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MUSICAL APTITUDE AND THE ABILITY TO LEARN
FRENCH AS A FOREIGN LANGUAGE

A Thesis

By

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Musical Aptitude and the Ability to Learn
French as a Foreign Language

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ABSTRACT

Problem

This research is directed towards the investigation of a possible relationship between musical aptitude and the ability to learn French as a foreign language, at the elementary school level.

Its purpose is to know whether success in music will predict success in French, whether it is worthwhile to teach a foreign language to children weak in music, or whether it would not be more advisable to develop a program of training in music to precede foreign language instructions.

Hypotheses

1. Of two groups of American elementary school children, matched for intelligence and motivation, but with significant differences in music scores, the one with the higher score in music, will have a higher achievement score in French.

2. The correlation between music scores and French achievement scores with intelligence and motivation scores being partialled out, will be high and positive.

Experiment

28 children, ranging in age between 7 to 9 were selected from the second and third elementary grades of the American Community

School in Beirut. They were given a music test and then divided into two musical ability groups, matched for motivation and intelligence. The two groups were given French achievement tests in vocabulary, comprehension and intonation, their results were compared. In addition, music scores and French achievement scores were correlated.

Results

A "t" test for small samples was used to measure the significance of the difference between the main scores obtained by the groups on the various tests of achievement in French.

In vocabulary, $t = 4.13$, which is significant, for 26 degrees of freedom, at the 1% level. In the comprehension test, $t = 3.40$, which is significant, for 25 degrees of freedom, at the 1% level.

The intonation test was not found to be reliable.

As to the degree of relationship between musical aptitude and achievement, a correlation of $r = .60$ was found between music scores and vocabulary, and a correlation of $r = .55$ was found between music scores and comprehension. Those correlations are both significant at the 5% level.

Discussion

The finding that the relation between achievement in French and musical aptitude is not null, indicates that there is some re-

lationship between them, at the elementary school level.

However, to explain the high correlations obtained, motivation and French scores were re-examined. It was felt that with a better control of motivation, and with a carefully standardized test in French, the partial correlations between motivation and French and between I.Q. and French would have been higher than they were found, would thus have reduced the correlation between music and French and led to a more conservative estimate of it.

Yet the differences found between the mean French achievement scores of the two ability groups in music suggest that perhaps music plays a more significant role in the acquisition of French, at the elementary level as contrasted with the college level.

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CHAPTER I
INTRODUCTION

Bilingualism in contemporary curricula is not new, as traditional schools had emphasized the study of classical languages, namely Latin and Greek. However, as it appears in modern literature of education, bilingualism refers to the ability to use a language other than one's mother tongue for communication, whether written or oral. Hence the emphasis on modern living languages.

This has raised the problem of how best to teach foreign languages, should it be through the traditional approach of text reading and translation into the mother tongue, or should it be through a direct aural-oral approach. But little attention has been paid to the question of building the auditory readiness of the child before engaging him in the experience of foreign language study.

Prompted by the need to build such readiness in the child, psychologists sought to identify relevant factors. Among other things, they have attempted to identify a relationship between musical aptitude and the ability to study a foreign language. But the researches carried were not thorough and perhaps lacked clarity. There is still need therefore for further investigation, in the hope that any further clarification of the relationship between musical aptitude and bilingualism might suggest new ways for more effective

methods of teaching foreign languages.

But before we state the problem of this research in more specific terms, it may be important to discuss the meaning of bilingualism and some of the outstanding views on its desirability in school curricula.

Background

Students of bilingualism seem to isolate two important variables in the study of linguistic development, the relation of language and thought, and the cultural context of the language.

According to Merleau Ponty for instance, word and thought are wrapped in each other, the meaning being found in the word, and the word being the external manifestation of the meaning.¹ Moreover, language is an institution, a social phenomenon. It is affected by culture and cannot be changed or distorted by individuals without provoking reactions. This explains its conventional character, the value of a linguistic sign results from the agreement established, by speaking subjects, between the meaning and the idea.² This is illustrated by the universally shared opinion that, "as we think so we speak, as we speak so we think". Perhaps, to understand a language and be able to use it in its pure form, we may have therefore to learn

1. A. Cuvillier. "Précis de philosophie". Le Langage et les Signes. Ch. XV. p.325

2. Ibid., p.332

about the culture where it is normally used as the medium of communication. In this sense, bilingualism refers not only to two patterns of "linguistic habits", but also to distinct patterns of "cultural habits", in all of their anthropological meaning; and the problem now becomes one of "biculturalism".¹

In that case, there are degrees of bilingualism. We may speak of "linguistic accents" due to various forms of interference between the patterned habits of the mother tongue and those of the second language, with results of distortion, substitution, omission of speech sounds, or grammatical structure or both".

We may also speak of "cultural accents which are the result of conflicting patterns persistently interfering with each other and resulting in any number of substitutions. Detected throughout the daily routine activities they can be perceived in non-verbal expressions of emotion as well as in the value system of the individual under consideration".

On the basis of the two concepts developed above, it may be possible to distinguish four types of situations:

- 1) bicultural - bilingual
- 2) bicultural - monolingual
- 3) monocultural - bilingual
- 4) monocultural - monolingual

1. James P. Soffiatti. "Bilingualism and Biculturalism", Modern Language Journal. Vol. 44; 1960, p.275

In the first situation, the person is considered as true bilingual. He participates in two cultures, a child of immigrant parents for example who, at home, continue to speak the native tongue and maintain most of the customs, beliefs, and value patterns.

The second case is represented by the child of immigrant parents who have given up speaking their native tongue, or whose native language happens to be identical with the indigeneous language, but who have not given up their native customs or value patterns.

The third instance is that of a child who participates in one culture, but who has learned to use a second language, either in school or at home. We find here no linguistic and cultural conflicts.¹

In view of the intimate connection between word and thought and the influence of cultural habits on thought and speech, some thinkers emphasized the inhibiting interferences which may result from the simultaneous study of two languages and thus advised against bilingualism. The nature of such interferences is summed up by Father Selim Abou, Jesuit Anthropologist, in the statement that as true bilingualism is the simultaneous exposure to two languages, it may result in a number of linguistic, psychological and sociological interferences, likely to cause a conflict of language and hence of personality.²

In specifying the nature of linguistic and psychological interferences, Dr. Kamal el-Haje considers that bilingualism may be

1. Ibid.,

2. Selim Abou: "Le Bilinguisme Arabe - Français au Liban". P.U.F. Introduction: pp.12-13.

a source of inferiority feelings and of impoverishment in thought. Bilingualism, he states, gives the child a double intelligence rather than expand it or develop it. Languages when studied simultaneously tend to be mutually inhibiting within the mind, for they derive from two different modalities of thought. Thus the law of verbal interference demonstrates how languages clash with one another handicapping the progress of thought, and resulting in a poor command of any of them likely to cause inferiority feelings. For this reason Dr. El-Haje opposes the teaching of a foreign language especially in early childhood.

However, Dr. El-Haje distinguishes between two kinds of thought, superficial thought and ultimate thought. To the superficial type, that is thought through which we express our practical needs or scientific ideas, corresponds the practical or intellectual bilingualism "le bilinguisme pratique et culturel" as he calls it, or even biglottism; and to the second type of ultimate thought, that through which we express our spiritual needs, such as poetry, corresponds true bilingualism or "le bilinguisme integral ou categorique, le bilinguisme proprement dit".

He suggests that once the child has mastered the mother tongue, he can or even perhaps should be exposed to the first type of bilingualism, because it would now enrich the mind and is economically and socially useful. It also safeguards from narrow and primitive nationalism. The second type of bilingualism is impossible of

realization, he thinks, and should be entirely rejected.¹

If we trust however, that intelligence tests, involving verbal performance, measure the kind of mental development understood by Dr. El-Haje, it would seem that his views are not without some exaggeration.

Pintner, for instance, in 1922-1923, carried a research on the mental development of a group of bilinguals living in Youngstown, Ohio and New York City in the United States of America through the administration of a battery of non-verbal performance tests, and found that there was no significant difference between the scores of monolinguals and bilinguals.²

These findings have since been confirmed by many investigators testing groups of American Chinese (1926), Jews and Italians (1937), Italians and Puerto Ricans (Darcy 1946-1952).³

This may therefore indicate that exposure to bilingualism does not necessarily handicap general mental development as the position of Dr. El-Haje may appear to suggest.

However, other types of disorders have been identified in children exposed to two languages before either one was adequately mastered. It would seem therefore that the age at which exposure to true bilingualism occurs is an important variable. This is

1. Kamal El-Haje. "Le bilinguisme est-il possible?" Conférences du Cenacle, Beyrouth. Ve année, No.7-8, Oct. 1951, pp.191-213.

2. Einar Haugen: "Bilingualism in the Americas". A bibliography and research guide (University of Alabama Press) 1956, p.81.

3. Ibid.,

further confirmed by a study carried by Einar Haugen on the verbal development of pupils who were introduced to a new language after infancy.

On the basis of intelligence tests involving verbal performances, Haugen noted a linguistic retardation in pupils introduced in the post - infant period to the language of the test, as compared with children introduced to it in infancy.

It would seem that individual differences in language command result among other things from differences in the age of learning. Haugen is thus led to argue that maladjustments of personality or linguistic confusion associated with bilingualism do not seem to be related to bilingualism absolutely, but to the conditions under which exposure to bilingualism occurs.

Next to the age of learning, Haugen mentions motivation as one of the primary variables in the study of languages. Differing motivations for the use of the language, he argues, lead to differences in learning reinforcement among bilinguals.

Haugen and others like him advocate bilingualism, recommending it to be introduced in infancy with the proper motivating climate. Allegations of verbal interference and personality disturbances are not serious enough, he believes, to cause any permanent prejudice to the learning of a foreign language if properly introduced.

To Haugen, exposure to bilingualism would be properly realized when bilingualism is introduced in infancy and/or when it is

associated with strong motives to use the additional language.¹

To this list, other writers add a number of conditions which they believe may build a better readiness for the study of foreign languages. Those conditions relate to the auditory factors involved in the learning of spoken language. This in turn suggested the possibility of a relationship between aptitude in music and the ability to learn a foreign language. A number of researches, however few, have been conducted to this effect.

1. Ibid.,

RESEARCH ON MUSICAL APTITUDE
AND
THE STUDY OF A FOREIGN LANGUAGE

In 1934, Dexter and other researchers tried to investigate the possibility of a relationship between the ability to discriminate pitch and the ability to learn to pronounce a foreign language.

She gave the Seashore Pitch discrimination test to 90 students in a girls high school and to 425 students in another high schools. Also instructors secured accent ratings. The results of this study showed a correlation between accent ratings and pitch discrimination ability of about $r = .639$. The mean correlation between intelligence (Henmon-Nelson Test of Mental Ability) and accent rating was $r = .592$. The correlation between intelligence and pitch discrimination was $r = .197$.

To determine whether intelligence or pitch discrimination was the more important factor, Dexter constituted two groups of 15 students each. Group 1 was composed of senior pupils who as freshmen had failed French after one year of study or less. The Median IQ for this group was 109. Group 2 consisted of senior students with an IQ of 109 or less but who had completed two years of French with success. Their Median IQ of 103 was inferior to the Median IQ of the first group. The results showed that in spite of its lower IQ Median, the second group had in accent rating a median of 84 while the first group had only a Median of 70. This seems to confirm Dexter's hypo-

thesis that pitch discrimination is more important than IQ in the ability to learn accent. She concluded that comparatively low IQ accompanied by good pitch discrimination seems to result in reasonably successful work in French; whereas correspondingly low intelligence accompanied by low ability to discriminate pitch leads to failure in French.¹

In another study, Primsleur and Stockwell aimed at reviewing the experimental literature pertaining to the factors within a student helping or hindering him in learning a foreign language. They carried a study on 202 students in their second semester of French in college, in terms of a number of variables including intelligence, verbal ability, pitch discrimination (they used the Seashore Pitch discrimination subtest), order of language study and bilingualism, study habits, motivation and attitudes (through a rating-scale and a questionnaire on interest), and personality factors. To measure achievement in French, they used the Cooperation French Test, the Pictorial Auditory Comprehension Test and Oral proficiency ratings. The only significant correlation they found between musical aptitude and achievement in French amounts to $r = .126$ between the Seashore Pitch Test and the Pictorial Auditory Comprehension Test, while between motivation and achievement in French, they found a total correlation of .40, and between verbal intelligence and achievement in French, a correlation of .45.

1. E.S. Dexter. "Pitch Discrimination and French Accent on the High School level". *Journal of Applied Psychology*. Vol. XVIII (1934) p.720

Thus, in their conclusion, they share Lambert's opinion,¹ that achievement in foreign language is mainly influenced by two important factors: Verbal intelligence and motivation. Yet they add that pitch discrimination plays a significant role.

However they indicate that a shortcoming in this study lies in the fact that mainly college students and adults were considered as subjects. Hence the difficulty of applying at lower levels the results obtained, where a wider range of intelligence and different motivational problems exist.²

In a study carried by Fenner, on the relationship between pitch discrimination and achievement in French, it was found that the correlation between the Seashore pitch scores and French reading ability was $r = .27$. This reinforces the hypothesis that there is possibly some advantage in pursuing research on the relationship between musical aptitude and the study of a foreign language.³

Also, developments in foreign language teaching, as a result of the adoption of audio-lingual methods seemed to further the interest of psychologists in the study of bilingualism as related to sound factors. Unlike traditional "grammar - translation", audio-

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1. Wallace E. Lambert. "Psychological Approaches to the Study of Languages", Part II. On Second-Language Learning and Bilingualism. *Modern Language Journal*. Vol. 47. March 1963. p.114
 2. Paul Primsleur, Ludwig Molsberg, Andrew L. Morrison: "Student Factors in Foreign Language Learning". *Modern Language Journal*. Vol. 46, 1962, pp.160-170
 3. Rest Fenner Jr. unpublished dissertation (Syracuse University 1955) in Auditory Factors and the Acquisition of French Language Mastery. *Modern Language Journal*. March 1964.

lingual methods imply a more thorough understanding of the auditory requisite for success in language learning.

Consequently, Leutenegger and his associates sought to investigate some of the questions pertaining to these new methods of teaching, for the purpose of finding which of the basic factors of sound seem most highly related to the learning of a foreign language.

His research concentrated on the study of the factors involved in the learning of the French and Spanish languages by subjects whose native tongue is English. To Leutenegger, the difference between English and French rhythm for instance is mainly due to such factors as pitch, loudness and duration. He also indicates that the perception of certain timbre differences, which are non distinctive in spoken English, is necessary for unfamiliar French vowel sounds. To approximate the aural habits of native Frenchmen, it is necessary for English speaking subjects to "perceive and produce minute sound differences, particularly slight pitch variations, both within phrase and within syllables".

Leutenegger assumes that "someone deficient in these auditory skills would have greater difficulty in mastering spoken French". If this proved to be the case, it would seem reasonable to believe that knowledge of the degree of proficiency in these auditory skills would help to predict the ease or difficulty of French language acquisition.

Conversely, it would seem reasonable that significant changes would be produced on the Seashore subtests over a semester's duration

during which French was studied by audio-lingual techniques. In other words, training in sound perception and the study of a foreign language by audio-lingual technique, according to Leutenegger may be mutually reinforcing.

With this assumption in mind, Leutenegger attempted to investigate:

1. Whether it will be possible on the basis of auditory scores as measured by the Seashore Test of Musical Talent, with intelligence and aptitude scores as measured by the Florida Orientation Test Battery, to predict relative success in the mastery of the French language.
2. Whether there is a significant improvement on the Seashore auditory measures, after the completion of a semester study of French.
3. Whether there is a significant difference between students studying French and those studying Spanish on the factors mentioned above. That is will the Seashore measures better predict success in French as compared with success in Spanish; and will there be a greater improvement on Seashore results after the completion of a semester of French as compared with a semester study of Spanish.

The experiment was carried on all students enrolled in a French course given at the University of Florida, totalling 460.

Auditory scores were obtained twice through the Seashore test, once at the beginning of the semester and once at the end, and included: 1) Pitch, 2) Loudness, 3) Rhythm, 4) Time, 5) Timbre and

6) Tonal Memory.

Verbal intelligence scores including vocabulary, comprehension, reading rate and English expression were obtained through the University of Florida Orientation Test Battery and the Educational Testing Service English Expression Test.

The subjects were given daily taped drill periods on given aspects of structure in French. Soon after the drill period, those students heard several sentences and were asked to indicate for each one whether or not the structure previously drilled was used in that sentence.

The analysis of the results through the analysis of variance and correlation techniques revealed the following:

1. That there is no powerful relationship between Seashore subtests and foreign language achievement scores, whether in Spanish or French.
2. That only did the tonal memory of females studying French emerge as a significant variable as correlated with achievement in French.
3. That there are no significant changes on any of the Seashore subtests after the completion of the foreign language training period.¹

Yet, the fact that Tonal Memory appears to be a predictive factor suggests conclusions similar to those of John Carroll's advocating "Phonetic Coding" as a "required ability in learning a

1. Ralph R. Leutenegger, Theodore H. Mueller and Irving R. Wershow: "Auditory Factors in Foreign Language Acquisition". The Modern Language Journal. Jan. 1965. Vol. XLIX. No.1, pp.22-31

foreign language, for, it would seem that Tonal Memory is basic to recognition, identification and remembrance over something longer than a few seconds."¹

The author concludes his study saying that his findings along with other laboratory observations tend to lend support to Primsleur's statement that non-intellectual characteristics, notably motivation as well as the personality of the student and the characteristics of the teacher are perhaps the most significant factors in foreign language study.²

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1. John Carroll, "The Prediction of Success in Intensive Foreign Language Training" in Robert Glaser (editor) Training Research and Education, University of Pittsburgh Press, 1962.
 2. Paul Primsleur, Stockwell and A.L. Comrey. "Foreign Language Learning Ability", Journal of Educational Psychology, Vol. LIII, No. 1 (February 1962), p.26

PROBLEM

General Considerations

Although previous experiments did not reveal strong correlations between musical aptitude and the ability to study a foreign language, a number of psychologists are still convinced of the fruitfulness of this approach and of the need for a more thorough investigation of the possibility of a relationship between those two variables.

Should there be a definite positive correlation between them, the task of teaching foreign language may be greatly facilitated.

Besides, some authors suggested that previous studies had neglected to extend research to younger ages levels and that there is need to investigate the relationship between musical aptitude and bilingualism at the elementary school level where a wider range of intelligence and different motivational problems exist.

Definition of Problem

This study is in fact directed toward the investigation of the relationship between musical aptitude and the ability to learn a foreign language in younger children, ranging in age, between seven and nine.

Its purpose is to know whether success in music will predict

success in foreign languages, whether it is worthwhile to teach a foreign language to children weak in music, or whether it would not be more advisable to develop a program of training in music to precede foreign language instruction.

For comparative reasons, the sample to be used in this study will include American children studying French.

Hypotheses

The relationship between musical aptitude and achievement in French at the elementary level, will be examined in terms of the following hypothesis.

In a sample of American elementary school children controlled for intelligence and motivation, achievement in French as a foreign language is a function of musical aptitude.

This hypothesis will be examined in terms of the following sub-hypotheses:

1. Of two groups matched for intelligence and motivation, but with significant differences in music scores, the one with the higher score in music, will have a higher achievement score in French.
2. The correlation between music scores and French achievement scores with intelligence and motivation scores being partialled out, will be high and positive.

Further analysis will center around knowing whether music scores could be used to predict success in particular areas in French.

This is to be tested by examining to what extent achievers in particular aspects of French can be differentiated from non-achievers on the basis of their music score. Three different areas are to be studied in relation to music, French vocabulary, French comprehension, and French intonation.

Other studies analyzed the relationship between partial music scores and partial French achievement scores. But in this study, this aspect will have to be overlooked, because of the lack of a suitable music test in Lebanon.

CHAPTER II

EXPERIMENT

Subjects

The study was carried out on a group of elementary school children of the second and third grades, who were made available for testing through the courtesy of the American Community School in Beirut. Only beginner students were selected. They are all citizens of the United States of America. These pupils come from families of high and middle socio-economic status, with well educated parents, speaking mainly English.

Most of the subjects are children of professors at the American University of Beirut, the rest of them have fathers holding high administrative jobs with the American Embassy in Beirut, or with large business companies.

The age of the children ranges between 7 and 9 years. The total number of subjects is 28.

Controls

In addition to age, other variables were controlled.

- Intellectual ability. The Davis Eells Test, Primary A for grade 2 was administered to 16 second graders. The Kuhlmann - Anderson Test CD, seventh edition was administered to twelve third graders. Then, the raw scores of the latter were easily converted into Davis-Eells

scores, since the standard deviation and the mean are the same for both tests: $\sigma = 16$, and the Mean = 100.

Raw scores on intelligence tests may be seen in the following table:

TABLE I

RAW SCORES OF SECOND AND THIRD GRADERS ON DAVIS EELLS TEST OF PROBLEM-SOLVING ABILITY

<u>SUBJECTS*</u>	<u>I.Q. SCORES</u>
1	50
2	49
3	46
4	39
5	38
6	37
7	37
8	37
9	37
10	36
11	36
12	36
13	35
14	35
15	35
16	33
17	32
18	31
19	31
20	31
21	31
22	30
23	29
24	29
25	27
26	26
27	26
28	25

N = 28

* The numbers stand for the subjects' names.

To control the subjects' exposure to either French or Music outside school, a questionnaire through pictures was distributed to them, asking each child if at home he likes to listen to his radio, his record player or his tape recorder; if he likes to sing or to dance, outside school sessions; if he plays the piano, the violon or another musical instrument. Besides, each child was to answer to other pictures related to French such as: does your father, your mother, grand-father, grand-mother, the maid or the neighbors speak French?

The children reported an equal interest in listening to music. A few liked to sing or play an instrument. Two children who reported piano playing belonged to the lower group in music, while four reporting either singing or interest in a musical instrument belonged to the top group.

We can generally state that no group of the two musical ability groups identified, as will be explained later, had an advantage over the other, in music practice outside school, while all children reported exposure to spoken French through the maids or the neighbors. There is no reason to suspect that this exposure to French is unequal from one group to the other.

Thus, the subjects belong to a similar environment as far as French is concerned.

Music Test

As there is no standard music test in Lebanon, a music test was constructed for this study with the help of an American expert in music who has conducted the Martha's Vineyard Chorus and studied conducting with Dr. Carl Bamberger, in New York.

This test consists of the six following parts, recorded on a tape:

1. **Rhythm:** This test includes nine different groups of sounds played on the drum, with the sticks and on the tambourine. Each group of sounds is to be played three times, following which each child has to reproduce the sounds with the same stresses.
2. **Duration:** This test includes three simple music patterns, the first two patterns comprise two notes each, and the third comprises three notes. Each music pattern is to be played three times, after which each child has to identify the note with longest or shortest duration.

Each of the above mentioned questions is scored + 1 if answered correctly, and 0, if answered wrongly.

3. **Pitch:** In this case, the height or depth of a sound is measured. This section includes four parts:

The first part measures the depth of a sound, and is played on the piano. It includes three simple music patterns, comprising two notes each. The second part measures the height of a sound and is played on the viola. It includes three simple music

patterns, consisting of two notes each. The third one is similar to the first except that the xylophone replaces the piano. The last part played on the piano, includes two patterns comprising three notes each, the first measuring the highest note and the second measuring the lowest note. Each of those eleven music patterns is to be played three times, following which the subject has to identify the note with the highest or the lowest pitch.

The scoring of this part is similar to the preceding ones, for, each right answer is scored 1, and each wrong answer 0.

4. Dynamics: In this part, the child's perception of loudness or intensity is measured.

It is divided into three sections:

The first section includes two simple music patterns, of three notes each, played on the piano. Each music pattern is to be played three times, after which the subject has to identify the loudest or softest note.

The second section includes two music phrases, played simultaneously three times on the piano, following which the child has to identify the loudest phrase.

The third section includes two music phrases, played on the viola, measuring differences of intensity. Each phrase is to be played three times, following which the child has to identify the gradual decrease or increase of tone.

In this part also, each right answer is scored + 1, and each wrong answer is scored 0.

5. Quality of the sound: This test includes two parts.

The first one consists of two identical notes, played on the viola, but with two different time values, thus changing the value of the sound. The second part, played on the piano, includes a perfect chord and a discord. Each part is to be played three times, following which the child has to identify the most pleasant or harshest sound.

Each right answer is scored + 1, and each wrong answer 0.

6. Melody: This test includes three parts, and is played on the piano.

In the first one, a short music phrase is played three times after which the subject has to sing it with the right rhythm and the right tune. The score is + 6 if the song is reproduced perfectly. In case either the tune or the rhythm is correct, the answer is scored + 3. The score is 0 for a bad reproduction.

The second part consists of two scales, one played upwards and the other downwards. Each scale is to be played three times, following which the child has to identify the melody going upwards and the phrase going downwards. The right answer is scored + 1, and the wrong one 0.

The last part consists of two small pieces, the first sounding happy and the other sad. Each piece is to be played three times, following which the subject has to identify the happy and the sad one.

The scoring of this part is similar to that of the preceding one, for, each right answer is scored + 1, and each wrong answer is scored 0. The maximum for the total test is 40.

Below is a table showing the music scores for second and third graders.

TABLE II
MUSIC SCORES OF SECOND AND THIRD GRADERS

<u>SUBJECTS</u>	<u>MUSIC SCORES</u>
1	33
2	29
3	36
4	26
5	30
6	30
7	29
8	32
9	29
10	33
11	36
12	40
13	39
14	30
15	29
15	35
17	27
18	34
19	28
20	39
21	32
22	39
23	21
24	26
25	39
26	33
27	28
28	25

N = 28

French Tests

As there is no standard French test for beginners, in Lebanon, three tests were constructed: a vocabulary test, a comprehension test and an intonation test. The last one was constructed with a French expert in phonetics.

The vocabulary test consists of 30 words, presented in a multiple choice form, through pictures. The stimulus word was to be read orally by the instructor and the pupils were to identify the picture corresponding to it.

To the stimulus "maison" for example, the subjects had the choice between three pictorial responses: 1) maison, 2) poisson, 3) oiseau.

The words were selected from the short list of vocabulary studied from the beginning of the year and were presented in order of difficulty (following the principle of familiarity, the words more often used were given before, followed by the less familiar ones). An analysis of item difficulty prior to the experiment was impossible because the sample is too small, and the words they know in French are rather limited.

Previous to giving the test, sufficient explanations were given, illustrated by examples, thus making sure that each pupil understood the rules of the review, for, in order to avoid anxiety, the test was presented as a revision before Spring vacations, to see how much they learned.

1. The test with the instructions for its use may be examined in appendix III.

Each right answer is scored + 1, and each wrong answer 0.

2. Below is a table showing the vocabulary scores.

TABLE III

VOCABULARY SCORES OF SECOND AND THIRD GRADERS

<u>SUBJECTS</u>	<u>VOCABULARY SCORES</u>
1	30
2	23
3	30
4	22
5	29
6	25
7	24
8	26
9	26
10	29
11	27
12	25
13	29
14	26
15	26
16	25
17	19
18	28
19	29
20	29
21	28
22	30
23	25
24	21
25	29
26	30
27	24
28	25

N = 28

The reliability of this test was determined by the "split-half" method. The coefficient obtained, $r = + .65$ is significant at the 5% level.

The comprehension test consists of 30 sentences, presented in a multiple choice form, through pictures. The stimulus sentence was to be read orally by the instructor and the pupils were to identify the picture corresponding to it.

To the stimulus: "Paul met son manteau" for example, the subjects has the choice between three pictorial responses: 1) a girl with a coat, 2) a boy putting on his shoes and 3) a boy putting on his coat. The sentences were also selected from the short list of sentences studied from the beginning of the year and were presented in order of difficulty (following the principle of familiarity, the sentences more often used were given before, followed by the less familiar ones). An analysis of item difficulty prior to the experiment was impossible, because the sample is too small, and the sentences they know in French are rather limited.

Prior to giving the test, sufficient explanations were given, illustrated by examples, thus making sure that each pupil understood the rules of the review, for, in order to avoid anxiety, the test was presented as a revision after Spring vacations, to see how much they remember.

The test with the instructions for its use may be examined in appendix IV.

As for scoring, each right answer is scored + 1, and each wrong answer 0.

Below is a table showing the Comprehension scores.

TABLE IV

COMPREHENSION SCORES OF SECOND AND THIRD GRADERS

<u>SUBJECTS</u>	<u>COMPREHENSION SCORES</u>
1	28
2	22
3	30
4	24
5	28
6	18
8	24
9	26
10	24
11	26
12	29
13	28
14	21
15	28
16	27
17	17
18	28
19	30
20	26
21	29
22	30
23	23
24	17
25	25
26	26
27	18
28	23

N = 27

* Subject No.7 was absent

The reliability of this test was determined by the "split-half" method, and the coefficient obtained $r = + .76$ is also significant at the 5% level.

The intonation test consists of 30 sentences, recorded on a tape, as read by an expert in French phonetics.

This test was given in order to determine which pupil can recognize the final intonation contours, who can determine the general movement of the voice, whether it is rising, falling or staying on the same level.

A simplified system was used to mark intonation, No.1, corresponds to a low note, or to a downward movement of the voice, No.2, stands for an unchanged movement of the voice, the words being pronounced on the same note, and No. 3 corresponds to a high note, or to an upward movement of the voice.

To the stimulus item: "Comment t'appelles-tu"? for example, the subjects are to respond by blackening, on their answer sheet one of the three above mentioned numbers, according to the intonation they heard.

The sentences were also selected from the short list of sentences studied from the beginning of the year.

Prior to giving the test, sufficient explanations were given, illustrated by examples, thus making sure that each pupil understood the rules of the test, which was presented as a final French test.

The answer sheet with the instructions for its use, may be examined in appendix V.

The scoring is similar to that of the preceding French tests. Each right answer is scored + 1, and each wrong answer is scored 0.

Below is a table showing the Intonation scores.

TABLE V

INTONATION SCORES OF SECOND AND THIRD GRADERS

<u>SUBJECTS</u>	<u>INTONATION SCORES</u>
1	17
3	14
4	13
5	13
6	14
7	14
8	11
9	11
10	16
11	16
12	22
13	16
14	14
15	18
16	17
17	12
19	15
20	15
21	20
22	16
23	9
24	10
25	16
26	15
27	13
28	0

N = 26

Subjects No. 2 and No. 18, were absent.

The reliability of this test was determined by the "split-half" method. The following correction formula was also applied:

$r_{11} = \frac{2r_1}{1+r_1}$. But the result obtained $r = +.20$ is insignificant.

CHAPTER III

RESULTS

The study on the relationship between musical aptitude and achievement in French, at the elementary level, was carried on the basis of the following hypothesis:

In a sample of American elementary school children controlled for intelligence and motivation, achievement in French as a foreign language is a function of musical aptitude.

This hypothesis was verified in terms of the following sub-hypotheses:

Hypothesis I

Of two groups matched for intelligence and motivation, but with significant differences in music scores, the one with the higher score in music, will have a higher achievement score in French.

To prove this hypothesis, it was first necessary to divide the sample into two groups representing different ability level in music. The median of the total music scores was taken as the criterion for this split. Subjects scoring above the median formed group A and subjects scoring below the median formed group B, as seen below:

TABLE VI
MUSIC SCORES OF GROUP A AND GROUP B

Group A	Music Scores	Group B	Music Scores
1	33	2	29
3	36	4	26
8	32	5	30
10	33	6	30
11	36	7	29
12	40	9	29
13	39	14	30
16	35	15	29
18	34	17	27
20	39	19	28
21	32	23	21
22	39	24	26
25	39	27	28
26	33	28	25

To make certain that these two groups are matched for intelligence and motivation, the "t" test for small samples was used to measure the significance of the difference between the mean scores obtained by the two groups on Davis-Eells Test.

Those scores are shown in the following table:

TABLE VII

RAW SCORES OF GROUP A AND GROUP B ON DAVIS EELLS TEST OF
PROBLEM SOLVING ABILITY

Group A	Scores on Davis-Eells Test	Group B	Scores on Davis-Eells Test
1	50	2	49
3	46	4	39
8	37	5	38
10	36	6	37
11	36	7	37
12	36	9	37
13	35	14	35
16	33	15	35
18	31	17	32
20	31	19	31
21	31	23	29
22	30	24	29
25	27	27	26
26	26	28	25

$$N_1 = 14$$

$$N_2 = 14$$

$$M_1 = 34.64$$

$$M_2 = 34.21$$

$$\sigma_1 = 6.30$$

$$\sigma_2 = 6.00$$

The "t" value is obviously insignificant, indicating that the two groups do not differ in mental development.

The same procedure was followed to measure the significance of the difference between the mean scores obtained by the two groups on a rating scale asking the children "how much they liked French". (A sample and the instructions for its use may be examined in Appendix VI).

The scores are shown in the following table:

TABLE VIII

MOTIVATION SCORES OF GROUP A AND GROUP B

<u>Group A</u>	<u>Group B</u>
1	1
2	4
2	3
2	3
1	2
2	2
1	3
3	3
2	1
4	4
2	1
3	4
4	1
3	1
<hr/>	<hr/>
32	33
$M_1 = 2.285$	$M_2 = 2.357$
$\sigma_1 = .95$	$\sigma_2 = 1.2$

The "t" value found was also insignificant, indicating that the two groups do not differ on motivation.

As there is no difference between the two groups, we can say that Group A and Group B are matched for intelligence and motivation.

It is now possible to compare their results with respect to achievement in French. Since three tests were administered, each test will be considered separately.

Vocabulary Test

The vocabulary scores obtained by Group A and Group B are shown in the following table:

TABLE IX
VOCABULARY SCORES OF GROUP A AND GROUP B

Subjects Group A	Vocabulary Scores	Subjects Group B	Vocabulary Scores
1	30	2	23
3	30	4	22
8	26	5	29
10	29	6	25
11	27	7	24
12	25	9	26
13	29	14	26
16	25	15	26
18	28	17	19
20	29	19	29
21	28	23	25
22	30	24	21
25	29	27	24
26	30	28	25
<hr/>		<hr/>	
N = 14	395	N = 14	344
M ₁ = 28.21		M ₂ = 24.57	

To compare the mean of vocabulary scores, the "t" test for small samples was used according to formula:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\sum x_1^2}{N_1} + \frac{\sum x_2^2}{N_2}\right) \left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

The "t" value found was $t = 4.13$, which is significant at the 1% level for 26 degrees of freedom.

This result indicates that the difference between the mean achievement scores in vocabulary could not have arisen by simple chance, and that they are most probably due to a true difference between the two musical ability groups in vocabulary.

The difference found between the mean achievement scores in vocabulary suggests the possibility of a relationship between musical aptitude and the ability to acquire French vocabulary.

Hypothesis II

The correlation between music scores and French achievement scores, with intelligence and motivation scores being partialled out, will be high and positive.

In order to find the degree to which vocabulary and music may be correlated, a coefficient of correlation was computed between those two variables, using Pearson's formula:

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}} = .60$$

To partial out the effect of Intelligence, the following formula was also applied:

$$*r_{12.3} = \frac{r_{12} - (r_{13} r_{23})}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}} = \frac{.6 - (.09)(.05)}{\sqrt{(1-.0081)(1-.0025)}} = .598$$

This result .6, is significant at the 5% level.

*
1 = Musical aptitude
2 = Vocabulary
3 = Intelligence or motivation

The same formula was applied again to partial out the effect of motivation. The correlation found between music and vocabulary was .61, significant at the 5% level.

Comprehension Test

The Comprehension scores obtained by Group A and Group B are shown in the following table:

TABLE X
COMPREHENSION SCORES OF GROUP A AND GROUP B

Subjects Group A	Comprehension Scores	Subjects Group B	Comprehension Scores
1	28	2	22
3	30	4	24
8	24	5	28
10	24	6	18
11	26	7*	-
12	29	9	26
13	28	14	21
16	27	15	28
18	28	17	17
20	26	19	30
21	29	23	23
22	30	24	17
25	25	27	18
26	26	28	23
N = 14		N = 13	
380		295	
M ₁ = 27.14		M ₂ = 22.7	

* Subject No.7 was absent.

To compare the mean of comprehension scores, the "t" test for small samples was used according to the above-mentioned formula.

The "t" value found was 3.40, which is significant at the 1% level for 25 degrees of freedom.

This result indicates that the difference between the mean achievement scores in comprehension could not have arisen by simple chance, and that they are most probably due to a true difference between the two musical ability groups in comprehension.

The difference found between the mean achievement scores in comprehension suggests the possibility of a relationship between musical aptitude and the ability to understand French.

However, it does not show the strength of this relationship. To find the degree to which these two variables may be correlated, a coefficient of correlation was computed between them, using the above mentioned Pearson's formula, and the result obtained was $r=.55$.

This demonstrates a significant relationship between musical aptitude and achievement in French comprehension in elementary school children.

The same formulae used for vocabulary were applied here to partial out the effects of intelligence and motivation. The results obtained were respectively $r = .55$ and $r = .56$, significant at the 5% level.

Intonation Test

The Intonation scores obtained by group A and group B are shown in the following table:

TABLE XI
INTONATION SCORES OF GROUP A AND GROUP B

Subjects Group A	Intonation Scores	Subjects Group B	Intonation Scores
1	17	4	13
3	14	2*	-
8	11	5	13
10	16	6	14
11	16	7	14
12	22	9	11
13	16	14	14
16	17	15	18
18*	-	17	12
20	15	19	15
21	20	23	9
22	16	24	10
25	16	27	13
26	15	28	8
N = 13		N = 13	
M ₁ = 16.2		M ₂ = 12.6	

* Subjects Nos. 18 and 2 were absent.

To compare the mean of intonation scores, the "t" test for small samples was used according to the above-mentioned formula.

The "t" value found was 3.46, which is significant at the 5% level for 24 degrees of freedom.

This result indicates that there is a difference between the mean achievement scores in intonation, but since this test was proved

to be unreliable, it will be rejected.

It is not necessary to analyse the results because this test is not reliable (as may be seen on p.31).

DISCUSSION

The present study indicates that the correlation between achievement in French and musical aptitude is not null. There is evidence that some relationship exists between them at the elementary school level.

As already mentioned in the results, the "t" value found for the mean vocabulary scores was 4.13, significant at the 1% level for 26 degrees of freedom, and for the mean comprehension score t was 3.40, significant at the 1% level, for 25 degrees of freedom.

This obtained relationship tends to lend support to the first hypothesis that the group with the higher score in music, will have a higher achievement score in French, under similar intellectual and motivational conditions.

Besides, "Pearson's r" coefficient of correlation was used to study the extent to which the two variables, music and vocabulary or comprehension, may be correlated, intelligence and motivation being partialled out.

The correlation between vocabulary and music was $r = .60$, and between comprehension and music $r = .56$, significant at the 5% level.

This suggests the conclusion that the correlation between musical aptitude and French achievement, with intelligence and motivation being partialled out, is positive and rather high.

This result agrees with Dexter's study who found a correlation of about $r = .639$, between French accent and pitch discrimination ability.

However, Primsleur and Stockwell's investigations showed a less important correlation $r = .126$, between the Seashore Pitch subtest and the Pictorial Auditory Comprehension Test. They still maintain that pitch discrimination ability is essential in learning French.

As for Leutenegger and his associates who expected to discover a change in the Seashore scores of the subjects after a semester course of French or Spanish, their results did not indicate a relationship between Seashore subtests and foreign language achievement scores, nor were they able to find significant pre-post changes in the music test.

Yet, they pointed out a correlation between tonal memory and achievement in French.

However, these conclusions cannot be easily compared with the findings of this study for several reasons.

First of all, previous researches were carried on university students most of whom are adults, who have a rather strong interest in acquiring a new language. Other factors seem to influence adults' learning process as compared with children's learning process. This difference was already recognized by Primsleur who declared that it will be difficult to apply the results obtained, at lower levels, where a wider range of intelligence and different motivational problems exist.¹

1. Paul Primsleur, Ludwig Molsberg and A. Morrison: "Student Factors in Foreign Language Learning". *Modern Language Journal*. Vol.46, 1962, p.160-170.

The second principal reason is due to the fact that the music test administered to the children included in the present study is different from the Seashore test of Musical Talent used in the researches of Primsleur and Leutenegger. It was prepared locally, as already mentioned, in accordance with the pupils' knowledge. Also unlike previous methods which considered the scores of each subtest separately, in this study, only was the total score considered. For instance, preceding researches tried to investigate the possibility of a relationship between ability to discriminate pitch, tonal memory or timbre, taken separately, and achievement in French, whereas this study used a score based on all the elements of music combined, that is, pitch, rhythm, duration, quality, intensity and melody, and tried to correlate it with the various components of the French test, namely vocabulary, comprehension and intonation. This may explain in part the difference between the results of this research and previous researches.

It would be useful therefore to construct a complete music test with all the required subtests, in order to analyse possible relationships between various musical elements and various aspects of achievement in French, at the elementary level.

However, to explain the basic difference between the results of this study and other studies, we may have to examine the way in which the relevant variables in this study were controlled. Previous investigations had identified verbal intelligence and motivation as significant factors in French achievement, especially in pictorial

auditory comprehension. The raw correlations found in this study between the music score and French comprehension and vocabulary respectively were $r = .55$, and $r = .60$. The correlations between intelligence and French achievement, were rather insignificant. These low correlations may be due, not to a real lack of relationships, but to the fact that intelligence scores used were drawn from a standardized test with questions graded in difficulty while the French scores were based on a teacher-made test whose items had not been tested for level of difficulty. This will naturally affect the size of the correlation between intelligence scores and French. Therefore the correlation coefficient between intelligence and French used in the first-order partial operation does not reflect the true correlation which may exist between intelligence and achievement in French. For this reason, the correlations found in this study may be unduly overestimated.

As to motivation, we may assert that the concern which the children of this study have for French is to a great extent subject to fluctuations, and is influenced by many factors, such as the parents attitude toward this language, the personality of the teacher, the methods of teaching, the materials taught and the children's own realization of the importance of the French language.

As a matter of fact, French is taught to these children as a secondary subject, and does not offer extrinsic rewards, nor does it provide them with situations where they are pressured to speak French

and made to feel a real need to learn it. In the absence of such truly motivating forces, the interest of the pupils in French is apt to fluctuate from day to day, depending on the immediate effect of the material used by the teacher and the way he handles the class. This is why it may be possible that the declared interest on the subjects in French as revealed in the rating scale used in this study is not dependable, and that there would be need for a more valid method to measure their motivation.

This may lead us to affirm that the correlations obtained in this study are also partly affected by the inadequate way in which motivation was measured.

If we should not depend much on the high correlations found in this study between music scores and French achievement scores, the difference between the mean French achievement scores of the two musical ability groups seem to indicate more dependably the existence of a relation between musical ability and achievement scores. However undependable the motivation scores are, there is no reason to believe that in matching groups A and B, there has been any systematic bias in favor of either group especially that their scores on declared interest in French were equal. Also, intelligence control was based on a properly validated test, and thus, there is no reason to doubt that groups A and B are not equal in mental ability taken as groups. Therefore, the differences in French achievement may be accepted as due to differences between those two groups, in musical ability.

A hypothesis may be given to explain this result as suggested by Haugen. He stated that "Individual differences in language command may result from differences in the age of learning, childhood being typically a period of memorization of rote patterns, adulthood one of the emphasis on the content of language".¹

In this assertion, Haugen expresses explicitly the difference between adults and children's methods of learning. He also explains the dissimilarity between the results of the present study and previous findings.

According to this statement, the emphasis on the content of language requires a high I.Q., good reasoning, intellectual faculties not required for memorization.

If Haugen's hypothesis is right, it may imply that the greater use of memory at the elementary level demands a greater reliance on good and spontaneous audition in learning foreign languages. This is affected by the sensitiveness of the ear, its capacity to identify particular sounds, the phonemes, thus fastening the association between the sound of the word and its meaning, rather than by a voluntary and conscious intellectual effort required at the higher abstract level. This in turn may explain why at the elementary level different musical ability groups show differences in achievement in French, as proved in this study.

1. Einar Haugen. "Bilingualism in the Americas". A bibliography and research guide (University of Alabama Press) 1956, p. 81.

IMPLICATIONS

The present study bears out a number of implications for both research and education.

1. The conclusions tend to reinforce the timid assertions made by previous researches on the importance of musical ability in learning French. For, one has to repeat what he hears, and one obviously hears strange sounds, not found in English, or words having characteristic accents and said with different intonations.

For, unlike English, where the word has a lexical stress, in French, the word loses its individuality to the benefit of the sentence. As the sentence stretches out, the stress moves to be on the final syllable.

Example: Mons ieur, Monsieur J ean, Monsieur Jean Dup ont.

Thus, it is said that the French accent is syntactique.¹

Besides, a stressed vowel can rise or fall down as compared with unstressed ones, and French is characterized by the constant use of rising pitches on the final vowels of a group. Whereas in English, the fall of the pitch, after the stressed vowel, is seldom final, the general melodic pattern being rising and falling, like a wave.²

1. P. & M. Leon. "Introduction a la Phonetique Corrective".
Ch. 11. Les Sons dans la chaine parlee. p. 64.

2. Ibid., p. 73.

As for intonation, unstressed French syllables of a rhythmical group are characterized by an even tune. Syllabic intonation is stable in French, for unstressed vowels. Each syllable considered separately is said on a sustained note, compared to the English language where the tendency is to slide down to the low notes.¹

All these subtleties require an adequate sound discrimination ability, rather than reasoning, or intellectual efforts. This seems to come more naturally with children, according to Haugen.

2. Since a well-developed ear is necessary for learning a new language, it would be advisable to suggest that, after the medical examination, teachers of foreign languages must be informed of the children's auditory defects. Thus, instead of receiving usual French lessons, these pupils would benefit from a training in sounds, pitch discrimination, and French phonemes.

Even if they are not gifted with "a musical ear", they will acquire some ability to discriminate sounds and will get used to French phonetics.

3. In grouping children for the French class, it will be useful to take into account their musical aptitudes, for, the musically gifted will belong to the advanced group. In addition to

1. Ibid., p.73.

French vocabulary and French patterns, they would also receive a more intensive training in French phonetics.

Whereas the rest would learn fewer patterns, and would be trained to identify and reproduce French phonemes.

4. Above all, this study seems to confirm the belief in the fruitfulness of continued research with perfected techniques on the possible relationships between various musical factors and the ability to learn various aspects of a foreign language, specially at the childhood level.

Name: _____

Date: _____

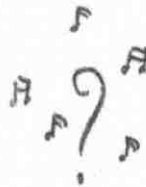


























APPENDIX II

Name:

Grade:

Date tested:

date of birth:

I - R Y T H M

- | | | | |
|----------------|----------------|----------------|----------------|
| 1) Drum: | a- | b- | c- |
| 2) Sticks: | a- | b- | c- |
| 3) Tambourine: | a- | b- | c- |
| 4) Duration: | a- Flûte L 2n. | b- Piano S 2n. | c- Piano L 3n. |

II - P I E C E

- | | | | |
|-------------------|----|------------|----|
| 1) Piano: low | a- | b- | c- |
| 2) Viola: H 2n | a- | b- | c- |
| 3) Xylophone: 18- | | b- | c- |
| 4) Piano: H 3n | | b- low 3n. | |

III- D Y N A M I C S

- | | | |
|-----------------------|---------------|---------------|
| 1) | a- louder 3n. | b- softer 3n. |
| 2) Louder (2 phrases) | | |
| 3) Viola | a- crescendo | b- diminuendo |

IV - T I M B R E

- 1) harsh 2n.
- 2) pretty 2n.

V - M E L O D Y

- | | | | |
|------------------------|---------|-----------|---------|
| 1) Repetition of song: | a- tune | b- rhythm | c- both |
| 2) a-melody going up | down | b- up | down |
| 3) a- happy | sad | b- happy | sad |

APPENDIX III
Vocabulary Test*

Part I

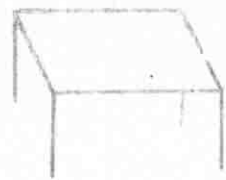
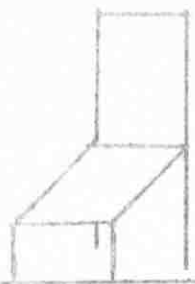
1. Une chaise
2. Un oiseau
3. Un lapin
4. Un crayon
5. Une pomme
6. Un bateau
7. Une chemise
8. Des yeux
9. Une règle
10. Une fenêtre
11. Un pied
12. Un tambour
13. Treize
14. Un drapeau
15. Vingt-six

Part II

1. Un bec
2. Un chou
3. Un loup
4. Un sac
5. Un bonhomme de neige
6. Un cheval
7. Un jardin
8. Une robe
9. Dix-huit
10. Une fille
11. Un nez
12. Un chat
13. Vingt
14. Un phono
15. Une montre

* The children were asked to identify the picture corresponding to the word of each row, by putting a check.

1



2



3



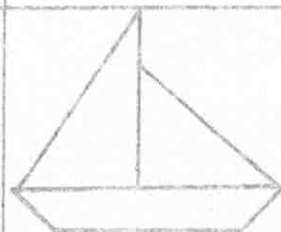
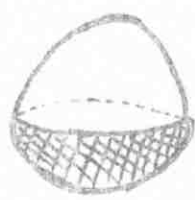
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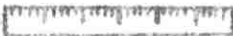

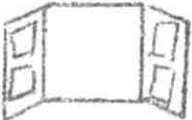













5

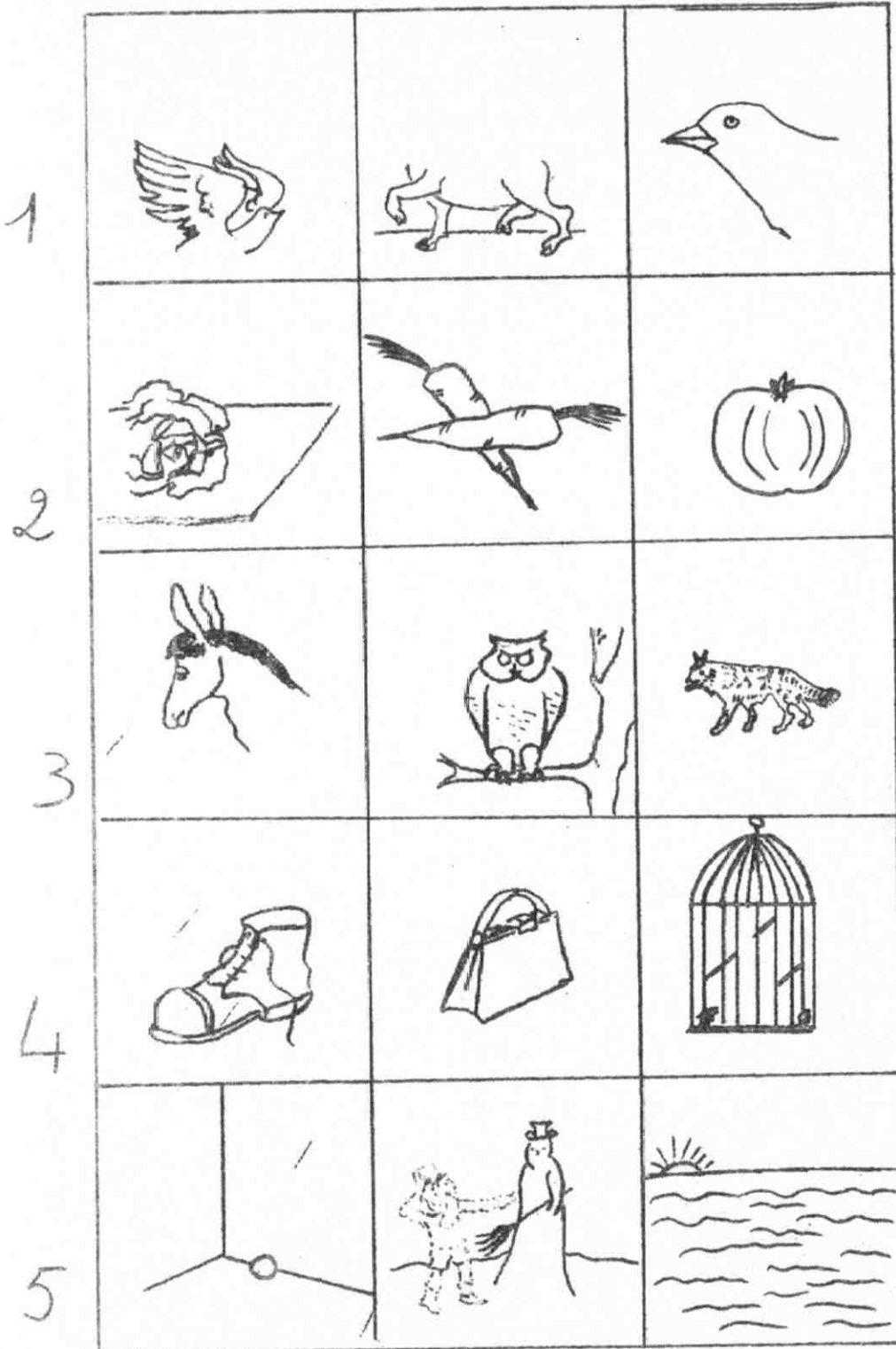


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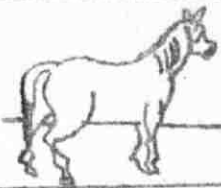


1			
2			
3			
4			
5			
6			
7	13	3	30
8			
9	16	26	6

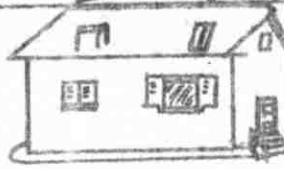
APPENDIX III
PART II



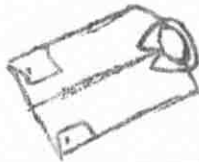
1



2



3



4

28

8

18

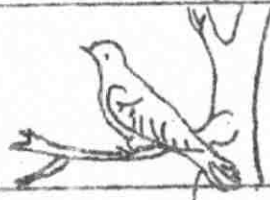
5



6



7



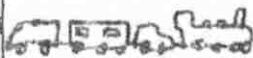
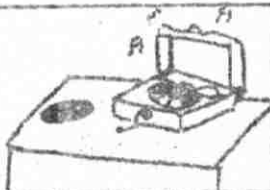
8

12

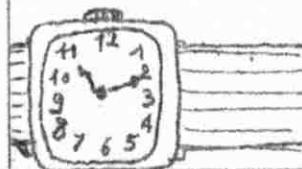
20

2

9



10



APPENDIX IV

Comprehension Test*

Part I

1. Il pleut. (2)
2. L'oiseau vole (2)
3. La pomme est verte (1)
4. Jean met sa chemise (3)
5. L'étoile est rouge et jaune (2)
6. Le chien regarde l'oiseau (1)
7. Il est cinq heures (3)
8. Le crayon est sur le livre (3)
9. L'avion vole (2)
10. Le chien a deux oreilles (3)
11. L'éléphant regarde le livre (1)
12. Paul met son manteau (3)
13. Le lapin regarde le sapin (2)
14. Marie a un phono (1)
15. La carotte est sur la carotte (3)

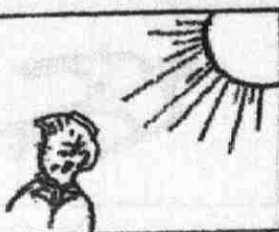




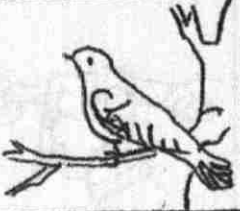








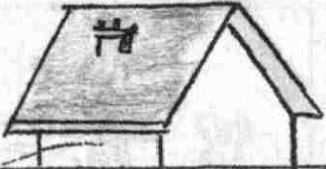


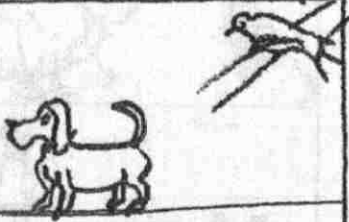
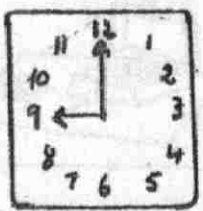
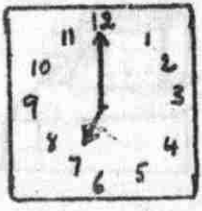
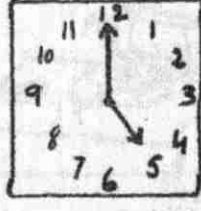
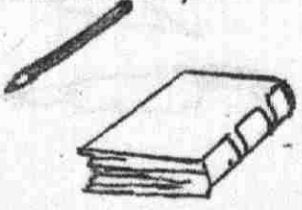
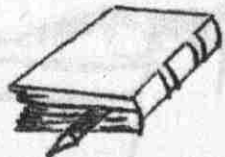
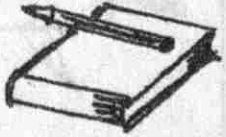
Part II

1. Le ballon est sur la chaise (3)
2. Pierre dessine un chien (1)
3. Marie voudrait une robe (2)
4. L'oiseau est dans la cage (2)
5. Le chat joue avec une balle (3)
6. Le chapeau est sur la tête de Marie (2)
7. Etienne ouvre la fenêtre (3)
8. Le poisson est dans la mer (2)
9. Mon merle a perdu cinq plumes (3)
10. Le bateau est sur le drapeau (1)
11. Meunier tu dors (ton moulin va trop vite) (3)
12. Pierre joue avec un ballon (2)
13. La souris est dans le jardin. Elle regarde l'oiseau (2)
14. Mademoiselle a un sac, elle parle avec une petite fille (3)
15. Mademoiselle demande a Paul: "Combien font $2+2=?$ Paul répond 4. (3)

* The children were asked to identify the picture corresponding to the sentence of each row, by putting a check.

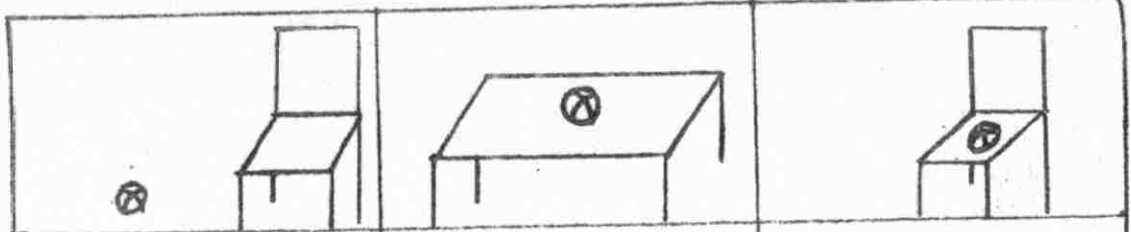
Name: _____

- 1 -

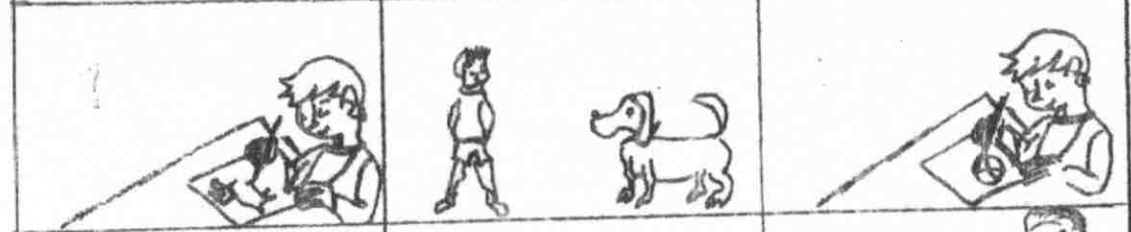
1			
2			
3			
4			
5			
6			
7			
8			

Name: _____

1



2



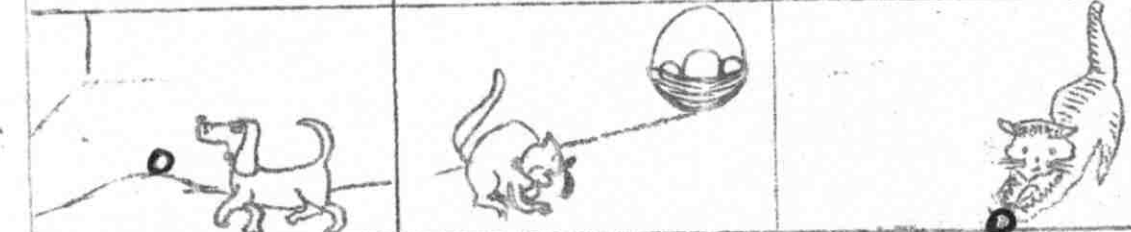
3



4



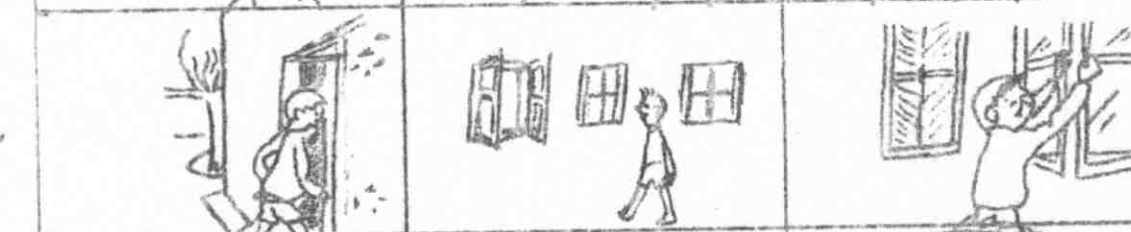
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6



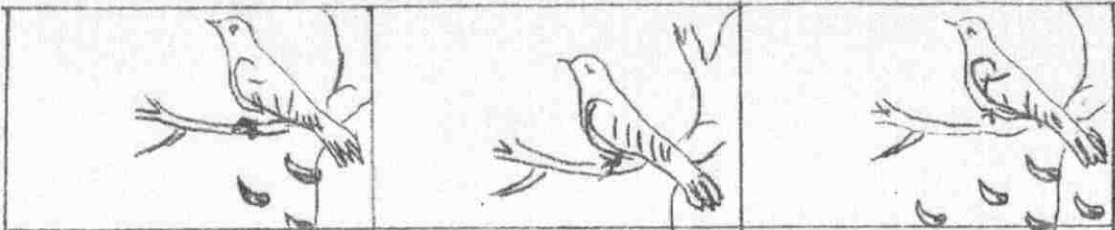
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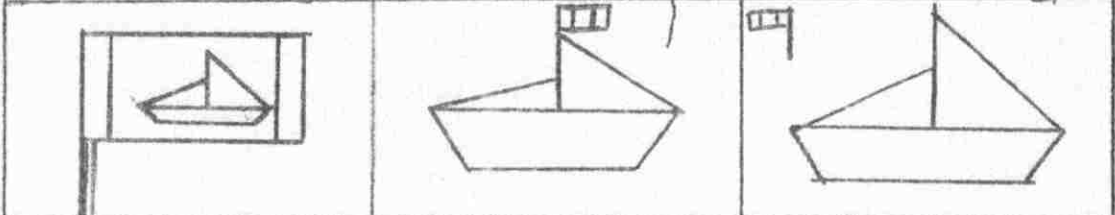
8



9



10



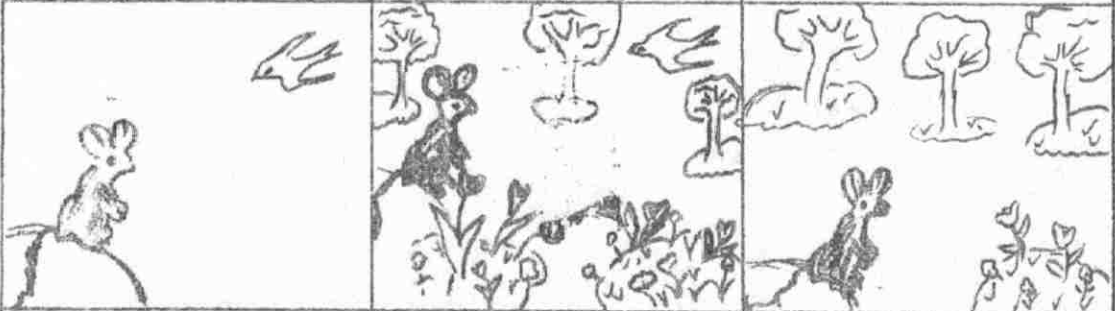
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12



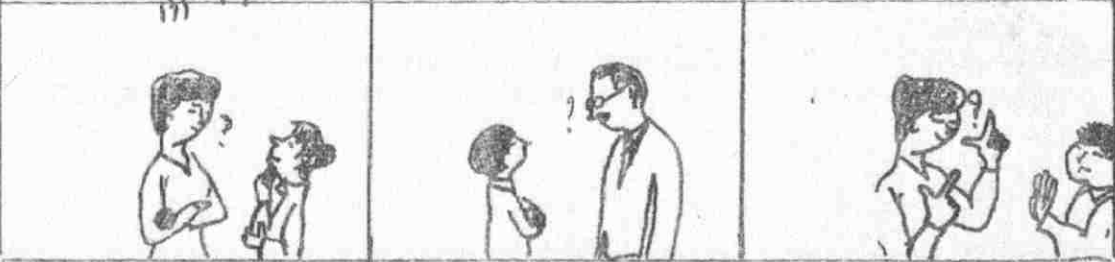
13



14



15



APPENDIX V

Intonation Test*

Examples: C'est une voiture (2)
C'est une voiture (1)
C'est une voiture? (3)

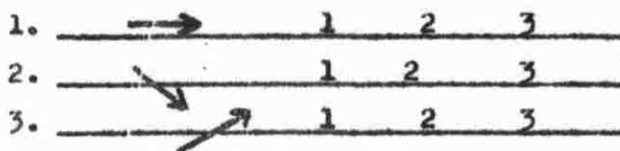
1. C'est fini? (3)
2. Ça va? (1)
3. C'est un crayon (2)
4. Comment t'appelles-tu? (3)
5. Je m'appelle Jean (1)
6. Voilà un ballon (1)
7. Pardon Monsieur l'agent (3)
8. Oui mon petit (1)
9. Le chat regarde l'oiseau (1)
10. Comment allez-vous? (3)
11. Le ballon est sur la table (1)
12. C'est fini! (1)
13. Quel temps fait-il aujourd'hui (3)
14. C'est lundi (2)
15. J'ai perdu mon chien (1)
16. Impossible (3)
17. Un chien sur mon auto? (3)
18. C'est à vous? (3)
19. Non monsieur (1)
20. Je voudrais une pomme rouge (1)
21. Quel âge as-tu? (3)
22. J'ai neuf ans (1)
23. L'oiseau est dans la cage (1)
24. Est-ce que l'avion vole? (3)
25. Il fait chaud? (3)
26. C'est un bateau (1)
27. Silence (1)
28. Tu vas au cinéma? (3)
29. Mets ton manteau (1)
30. Au revoir (1)

* The children were asked to identify the intonation of the sentence by blackening one of the three numbers, No.1, corresponding to a low note, a downward movement of the voice, No.2, and unchanged movement of the voice, and No.3, standing for an upward movement of the voice.

APPENDIX V

H. R. M. S.:

Date: _____



1.	I	2	3
2.	I	2	3
3.	I	2	3
4.	I	2	3
5.	I	2	3
6.	I	2	3
7.	I	2	3
8.	I	2	3
9.	I	2	3
10.	I	2	3
11.	I	2	3
12.	I	2	3
13.	I	2	3
14.	I	2	3
15.	I	2	3
16.	I	2	3
17.	I	2	3
18.	I	2	3
19.	I	2	3
20.	I	2	3
21.	I	2	3
22.	I	2	3
23.	I	2	3
24.	I	2	3
25.	I	2	3
26.	I	2	3
27.	I	2	3
28.	I	2	3
29.	I	2	3
30.	I	2	3

APPENDIX VI

Name : _____

I like French

Very much

Much

Little

Very little

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