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THE RELATIONSHIP BETWEEN ENTRANCE AGE AND SCHOOL SUCCESS

by

DOROTHY KILGTAT

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN COUNSELLING PSYCHOLOGY

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ABSTRACT

This study was conducted with 374 children enrolled in grades two to six in the Thibault R.C.P.S.D. #35 elementary schools in Morinville, Alberta during the 1981-82 school year.

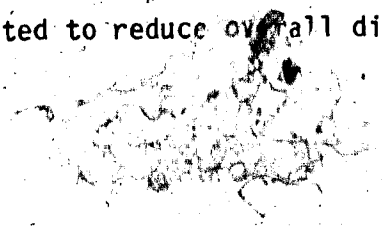
The academic progress and social development of students who had enrolled in grade one as young entrants (birthdays November 1 to February 28), middle entrants (birthdays July 1 to October 31), or old entrants (birthdays March 1 to June 30) were compared. Instruments used were the Canadian Tests of Basic Skills, Teacher Ratings and a Peer Sociogram.

Comparisons among the three age groups showed that there were no significant differences in achievement scores in any subject area, at any grade level. As well, there were no significant differences in achievement between the French Immersion classes and the regular English classes. However, in grades three and six, girls performed better than their male counterparts in several areas.

There were no significant differences between age groups in teachers' assessments of social and emotional well-being, peer acceptance, or in the number of referrals for psychoeducational testing or to the Resource Room.

A separate analysis carried out on 53 repeaters not included in the sample showed that a disproportionate number of young entrants (n=26, 49.1%) had repeated a grade. By comparison, only 15 middle entrants (28.3%) and 12 old entrants (22.6%) had repeated. This

differential failure rate may have acted to reduce overall differences in the rest of the study.



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CHAPTER 1

INTRODUCTION

Admission to school has historically been based on an arbitrarily chosen chronological age with little or no regard to the individual child's mental ability or social and emotional development. The use of chronological age as the sole criterion for admission has the advantages of being objective, well-defined and easy to administer. However, exactly what this age should be has been a subject of concern and controversy for many years.

Administrators often face pressure to change their minimum age requirements. Some people strive to raise the entrance age in an attempt to ensure that students will have the necessary maturity to cope with the social and academic demands of school. Sometimes parents will press to have the entrance age lowered because they feel their child is ready for school and they wish to get formal education underway as soon as possible. Both sides are able to quote studies supporting their viewpoint.

In this thesis, the relationship between age of entry into grade one and subsequent academic achievement and social adjustment will be studied.

The Problem Under Investigation

This current study was conducted in the elementary schools of the Thibault R.C.P.S.D. #35 in Morinville, Alberta. In Morinville,

eligibility for entrance into school is based on chronological age alone. Under current practice, children who reach their sixth birthday by February 28th of the following year may enter grade one, which means that some children are beginning their formal schooling at the age of 5 years 6 months.

This study arose out of concern by teachers and other school personnel that children who begin grade one several months before their sixth birthday may be at a continuing disadvantage both academically and socially throughout their school careers. The general impression seems to be that children whose parents keep them out of school for the extra year fare better than their counterparts whose parents send them to school at the minimum age. Another commonly held belief is that underage boys are at an even more serious handicap than underage girls.

The students taking part in this study were in grades two to six at the Georges P. Vanier and Notre Dame Schools in Morinville Alberta. Since the Thibault School District offers French Immersion as well as regular English instruction, this study will also look at the relationship between language of instruction and academic achievement.

Purpose of the Study

In summary, the purpose of this study is to attempt to answer the following questions:

1. Is age of entry into grade one related to school achievement across grade levels, as measured by the Canadian Tests of Basic Skills?

2. Is sex related to school achievement across grade levels, as measured by the C.T.B.S.?

3. Is there an interaction effect between age of entry and sex on school achievement across grade levels as measured by the C.T.B.S.?

4. Is the language of instruction (French vs. English) related to achievement as measured by the C.T.B.S.?

5. Is there an interaction effect between age of entry and language of instruction on achievement as measured by the C.T.B.S.?

6. Is the age of entry into grade one related to being chosen by the teacher as being socially and emotionally well-adjusted?

7. Is age of entry into grade one related to being chosen by the teacher as having social and emotional difficulties?

8. Is age of entry into grade one related to peer acceptance as measured by a classroom sociogram?

9. Is age of entry into grade one related to being referred for psychoeducational assessment?

10. Is age of entry into grade one related to being referred to the Resource Room for remedial instruction?

11. Is age of entry into grade one related to repeating a grade?

Limitations of the Study

This thesis is restricted to a study of those students in grade two to six in Morinville, Alberta who moved into the Thibault School District prior to June 1981. Students who have repeated a grade have been excluded from the sample and subjected to a separate analysis.

Because only students from Morinville have been used for this study, generalizations to children in other school jurisdictions must be done with caution.

In addition, this thesis does not attempt to deal with the reliability and validity of the Canadian Tests of Basic Skills, the teacher questionnaire or the peer sociogram used in the study. It also does not attempt to deal with the pros and cons of a bilingual education.

Definition of Terms

For this study, the following terms will be used:

1. Age of Entry or Entrance Age: These terms refer to chronological age at the time of entry into school. These ages are given in years and months. For example, a June birthday would yield an entrance age of 6 years three months, while a December birthday would mean an entrance age of 5 years 9 months.

2. Young Entrants: Young entrants are those children whose sixth birthday fell in the November, December, January or February after they began grade one.

3. Middle Entrants: Middle entrants are those children whose sixth birthday fell in July, August, September or October of the year they began grade one.

4. Old Entrants: Old entrants are those children whose sixth birthday fell in the March, April, May, or June before they started grade one. Also included in this group are the children whose sixth birthdays were in the January or February before they began grade one.

5. School Achievement: School achievement for this study is that which is measured by the Vocabulary, Reading Comprehension, Spelling, Math Concepts, Math Problem Solving, Total Math, and Composite scores of the Canadian Tests of Basic Skills. These tests were administered in June 1981 at the end of the previous grade. Therefore, Primary Battery scores are used for the current grades 2 and 3, while Form 3M  been used for grades 4 to 6.

6. Peer Acceptance: This term refers to acceptance by peers on the classroom sociogram, which was administered by each classroom teacher.

7. Social Adjustment: This refers to that which was measured by the teacher questionnaire. Each teacher was asked to name the five children in his or her class who seemed to have the best social and emotional adjustment, as well as the five who appeared to be the least well-adjusted.

CHAPTER II

LITERATURE REVIEW

1. Does School Entry Age Affect Academic Achievement?

There have been many studies conducted over the years in an attempt to answer this question, although most of these studies were done prior to the mid 1970's. The results tend to be contradictory at times, but the overall trend seems to be that early entrants are at a continuing disadvantage throughout their school careers.

One of the earlier studies was conducted by Bigelow (1934) in Summit, N.J. She compared a group of children who had entered school before their sixth birthday with another group who had entered after their sixth birthday. She found that the rate of academic success depended on IQ as well as chronological age, and concluded that children who are younger than six years at entry and who have an IQ of less than 110 have little chance of success in school.

Hamalainen (1952) reported on a survey he conducted among elementary school administrators in Nassau County, N.Y. He found that children who had started grade one at less than 5 years 9 months of age had greater scholastic problems in the first three grades than those who were older at the time of entrance. However, by grades four to six, this discrepancy had largely disappeared.

King (1955) studied the school progress of two groups of students. One group had begun grade one at a mean age of 5 years 10 months, while the other group had begun at a mean age of 6 years 7

months. The children were all of average intelligence. King found that the younger group had trouble attaining grade level in academic skills and that many fell far below their grade level. In addition, a larger number of the younger entrants had repeated a grade.

In a locally conducted study, Bevington (1957) studied 640 pupils who had completed the first six grades in the Edmonton Public Schools. He found no differences in standardized test scores on the basis of chronological age. However, he found that older pupils did have a slight disadvantage in the areas of grade repetition, recommendations, honour standings and accelerations. In Edmonton at that time, children whose sixth birthday fell between September 1 and February 28 could be admitted to grade one if they had a Mental Age of 5 years 9 months.

Baer (1958) conducted a longitudinal study of 146 students through eleven years of schooling. Entrance age for kindergarten was 5 years by November first, although children whose fifth birthday fell in November or December could be admitted provided they had a mental age of 5 years. Baer matched an underage group (November and December birthdays) with an overage group (January and February birthdays) on the basis of intelligence. He found that the overage children, as a group, obtained the higher marks in school and had fewer grade retentions than the younger children.

Hampleman (1959) studied the relationship between school entry age and reading success in grade six. He concluded that although there are many factors that affect reading readiness (eg: mental age, life experiences), it seems that children who start school a few months

later have a better chance for success than those who start earlier. His explanation was that as chronological age advances, the other factors advance also.

In a study of 801 retentions, Hall (1963) found that approximately 77.9% of the boys and 80% of the girls who had repeated a grade were less than 6 years 6 months when they entered grade one. He also found that overage boys and girls achieved at a higher level than their underage peers of the same sex, and that underage boys achieved at a lower level than any other group.

Carroll (1963) compared two groups of grade three children who had been matched for IQ scores. The average grade one entrance age for one group was 5 years 10 months, while for the other it was 6 years 5 months. The older group's achievement was considerably better than that of the younger group, leading Carroll to conclude that even a few months of additional growth and development may mean an advantage in formal education.

Dickinson and Larson (1963) studied 480 fourth graders in Sioux Falls, Iowa. The younger pupils had entered school before their sixth birthday, but had turned 6 by November first. The older pupils were already 6 on school entrance. Dickinson and Larson found that the older group had higher standarized achievement scores even though the younger group had a slightly higher mean IQ.

Johnston (1964), in a survey done by the Illinois Association for Childhood Education, found that children who had entered grade one at less than 6 years of age had the poorest reading achievement regardless of ability level, and the highest retention rate.

In 1967, Miller and Norris studied a group of grade four and five pupils who had spent their early school years in an ungraded primary unit that catered to individual differences. They found that the early entrants were at a disadvantage on readiness tests administered when they began school. However, by grade four, their achievement was no different from that of the normal group. The grade retention rate and rate of referrals for psychoeducational services were similar for early and normal entrants.

Hirst (1970) followed the progress for 300 children from kindergarten to grade two. She found that age was not a reliable predictor of success in reading and arithmetic in grades one and two.

Clarke and Drowatsky (1972) found from their research that although the underage boys they studied had the same intellectual ability as the older boys, the younger ones tended to obtain lower mean scores on achievement tests.

In a locally conducted study of 198 grade four students in Spruce Grove, Alberta, Reynolds (1974) compared the school achievement of children who were six years old or younger at grade one entrance with that of children who were older than six years. He concluded that the younger group was not significantly disadvantaged, and that mental age correlated more highly with achievement than did chronological age. However, the younger group had a greater number chosen as likely to benefit from repeating grade four.

In 1980, Davis, Trimble and Vincent examined the records of 17,000 to 19,000 students in grade one, four, and eight in the Kentucky Public Schools. The achievement of the youngest third (aged 5 years,

8 months to 5 years 11 months at entry) was compared to the remaining older group who were already six years or older at entry. In grades one and four, the older groups scored significantly higher in language, math, reading and total achievement. In grade eight the older group was significantly higher in reading only. The older students in this study appeared to begin school at an academic advantage which they maintained over their school careers, at least in reading.

In a study done by the St. Albert, Alberta Protestant Separate School District #6 in 1981, it was found that younger entrants were at a continuing disadvantage relative to their older peers, but few of the results were statistically significant.. Younger students repeated grades more often, received more remedial help, and scored consistently lower on readiness tests at the beginning of grade one than did older students. In St. Albert, the minimum entrance age into grade one is 5 years 6 months, the same as in Morinville.

Despite some contradictory findings, most research conducted appears to indicate a positive relationship between age of entry into grade one and subsequent academic success. Children who are older in grade one appear to have a greater chance of success. Nearly all of the studies quoted had minimum entrance ages above the current minimum age in Morinville, Alberta.

2. Does Sex Affect Academic Achievement?

Many of the studies previously quoted have used sex as one if the variables. Generally it has been found that the sex of the child does have a bearing on his or her academic achievement, particularly in

the lower grades. The research seems to indicate that underage boys are at the most severe disadvantage at school.

King (1955) found that more young boys than girls had repeated a grade.

Carter (1956) found that chronological age had more of an effect on boys' academic achievement than on girls'. The underage boys scored lower than the underage girls.

Baer (1958) reported that girls were consistently marked higher than boys across many grade levels.

In his study of 801 retainees in Seattle, Hall (1963) found that 457 young entry boys had been retained, compared to 129 young entry girls. He also found that overall, girls tended to score higher than boys on achievement tests in reading and language. Underage boys scored lower than any other group, and in some achievement areas they were two years behind the overage girls.

In Binkley's study (1968-69), girls scored higher than boys in reading and spelling, and Hirst (1970) found that sex was a significant variable in grade one reading success.

Reynolds (1974), in his study of grade four students in Spruce Grove, found that boys as a group were significantly lower than girls in spelling, capitalization, language usage, and total language achievement on the Canadian Tests of Basic Skills. Boys were also selected more often than girls by their teachers as likely to benefit from repeating grade four.

Evans (1974), from his study of inner city children, concluded that sex was a reliable predictor of academic success, and that young

boys were at the greatest disadvantage. However, Good and Brophy (1971) indicated that although girls seem to have an advantage over boys in learning to read in the early grades, this advantage is not significant because the boys eventually catch up. Likewise, Tures (1972), in a longitudinal study of students when they were in the third and tenth grades, concluded that the differences in achievement favouring girls seem to have disappeared by grade ten.

3. Does Age of Entry Affect Social and Emotional Adjustment?

Educators and parents alike have expressed concern about the social and emotional adjustment of the younger entrants. Many studies have addressed this problem.

In his survey of elementary school administrators, Hamalainen (1952) found that underage children were at the greatest disadvantage in the areas of social and emotional adjustment. The wide discrepancy between the younger entrants and the normal-aged children persisted throughout the elementary grades.

According to King (1954-55) younger entrants showed more indications of poor social and personal adjustment at school. She concluded that a few additional months of chronological age at the beginning of grade one seem to be an important factor in a child's ability to meet the restrictions and tensions of school.

Baer (1958) found that older children were rated significantly higher on personal traits by their teachers than younger entrants. These traits included participation in school activities, attitude,

appearance, dependability, emotional stability, initiative, and cooperation.

On the other hand, Bevington (1957) found no difference between younger and older entrants on the personal traits of emotional control, creativeness, judgment, cooperation, dependability and courtesy.

Gott (1963) described the older entrants as adjusting better to peers and adults and showing more initiative than their younger classmates.

According to Carroll (1963), younger and older age groups rated fairly evenly on responsibility, respect for rules, social acceptance, and attitude toward adults. The younger group was considerably lower on attention span, independence and social maturity.

Johnston (1964) found that children who entered school prior to their sixth birthday had a greater percentage of emotional problems, although the differences were not significant.

In 1964, Mawhinney's study prompted the Grosse Point, Michigan Board of Education to terminate their fourteen year programme of selected early entrance. Mawhinney reported that 30.6% of the selected early entrants were considered poorly adjusted, 77.4% were considered entirely lacking in leadership, and 25.3% were below average academically or had repeated a grade.

On the other hand, Birch, Tisdall and Barney (1964) also conducted a study of selected early entrants and found that at the end of grade one, all of the younger children in their study were progressing favourably and were accepted by their teachers and peers.

Likewise, Ahr (1966-67) found that teachers' ratings of selected early entrants in social, emotional, physical and motor development were average compared to regular entrants. This study was done across several grade levels.

According to Weinstein (1968-69), younger pupils are more likely to be seen as disturbed by school personnel, are more likely to fail a grade, and are more likely to be rejected by their classmates. However, Weinstein sees the problem as one of relative age, rather than absolute age or an optimal age for learning. She says there will always be some pupils who are young relative to their classmates no matter what the grade one minimum entrance age is, and these children will face similar adjustment problems.

In a study of inner city children, Binkley (1968-69) found that chronological age was a relatively unimportant factor in personal and social adjustment.

Braga (1969) compared children who had been selected early entrants with regular entrants. His study encompassed grades one, three, five, and seven. He found no significant differences in general work behaviour, work habits or referrals for special help between the two groups.

Reynolds (1974) found no significant differences between late and early entrants in the areas of behaviour or social adjustment.

In the St. Albert P.S.S.D. #6 study (1981), it was found that older pupils scored consistently higher on a self-concept inventory. Teachers' assessments of behaviour problems showed no significant differences between age groups in grade eight, but some difficulties

appeared for the younger group in grades two and six. Older children in all grades studied were chosen more on a classroom sociogram than were their younger peers, but the differences were significant only in grade eight.

The research tends to lend support to the idea that younger entrants as a whole have a more difficult time both emotionally and socially at school. In most of the studies which found little or no difference between young and normal entrants, the younger children had been selected for early school entrance on the basis of advanced mental age, as well as their physical, social and emotional maturity.

4. Does the Language of Instruction Affect Academic Achievement?

There has been much controversy over this question in recent years because of the current emphasis on bilingualism in Canada.

In 1972, Lambert and Tucker reported on their landmark longitudinal study of French Immersion students in St. Lambert, Quebec. In this study, a group of English-speaking children enrolled in a French Immersion programme were compared over several years with an English-only control group. The two groups were matched for intellectual capacity and socio-economic backgrounds. By the end of grade four, there were no significant differences between the two groups in English language arts achievement or in math achievement.

Swain (1974) concluded from research findings across Canada that students in total French Immersion programmes catch up quickly to their English-educated peers in English reading skills if they are introduced to English language arts at the grade two, three, or four

level. She also reported that where achievement in subject areas taught in French (eg: math) has been examined in English, French Immersion pupils perform as well as their English-instructed peers.

In 1978, Swain reported that at the end of grade three, French Immersion students have not completely closed the gap between themselves and their English counterparts in English language arts, particularly in spelling and other technical skills. However, by the end of grade four, both groups are equal, and by the end of grade five, the Immersion pupils out perform their English peers on several aspects of measured English skills.

In a study of the French Immersion programme offered by the Ottawa R.C.S.S.B., Edwards (1976-77) found that by the end of grade three, C.T.B.S. results showed no significant differences between the English language arts achievement of French Immersion pupils and their English-only peers. In this case, English language arts had only been introduced at the beginning of grade three.

Shapson and Kaufman (1978) found that at the end of grade two, French Immersion students in British Columbia scored lower than the English-only regular programme comparison group in all areas of basic English language skills tested. However by the end of grade three, the gap between the two was virtually closed, except for spelling.

There seemed to be no studies available which looked at the interaction effect between age of entry into grade one and language of instruction on achievement in English.

CHAPTER III

METHODOLOGY

1. Sample and Administrative Procedures

The students taking part in this study were in grades two to six at the Georges P. Vanier and Notre Dame Elementary Schools in Morinville Alberta. From the total school population in these five grades, only children currently attending who had also been present in June 1981 for the year-end C.T.B.S. assessment were chosen for the study. Children who had repeated a grade were excluded and subjected to a separate analysis.

The final sample consisted of 374 pupils. Of these, 316 were enrolled in the regular English programme, grades two to six, and 58 were enrolled in French Immersion, grades three to five. In Morinville, a child is allowed to enroll in the French Immersion programme in grade one at his parents' request. However, if he subsequently experiences academic difficulties, it is often recommended that he be placed back in the regular English programme. This tends to limit the population of the French classes to those children who are successful students.

All students were administered the Canadian Tests of Basic Skills, which are patterned after the Iowa Tests of Basic Skills, and normed in Canada. The tests aim to measure skills in the major areas of Reading, Language, Work Study and Mathematics. As well, there is a Composite Score. The specific subtests chosen for this study were

Vocabulary, Reading Comprehension, Spelling, Math Concepts, Math Problem Solving, the Total Math Score and the Composite Score. These were chosen because they appear in both the Primary Battery and Form 3M versions of the C.T.B.S.

The tests were administered to the students at the end of their previous grade, in June, 1981. The primary grades (one and two) had been given the Primary Battery, while grades three and higher had been given Form 3M. The tests were all administered and scored by the classroom teachers.

In the fall of 1981, teachers were asked to list the five students in their respective classes whom they considered to have the best social and emotional adjustment, and the five they felt had the poorest adjustment.

They were also requested to administer a classroom sociogram. They were to say, "If I decided to arrange the desks in here in groups, and you could sit with your friends, who would you like to have sitting in your group with you?" The students were to name five friends.

Finally, the names of children who had been referred for psychological assessment were gathered, as were the names of children referred to the Resource Room for remedial academic help.

In order to eliminate bias in their selections, teachers were not told the purpose of this study until all pertinent information had been gathered.

2. Hypotheses

Appropriate null hypotheses were developed to test each of the stated aims of the study. These hypotheses will be stated in Chapter IV, along wih the results of the study. A level of significance of .05 was chosen as being necessary to reject the null hypotheses.

3. Treatment of the Data

Students were assigned to one of three chronological age groupings. Young entrants were those children whose sixth birthday fell in the November, December, January or February after they began grade one. Middle entrants were those children whose sixth birthday fell in July, August, September, or October of the year they began grade one. Old entrants were those children whose birthday fell in the March, April, May, or June before they started grade one. Also included in the older group were the children who had turned six in the January or February before they began grade one, and whose parents, for whatever reason, had chosen to keep them out of school for one more year.

The subtest scores used from the Canadian Tests of Basic Skills included Vocabulary, Reading Comprehension, Spelling, Math Concepts, Math Problem Solving, Total Math and the Composite Score.

For the regular English classes from grades two to six, these subtest scores were subjected to a two-way analysis of variance for each grade level to test for the signficance of the difference between means when the students were grouped according to age of entry and sex.

The subtest scores for grades three, four, and five, both French and English, were then subjected to a two-way analysis of variance for each grade level to test for the significance of the difference between means when the students were grouped on the basis of age of entry and language of instruction.

Chi-square analyses were carried out on students selected by their teachers to determine whether good and poor social and emotional adjustment are independent of entry age into school. A similar analysis was conducted to determine if being chosen on a peer sociogram is independent of entry age. Further chi-square analyses were carried out to determine if being referred for Resource Room help or for psychoeducational assessment are independent of the age at which the students started grade one.

Because the three age groups were not equal in number, (Young n=81, Middle n=151, Old n=142), 81 of the middle entrants and 81 of the old entrants were randomly selected for inclusion in all of the chi-square analyses.

Finally, the children who had repeated a grade were analyzed on a simple percentage basis for each age group.

CHAPTER IV

RESULTS AND FINDINGS

1. Introduction

Analyses of the data were carried out as described in Chapter III. First, using several C.T.B.S. subtest scores for the English classes from grades two to six, two-way analyses of variance were conducted to test for the significance of the difference between (a) young, middle and old entrants' means on the subtests, and (b) boy's and girls' means on the subtests. The interaction effect between age of entry and sex were studied as well.

Next, using the same C.T.B.S. subtests, the scores of the French Immersion and English classes from grades three to five were subjected to two-way analyses of variance to test for the significance of the difference between the French and English students' means on the subtests. The interaction effect between age of entry and language of instruction was studied as well.

Chi-square analyses were conducted to determine if being chosen by one's teacher as being either socially and emotionally well-adjusted or poorly-adjusted was independent of school entrance age. Similar analyses were conducted to determine if being chosen on a peer sociogram, or being referred for Resource Room help or psychoeducational testing were independent of entry age.

Finally, the percentages of young, middle and old entrants who had repeated a grade were found.

TABLE #1

Numbers and Percentages of Students in the Different Age Groupings.

English n=316
French n= 58
Total n=374

	ENGLISH CLASSES					FRENCH CLASSES		
	GR2	GR3	GR4	GR5	GR6	GR3	GR4	GR5
Young	9 (20%)	10 (17%)	17 (24%)	19 (32%)	15 (18%)	4 (15%)	4 (20%)	3 (25%)
Middle	17 (39%)	27 (45%)	26 (37%)	23 (39%)	33 (40%)	15 (58%)	5 (25%)	5 (42%)
Old	18 (41%)	23 (38%)	28 (39%)	17 (29%)	34 (42%)	7 (27%)	11 (55%)	4 (33%)
TOTAL	44	60	71	59	82	26	20	12

TABLE #2

Number and Percentages of Girls and Boys in Each Age Group in English Classes.

	ENGLISH CLASSES				
	GR2	GR3	GR4	GR5	GR6
Young Male	3 (7%)	5 (8%)	13 (18%)	8 (14%)	10 (12%)
Young Female	6 (14%)	5 (8%)	4 (6%)	11 (19%)	5 (6%)
Middle Male	11 (25%)	15 (25%)	16 (23%)	15 (25%)	16 (19%)
Middle Female	6 (14%)	12 (20%)	10 (14%)	8 (14%)	17 (21%)
Old Male	9 (20%)	11 (18%)	10 (14%)	13 (22%)	17 (21%)
Old Female	9 (20%)	12 (20%)	18 (25%)	4 (7%)	17 (21%)
TOTAL	44	60	71	59	82

Null hypotheses, along with the results are given next. An alpha level of .05 was considered necessary to reject the null hypotheses stated in this chapter.

A summary of the analysis of variance results are located in Appendix C at the end of the thesis.

2. Hypothesis Testing and Results

The following null hypotheses developed out of the aims of this study. Acceptance or rejection of these hypotheses is based on the results of the analyses described previous to this section.

Hypothesis #1

There is no significant relationship between age of entry into school and subsequent achievement across grade levels, as measured by the C.T.B.S.

Based on the data analysis, this hypothesis is accepted.

There were no significant differences in means between early, middle, and late entrants on the achievement variables of Vocabulary, Reading Comprehension, Spelling, Math Concepts, Math Problem Solving, Total Math or on the Composite Score. This was true at all grade levels.

Hypothesis #2

There is no significant relationship between sex and school achievement across grade levels, as measured by the C.T.B.S.

Based on the data analysis, this hypothesis is accepted for grades two, four and five. In these grades, there were no significant differences in means between girls and boys on any of the achievement variables.

In grade three, the null hypothesis is accepted for Math Concepts, Math Problem Solving and Total Math. However, it is rejected for the achievement variables of Vocabulary, Reading Comprehension, Spelling and the Composite Score, where the mean scores for girls were significantly higher than those for boys.

In grade six, the null hypothesis is accepted for Reading Comprehension, Math Concepts, Total Math and the Composite Score. However, it is rejected for Vocabulary and Math Problem Solving where once again the girls' mean scores were significantly higher than the boys'.

Hypothesis #3

There is no significant interaction effect between age of entry into school and sex on school achievement across grade levels, as measured by the C.T.B.S.

Based on the data analysis, this hypothesis is accepted for grades two, three, four and five. In grade six, the hypothesis is accepted for the achievement variables of Spelling and Math Concepts. However, it is rejected for the variables of Vocabulary, Reading Comprehension, Math Problem Solving, Total Math and the Composite Score. In these latter areas, there was a significant interaction

TABLE #3

Mean C.T.B.S. Grade Equivalent Scores

by Age and Sex - Grade 2.

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young Male	1.6	1.5	1.5	2.0	1.6	1.8	1.7
Young Female	2.2	2.3	2.2	2.1	1.6	1.9	2.0
Middle Male	2.0	1.9	1.9	2.3	1.8	2.1	2.0
Middle Female	2.1	1.9	2.1	1.8	1.6	1.7	2.0
Old Male	1.9	1.9	2.2	1.9	2.0	2.0	2.0
Old Female	1.7	1.8	1.6	2.1	2.0	2.1	1.8
Young	2.0	2.0	2.0	2.1	1.6	1.9	1.9
Middle	2.0	1.9	1.9	2.1	1.8	1.9	2.0
Old	1.8	1.9	1.9	2.0	2.0	2.0	1.9
Male	1.9	1.8	2.0	2.1	1.9	2.0	2.0
Female	1.9	2.0	1.9	2.0	1.8	1.9	1.9
OVERALL GRADE MEAN	1.9	1.9	1.9	2.1	1.8	2.0	1.9

TABLE #4

Mean C.T.B.S. Grade Equivalent Scores

by Age and Sex - Grade 3.

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young Male	2.7	2.7	2.9	3.2	3.0	3.1	3.0
Young Female	2.5	2.4	2.6	2.6	2.4	2.5	2.6
Middle Male	2.7	2.8	2.6	2.9	2.7	2.8	2.7
Middle Female	3.1	3.3	3.2	2.8	2.7	2.8	3.2
Old Male	2.4	2.5	2.4	2.8	2.8	2.8	2.5
Old Female	3.3	3.4	3.1	3.2	2.8	3.0	3.3
Young	2.6	2.5	2.7	2.9	2.7	2.8	2.8
Middle	2.9	3.0	2.9	2.9	2.7	2.8	2.9
Old	2.9	3.0	2.7	3.0	2.8	2.9	2.9
Male	2.6	2.7	2.6	2.9	2.8	2.9	2.7
Female	3.1	3.2	3.0	2.9	2.7	2.8	3.1
OVERALL GRADE MEAN	2.8	2.9	2.8	2.9	2.8	2.8	2.9

TABLE #5

Mean C.T.B.S. Grade Equivalent Scores

by Age and Sex - Grade 4.

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young Male	3.8	4.0	4.1	3.8	4.2	4.0	3.9
Young Female	4.3	4.5	4.7	3.8	4.2	4.0	4.4
Middle Male	3.9	3.7	4.0	3.6	4.1	3.9	3.9
Middle Female	4.1	4.3	4.1	3.8	3.9	3.9	4.1
Old Male	4.6	4.5	5.1	3.9	4.3	4.1	4.4
Old Female	4.5	4.5	4.7	4.1	4.4	4.3	4.4
Young	3.9	4.1	4.2	3.8	4.2	4.0	4.0
Middle	4.0	4.0	4.1	3.7	4.0	3.9	3.9
Old	4.5	4.5	4.9	4.0	4.4	4.2	4.4
Male	4.0	4.0	4.3	3.8	4.2	4.0	4.0
Female	4.3	4.5	4.5	4.0	4.2	4.1	4.3
OVERALL GRADE MEAN	4.2	4.2	4.4	3.9	4.2	4.0	4.2

TABLE #6

Mean C.T.B.S. Grade Equivalent Scores

by Age and Sex - Grade 5.

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young Male	5.2	5.2	5.6	5.1	5.1	5.1	5.2
Young Female	4.8	5.2	5.6	4.6	4.6	4.6	4.9
Middle Male	4.5	4.9	4.8	4.8	4.5	4.7	4.7
Middle Female	4.2	5.1	5.8	4.9	4.9	5.0	5.1
Old Male	4.9	5.2	5.3	5.0	4.7	4.9	5.0
Old Female	4.0	4.7	4.4	4.4	4.2	4.3	4.3
Young	5.0	5.2	5.6	4.8	4.8	4.8	5.0
Middle	4.7	4.9	5.2	4.8	4.7	4.8	4.8
Old	4.7	5.1	5.1	4.8	4.6	4.7	4.9
Male	4.8	5.1	5.2	4.9	4.7	4.8	4.9
Female	4.8	5.1	5.4	4.7	4.6	4.7	4.9
OVERALL GRADE MEAN	4.8	5.1	5.3	4.8	4.7	4.8	4.9

TABLE #7

Mean C.T.B.S. Grade Equivalent Scores

by Age and Sex - Grade 6.

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young Male	6.0	6.0	6.2	5.5	5.5	5.5	5.9
Young Female	6.6	6.5	5.9	6.1	6.7	6.4	6.5
Middle Male	5.9	5.9	6.1	6.1	5.8	6.0	6.0
Middle Female	5.7	5.5	6.1	5.4	5.5	5.4	5.6
Old Male	5.3	5.3	5.8	5.7	5.4	5.6	5.4
Old Female	6.6	6.5	6.9	6.3	6.7	6.5	6.6
Young	6.2	6.2	6.1	5.7	5.9	5.8	6.1
Middle	5.8	5.7	6.1	5.7	5.6	5.7	5.8
Old	5.9	5.9	6.3	6.0	6.1	6.0	6.0
Male	5.7	5.7	6.0	5.8	5.6	5.7	5.8
Female	6.2	6.1	6.4	5.9	6.2	6.0	6.1
OVERALL GRADE MEAN	5.9	5.9	6.2	5.8	5.9	5.9	5.9

interaction between age and sex, with the middle entrant girls scoring lower than would have been expected.

Hypothesis #4

There is no significant relationship between the language of instruction (French vs. English) on achievement as measured by the C.T.B.S.

Based on the analysis, this hypothesis is accepted for the three grades included in this part of the study. There were no significant differences in the mean scores of the French Immersion or English classes on any of the C.T.B.S. subtests used as variables.

Hypothesis #5

There is no significant interaction effect between age of entry and language of instruction (French vs. English) on school achievement as measured by the C.T.B.S.

Based on the data analysis, this hypothesis is accepted for the three grade levels studied.

Hypothesis #6

There is no significant relationship between age of entry into scool and being chosen by the teacher as being socially and emotionally well-adjusted.

Results of the chi-square analysis support this hypothesis, indicating that being considered by the teacher as being socially and emotionally well-adjusted is independent of age.

TABLE #8

Mean C.T.B.S. Grade Equivalent Scores

by Age and Language of Instruction - Grade 3

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young English	2.6	2.5	2.7	2.9	2.7	2.8	2.8
Young French	2.8	2.7	2.3	3.0	2.5	2.8	2.6
Middle English	2.9	3.0	2.9	2.9	2.7	2.8	2.9
Middle French	3.0	3.2	2.8	2.9	2.7	2.8	3.0
Old English	2.9	3.0	2.8	3.0	2.8	2.9	2.9
Old French	3.4	3.7	3.1	3.3	3.0	3.2	3.3
Young	2.7	2.6	2.6	2.9	2.6	2.8	2.7
Middle	2.9	3.1	2.8	2.9	2.7	2.8	3.0
Old	3.0	3.1	2.8	3.1	2.9	3.0	3.0
English	2.8	2.9	2.8	2.9	2.8	2.8	2.9
French	3.1	3.3	2.8	3.0	2.7	2.9	3.0
OVERALL GRADE MEAN	2.9	3.0	2.8	3.0	2.7	2.9	2.9

TABLE #9

Mean C.T.B.S. Grade Equivalent Scores

by Age and Language of Instruction - Grade 4

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young English	3.9	4.1	4.2	3.8	4.2	4.0	4.0
Young French	4.6	4.7	5.1	4.0	4.5	4.3	4.6
Middle English	4.0	3.9	4.1	3.7	4.0	3.9	3.9
Middle French	4.7	4.9	5.0	4.2	4.8	4.5	4.8
Old English	4.5	4.5	4.9	4.0	4.4	4.2	4.4
Old French	4.4	4.3	4.7	4.0	4.6	4.3	4.5
Young	4.0	4.2	4.4	3.9	4.2	4.1	4.1
Middle	4.1	4.1	4.2	3.8	4.2	4.0	4.1
Old	4.5	4.5	4.8	4.0	4.4	4.2	4.4
English	4.2	4.2	4.4	3.9	4.2	4.0	4.2
French	4.5	4.5	4.8	4.1	4.6	4.3	4.6
OVERALL GRADE MEAN	4.2	4.3	4.5	3.9	4.3	4.1	4.2

TABLE #10

Mean C.T.B.S. Grade Equivalent Scores

by Age and Language of Instruction - Grade 5

	Vocabulary	Reading Comprehension	Spelling	Math Concepts	Math Problems	Total Math	Composite
Young English	5.0	5.2	5.6	4.8	4.8	4.8	5.0
Young French	5.4	5.3	5.7	5.6	4.7	5.1	5.3
Middle English	4.7	4.9	5.1	4.8	4.7	4.8	4.8
Middle French	5.3	4.9	5.5	5.5	5.0	5.2	5.3
Old English	4.7	5.1	5.1	4.8	4.6	4.7	4.9
Old French	4.1	4.3	4.1	4.3	4.1	4.2	4.2
Young	5.0	5.2	5.6	4.9	4.8	4.9	5.1
Middle	4.8	4.9	5.2	5.0	4.7	4.8	4.9
Old	4.6	5.0	4.9	4.7	4.5	4.6	4.7
English	4.8	5.1	5.3	4.8	4.7	4.8	4.9
French	4.9	4.8	5.1	5.1	4.6	4.8	4.9
OVERALL GRADE MEAN	4.8	5.0	5.2	4.9	4.7	4.8	4.9

Hypothesis #7

There is no significant relationship between age of entry into school and being chosen by the teacher as having social and emotional problems.

Results of a chi-square analysis also support this hypothesis, indicating that being considered by the teacher as having social and emotional difficulties is independent of age.

TABLE #11

Number and Percentage of Children Chosen by the Teacher as Having Good or Poor Social and Emotional Adjustment

	Good Adjustment		Poor Adjustment	
	n	%	n	%
Young	22	34.9%	22	35.4%
Middle	20	31.8%	20	32.3%
Old	21	33.3%	20	32.3%
TOTAL	63	100.0%	62	100.0%

Hypothesis #8

There is no significant relationship between age of entry into school and being chosen by classmates on a peer sociogram.

Based on the results of a chi-square analysis, this hypothesis is accepted. There is no significant relationship between age of entry and being chosen by classmates on a peer sociogram.

TABLE #12

Number and Percentage of Times Children From Each Age Group Chosen on Peer Sociogram.

	n	%
Young	344	30.6%
Middle	391	34.7%
Old	391	34.7%
TOTAL	1126	100.0%

Hypothesis #9

There is no significant relationship between age of entry into school and being referred for psychoeducational testing.

Results of a chi-square analysis support this hypothesis. Being referred for assessment is independent of entrance age.

Hypothesis #10

There is no significant relationship between age of entry into school and being referred to the Resource Room for remedial instruction.

Based on the results of a chi-square analysis, this hypothesis is accepted. There is no significant relationship between age of entry and being referred to the Resource Room.

TABLE #13

Number and Percentage of Children From Each Age Group Referred to Resource Room or for Psychoeducational Assessment

	Resource Room		Psychoeducational Assessment	
	n	%	n	%
Young	5	17.9%	6	22.2%
Middle	12	42.9%	13	48.2%
Old	11	39.2%	8	29.6%
TOTAL	28	100.0%	27	100.0%

Hypothesis #11

There is no relationship between age of entry into school and repeating a grade.

Results showed that of the 53 children who had repeated a grade, 49.1% were young entrants, 28.3% were middle entrants, and 22.6% were old entrants. This indicates an over-representation of young entrants, and is statistically significant.

TABLE #14

Number and Percentage of Repeaters

in Each Age Group.

	n	%
Young	26	49.1%
Middle	15	28.3%
Old	12	22.6%
TOTAL	53	100.0%

3. Discussion

The findings that age of entry into grade one had no significant effect on achievement at any grade level from two to six agree with Bevington (1957), Hirst (1970), and Reynolds (1974). However, they disagree with the conclusions of many other researchers, including Hamalainen (1952), King (1955), Baer (1958), Hampleman (1959), Hall (1963), Carroll (1963), Dickinson and Larson (1963), and Davis, Trimble and Vincent (1980).

Looking at the relationship between sex and achievement, the mean scores for boys and girls were not significantly different on any of the C.T.B.S. subtests in grades two, four, and five. However, in the cases where there were significant differences, (ie: grade three Vocabulary, Reading Comprehension, Spelling and the Composite score, and in grade six Vocabulary and Math Problem Solving), the results favoured the girls. These differences are in line with the findings of

King (1955), Baer (1958), Hall (1963), Binkley (1968-69), and Evans (1974).

For grades three, four, and five, the language of instruction had no significant relationship to achievement scores on the C.T.B.S. These findings generally agree with the studies quoted in the literature review, except for Swain (1976) and (1978) who found that grade three French Immersion students had still not caught up with their English counterparts in some English language skills.

In the area of personal adjustment, there was no sigificant relationship between the age factor and being chosen by one's teacher as having either good or poor social and emotional adjustment. Similarly, age had no significant bearing on being chosen by classmates on a peer sociogram. These findings agree with Bevington (1957), Binkley (1968-69), and Reynolds (1974).

There was no significant relationship between age of entry into grade one and referral to either the Resource Room for remedial instruction or for a psychoeducational assessment. However, there was a disproportionate number of early entrants (n=26 or 49.1%) who had already repeated a grade. This could be because the younger students were genuinely having more academic and adjustment problems than the older children. There might also be more of a willingness to allow the younger children having problems to repeat.

This different failure rate for the three age groups may have acted to reduce overall differences in the study as a whole, since all children who had repeatd a grade were excluded from the sample. This would mean that a large number of early entrants who had been

experiencing severe difficulties in school were excluded from the study, which would tend to raise the mean scores for the younger age group.

In the same vein, a disproportionately small number of old entrants (n=12, or 22.6%) had repeated and were thus excluded. This could be because more older entrants were achieving adequately. It could also be because of a reluctance to hold back children who were already several months older than their peers. If the reason is the latter, the sample would then contain a larger number of older children who were poor achievers. This would tend to lower the scores of the old entrant group.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND FURTHER RESEARCH

Restatement of the Problem

During the school year 1981-82, 374 students in grades two to six in the Thibault R.C.P.S.D. #35 elementary schools in Morinville, Alberta were studied in an attempt to answer the following questions:

1. Is age of entry into grade one related to school achievement across grade levels, as measured by the Canadian Tests of Basic Skills?

2. Is sex related to school achievement across grade levels as measured by the C.T.B.S.?

3. Is there an interaction effect between age of entry and sex on school achievement across grade levels as measured by the C.T.B.S.?

4. Is the language of instruction (French vs. English) related to achievement, as measured by the C.T.B.S.?

5. Is there an interaction effect between age of entry and language of instruction on achievement as measured by the C.T.B.S.?

6. Is age of entry into grade one related to being chosen by the teacher as being socially and emotionally well-adjusted?

7. Is age of entry into grade one related to being chosen by the teacher as having social and emotional difficulties?

8. Is age of entry into grade one related to peer acceptance as measured by a classroom sociogram?

9. Is age of entry into grade one related to being referred for psychoeducational assessment?

10. Is age of entry into grade one related to being referred to the Resource Room for remedial instruction?

In addition, 53 children who had repeated a grade and were consequently excluded from the above sample, were studied to see if age of entry into grade one is related to repeating at least one year at school.

Summary of the Findings

1. There was no significant relationship between age of entry into grade one and subsequent achievement across grade levels, as measured by the Canadian Tests of Basic Skills.

2. In grades two, four and five, there were no significant differences in achievement between girls and boys. However, in grade three, girls achieved significantly better than boys in the areas of Vocabulary, Reading Comprehension, Spelling, and the Composite Score. In grade six, the girls did significantly better in Vocabulary and Math Problem Solving.

3. There was no significant interaction between entrance age and sex on any of the achievement variables for grades two, three, four or five. However, for grade six, there was an interaction between age and sex on the achievement variable of Vocabulary, Reading Comprehension, Math Problem Solving, Total Math and the Composite Score. On these variables, the female middle entrants scored lower than might have been expected.

4. There were no significant differences in achievement between the English and French Immersion classes in grades three, four and five.

5. There was no significant interaction between entrance age and language of instruction on any of the achievement variables.

6. There was no significant relationship between age of entry and being chosen by the teacher as being socially and emotionaly well-adjusted.

7. There was no significant relationship between entrance age and being chosen by the teacher as having social and emotional difficulties.

8. There was no significant relationship between age of entry and being chosen by classmates on a peer sociogram.

9. There was no significant relationship between entrance age and being referred for a psychoeducational assessment.

10. There was no significant relationship between entrance age and being referred to the Resource Room for remedial instruction.

11. There was a disproportionate number of early entrants who had repeated a grade. (Young n=26 or 49.1%, Middle n=15 or 28.3%, and Old n=12 or 22.6%).

Conclusions and Recommendations

Although at first glance, there seem to be no significant differences between young entrants and their older peers on any of the measures used in this study, the way the sample was selected may have influenced the results.

The differential failure rate may have acted to reduce overall differences between age groups in the study as a whole since repeaters were excluded from the sample, and half of all repeaters were young entrants. Therefore there may be more of a relationship between entrance age and academic and social success at school than this study would seem to indicate. One thing seems certain: Younger entrants are far more likely to repeat a grade somewhere along the line than are their older counterparts.

One answer to this problem might be to have a flexible grade one programme which would accommodate the younger children having trouble adjusting (eg: a low-enrolment grade one).

Another solution might be to have a policy of selected early entrance. The minimum age cut-off could be February 28, but children whose birthdays fall between December 1 and February 28 would be admitted only if deemed ready. School readiness could be based on mental ability, as well as social, emotional and physical maturity.

Still another solution might be the modification of the grade system from grades one to four, which would allow students to progress at their own rate without engendering a sense of failure. Mature and capable children could handle the four grades in three years. Those who were less mature and perhaps slow starters might take five years. There would be no repeating of grades. Favourable results from this type of arrangement were reported in Miller and Norris (1967).

One point raised by Weinstein (1968-69) seems to be relevant. She points out that no matter what the minimum entrance age is, there will always be some students who are young relative to their peers, and

that many of these students will face adjustment problems. The problem, as she sees it, is one of relative age.

Further Research

For further research into the question of entrance age, the following are recommended:

(i) A study similar to this current one, using a larger sample.

(ii) A longitudinal study of a group of students as they progress from grade one to twelve and even beyond, if possible.

(iii) A study similar to this current one using the variables of IQ or mental age, as well as age of entry and sex, across several grade levels.

(iv) A larger, Alberta-based study examining the relationship between age of entry, IQ, and language of instruction on achievement.

(v) Individual case studies to answer the question "What is life like for a young entrant?"

(vi) A study of teacher attitudes towards their younger students and how these attitudes affect their approach to teaching these students.

(vii) A study similar to this current one with the sample arranged differently so that repeaters are included.

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APPENDIX A

Classroom Sociogram Instructions

1. Give each child a piece of paper.

2. Have them put their own name at the top. (First and last names).

3. Say: "If I decided to arrange the desks in here in groups, and you could sit with your friends, who would you like to have sitting in your group with you?"

4. The children write the names down on their piece of paper. (First and last names).

5. Ideally, each child will name 5 others.

6. Collect the papers. I will pick them up as soon as possible. Thanks!

APPENDIX B

Teacher Questionnaire

1. List the five children in your class who you feel have the best social and emotional adjustment, (ie: well-behaved, seem to have it all-together).

1. _____
2. _____
3. _____
4. _____
5. _____

2. List the five children in your class who you feel have the poorest social and emotional adjustment, (ie: social and behaviour problems).

1. _____
2. _____
3. _____
4. _____
5. _____

APPENDIX C

SUMMARIES OF ANALYSIS OF VARIANCE

SUMMARY OF ANALYSIS OF VARIANCE - GR. 2

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	51.648	2	0.661	10.265	2	0.111
Sex	2.314	1	0.059	12.265	1	0.266
Interaction	70.084	2	0.897	117.502	2	1.273
Explained	122.707	5	0.628	145.738	5	0.631
Residual	1484.016	38	-	1754.167	38	-
TOTAL	1606-723	43	-	1899.905	43	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	5.700	2	0.059	6.878	2	0.128
Sex	3.244	1	0.067	11.181	1	0.418
Interaction	266.747	2	2.750	92.006	2	1.719
Explained	274.871	5	1.133	109.861	5	0.821
Residual	1843.010	38	-	1017.111	38	-
TOTAL	2117.882	43	-	1126.973	43	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 2

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	112.443	2	2.286	16.549	2	0.371
Sex	5.705	1	0.232	8.982	1	0.403
Interaction	13.145	2	0.267	43.183	2	0.968
Explained	133.230	5	1.083	70.528	5	0.632
Residual	934.653	38	-	847.900	38	-
TOTAL	1067-883	43	-	918.428	43	-

	COMPOSITE		
	s.s.	d.f.	F
Age	11.478	2	0.216
Sex	1.220	1	0.046
Interaction	30.372	2	0.573
Explained	45.154	5	0.341
Residual	1007.819	38	-
TOTAL	1052.973	43	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 3

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	88.294	2	1.035	220.814	2	1.598
Sex	351.504	1	8.238*	436.758	1	6.323*
Interaction	201.739	2	2.364	253.814	2	1.837
Explained	629.958	5	2.953	893.974	5	2.589
Residual	2303.970	54	-	3729.752	54	-
TOTAL	2933-927	59	-	4623.727	59	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	31.370	2	0.256	22.296	2	0.271
Sex	363.690	1	5.938*	0.026	1	0.001
Interaction	193.374	2	1.579	210.441	2	2.559
Explained	575.389	5	1.879	232.958	5	1.133
Residual	3307.587	54	-	2220.020	54	-
TOTAL	3882.977	59	-	2452.978	59	-

* denotes significance

SUMMARY OF ANALYSIS OF VARIANCE - GR. 3

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	18.840	2	0.183	9.653	2	0.131
Sex	24.782	1	0.480	11.909	1	0.322
Interaction	72.689	2	0.704	108.475	2	1.468
Explained	114.206	5	0.443	128.724	5	0.697
Residual	2786.521	54	-	1995.669	54	-
TOTAL	2900-728	59	-	2124.394	59	-

	COMPOSITE		
	s.s.	d.f.	F
Age	31.734	2	0.405
Sex	283.952	1	7.245*
Interaction	240.474	2	3.068
Explained	550.297	5	2.808
Residual	2116.547	54	-
TOTAL	2666.844	59	-

* denotes significance

SUMMARY OF ANALYSIS OF VARIANCE - GR. 4

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	383.429	2	2.535	322.920	2	1.640
Sex	34.275	1	0.453	178.258	1	1.811
Interaction	66.245	2	0.438	130.612	2	0.663
Explained	615.051	5	1.626	802.289	5	1.630
Residual	4916.102	65	-	6399.137	65	-
TOTAL	5531-152	70	-	7201.426	70	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	856.077	2	3.100	131.342	2	1.254
Sex	0.328	1	0.002	32.713	1	0.625
Interaction	209.305	2	0.758	12.820	2	0.122
Explained	1153.230	5	1.670	220.865	5	0.844
Residual	8976.176	65	-	3403.607	65	-
TOTAL	10129.406	70	-	3624.472	70	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 4

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	151.736	2	0.840	133.975	2	1.077
Sex	1.164	1	0.013	7.327	1	0.118
Interaction	34.116	2	0.189	14.139	2	0.114
Explained	189.637	5	0.420	180.156	5	0.579
Residual	5872.629	65	-	4044.023	65	-
TOTAL	6062-266	70	-	4224.180	70	-

	COMPOSITE		
	s.s.	d.f.	F
Age	277.582	2	2.180
Sex	38.443	1	0.604
Interaction	34.298	2	0.269
Explained	443.344	5	1.393
Residual	4137.781	65	-
TOTAL	4581.125	70	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 5

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	95.446	2	0.386	67.330	2	0.347
Sex	1.475	1	0.012	2.237	1	0.023
Interaction	630.179	2	2.548	112.939	2	0.581
Explained	728.148	5	1.178	180.363	5	0.371
Residual	6554.359	53	-	5148.801	53	-
TOTAL	7282.508	58	-	5329.164	58	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	196.128	2	0.682	1.371	2	0.009
Sex	38.827	1	0.270	97.435	1	1.223
Interaction	714.367	2	2.485	165.451	2	1.039
Explained	1018.691	5	1.418	265.898	5	0.668
Residual	7617.270	53	-	4221.031	53	-
TOTAL	8635.961	58	-	4486.930	58	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 5

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	72.989	2	0.315	22.267	2	0.134
Sex	27.479	1	0.237	53.284	1	0.642
Interaction	242.403	2	1.045	213.093	2	1.284
Explained	324.098	5	0.559	274.121	5	0.660
Residual	6144.418	53	-	4399.414	53	-
TOTAL	6468-516	58	-	4673.535	58	-

	COMPOSITE		
	s.s.	d.f.	F
Age	53.537	2	0.350
Sex	13.254	1	0.174
Interaction	225.435	2	1.476
Explained	282.414	5	0.739
Residual	4048.145	53	-
TOTAL	4330.559	58	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 6

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	282.067	2	1.264	321.266	2	1.328
Sex	623.819	1	5.590*	400.759	1	3.313
Interaction	1020.917	2	4.574*	1140.833	2	4.716*
Explained	1829.625	5	3.279	1787.371	5	2.955
Residual	8481.773	76	-	9192.563	76	-
TOTAL	10311.398	81	-	10979.934	81	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	96.117	2	0.281	129.672	2	0.375
Sex	372.831	1	2.182	19.504	1	0.113
Interaction	671.283	2	1.964	826.006	2	2.390
Explained	1145.641	5	1.341	980.945	5	1.135
Residual	12988.172	76	-	13133.965	76	-
TOTAL	14133.813	81	-	14114.910	81	-

* denotes significance

SUMMARY OF ANALYSIS OF VARIANCE - GR. 6

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	337.899	2	1.207	200.901	2	0.713
Sex	769.834	1	5.502*	225.732	1	1.602
Interaction	1108.030	2	3.959*	1104.003	2	3.918*
Explained	2175.750	5	3.110	1526.809	5	2.167
Residual	10634.043	76	-	10708.836	76	-
TOTAL	12809.793	81	-	12235.645	81	-

	COMPOSITE		
	s.s.	d.f.	F
Age	145.660	2	0.682
Sex	303.876	1	2.846
Interaction	1043.081	2	4.885*
Explained	1451.496	5	2.719
Residual	8114.109	76	-
TOTAL	9565.605	81	-

* denotes significance

SUMMARY OF ANALYSIS OF VARIANCE - GR. 3

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	122.422	2	1.225	374.955	2	2.378
Language	121.319	1	2.427	208.037	1	2.639
Interaction	76.976	2	0.770	114.398	2	0.726
Explained	317.945	5	1.272	697.469	5	1.770
Residual	3998.360	80	-	6306.203	80	-
TOTAL	4316.305	85	-	7003.672	85	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	55.691	2	0.428	75.729	2	0.945
Language	0.113	1	0.002	34.450	1	0.859
Interaction	132.691	2	1.019	26.645	2	0.332
Explained	188.449	5	0.579	126.150	5	0.629
Residual	5208.398	80	-	3207.062	80	-
TOTAL	5396.848	85	-	3333.212	85	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 3

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	64.190	2	0.636	46.614	2	0.644
Language	1.502	1	0.030	14.260	1	0.394
Interaction	31.171	2	0.309	34.372	2	0.475
Explained	99.054	5	0.392	90.270	5	0.499
Residual	4034.016	80	-	2896.058	80	-
TOTAL	4137.070	85	-	2986.328	85	-

	COMPOSITE		
	s.s.	d.f.	F
Age	102.197	2	1.123
Language	19.662	1	0.432
Interaction	88.587	2	0.973
Explained	208.508	5	0.916
Residual	3641.018	80	-
TOTAL	3849.526	85	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 4

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	288.512	2	1.871	217.743	2	1.184
Language	105.469	1	1.368	117.439	1	1.277
Interaction	271.089	2	1.758	386.843	2	2.103
Explained	715.410	5	1.856	770.984	5	1.677
Residual	6554.063	85	-	7817.398	85	-
TOTAL	7269.473	90	-	8588.332	90	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	558.641	2	2.192	119.012	2	1.086
Language	194.873	1	1.530	41.593	1	0.759
Interaction	454.719	2	1.785	66.592	2	0.608
Explained	1310.742	5	2.058	249.039	5	0.909
Residual	10828.945	85	-	4657.398	85	-
TOTAL	12139.688	90	-	4906.438	90	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 4

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	80.469	2	0.474	92.778	2	0.783
Language	238.662	1	2.809	117.827	1	1.989
Interaction	108.509	2	0.639	87.063	2	0.735
Explained	470.648	5	1.108	329.598	5	1.113
Residual	7221.793	85	-	5035.246	85	-
TOTAL	7692.441	90	-	5364.844	90	-

	COMPOSITE		
	s.s.	d.f.	F
Age	196.244	2	1.642
Language	219.568	1	3.675
Interaction	218.812	2	1.831
Explained	698.035	5	2.337
Residual	5078.574	85	-
TOTAL	5776.609	90	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 5

	VOCABULARY			READING COMP.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	245.875	2	0.953	88.943	2	0.477
Language	23.071	1	0.179	74.864	1	0.802
Interaction	253.485	2	0.982	133.294	2	0.714
Explained	514.977	5	0.798	306.824	5	0.658
Residual	8388.789	65	-	6064.563	65	-
TOTAL	8903.766	70	-	6371.387	70	-

	SPELLING			MATH. CONCEPTS		
	s.s	d.f.	F	s.s.	d.f.	F
Age	505.435	2	1.527	59.713	2	0.359
Language	16.302	1	0.098	97.421	1	1.170
Interaction	418.109	2	1.255	376.931	2	2.263
Explained	952.145	5	1.143	530.234	5	1.274
Residual	10827.309	65	-	5412.520	65	-
TOTAL	11779.453	70	-	5942.754	70	-

SUMMARY OF ANALYSIS OF VARIANCE - GR. 5

	MATH. PROBLEMS			TOTAL MATH.		
	s.s.	d.f.	F	s.s.	d.f.	F
Age	107.979	2	0.467	72.367	2	0.423
Language	8.357	1	0.072	3.173	1	0.037
Interaction	133.033	2	0.576	213.156	2	1.245
Explained	252.688	5	0.437	287.574	5	0.672
Residual	7511.152	65	-	5566.234	65	-
TOTAL	7763.840	70	-	5853.809	70	-

	COMPOSITE		
	s.s.	d.f.	F
Age	114.367	2	0.730
Language	0.345	1	0.004
Interaction	252.426	2	1.608
Explained	366.426	5	0.935
Residual	5095.031	65	-
TOTAL	5461.457	70	-