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COGNITIVE ACTIVITIES IN WRITING:
A COMPARATIVE STUDY OF FRENCH IMMERSION
AND REGULAR ENGLISH STUDENTS

by

© Amanda Margaret Dibbs

A Thesis

submitted to the Faculty of Graduate Studies
through the Faculty of Education
in Partial Fulfillment

of the requirements for the Degree of
Master of Education
at The University of Windsor

Windsor, Ontario, Canada

1986

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Cognitive Activities in Writing:
A Comparative Study of French Immersion
And Regular English Students

by

Amanda Margaret Dibbs

Abstract

The study addresses the question of the effects of French immersion education on the cognitive activities in the narrative and argumentative English-language writing of students involved. The subjects, all Grade 8 students, were divided into two groups, immersion students, and regular English students. The students in the two educational groups were compared as to the cognitive activities found in their narrative and argumentative English-language writing. The instrument used to assess cognitive activity in writing was a list of cognitive categories developed by the researcher, based on the cognitive taxonomy developed by Wilkinson, Barnsley, Hanna, and Swan for The Crediton Project (1980). Forty cognitive variables were tested for significance at the .05 level (two-sided) with the results of the study indicating that any differences between the two educational groups were not of educational significance. Thus, it was concluded that educational group was not a factor affecting cognitive activities in English-language writing. It

was further concluded that the list of cognitive categories in writing developed for this study was successful and could be applied to other studies involving cognition in writing.

DEDICATION

To Larry, always with love

and

In loving memory of grandparents,

Emily May and George Baker

and

Alice and Arthur Dibbs

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COGNITIVE ACTIVITIES IN WRITING:
A COMPARATIVE STUDY OF FRENCH IMMERSION
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Introduction

In immersion education programs where French is the major vehicle of communication and instruction in the classroom, it is not unusual for concern about the normal development of first language skills to develop. This concern, which concentrates on the language skills associated with school achievement such as reading, spelling, and other aspects of written expression, has initiated a variety of studies formulated to assess the English-language skills of immersion students. These studies have generally used the language abilities of English-educated students of the same age and grade as the standard by which to measure the English-language skills of French immersion students.

The results of such research studies into French immersion students' English-language proficiency have suggested that in general, and over the long run, immersion students are able to maintain standards of achievement consistent with those of their English-educated peers (Lambert, Tucker & d'Anglejan, 1973; Barik & Swain, 1978; Swain & Lapkin, 1979, 1981). This view rests largely on the results of studies involving the language arts sections of standardized tests such as The Metropolitan Achievement Tests, The Canadian Tests of Basic Skills or The Peabody Picture Vocabulary Test.

Very few studies have looked at French immersion

students' English-language writing and those that have have generally placed emphasis on surface structures. As such, the writing has been analyzed for overall impressionistic and specific ratings, actual error counts, and for T-unit analysis and holistic scoring (Swain, 1975; Genesee & Stanley, 1976; Laing, in press).

Despite the suggestion of surface structure studies that immersion education does not impede the students' development of English-language skills, these studies are limited to comparing the surface structures of the English-language writing skills of immersion and non-immersion students.

In consideration of the question of what writing research in general should involve beyond skills analysis, it has been argued that students' writing reflects their level of cognitive development (Bereiter, 1980). Thus, writing research should involve the study of cognition.

The most useful attempt to measure cognitive activities in writing to date has been that of Andrew Wilkinson and his colleagues in The Crediton Project (Wilkinson, Barnsley, Hanna & Swan, 1980). Wilkinson et al. (1980) developed a taxonomy of cognition in writing which evolved from questions concerning Piagetian theory's distinction between formal and operational thought, and the effect of chronological age on writing products. The taxonomy, designed to

measure cognitive activities in writing, was applied to the narrative and argumentative writing products of students (aged 7+, 10+, and 13+) participating in The Crediton Project.

Given the knowledge educators have regarding the effects of immersion education on English-language skills, and the need to consider cognition in writing as well as surface structures, and further given the basis for an instrument with which to measure cognitive activity in writing (Wilkinson et al., 1980), a study of the cognitive activities in immersion students' English-language writing measured in comparison with the cognitive activities in the writing of regular English students suggests itself as a reasonable undertaking.

Statement of the Problem

The initial purpose of this study was to look at the narrative and argumentative English-language writing of Grade 8 French immersion students in comparison with regular English students in terms of cognitive activity. This was to be done by utilizing the taxonomy of cognition in writing developed by Wilkinson et al. (1980). However, this taxonomy, although quite specific in nature, did not make allowances for certain features in students' writing, such as inadequate inferences, and opinions. Thus, a more complete and precise list of cognitive categories by which to measure cognitive activity in

writing needed to be developed and implemented in this study.

The study involved all the Grade 8 immersion students in the francophone schools in Windsor, and an equal random sample of anglophone students from regular English schools. The subjects wrote both narrative and argumentative papers, which were subsequently analyzed for cognitive activity according to the list of cognitive categories developed by the researcher.

The hypothesis tested was that there would be no significant difference at the .05 level (two-sided) between the two educational groups in terms of the cognitive activities found in the writing of the participating students.

Limitations

"Immersion education" relates to a situation in which the student is required to use in school a language that is different from that used in the home. According to Swain and Cummins (1979), immersion "refers to a situation in which children from the same linguistic and cultural background who have had no prior contact with the school language are put together in a classroom setting in which the second language is used as the medium of instruction" (p. 5).

Since some of the students who attend the French language schools of Windsor list French as their

mother tongue, the schools cannot, under Swain and Cummins' definition, be defined as immersion schools.

The anglophone students who attend these French-language schools can however be defined as "immersion" in that the language of instruction in the classroom is not their native language.

Thus with the understanding that they are involved in a special situation, for the purposes of this study, the anglophone students from the Windsor Separate School Board French-language schools were classified as "immersion students."

Although the cognitive categories developed for this study are listed alphabetically, this is purely arbitrary and not intended to suggest hierarchical levels of cognitive activities in writing. Further research would be needed before a hierarchical ranking of these categories could be developed.

Finally, no I.Q. scores were recorded for the students who participated in this study, and thus, it was not possible to determine if the students in the two educational groups were homogeneous as to I.Q., nor was it possible to look at the effect of I.Q. on individual performances. As such, there remains a possibility that any significant differences found between the two educational groups could have been attributable to I.Q.

Summary

Much of the writing research concerning the

effects of immersion education on English-language writing skills conducted to date has focussed on surface structures, yet other writing research has suggested the need to examine cognitive activity in writing. Attempts to measure cognitive activity in writing have, however, been limited in their application and the need for a more precise list of cognitive categories by which to measure cognitive activity in writing has developed. This study has combined these research needs by developing a more extensive list of cognitive categories by which to measure cognitive activity in writing, and implementing this instrument in a comparative study of the cognitive activities found in immersion and non-immersion students' narrative and argumentative English-language writing.

Review of Related Literature

Prior to the 1960's, it was commonly assumed that immersion education impeded academic and cognitive processes, and that native-language development would suffer if a significant amount of time was devoted to second language learning (Cummins, 1976, 1983). Thus, research studies into the effects of French immersion education over the past twenty years have focussed on three central issues: (1) how well do immersion students learn French? (2) does learning other subjects, such as math and science, in French impede the students' learning in those areas? and (3) how does immersion education affect the English-language skills of the students involved? Of these three questions, this study has concerned itself with the last--the effects of French immersion education on English-language skills.

Prior to the large-scale institutionalization of French immersion programs in Canada, it was generally assumed that there was a direct relationship between the amount of instructional time devoted to a language and achievement in that language (Cummins, 1983). Hence, an interest into the effects of immersion education on English-language proficiency has developed. This research interest has further been motivated by the underlying philosophy of French immersion education--that the immersion students'

education should be the same as that of students in regular English programs, with the only major difference being the language through which the teacher and students communicate in the classroom (Swain & Lapkin, 1979).

Studies of the effects of French immersion education on English-language skills have involved a variety of techniques. For example, some studies have looked at students' speaking and communication skills in English regarding such dimensions as overall expressive ability, enunciation, intonation, grammatical errors, number of words produced, word association tasks, and the speaker's sensitivity to the needs of listeners (Lambert & Tucker, 1972; Genesee, Lambert & Tucker, 1975). Lambert and Tucker (1972) studied the effects of immersion education on the speaking and communication skills of students to Grade 4 and concluded that the immersion students' word knowledge, word discrimination, language usage, reading ability, listening comprehension, and knowledge of concepts in English were at the same level as those of their English-educated peers. Genesee, Lambert and Tucker (1975) further asserted that the Kindergarten to Grade 2 students they studied not only used the language in the same way as their English-educated peers, but were more sensitive to the needs of listeners and had attained a higher level of social sensitivity than their English

counterparts.

Other immersion studies have asked parents to express their opinions on the effects of immersion education on English-language development (McEachern, 1980). The results of such studies have indicated that parents of children in French immersion programs do not feel their children's English-language development suffers due to their immersion experience whereas, despite consistent research results to the contrary, parents of children enrolled in English-language programs feel that their children might suffer academically in an immersion education program (McEachern, 1980). Other studies have focused on "cloze" procedures. In these tasks, students are provided with a sentence or complete text in which they must fill in missing items (words or grammatical endings on words). These tests determine an indication of a student's overall intuitive feeling for the language (Berko, 1958) and proficiency in that language (Lapkin & Swain, 1977). Generally, the results of these studies have indicated that there is nothing negative in providing initial education through the medium of a second or foreign language (Swain & Lapkin, 1979).

Despite the suggestion of the aforementioned studies that immersion education does not impede the students' development of English-language skills, the studies are limited in that they deal primarily with

oral language skills. This has prompted researchers to examine the question of the effects of immersion education on students' English-language writing skills.

The most common technique employed to study the English-language writing abilities of immersion students has been the comparison of French immersion students with regular English students of the same age and/or grade. The language sections of commercially available standardized tests such as The Metropolitan Achievement Tests, The Canadian Tests of Basic Skills, and The Peabody Picture Vocabulary Test have been used to measure such skills as vocabulary, spelling, and punctuation (Lambert, Tucker & d'Anglejan, 1973; Barik & Swain, 1978; Grobe, n.d.).

The earliest of these studies, that of Lambert, Tucker & d'Anglejan (1973), indicated that Grade 5 immersion students' performance in spelling, word usage and vocabulary was equivalent to that of regular English students. This assessment was supported by Grobe (n.d.) who studied the results of The New Brunswick Language Arts Criterion Referenced Test and reported that New Brunswick French immersion students at the Grade 5 level were equal, if not superior, to their English-educated peers. This similarity between immersion and regular English students was further supported by Barik and Swain

(1978) who studied immersion students at Grades 3 to 5 and concluded that while Grade 3 immersion students are behind regular English students in several English-language skills--capitalization, punctuation, language total--by Grade 5, the immersion students are ahead of their English counterparts in some language skills.

Although the results of studies using standardized tests have further indicated that immersion education does not impede the development of English-language skills, the studies are limited to such English-language skills as vocabulary, spelling and punctuation and do not look at actual writing performance. Very few studies have overcome this limitation by looking at actual writing, and those that have, have still placed an emphasis on surface structures. For example, some studies have asked students to write in English a short story about a picture or about one of several topics. The written texts have been scored by teachers of the appropriate grade level on two measures; a global overall impressionistic rating, and specific ratings according to such categories as spelling, sentence complexity and variety, organization, and originality (Genesee, 1974; Genesee & Stanley, 1976).

Genesee and Stanley (1976) studied the narrative compositions of fifty-four immersion students in Grade 4, twenty-six in Grade 6, one-hundred and

seventeen in Grade 7, and eighty-six in Grade 11, and looked at nine different dimensions of the students' writing. These dimensions included spelling, sentence accuracy, complexity and variety, organization, originality, length, punctuation, vocabulary and quality. The papers were rated superior, average or below-average for vocabulary; appropriate or inappropriate for the dimensions of length and punctuation; and 1 (excellent) to 5 (unsatisfactory) for the remaining six dimensions; however Genesee and Stanley did not give definitive examples of the rating terms or scales. The results of this study suggested "that no harmful effects had resulted to the English-writing skills of students participating in French immersion programs at either the elementary or secondary level" (Genesee & Stanley, 1976, p. 20).

Further studies have subjected students' writing to actual counts of errors in such areas as spelling, punctuation and word usage (Swain, 1975; Laing, in press).

Swain (1975) compared two short stories written by forty Grade 3 immersion students in response to provided pictures with those done by twenty-four children from regular English Grade 3 classes. The results indicated that the immersion students' writing compared "favourably with that of their English-instructed peers" (Swain, 1975, p. 19).

Laing's study (in press) further supports Genesee's and Swain's earlier findings. Laing's comparative study involves thirty-one immersion and thirty-three regular English Grade 8 students. The subjects wrote papers in two modes, narrative and argumentative, with assigned topics. The papers were analyzed for ~~overall~~ quality, syntactic maturity and surface feature control, revealing no significant difference on fifty writing variables. This finding supports other studies which have consistently shown that although immersion students tend to lag behind their English-educated peers in English language arts until formal English instruction is introduced (usually Grade 2 or Grade 3), they very quickly catch up and may even surpass their peers by Grade 5 or Grade 6 (Tremaine, 1975; Swain, 1978; Barik & Swain, 1978). The results of Laing's study also support Cummins' (1983) argument that, in the long run, the amount of instructional time spent in a second language has little effect on achievement in the native language.

Considering what writing research in general should involve beyond surface structures, Bereiter (1980) maintains that while frequency-count findings suggest quantitative trends in writing development, there are qualitative changes in the way children go about writing which need to be studied. Bereiter further asserts that students' writing reflects their

level of cognitive development (Bereiter, 1980). Thus, writing research should involve the study of cognition in writing.

To date, the most useful attempt to measure cognitive activity in writing has been that of Andrew Wilkinson and his colleagues in The Crediton Project (Wilkinson, Barnsley, Hanna & Swan, 1980). They developed a cognitive taxonomy designed to apply "to most forms of written discourse," and to explore the hypothesis that children's abilities with the written language vary markedly within chronological age groupings. The cognitive taxonomy consists of four main parts: describing, interpreting, generalizing, and speculating. This taxonomy evolved from an essential difference in Piagetian psychology between formal and operational thought--that the former is possibility invoking whilst the latter is tied to the here and now. Wilkinson et al. suggested that attempts at reasoning are a step away from describer thinking and attempts at speculating are a step away from reasoning. As such, interpretative statements--explaining, inferring, deducing--are considered more cognitively demanding than simple descriptive statements while speculative statements--hypotheses, exploring, projecting--are considered more cognitively demanding than interpretative statements. Thus, the interpreting category of the taxonomy was designed to account for

the concrete logic of childhood while the speculating category was more suited to the formal, possibility-invoking thoughts of adulthood.

The subjects of The Crediton Project, pupils at ages 7+, 10+, and 13+, each wrote four papers; an autobiographical narrative, an account of a process, a fictional story, and a discussion of an issue. The papers were subsequently analyzed for cognition, affect, moral issues and style.

For the narrative process segment, the subjects were asked to describe how to play a game. Younger children (age 7+) tended to focus their accounts on descriptions of the equipment used in the games, whereas older students (ages 10+, 13+) emphasized the rules of the game. This confirmed the suggestion of Wilkinson et al. that as children mature they begin to write more interpretative (explaining) statements and they develop a greater capacity for generalizing information and for decentring. Wilkinson et al. concluded that, cognitively, as children grow older, their capacity for producing reasonable descriptive, interpretative and generalizational statements improves.

The argument segment of the study required the subjects to discuss the topic "Would it work if children came to school when they liked and did what they liked there?" Although this is, in fact, two questions, Wilkinson et al. discovered that the

younger (age 7+) students failed to notice its two parts and answered "yes" or "no" at the outset, followed by attempts at logical reasoning for their statements. Students at this and older ages (10+, 13+) often wound up in self-contradiction. Wilkinson et al. concluded that the capacity to produce speculative cognitive statements--hypotheses, exploring, projecting--improves with age. Thus, Wilkinson et al. asserted that "older children decentre more, elaborate content more, generalize and hypothesize more, (and)... are beginning to move towards what Bruner (1975) terms 'analytic competence' with the language" (Wilkinson, et al., 1980, p. 130).

Given the knowledge educators have regarding the effects of immersion education on surface structures of English-language writing, and the detected similarities between immersion and regular English students, and further given the suggestion that there is more to writing research than skills analysis--specifically, cognition--it seems reasonable to conduct a study, using an instrument such as the cognitive taxonomy employed in The Crediton Project, which looks at the cognitive activities in the English-language writing of French immersion students in comparison with the cognitive activities in the writing of their English-educated peers. Further, in consideration of the results of

studies conducted to date concerning the effects of immersion education on English-language skills, it is reasonable to hypothesize that there will be no differences between the two educational groups in terms of cognitive activity within their English-language writing.

Procedures

The original intent of this study was to compare cognitive activities found in the narrative and argumentative English-language writing of French immersion and regular English students by using the cognitive taxonomy developed by Wilkinson et al. (1980). Having students write both narrative and argumentative papers enables them to write both as spectator and participant, and further gives an indication of which cognitive categories lend themselves to each mode of writing (Wilkinson, et al., 1980). When the taxonomy was applied to the students' papers, however, certain complications arose. A textual reference to a category which failed to exist within the taxonomy led to the discovery of other missing, yet pertinent, cognitive categories. Under the heading of interpretation, for example, Wilkinson only allows for "inferring", yet it was this researcher's observation that not all attempts at inference are adequate. Further, Wilkinson does not make allowances for writers' opinions (which would come under the heading of "generalizing"), yet this researcher noted writers who stated opinions freely within the argumentative mode. Thus, it was found propitious to develop a list of cognitive categories by which to measure cognitive activity in writing, which included these, and other, overlooked classifications.

Using the taxonomy from The Crediton Project as a base, and making reference to Joan Tough's (1976) classifications of oral language, this researcher wrote and tested four lists of cognitive categories by which to measure cognitive activity in writing before finally developing the list used for this study. A comparative look at the final list of cognitive categories used in this study, and those from which it evolved and drew reference is found in Appendixes A and B. Although some of the categories could be found within other lists of cognitive processes, others, such as inadequate inferences, opinions without supporting reasons and with inadequate reasons, illogical hypothetical statements, and logical hypothetical statements without supporting reasons, were initiated by this researcher and proved to be useful in assessing the cognitive activities in the writing of the subjects involved in this study. The lists of cognitive categories which were written and tested, and which ultimately led to the development of the list of cognitive categories used in this study are found in Appendix C.

Subjects

All the Grade eight students (N=65) in the four French-speaking schools of the Windsor Separate School Board and in four English-speaking schools (N=95) located in comparable geographic areas of the

city participated in the initial study (Laing, in press). For the purposes of the present study, two subgroups were established from this population.

(a) Immersion students (IMM); this subgroup consists of all the students in the French-speaking schools who claimed English as their mother tongue and who had been educated predominantly in French. Of the 33 students initially classified as IMM, two students who claimed both English and French as their mother tongues but spoke French predominantly in their homes were withdrawn, leaving a group of 31 subjects. Of these 31 subjects, 28 received their entire elementary education from kindergarten to Grade 8 in French-speaking schools, while the other 3 spent six years in immersion programs.

(b) Regular English Program Students (REG); this subgroup consists of a random sample of 30 students who claimed English as their native tongue. To eliminate the possibility of second-language interference, 27 students who reported a native language other than English, or who regularly used a second language at home, were eliminated from the pool of students from the English speaking schools before the sample was drawn.

Some students were absent on one or more of the four writing days with the results that in IMM, 27 narratives and 29 arguments were written, and in REG, 30 narratives and 28 arguments were submitted. In

the immersion group, 9 boys and 18 girls wrote narratives and 21 girls and 8 boys wrote arguments. The average age of the immersion students was 13.73. Of the regular English students, the entire group of 17 girls and 13 boys wrote narratives while 12 boys and 16 girls wrote arguments. The average age of the regular English students was 14.0. Descriptive statistics comparing the groups of students writing in each mode by sex and age are given in Table 1:

Table 1:
Mean Age in Years and Months
of Groups by Mode and Sex

		IMM			REG		
		F	M	T	F	M	T
Nar.	<u>n</u> 18		9	27	<u>n</u> 17	13	30
	M 13.68		13.74	13.73	M 13.95	14.10	14.0
Arg.	<u>n</u> 21		8	29	<u>n</u> 16	12	28
	M 13.73		13.68	13.73	M 13.95	14.09	14.0

It is commonly believed that students in immersion programs tend to come from privileged backgrounds. Employing a simplified version of the

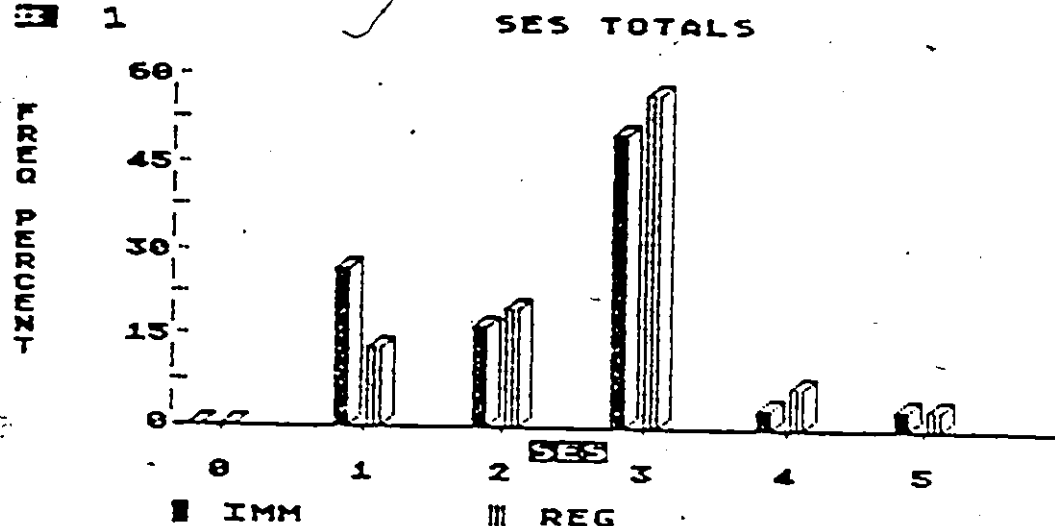
occupational categories and rankings of Pineo and Porter (1979), the subjects were rated by parental occupation on a five-point scale according to the following classifications:

1. Professionals, major proprietors, managers and officials, large; for example, university professors, ministers and priests, physicians, Federal civil service administrative officers, bank managers, mayors of large cities.
2. Semi-professionals, minor proprietors, managers and officials, small; for example, journalists, social workers, dental technicians, factory foremen, supermarket managers, members of city council.
3. Clerical and sales, skilled and semi-skilled workers; for example, bank tellers, supermarket cashiers, butchers, plumbers, bartenders, bus drivers.
4. Unskilled workers; for example, mailmen, garbage collectors, gas station attendants, waitresses, housekeepers, cab drivers.
5. Unemployed, welfare, retraining allowances, etc.

In cases where parents were employed at different levels, subjects were placed in the higher SES classification. Subjects in single-parent homes were rated according to the parent they lived with. A bar

graph depicting the socio-economic status of the participating students in each educational group is found in Figure 1.

FIGURE
1



As Figure 1 indicates, the immersion and regular groups are remarkably close in socioeconomic profile.

Writing Procedures of the Participating Students

The grade 8 students were asked to write two compositions, one narrative, the other argumentative, two weeks apart in May and June (1984) under the supervision of the regular classroom teachers. Both writing stimuli were taken from the Ontario Assessment Instrument Pool (Ministry of Education, Ontario, 1982). The narrative stimulus suggested as a possible title, "Trouble Always Starts When _____ Is Around." The argument stimulus asked, "Should Young Teenagers be Spanked?" and students were asked to consider both sides of the question, and to

suggest any ideas that seemed reasonable to them. The students were encouraged to discuss both topics amongst themselves before they began to write. The use of dictionaries and other standard classroom reference materials was permitted. Forty-five minutes were given on the first day for an initial draft, which was then collected. On the second day, an additional forty-five minutes were provided for revising and polishing the draft into final form. After the writing sessions, the papers, identified only by number and written on standard school foolscap, were taken to the university, photocopied, and returned directly to the teachers for purposes within their own classroom writing programs.

Coding Procedures

The researcher and an outside reader, both qualified teachers, independently analyzed the narrative and argumentative compositions of the participating students according to the list of cognitive categories found in Appendix A. Each sentence was coded according to the list of cognitive categories with an "N" or an "A" preceding the code to identify narrative and argumentative papers respectively. Sentence fragments and garbled sentences were disregarded while run-on sentences were coded as single units. The results of the two readers were compared and produced the following levels of agreement:

Table 2
Agreement

Papers	% Agreement
IMM Narratives	96.43
REG Narratives	97.96
IMM Arguments	89.24
REG Arguments	93.31

The majority of discrepancies involved situations in which a reader had simply missed the "because clause" stated within an opinion, had overlooked the "if...then" of a hypothetical situation, or had indicated that a statement was present tense when it was in fact written in the past tense. The sentences upon which the two readers did not initially agree were discussed and 100% agreement was readily reached.

Results and Discussion

The statistical tests used to analyze the data were chi-square for homogeneous and inhomogeneous variances, and t -tests. An F-test was used to determine the use of the pooled or unpooled t for all of the variables within each of the t -tests performed. Further, t was always analyzed on a two-sided scale.

The result of a chi-square test indicated that the two educational groups were homogeneous with respect to sex ($\chi^2 = .60$) and socio-economic status (SES) ($\chi^2 = 1.72$) ($p > .05$). Thus, any significant differences between the two educational groups in terms of cognitive activity cannot be attributed to sex or SES.

The Effect of Educational Group

The effect of educational group on cognitive activities in writing also proved to be generally non-significant with the exceptions being NAB, narrative recording in the present tense; AAB, argument recording in the present tense; NBA, narrative explaining; and ADD, argument exploratory statements, all of which were significant at .05, with NAB even proving significant at .01 (see Tables 3 - 7). NAB, narrative reporting in the present tense, NBA, narrative explaining, and AAB, argument recording in the present tense were written more

TABLE 3
EFFECT OF EDUCATIONAL GROUP ON DESCRIPTION

Var.	IMM		REG		<u>t</u>
	Mean	S.D.	Mean	S.D.	
NAA	-	-	0.10	0.31	n.a.
AAA	0.03	0.19	0.04	0.19	0.02
NAB	4.70	5.30	1.73	2.08	2.73 **
AAB	0.83	1.14	0.29	0.81	2.08 *
NAC	18.70	12.30	24.13	16.26	1.41
AAC	1.14	3.26	0.54	1.71	.88

* significant at .05 (two-sided)
 ** significant at .01 (two-sided)
 n.a. t not available because one group
 did not produce this variable

TABLE 4
EFFECT OF EDUCATIONAL GROUP ON INTERPRETATION

Var.	IMM		REG		<u>t</u>
	Mean	S.D.	Mean	S.D.	
NBA	0.63	0.84	0.20	0.41	2.42 *
ABA	-	-	-	-	n.a.
NBB	0.04	0.19	0.17	0.46	1.41
ABB	0.10	0.31	0.04	0.19	1.00
NBC	0.11	0.42	-	-	n.a.
ABC	0.17	0.47	0.21	0.69	0.27
NBD	0.04	0.19	0.03	0.18	0.07
ABD	-	-	-	-	n.a.

* significant at .05 (two sided)
n.a. t not available because one group did not produce this variable

TABLE 5
EFFECT OF EDUCATIONAL GROUP ON EVALUATION

Var.	IMM		REG		<u>t</u>
	Mean	S.D.	Mean	S.D.	
NCA	-	-	0.10	0.40	n.a.
ACA	-	-	-	-	n.a.
NCB	-	-	-	-	n.a.
ACB	-	-	-	-	n.a.
NCC	0.19	0.48	-	-	n.a.
ACC	0.07	0.26	-	-	n.a.
NCD	0.81	1.00	1.43	1.79	1.63
ACD	10.34	5.65	9.57	5.00	0.55
NCE	-	-	-	-	n.a.
ACE	0.72	0.92	0.43	0.92	1.21
NCF	0.04	0.19	0.03	0.18	0.07
ACF	0.34	0.77	0.43	0.74	0.42
NCG	0.04	0.19	0.03	0.18	0.07
ACG	-	-	0.07	0.38	n.a.
NCH	0.04	0.19	0.03	0.18	0.07
ACH	-	-	-	-	n.a.

n.a. t not available because one or both groups did not produce this variable

TABLE 6
EFFECT OF EDUCATIONAL GROUP ON SPECULATION

Var.	IMM		REG		<u>t</u>
	Mean	S.D.	Mean	S.D.	
NDA	-	-	-	-	n.a.
ADA	0.21	0.41	0.54	1.14	1.44
NDB	-	-	-	-	n.a.
ADB	0.41	0.68	0.71	0.94	1.38
NDC	-	-	-	-	n.a.
ADC	0.21	0.49	0.07	0.26	1.30
NDD	-	-	0.10	0.40	n.a.
ADD	0.41	1.12	1.32	2.11	2.02 *

* significant at .05 (two-sided)
n.a. t not available because one or
both groups did not produce
this variable

TABLE 7
EFFECT OF EDUCATIONAL GROUP ON STATEMENT TOTALS

Var.	IMM		REG		<u>t</u>
	Mean	S.D.	Mean	S.D.	
NTOT	25.33	11.46	28.10	16.17	.75
ATOT	15.00	6.13	14.25	6.05	.46

often by the immersion students while ADD was found more frequently in the papers of the regular students (see Tables 3, 4 and 5).

Although writing in the present tense (NAB) did occur within both groups in the narrative papers, and the immersion students wrote a greater number of this type of statement, writing narratively in the present tense was far less common than was writing narratively in the past tense (NAC) (see Table 3).

Writing argumentatively in the present tense (AAB) was also an infrequent occurrence although immersion students did write more of these types of statements than did their English-educated counterparts (see Table 3). Immersion students also wrote more narrative explanatory statements (NBA) than did their counterparts. An example of an explanatory statement is "I just ignore him because if I say something to my mom or hit him or yell at him or even get him back my mom will get mad..." Although immersion students wrote more of these statements, neither group wrote a great number of them in comparison with the results for recording or reporting (see Tables 3 and 4).

Regular students wrote more exploratory statements in the argument mode (ADD) than did their immersion counterparts. These are speculative situations in which the writer creates a scenario for the reader or questions a current situation; for example, "why don't they take time to discuss and

solve the problem without physical punishment?" Despite the significantly higher score for the regular students, the high standard deviations for both groups indicate that some students wrote a lot of exploratory statements in their argument papers while others wrote none at all (see Table 6).

Although four cognitive variables proved to be significant as to educational group, and three of these four types of statements were written more often by the immersion students, the four variables were only four of forty, and, with the exception of NAB, narrative recording in the present tense (written more often by the immersion students), these statements were not written frequently by either group. Thus, it can be asserted that any differences between the two educational groups in terms of cognitive activity in their narrative and argumentative English-language writing were not of educational significance.

Types of Cognitive Statements Written

Narratively, the most common cognitive statement written by both groups was NAC, reporting in the past tense. The immersion students wrote 73.16 reporting statements and the regular students wrote 85.59 per 100 statements (see Figures 2 and 3). Given the suggested topic, "Trouble Always Starts When _____ Is Around", and further given the fact that many fictional children's stories are written in the past

tense, it is not surprising that reporting in the past tense was the most frequently written type of statement in the narrative papers.

The next most frequently written statements for both groups were NAB, recording in the present tense, with immersion students writing 19.04 and regular students writing 6.30 per 100 statements [note, although this was the second most common type of narrative cognitive statement written by both groups, the immersion students wrote significantly more narrative recording statements than did their regular counterparts (see Table 3)]. The greater number of NAB, recording in the present tense, statements written by immersion students was indicative of a pattern detected amongst immersion students - that of inserting present tense statements and dialogue into a story written in the past tense; for example, "'A ton of sugar' I said lazily. All the while she is waving the eraser around while I'm trying to grab it. 'A mountain of whipped cream' she continues..."

Both educational groups also produced quite a few NCD, opinions, judgements and suggestions without supporting reasons, statements; the immersion students produced 3.30 and the regular students 5.21 per 100 statements. The immersion students also produced a significantly greater number of NBA, explanatory, statements (see Table 4 and Figures 2 and 3).

In the argumentative mode, the cognitive statements most frequently written by both groups were ACD, opinions, judgements or suggestions without supporting reasons. The immersion students produced 67.64 and the regular students wrote 67.20 opinions without supporting reasons per 100 statements (see Figures 4 and 5). The students in both groups also wrote quite a few ACE, opinions with inadequate reasons, and ACF, opinions with adequate reasons, statements. The regular students produced 3.00 of both ACE and ACF per 100 statements while the immersion students wrote 5.02 and 2.40 respectively per 100 statements (see Figures 4 and 5). Other frequently found statements were AAC, reporting in the past tense, often found when the authors were creating scenarios to support their arguments (see Figures 4 and 5). Finally, the immersion students did write significantly more AAB, recording in the present tense, and ADD, speculative exploratory statements than did the regular students (see Tables 3 and 6, and Figures 4 and 5).

Types of Cognitive Statements not Written

There were some types of statements which no-one wrote in either educational group. They were as follows:

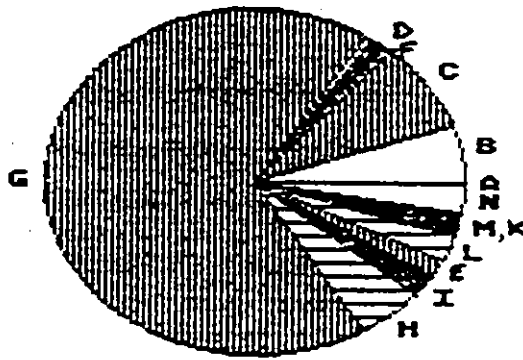
NCE - Narrative opinions with inadequate reasons

NDA - Narrative illogical hypothetical

FIGURE
3-4

IMMERSION STUDENTS

39

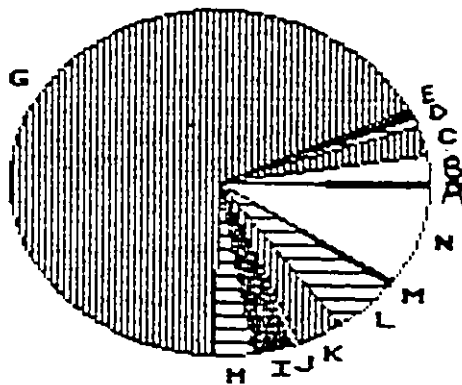


FUNCTION	PERCENT
A::	0000
B::	0000
C::	0000
D::	0000
E::	0000
F::	0000
G::	0000
H::	0000
I::	0000
J::	0000
K::	0000
L::	0000
M::	0000
N::	0000
O::	0000
P::	0000
Q::	0000
R::	0000
S::	0000
T::	0000
U::	0000
V::	0000
W::	0000
X::	0000
Y::	0000
Z::	0000
OTHERS	0000

ARGUMENT PAPERS

FIGURE
3-5

REGULAR STUDENTS



FUNCTION	PERCENT
A::	0000
B::	0000
C::	0000
D::	0000
E::	0000
F::	0000
G::	0000
H::	0000
I::	0000
J::	0000
K::	0000
L::	0000
M::	0000
N::	0000
O::	0000
P::	0000
Q::	0000
R::	0000
S::	0000
T::	0000
U::	0000
V::	0000
W::	0000
X::	0000
Y::	0000
Z::	0000
OTHERS	0000

ARGUMENT PAPERS

statements

NDB - Narrative logical hypothetical

statements

NDC - Narrative logical hypothetical

statements with supporting

reasons

ABA - Argument explaining statements

ABD - Argument deducing statements

ACA - Argument abstracting statements

ACH - Argument reflecting statements

In the narrative mode it is reasonable that the students would not write speculative hypothetical statements (logical or otherwise) as hypothetical statements lend themselves more to the argumentative mode. Generalizing statements such as opinions with inadequate reasons are also more likely to be found in the argumentative mode, and although the students did write some opinions and opinions with adequate reasons in their narrative papers, they wrote very few of them (see Table 5).

In the argumentative mode, it is equally reasonable that students would not write interpretative explanatory, or evaluative abstracting statements as these are more suited to narrative writing. On the other hand, deducing and reflecting are very well suited to argument writing. However, these particular students did not make use of these devices within their argument papers.

Deducing, as defined within the list of cognitive categories found in Appendix A, starts with a judgement or abstraction and draws a conclusion from it. These particular students tended to focus solely upon their judgements (ACD) or inferences (ABC) and did not expand upon them to develop conclusions and deductions. Further, although some students did refer to external principles such as "Spare the Rod and Spoil the Child," they were presented simply as recording statements and were not reflected upon in any way.

No writer from either group summarized in either their narrative or argument papers. Narratively, the authors may have felt that since the stories were fairly short, and were fictional, a summary was unnecessary. For argument papers, the authors often summarized their ideas by restating their hypothesis, which more often than not took the form of an opinion; for example, "As I said, in my opinion, teenagers should not be spanked."

Just as the aforementioned statements were not written by students in either educational group, there were some types of statements which no-one wrote in just one of the educational groups. For example, the immersion students did not write any narrative statements which only listed partial descriptive information (NAA), nor did they write any narrative abstractions (NCA) (see Tables 3 and 5).

Further, immersion students did not evaluate situations in their argument papers (ACG) or write exploratory statements in their narrative papers (NDD) (see Tables 5 and 6). Regular students did not write any adequate inferences in their narrative papers (NBC) (although they did write a few inadequate ones), nor did they write any conclusions in their argument papers (ACC) (see Tables 4 and 5). In no case, where one group did not write a particular type of statement did the other group write more than a mean of .1 of that kind of statement.

Summary

In relation to cognitive activities in the narrative and argumentative writing of students in the two educational groups, only four of forty cognitive variables were found to be significant at the .05 level. Of these four types of statements, only one was written with any frequency by the two educational groups, and the comparison favours the immersion students. Thus, these results add a new dimension to the view that immersion education does not affect the achievement of native-language proficiency.

Conclusion

It must be reiterated that since the I.Q. scores of the participating students were not recorded, the results of this study may not be absolute. Further, as only one grade has been studied, this study cannot confirm the results of previous immersion studies which suggest that comparative differences vary with grade level (Lambert, Tucker & d'Anglejan, 1973; Genesee, 1974; Tremaine, 1975; Genesee & Stanley, 1976; Swain, 1978; Barik & Swain, 1978). Further, the taxonomy developed by Wilkinson et al. (1980) was designed to be applied to students at various grade levels; however the list of cognitive categories developed for, and implemented in, this study can only be said to be successful for analyzing cognitive activities in the writing of students at the Grade 8 level. It must also be noted that, although there is no evidence to substantiate it, there exists a possibility that the participating students were unique in their cognitive activities.

Nonetheless, the results of this study do suggest that students in the two educational groups are very similar in cognitive activities in both narrative and argumentative writing.

Recommendations for Future Research

Future studies of cognitive activity in writing need to be conducted to determine the scope and applicability of the list of cognitive activities

designed by the researcher. Further studies in this area also need to consider the development of a hierarchical ranking of these categories, and the effects, if any, of I.Q. on cognitive activity in writing.

Another area which requires future study is that of the effects of age and grade level on cognition in writing. Just as the taxonomy of Wilkinson et al. (1980) was designed to be applied to writers of all ages, the list of cognitive categories developed for this study needs to be applied to writers at different age and grade levels. Comparative studies of cognitive activities in the writing of grade school, high school, and adult writers could initiate a hypothesis of age and cognition in writing, and could also aid in the development of a hierarchical ranking of cognitive activities.

Future immersion research also needs to consider the effects of age and grade level on cognition in writing. As previous immersion studies have indicated, immersion students' abilities with the English language vary at different grade levels (Lambert, Tucker & d'Anglejan, 1973; Genesee, 1974; Tremaine, 1975; Genesee & Stanley, 1976; Swain, 1978; Barik & Swain, 1978). Thus, studies of cognitive activities in the English-language writing of immersion students at various grade levels need to be conducted.

Finally, research into the effects of immersion education on all aspects of English-language abilities needs to be applied to post-Grade 8 students.

APPENDIX A

List of Cognitive Categories

A) Description

- AA) Partial Information: some concrete detail given, but unorganized; for example, "When I got there I saw the red thing."
- AB) Recording: concrete statements about the here and now. Statements are in the present tense.
- AC) Reporting: concrete statements about events that have already transpired. Statements are in the past tense.

B) Interpretation

- BA) Explaining: why something is so. This includes accepted truths; for example, "I lived with my father because my mother died." The clause "because my mother died" is the explanatory clause. Explaining can also include descriptions of how something is done.
- BB) Inadequate inference: an inference based on unwarranted evidence. The physical evidence does not support the inference; for example, "He's alone and he's quiet so he must be crazy."
- BC) Inference: a reasonable reached conclusion based on physical evidence; for example, "He's alone and he's quiet so he is probably unhappy."
- BD) Deducing: thought processes which go from a general conclusion (accepted) to a specific idea through deductive reasoning; for example, "My sister's friends are wild and do drugs, so my sister is wild and does drugs also." Starts with a judgement or abstraction and draws a conclusion from it.

- C) Evaluating (Generalizing)
- CA) Abstracting: using abstract terms as well as concrete ones. This also includes the use of analogies.
- CB) Summarizing: a recapitulation of events.
- CC) Concluding: a stated end result; for example, "I'm not friends with her anymore."
- CD) Opinions: opinions, judgements, or suggestions with unstated reasons; for example, "I don't think we should be spanked." This also includes rhetorical questions answered directly in the text.
- CE) Opinions with inadequate reasons: opinions, judgements, or suggestions with inadequate reasons; for example, "...they should be spanked because they don't care that you spank them."
- CF) Opinions with adequate reasons: opinions, judgements, or suggestions with adequate reasons. Refers to outside experiences; for example, "Teenagers shouldn't be spanked because it might be mistaken for child abuse."
- CG) Evaluation: an assessment of overall experience. A stated end result with explanatory sentences; for example, "I'm not friends with her anymore because she was a bad influence on me."
- CH) Reflecting: generalizing with reference to external principles; for example, "I didn't take anything because it is wrong to steal."

D) Speculating

- DA) Illogical hypothetical statements: for example, "If we were to be spanked, we would fail our courses."
- DB) Logical hypothetical statements: logical statements without supporting reasons; for example, "If teens are spanked, it might be confused with child abuse."
- DC) Logical hypothetical statements with supporting reasons: for example, "If teens are spanked, it might be confused with child abuse, because the parent might get carried away while hitting the child."
- DD) Exploratory statements: for example, "Now, take the case of the teen..."

APPENDIX B

A Comparative Look at the List of Cognitive Categories
used in this study with the Cognitive Taxonomies from
which it evolved and drew reference

<u>Tough</u>	<u>Wilkinson</u>	<u>Current List</u>
self-maintaining directing		
	DESCRIPTION	DESCRIPTION
	-labelling	
	-naming	
	-partial information	-partial information
	-recording	-recording
REPORTING	-reporting	-reporting
TOWARDS REASONING	INTERPRETATION	INTERPRETATION
-explaining	-explaining	-explaining
		-inadequate inference
-recognizing causal and dependent relationships	-inferring	-adequate inference
	-deducing	-deducing
	GENERALIZING	GENERALIZING
	-abstracting	-abstracting
	-summarizing	-summarizing
	-evaluating	-evaluation
	-concluding	-concluding
		-opinions without reasons
		-opinions with inadequate reasons
-justifying judgements		-opinions with adequate reasons
-reflecting -recognition of principles	-reflecting	-reflecting

PREDICTING

-anticipating
problems
and
solutions

-projecting

IMAGINING

SPECULATING

-irrelevant
hypothesis
-inadequate
hypothesis
-adequate
hypothesis

-exploring

-projecting

THEORIZING

SPECULATING

-illogical
hypothetical
statements
-logical
hypothetical
statements
without
reasons
-logical
hypothetical
statements
with
reasons
-exploratory
statements

APPENDIX C

Development of the List of Cognitive Categories

List 1A Description

- AA) Labelling: using simple concept words; for example, man, book, etc.
- AB) Naming: using specific words; for example, Mr. Jones, "War and Peace".
- AC) Partial information: some concrete detail given, but unorganized; for example, "When you get to near the red circle, you would of got caught."
- AD) Recording: concrete statements about the here and now.
- AE) Reporting: linking between statements in chronological / spatial sequence; for example, "I did this, then I did that."

B) Interpretation

- BA) Explaining: why something is so. This includes accepted truths; for example, "I lived with my father because my mother died." Explaining can also include descriptions on how something is done.
- BB) Inference: a reached conclusion based on evidence; for example, "He's alone and he's quiet, therefore he's unhappy."
- BC) Deducing: thought processes which go from a general conclusion (accepted) to a specific idea through deductive reasoning; for example, "My sister's friends are wild. Those friends do drugs. Therefore my sister is wild and does drugs also."

C) Evaluating (Generalizing)

- CA) Abstracting: using abstract terms as well as concrete ones; for example, people, the players. This also includes the use of analogies.
- CB) Summarizing: a recapitulation of events
- CC) Concluding: a stated end result; for example, "I'm not friends with her anymore."
- CD) Evaluation: a stated end result with explanatory sentences or phrases; for example, "I'm not friends with her anymore because she was a bad influence on me."
- CE) Reflecting: generalizing with reference to external principles; for example, "I didn't take anything because it's wrong to steal."
- CF) Classifying: usually found in explanatory writing. The writer divides his explanations into sub-groups and categories.

- D) Speculating
- DA) Irrelevant hypothesis: for example, if we didn't come to school we would get sick and die.
- DB) Relevant but inadequate hypothesis: an acceptable hypothesis which lacks supporting evidence; for example, "some parents think that spanking their children will teach them a lesson, but it won't."
- DC) Adequate hypothesis: an acceptable hypothesis with supporting evidence; for example, "When you hit a teenager, it's not as effective as hitting a young child because teens are less bothered by the pain."
- DD) Exploring: asking tentative but relevant questions; for example, "what would happen if..." This can also include hypothetical situations.
- DE) Projecting: a set of organized hypotheses about a possible future solution to a problem.
- DF) Theorizing: sustained hypotheses linked through hypothetico-deductive reasoning.

List 2A) Description

- AA) Labelling: using simple concept words; for example, man, book, etc.
- AB) Naming: using specific words; for example, Mr. Jones, "War and Peace".
- AC) Partial information: some concrete detail given, but unorganized; for example, "When you get to near the red circle, you would of got caught."
- AD) Recording: concrete statements about the here and now written in present tense.
- AE) Reporting: statements about past events written in the past tense.

B) Interpretation

- BA) Explaining: why something is so. This includes accepted truths; for example, "I lived with my father because my mother died." Explaining can also include descriptions on how something is done.
- BB) Inference: a reached conclusion based on evidence; for example, "He's alone and he's quiet, therefore he's unhappy."
- BC) Deducing: thought processes which go from a general conclusion (accepted) to a specific idea through deductive reasoning; for example, "My sister's friends are wild. Those friends do drugs. Therefore my sister is wild and does drugs." Starts with a judgement and draws a conclusion from it.

- C) Evaluating (Generalizing)
- CA) Abstracting: using abstract terms as well as concrete ones; for example, people, the players. This also includes the use of analogies.
- CB) Summarizing: a recapitulation of events
- CC) Concluding: a stated end result; for example, "I'm not friends with her anymore."
- CD) Opinions: for example, "I think we shouldn't be spanked."
- CE) Evaluation: a stated end result with explanatory sentences or phrases; for example, "I'm not friends with her anymore because she was a bad influence on me."
- CF) Reflecting: generalizing with reference to external principles; for example, "I didn't take anything because it's wrong to steal."

D) Speculating

- DA) Irrelevant hypothesis: for example, if we didn't come to school we would get sick and die.
- DB) Relevant but inadequate hypothesis: an acceptable hypothesis which lacks supporting evidence; for example, "some parents think that spanking their children will teach them a lesson, but it won't."
- DC) Adequate hypothesis: an acceptable hypothesis with supporting evidence; for example, "When you hit a teenager, it's not as effective as hitting a young child because teens are less bothered by the pain."
- DD) Exploring: asking tentative but relevant questions; for example, "what would happen if..." This can also include hypothetical situations.
- DE) Projecting: a set of organized hypotheses about a possible future solution to a problem.
- DF) Theorizing: sustained hypotheses linked through hypothetico-deductive reasoning.

List 3A) Description

- AA) Labelling: using simple concept words; for example, man, book, etc.
- AB) Naming: using specific words; for example, Mr. Jones, "War and Peace".
- AC) Partial information: some concrete detail given, but unorganized; for example, "When you get to near the red circle, you would of got caught."
- AD) Recording: concrete statements about the here and now written in present tense.
- AE) Reporting: statements about past events written in the past tense.

B) Interpretation

- BA) Explaining: why something is so. This includes accepted truths; for example, "I lived with my father because my mother died." Explaining can also include descriptions on how something is done.
- BB) Inadequate inference: a reached conclusion based on physical evidence; for example, "He's alone and he's quiet, therefore he's crazy."
- BC) Inference: a reached conclusion based on evidence; for example, "He's alone and he's quiet, therefore he's unhappy."
- BD) Deducing: thought processes which go from a general conclusion (accepted) to a specific idea through deductive reasoning; for example, "My sister's friends are wild. Those friends do drugs. Therefore my sister is wild and does drugs." Starts with a judgement and draws a conclusion from it.

C) Evaluating (Generalizing)

- CA) Abstracting: using abstract terms as well as concrete ones; for example, people, the players. This also includes the use of analogies.
- CB) Summarizing: a recapitulation of events
- CC) Concluding: a stated end result; for example, "I'm not friends with her anymore."
- CD) Opinions: for example, "I think we shouldn't be spanked."
- CE) Evaluation: a stated end result with explanatory sentences or phrases; for example, "I'm not friends with her anymore because she was a bad influence on me."
- CF) Judgements: judgements with unstated reasons (explanatory). Refers to experiences beyond the here and now.
- CG) Reflecting: generalizing with reference to external principles; for example, "I didn't take anything because it's wrong to steal."

D) Speculating

DA) Irrelevant hypothesis: for example, if we didn't come to school we would get sick and die.

DB) Relevant but inadequate hypothesis: an acceptable hypothesis which lacks supporting evidence; for example, "some parents think that spanking their children will teach them a lesson, but it won't."

DC) Adequate hypothesis: an acceptable hypothesis with supporting evidence; for example, "When you hit a teenager, it's not as effective as hitting a young child because teens are less bothered by the pain."

DD) Exploring: asking tentative but relevant questions; for example, "what would happen if..." This can also include hypothetical situations.

DE) Projecting: a set of organized hypotheses about a possible future solution to a problem.

DF) Theorizing: sustained hypotheses linked through hypothetico-deductive reasoning.

List 4A) Description

- AA) Partial Information: some concrete detail given, but unorganized; for example, "When I got there I saw the red thing."
- AB) Recording: concrete statements about the here and now. Statements are in the present tense.
- AC) Reporting: concrete statements about events that have already transpired. Statements are in the past tense.

B) Interpretation

- BA) Explaining: why something is so. This includes accepted truths; for example, "I lived with my father because my mother died." The clause "because my mother died" is the explanatory clause. Explaining can also include descriptions on how something is done.
- BB) Inadequate inference: an inference based on unwarranted evidence. The physical evidence does not support the inference; for example, "He's alone and he's quiet so he must be crazy."
- BC) Inference: a reached conclusion based on physical evidence; for example, "He's alone and he's quiet so he is probably unhappy."
- BD) Deducing: thought processes which go from a general conclusion (accepted) to a specific idea through deductive reasoning; for example, "My sister's friends are wild and do drugs, so my sister is wild and does drugs also." Starts with a judgement or abstraction and draws a conclusion from it.

C) Evaluating (Generalizing)

- CA) Abstracting: using abstract terms as well as concrete ones. This also includes the use of analogies.
- CB) Summarizing: a recapitulation of events.
- CC) Concluding: a stated end result; for example, "I'm not friends with her anymore."
- CD) Opinions: opinions, judgements, or suggestions with unstated reasons; for example, "I don't think we should be spanked." This also includes rhetorical questions answered directly in the text.
- CE) Opinions with reasons: opinions, judgements, or suggestions with supporting reasons. Refers to outside experiences; for example, "Teenagers shouldn't be spanked because it might be mistaken for child abuse."
- CF) Evaluation: an assessment of overall experience. A stated end result with explanatory sentences; for example, "I'm not friends with her anymore because she was a bad influence on me."
- CG) Reflecting: generalizing with reference to external principles; for example, "I didn't take anything because it is wrong to steal."

D) Speculating

- DA) Irrelevant hypothesis: for example,
if we didn't come to school we
would get sick and die.
- DB) Relevant but inadequate hypothesis:
an acceptable hypothesis which lacks
supporting evidence; for example,
"some parents think that spanking
their children will teach them a
lesson, but it won't."
- DC) Adequate hypothesis: an acceptable
hypothesis with supporting evidence;
for example, "When you hit a
teenager, it's not as effective as
hitting a young child because teens
are less bothered by the pain."
- DD) Exploring: asking tentative but relevant
questions; for example, "what would
happen if..." This can also include
hypothetical situations.
- DE) Projecting: a set of organized hypotheses
about a possible future solution to
a problem.
- DF) Theorizing: sustained hypotheses linked
through hypothetico-deductive reasoning.

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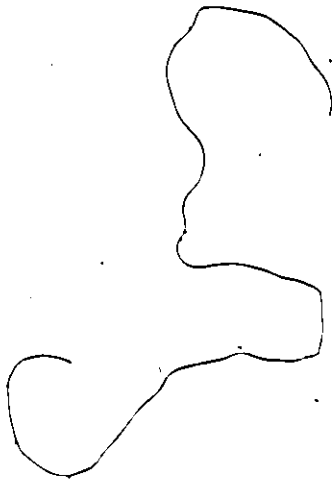
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VITA AUCTORIS

Amanda Margaret Dibbs was born in Driffield, England in 1962. After immigrating to Canada, she received her elementary and secondary education in the public schools of London, Ontario. In 1980 she entered the University of Western Ontario, graduating three years later with a B.A. in History. In the academic year 1983-84 she completed the B.Ed. degree at the University of Windsor, where she continued as a graduate student in the Faculty of Education supported by the Gregory Blake Nephew Memorial Scholarship.

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