudette regarde la pendule. Bon, elle est à l'heure. Elle cherche des livres. Ils sont sur le buffet dans la salle à manger. Enfin, elle trouve les livres, et elle quitte la maison. (Experiment 3)

* Titles were either in French or English depending on the source of the test.

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