

Language Proficiency, Bilingualism and French Immersion*

Jim Cummins

the ontario institute for studies in education

The impact of Canadian French immersion research on theoretical conceptions of bilingualism and biliteracy is reviewed and four major issues on which immersion research has had a significant impact are identified. These are: (1) the effects of bilingualism on children's cognitive and academic development; (2) the effects of intensity of school exposure to the second language (L2) on children's L1 and L2 development; (3) the "optimal age" issue in L2 learning; and (4) the suitability of a home-school language switch for all children. Contrary to many earlier assumptions, Canadian immersion research findings suggest that: (1) cognitive advantages may accrue to children who develop high levels of bilingual skills; (2) amount of instructional time through the minority language is generally related to achievement in that language but unrelated to achievement in the majority language; (3) older learners make more rapid progress than younger learners in acquiring L2 cognitive and academic skills; and (4) there is no evidence that immersion programs are unsuitable for any identifiable category of students. These findings are interpreted in the light of a theoretical framework for examining the relationships between language proficiency, bilingualism and academic achievement.

Cet article traite des recherches qui ont été faites au Canada sur les programmes de français par immersion. On y analyse leur impact sur notre compréhension du bilinguisme et sur le rôle qu'il joue dans le domaine de l'éducation. Les quatre domaines majeurs où cet impact a été le plus marqué sont les suivants: (1) les effets du bilinguisme sur le développement cognitif et académique des enfants; (2) les effets de l'intensité de l'exposition à L2 sur le développement L1 et L2 des enfants; (3) le problème de "l'âge optimal" dans l'apprentissage de L2; (4) la pertinence d'un changement de langue, de la maison à l'école, pour tous les enfants. Contrairement à de nombreuses opinions préconçues, les résultats des recherches sur les programmes d'immersion au Canada suggèrent que: (1) les enfants qui arrivent à maîtriser assez bien deux langues sont avantagés sur le plan de la connaissance; (2) le temps consacré à l'enseignement par l'intermédiaire de la langue de la minorité est généralement lié à la réussite dans cette langue, mais sans rapport avec la réussite dans la langue de la majorité; (3) les étudiants plus âgés progressent plus rapidement que les jeunes étudiants lorsqu'il s'agit d'acquérir une compétence cognitive et académique en L2; (4) les programmes d'immersion conviendraient vraisemblablement à toutes les catégories d'étudiants. On suggère que ces résultats soient interprétés suivant un modèle théorique de compétence linguistique en tenant compte des dimensions trans-linguistiques du modèle, lequel pose en principe: (a) une distinction entre compétence cognitive et académique dans une langue et, d'autre part, les talents élémentaires de communication interpersonnelle en L1 et L2; (b) une interdépendance entre L1 et la compétence (cognitive/académique) linguistique de L2.

In reading through the vast number of Canadian research articles on French immersion written during the past 15 years, one could easily gain

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the impression that immersion education was “discovered” in Canada. In fact, many North American educators and parents assume that this is the case and that immersion education began in the mid-sixties with the St Lambert program in the Montreal region. This, of course, is completely wrong. Immersion education, in the sense of a switch between the language of the home and the language of the school, goes back to ancient times (Lewis, 1977). Programs involving a home-school language switch are extremely common in the world today and large-scale experiments were carried out in many countries prior to the Canadian experiment (e.g. Ireland, Philippines, several African countries).

However, what makes the Canadian experience unique is the systematic evaluation of the educational consequences of a home-school language switch. French immersion programs have spread extremely rapidly across Canada, not so much because they have succeeded in transmitting high levels of French proficiency to students at no cost to other academic skills, but because they have been *seen* to have succeeded. The importance of research in this regard can be seen by contrasting the Canadian experience with that of Ireland, where in the early 1920s, shortly after independence from Britain, a large-scale effort was made to revive Irish (Gaelic) by using it as a medium of instruction in schools for students from English homes. The number of “all-Irish” or immersion schools grew to over 300 in the late 1930s but have declined steadily since then until they number only about 20 today (Cummins, 1978). A major contributor to the decline in the number of Irish immersion schools was the perception by both teachers and parents that children did not do as well academically when taught through Irish (see Committee on Irish Language Attitudes Report, 1977). However, evidence from recent studies does not support these beliefs. As in Canadian programs, it has been found that children’s second language (L2) skills benefited significantly from immersion and at no cost to their first language proficiency (Cummins, 1977(a), 1977(b), 1978(b); Macnamara, 1966).¹

Thus, research has played a crucial role both in the spread of French immersion programs across Canada and in establishing the Canadian experiment as one of the most significant innovations in second-language teaching in this century. I shall discuss what we have learned about bilingualism and second-language learning from this large-scale research effort in the context of four issues which have been of major concern to both practitioners and theorists. These issues are: (1) the cognitive and academic effects of immersion; (2) the effects of intensity of L2 exposure on L1 and L2 development; (3) the relative advantages of early versus late immersion; (4) the suitability of immersion for all students, particularly those with learning difficulties.

In a more general form these issues have been investigated by researchers in a variety of educational contexts. For example, since the 1920s an extremely large amount of research has been carried out on the

effects of bilingualism on children's cognitive development. The effects of intensity of exposure, or "accumulated hours" has been investigated in several large-scale studies (e.g. Carroll, 1975) and is of obvious practical relevance to program planning. The "optimal age" issue has also been a favourite topic of speculation and, in recent years, research. The fourth issue relates to the broader question of individual differences in learning a second language which has a long tradition of research outside of immersion education (Stern and Cummins, 1980).

The research on French immersion has contributed significantly to our knowledge in each of these four general areas. In some cases, it has given rise to new insights into the nature of language learning, in others it has confirmed trends that were emerging from research in other educational contexts. In order to adequately interpret the research findings, it is necessary to reconsider the meaning of constructs such as "language proficiency," "bilingualism," and "biliteracy." After reviewing the research, I shall present a theoretical framework for relating these constructs to academic achievement.

ACADEMIC AND COGNITIVE CONSEQUENCES OF BILINGUALISM

A large majority of the studies conducted between 1920 and 1960 reported that in comparison to unilingual children, bilingual children tended to perform more poorly at school, score lower on the verbal parts of IQ tests and exhibit more emotional problems (see Darcy, 1953; Peal and Lambert, 1962 for reviews of these studies.) Investigators often spoke of "mental confusion" and "language handicaps" among bilingual children and some writers went so far as to claim that bilingualism led to split personalities and schizophrenia (see Diebold, 1968) and also that bilinguals were morally untrustworthy (see Vildomec, 1963, pp. 32, 39).

As Peal and Lambert (1962) point out, many of these early studies were poorly designed in that they failed to take into account the effects of confounding variables such as socio-economic status (SES). For example, in some studies middle-class unilingual children were compared with lower-class bilingual children. However, the trend in the research findings was so one-sided that it is not surprising that the risks associated with bilingualism and bilingual education should be uppermost in the minds of educators. This is illustrated in a brief from the Association of (English-speaking) Catholic Principals of Montreal (1969) which stated: "We are of the opinion that the average child cannot cope with two languages of instruction and to try to do so leads to insecurity, language interference, and academic retardation ..." (quoted in Lambert and Tucker, 1972).

However, this view is refuted by the results of many studies conducted during the past 15 years which have reported a positive association between bilingualism and cognitive/academic functioning (see Cummins,

1978(c) for a detailed review). For example, children in French immersion programs have been found to perform better than comparison groups in some aspects of English skills (Barik and Swain, 1978; Cummins and Lamont, 1980; Tremaine, 1975). A positive association has also been found between bilingualism and both aspects of cognitive flexibility (Balkan, 1970; Duncan and DeAvila, 1979; Kessler and Quinn, 1980) and divergent or "creative" thinking abilities (Cummins and Gulutsan, 1974; Scott, 1973) and some studies have reported that bilingual children are more advanced in general intellectual development than are unilingual children (Bain, 1975; Liedke and Nelson, 1968; Peal and Lambert, 1962). There is also evidence that bilingual children are better able to analyze linguistic meaning and are more sensitive to aspects of interpersonal communication than unilingual children (Bain, 1975; Bain and Yu, 1980; Ben-Zeev, 1977(a), 1977(b); Cummins, 1978(a); Cummins and Mulcahy, 1978; Genesee, Tucker and Lambert, 1975; Feldman and Shen, 1971; Ianco-Worrall, 1972). A large majority of these studies reporting positive effects have involved bilingual students whose L1 has continued to develop while L2 was being acquired, a fact which suggests that the level of bilingual proficiency may be an important intervening variable mediating the effects of bilingualism on cognition (Cummins, 1976).

In a recent book entitled "The Bilingual Brain," Albert and Obler (1979) conclude on the basis of the neuropsychological research findings that "Bilinguals mature earlier than monolinguals both in terms of cerebral lateralization for language and in acquiring skills for linguistic abstraction. Bilinguals have better developed auditory language skills than monolinguals, but there is no clear evidence that they differ from monolinguals in written skills" (1979, p. 248). These trends in the research are not at all surprising when one considers that bilingual children have been exposed to considerably more "training" in analyzing and interpreting language than unilingual children. The possibility of greater analytic orientation to language in bilingual children is consistent with the view of Vygotsky (1962) who argued that being able to express the same thought in different languages will enable the child to "see his language as one particular system among many, to view its phenomena under more general categories, and this leads to awareness of his linguistic operations" (p. 110). Lambert and Tucker (1972) argued that a similar process was likely to operate among children in immersion programs. They suggested that as children develop high-level bilingual skills they are likely to practice a form of "incipient contrastive linguistics" by comparing the syntax and vocabulary of their two languages.

It should be pointed out that the validity of these recent "positive" findings is not accepted by all investigators. McNab (1979), for example, has criticized research design, control variables and sample selection procedures in several of these studies. It is true that the findings of no one study constitute unequivocal evidence that bilingualism enhances cogni-

tive functioning but, to many investigators, the considerable amount of recent evidence pointing in this direction is convincing that subtle cognitive benefits are associated with bilingualism when the development of both languages is encouraged in the home and school (e.g. Bain, 1975; Cummins, 1979(a); Lambert, 1975).

INSTRUCTIONAL TIME AND LANGUAGE DEVELOPMENT IN IMMERSION PROGRAMS

The research results on the effects of instructional time in the target language will be considered separately for L1 and L2 development. Recent findings in these areas have led educators to qualify their initial assumptions with regard to the relationship between instructional time and progress in L2, and to reassess the construct of bilingual proficiency in order to accommodate the lack of a relationship between instructional time in L2 and progress in L1 academic skills.

L2 Development

Comparisons between immersion and French-as-a-second-language (FSL) programs (Swain, 1978) as well as international studies (e.g. Carroll, 1975) led to the assumption that the number of accumulated hours of L2 instruction is one of the most critical factors in L2 achievement. For example, Carroll's conclusion in the IEA French study was that "the primary factor in the attainment of proficiency in French ... is the amount of instructional time provided" (1975, p. 276).

Initial comparisons between early partial immersion or 50/50 programs and early total immersion programs supported this conclusion. For example, the evaluation of the Elgin County partial immersion program showed that students developed proficiency in French considerably more slowly than those in total immersion. However, contrary to the assumptions of administrators and presumably parents, children's progress in English was no different from that of children in total immersion. The Elgin County students also performed more poorly than the regular program comparison group in Science and Mathematics in the final grades of elementary school (Swain, 1978).

These results led several investigators (e.g. Cummins, 1979(b); Swain, 1978) to suggest that early partial immersion was a less viable program option than early total immersion. However, more recent results from the Ottawa Roman Catholic Separate School Board (ORCSSB) partial immersion program suggest that it may be premature to generalize about the relative merits of partial vs. total immersion. In the ORCSSB program each day is divided into morning and afternoon units, one taught in English and the other in French by different teachers. Unlike most other immersion programs approximately 90% of students in the ORCSSB

attend the partial immersion program. The evaluation of the program (summarized in Game, 1979) has shown no detrimental effects on the development of English or other academic skills while students' French proficiency is intermediate between that of early total immersion and extended French (75 minutes per day). However, the gap between the partial and total immersion students in French skills which is evident at the Grade 5 level may decrease in subsequent grades as the proportion of time through the medium of French in the total immersion program drops to around 50% (see early vs. late immersion comparisons discussed below).

A study carried out by McDougall and Bruck (1976) is relevant to the assumed direct relationship between time and achievement in L2. They found that the performance of early immersion students introduced to English language arts in Grade 4 was equivalent to that of students introduced to English language arts in Grade 2 in both French and English academic skills. Thus, in this instance, a moderate increase in accumulated hours through French resulted in no increase in French achievement.

In summary, the direct relationship assumed between amount of L2 instructional time and achievement in L2 requires qualification. Although large differences in school exposure to L2 tend to result in differential achievement, differences in achievement are not always proportional to differences in accumulated hours. Other factors also play an important role in determining rate of L2 progress. For example, the extent to which L2 is taught as a subject or used as a medium of instruction, the quality of the curriculum, and the age of the learners are all capable of modifying the effects of accumulated hours. Thus, because of the influence of these, and possibly other factors, relatively small differences in exposure to L2 are unlikely to exert reliable effects on achievement.

L1 Development

Prior to the large-scale institutionalization of immersion programs in Canada, it was generally assumed that there was a direct relationship between the amount of instructional time devoted to a language (or any academic subject) and achievement in that language. Thus initial fears in regard to French immersion were largely concerned with possible detrimental effects on the development of children's English academic skills. It seemed reasonable to assume that if English language arts were not introduced until Grade 2, 3 or 4 (depending upon the program variation), and if considerably less total time were spent through the medium of English, then English skills must inevitably suffer.

These initial fears, however, have not been borne out in practice. Evaluations from across Canada have consistently shown that although

immersion students tend to lag behind their monolingual peers in English language arts until formal English instruction is introduced (usually Grade 2), they very quickly catch up and may even surpass their peers by Grade 5 or 6. Also, the development of English academic skills appears to be relatively unaffected either by the grade level at which English language arts are introduced or by the amount of English instructional time (see Swain, 1978). Thus, although there is generally a significant relationship between amount of instructional time in the minority language (French) and achievement in that language, little relationship is observed between English achievement and instructional time through English.

These findings suggest that there is a considerable degree of cross-lingual transfer of the academic skills underlying literacy in French immersion programs, or, to put it differently, that L1 and L2 literacy-related skills are manifestations of a common underlying proficiency. This conclusion is supported by the high correlations typically observed between L1 and L2 reading skills and the fact that, for minority language students in bilingual programs, there is also generally little relationship between amount of instruction in the majority language and achievement in that language (Cummins, 1980), suggesting similar cross-lingual transfer. This interdependence between L1 and L2 academic skills is also evident in comparisons between early and late immersion programs.

THE AGE QUESTION IN L2 LEARNING

Initially early total immersion programs were predicated upon two basic assumptions which drew their inspiration from the writings of the Montreal neurosurgeon, Wilder Penfield (1965). Penfield had advocated what he called "the mother's method" of teaching second languages. By this he meant using the L2 as a medium of instruction in order to communicate something meaningful to the child, rather than teaching it as a subject. Penfield also argued strongly that there is an optimal pre-pubertal age for L2 learning and that after the age of 10–12 individuals became progressively less capable of acquiring native-like proficiency in an L2. The apparent ease with which immigrant children acquire native-like L2 proficiency in comparison to the obvious non-native phonology and syntax of many of their parents seemed to provide persuasive evidence for the optimal age theory. Penfield also invoked neurological arguments which, although not persuasive to others in the field (e.g. Macnamara, 1975), added to the popular conviction that "younger-is-better."

It is easy to see how these two principles are embodied in early immersion, and the success of this program appeared to confirm their validity. However, although the efficacy of using L2 as a medium of

instruction is still generally accepted, recent comparisons of early versus late immersion, as well the findings of many research studies, cast considerable doubt on the optimal age theory.

Reviews of recent studies of age and L2 learning are unanimous in their conclusion that older learners make more rapid progress in learning literacy-related aspects of L2, although younger learners may achieve a higher level of ultimate attainment in L2 because of the greater amount of time available to them (Cummins, 1980; Genesee, 1978; Ekstrand, 1977; Krashen, Long and Scarcella, 1979). The superiority of older learners in acquiring these aspects of L2 is not surprising given their greater cognitive maturity. It has been found that older learners are not necessarily better in acquisition of L2 face-to-face communicative skills, probably because these language skills are more dependent on personality and motivational factors than on cognitive factors (Cummins, Swain, Nakajima, Handscombe, Green, and Tran, 1981).

Comparisons of the acquisition of French in early and late immersion programs show that late immersion students make rapid gains in French proficiency, sometimes performing as well as equivalent grade students who have gone through an early immersion program. For example, Adiv and Marcos (1979) reported that students in an intensive late immersion program (80% French Grades 7 and 8) in the Montreal area performed as well in all aspects of French in Grades 8 and 9 as Grades 8 and 9 early immersion students. Morrison (1979), however, reported a consistent superiority for early immersion students in the Ottawa area. This apparent discrepancy is probably due to the fact that in Grades 3 through 8 considerably more time is spent through French in the Ottawa early immersion program than in the Montreal program.

Another study (Lapkin, Swain, Kamin & Hanna, 1980) carried out in Ontario illustrates the rapidity with which older students can acquire certain L2 skills. The early immersion group were in Grade 8 at the time of testing and had accumulated over 4000 hours of French. The late immersion group were in Grade 10 at the time of testing and had had 30 minutes a day FSL in Grade 7, followed by 70% instruction in French in Grade 8, and 40% in Grades 9 and 10, totalling approximately 1400 hours of French. The early immersion students performed significantly better on a test of French listening comprehension but were inferior to the late immersion students on a French reading comprehension test. There were no group differences on a French cloze test.

Thus, the findings from immersion programs are consistent with those from other contexts in showing that older learners are more efficient in some aspects of L2 learning than younger learners. These results can be interpreted in terms of the interdependence of academic skills across languages, discussed in the previous section. Older learners come to the language acquisition task equipped with L1 reading and writing skills, a large store of concepts and corresponding L1 lexical knowledge as well as

knowledge about how grammatical systems work. Their task is to learn the surface manifestations of these skills and knowledge in L2. Students in early immersion programs, on the other hand, are developing these underlying cognitive and academic skills in the process of learning French. Thus, in the Ontario example, the 4000 accumulated hours of French have succeeded in developing considerably more than just French skills. In summary, although accumulated hours "on task" constitute an obviously important factor in any learning activity, the "task" in early and late immersion programs is not the same.

SUITABILITY OF IMMERSION FOR ALL CHILDREN

Because of the presumed challenging nature of immersion programs, and the possible negative consequences of transfer to a regular program, considerable research has been carried out on the suitability of immersion programs for all children. The initial tendency among many educators was to exclude from immersion programs students who were characterized by learning disabilities, "third" language backgrounds or low academic ability. For example, it was, and still is, often assumed that students who experience learning problems in early immersion would be better off in an English program. The research conducted on these issues suggests that these assumptions have little foundation.

Academic Ability

Several studies have reported that IQ measures are relatively poor predictors of L2 communicative skills. For example, in the Ontario evaluations (Swain, 1975), IQ correlated less with French listening comprehension than with other academic tasks. Similarly, Genesee (1976(a)) tested anglophone students in Grades 4, 7 and 11 in French immersion and "core" French programs in Montreal on a battery of French language tests. He reported that although IQ was strongly related to the development of academic French language skills (reading, grammar, vocabulary, etc.) it was, with one exception, unrelated to ratings of French oral productive skills at any grade level. The exception was pronunciation at the Grade 4 level which was significantly related to IQ. Listening comprehension (measured by a standardized test) was significantly related to IQ only at the Grade 7 level.

Bruck (1981) has investigated whether language of instruction exerted a differential effect on children with different levels of L1 development on entry to Grade 1. She reports that although linguistic skills were significantly related to achievement in both immersion and regular programs, there was no evidence that immersion has any differential effect on the academic progress of children with poor linguistic skills. The majority of linguistic measures used in this study assessed academic

aspects of language proficiency (e.g. vocabulary level) which tend to be strongly related to cognitive measures. Consistent with the interdependence hypothesis, Bruck reported strong relationships between L1 and L2 cognitive/academic proficiencies.

In summary, research suggests that immersion programs are *not* just for the academically gifted. Although IQ measures are strongly related to the development of L1 and L2 literacy skills in both early and late immersion (as in regular programs), they are much less related to the development of French (or English) face-to-face communicative skills.

Language Background

There is considerable anecdotal evidence that bilingual children have an advantage in learning an additional language. For example, Saif and Sheldon (1969) quoted the opinion of the French Department of the Toronto Board of Education that “students who are learning French as a third language perform better than children who are learning French as a second language. Somehow the learning of a third language is facilitated by the learning of a second” (1969, p. 7). Support for this opinion comes from several studies conducted within the context of core or extended FSL programs where children from minority language backgrounds have performed better in French than children from anglophone backgrounds (see Cummins, 1981).

Studies of the achievement of third language groups conducted within the context of French immersion programs have generally failed to control for SES and other confounding variables (e.g. Edwards and Casserly, 1973). The results of such comparisons have, however, been encouraging. Genesee (1976(b)) concludes his review of these studies as follows:

the findings that the third language children scored as well as they did on some of the English tests is remarkable considering their lack of formal instruction in English. At the same time, their French language skills were comparable to the English based groups, despite differences in social class background ... there is nothing in these data to suggest that French immersion would not be suitable for third language children (1976(b), p. 510).

A more recent small-scale study (Orpwood, 1980) examined the achievement of children in an early immersion program in Grades 2 and 4 who had exposure to another language in the home. Unlike the studies conducted in Ottawa by Edwards and his colleagues, all the third-language children in this study were comparable in SES to their peers from anglophone backgrounds. A large variety of language backgrounds were represented and children were generally from middle to upper SES backgrounds. Orpwood found consistent differences in favour of the third-language children in French, English and Mathematics at both

grade levels. She concludes that "a degree of access to a third language has in no way detracted from their school performance. On the contrary, the average scores of such children are above the already high average scores of the immersion classes they are in" (p. 14). These results are consistent with findings in regular school contexts showing high academic performance by Canadian-born minority language children (see Cummins, 1979/80, for a review).

The only Canadian experiment in trilingual education which has been well-documented involved children from English-speaking homes receiving instruction in French, Hebrew, and English (Genesee, Tucker and Lambert, 1978). The evaluation clearly showed the feasibility of such a trilingual program in that the experimental group performed as well in English and French and better in Hebrew than comparison groups.

In summary, the available data provide no evidence that French immersion programs are inappropriate for children from third-language backgrounds. However, studies of this question have tended to be small-scale and few in number and the issues are by no means resolved. For example, we know virtually nothing about the possible differential appropriateness of early vs. late immersion, or early total vs. early partial immersion for students from different third-language backgrounds.

Learning Disabilities

It has been claimed by Trites (1976) on the basis of extensive testing of children who experienced difficulty in early total immersion (Trites and Price, 1976, 1977) that these programs give rise to learning disabilities in some children and that procedures should be implemented to screen out those children who are more predisposed to develop learning disabilities in early immersion than they would be in a regular program. Trites also argues that children who develop learning disabilities in early immersion should be switched to an English program without delay.

Bruck (1978, 1980) takes a diametrically opposite view on the basis of a longitudinal study of children with learning disabilities in early total immersion. She reports that learning disabled children in immersion acquire basic skills at a comparable rate to learning disabled children in English programs. In addition, they develop fluent interpersonal communicative skills in French, although at a slower rate than non-learning disabled children. She points out that these results are all the more striking because learning disabled children tend to do particularly poorly in traditional FSL classes where instruction usually involves repetition of linguistic utterances in a non-meaningful context, a skill which is often poorly developed in learning disabled children (see Das and Cummins, 1982).

Bruck (1980) also reports significant correlations between French and English literacy skills, suggesting that level of literacy is not language-

specific but a function of some underlying general abilities. The fact that academic difficulties persisted after children were transferred from immersion to English programs supports this conclusion. Oral proficiency in French, however, was much more related to amount of French exposure than to severity of learning problems or to academic achievement. Bruck (1978, 1980) strongly recommends that learning disabled children remain in the immersion program and receive appropriate remedial assistance.

How do we resolve the contradiction between the findings of Trites and Bruck? It has been argued (Cummins, 1979(c)) that some of Trites' data on the academic consequences of transferring from immersion showed that children who transferred made poorer progress in English reading than those who remained in immersion – the opposite to what Trites claims. Trites' argument that some children are predisposed to develop learning disabilities in immersion is also unconvincing. The issue is worth considering here both because of its immediate practical importance and because of its broader theoretical significance. From a theoretical point of view the issue is whether the development of literacy skills in a French immersion program is determined by the same set of underlying abilities as the development of literacy skills in an English program.

Early Immersion and Maturational Lags

Trites' specific claim is that "some children, of above average potential and normal abilities for school progress in their native language, experience difficulty or fail in a primary immersion program in a second language as a result of a mild specific maturational lag" (1976, p. 200–201). The suggestion that children who experience difficulties in French immersion are characterized by a specific maturational lag in the temporal lobe regions of the brain is based on the results of two studies (Trites and Price, 1976, 1977) in both of which a French immersion "difficulty group" performed more poorly than comparison groups on the Tactual Performance Test (TPT), a complex psychomotor problem-solving task (Halstead, 1947). On the TPT the subject is required to place blocks of various shapes in a formboard while blindfolded, first with the dominant hand, then with the non-dominant hand and finally with both hands together.

Trites claims that "performance on this test has specific implications with regard to adequacy of functioning of the temporal lobes. In turn, it is well established in the neuropsychological literature that the temporal lobes are important brain structures for subserving language, memory and auditory perceptual functions" (1976, p. 198). He goes on to argue that the relatively poor performance of the French immersion difficulty group on the TPT in the initial study "is compatible with the interpretation of a maturational lag in the temporal lobe regions" (1976, p. 200).

Trites and Price (1977) suggest that this interpretation is supported by the poorer TPT performance of the French immersion drop-outs in the subsequent cross-validation study. The reason a maturational lag in the temporal lobes could cause difficulties for children in French immersion is that "since the primary auditory cortex is situated in the temporal lobes, children who have a mild maturational deficit affecting these areas would have difficulty in a complex language learning situation" (Trites and Price, 1976, p. 135).

The apparent logic in this argument falls apart when one takes account of the fact that the left and right temporal lobes are specialized for different types of information processing. The left temporal lobe is specialized for the processing of verbal material, particularly in the auditory modality. The right temporal lobe, on the other hand, is less involved with the speech system (see e.g. Luria, 1973), being primarily involved in perception of space, both visual and non-visual (see e.g. Gazzaniga, 1972; Milner, 1954).

Trites and Price (1976, 1977) consistently maintain that the TPT is related to "temporal lobe functioning", however, they cite no evidence to back up this claim nor do they say whether left or right temporal lobe functioning is involved, although they do admit that right and left temporal lobes subserve different psychological functions (1977, p. 18). The logic of their argument, however, implies that the TPT involves the left temporal lobe since this is the primary localization of speech and language functions. If the TPT is dependent upon the right or non-dominant temporal lobe, its relationship to the difficulties some children experience in the complex learning of language is less evident.²

An examination of the neuropsychological literature relating to the TPT (e.g., Klove, 1963; Knights, 1966; Lezak, 1976) provides no evidence that it is in any way associated with left temporal lobe functioning. It would be curious indeed if any such connection were to emerge since the TPT involves spatial integration in the tactual modality and has no linguistic or auditory component. The available neuropsychological evidence (e.g. Milner, 1954, p. 58), as well as the fact that in Trites and Price's own studies the TPT related significantly to non-verbal ability measures, suggests that the TPT may reflect right rather than left hemispheric functions. However, what in fact it is measuring is sufficiently unclear as to make any interpretation speculative. In summary, there is no logical basis for expecting a relationship between TPT performance and difficulty in early immersion. The empirical evidence for such a relationship is equally unconvincing.

As pointed out by Stern et al. (1976), the clinical group of early immersion "difficulty" children who performed poorly on the TPT in the initial Trites and Price study may not have been representative of children in general who experience difficulty in early immersion. Thus, a cross-validation study was undertaken with children who dropped out of

immersion but who had not been referred for clinical assessment. A group of 16 drop-outs was compared to 16 children who were successful in immersion using a similar battery of tests to that used in the initial study.

As would be expected in a comparison of drop-outs and successful students in *any* academic program on *any* battery of cognitive tests, significant group differences were found on intellectual, psycholinguistic and reading abilities as well as on parent and teacher rating scales. One of the few variables where differences between drop-out and success groups did *not* attain significance was the TPT (see Trites and Price, 1977, Table 10, p. 43). In subsequent analyses the samples were divided into those above and below nine years of age, and significant differences emerged in the younger but not the older age group. However, these differences appear to be largely a function of non-verbal IQ differences between the groups, since there are strong correlations between TPT and non-verbal IQ, and significant non-verbal IQ differences between the groups. In the analysis of group differences on all other dependent variables *except* TPT, the influence of non-verbal IQ was statistically removed through analysis of covariance.

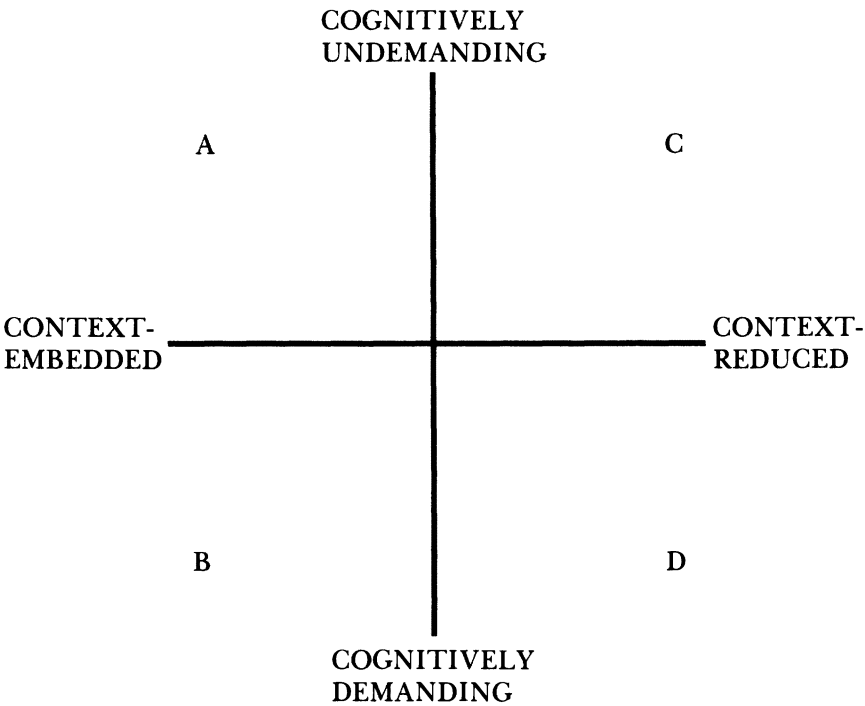
In summary, there is very little empirical evidence that children who drop out of ETI have a unique pattern of deficits or suffer from a maturational lag in temporal lobe regions of the brain. On the contrary, as suggested by Bruck's findings, academic proficiencies (and difficulties) are cross-lingual, i.e., similar in nature whether they occur in an immersion or regular English program.

THEORETICAL INTEGRATION

The findings reviewed above raise several questions about the relationships between L1 and L2 academic skills: (1) Why is it that although a large proportion of their instruction has been through French, children in immersion programs develop English academic skills at least as adequately as children in regular English programs? (2) Why is there a direct relationship between the age of the learner (at least up to age 14–15) and the rapidity with which academically related aspects of L2 are acquired? (3) Why are strong relationships consistently observed between L1 and L2 literacy-related skills (e.g. vocabulary knowledge) both among learning disabled and non-disabled immersion students?

A second set of questions concerns the relationship between literacy-related and face-to-face communicative L2 skills: (1) Why do cognitive abilities only weakly predict L2 face-to-face communicative skills? (2) Why do learning disabled children in immersion experience considerably less difficulty in acquiring L2 face-to-face communicative skills than they do in developing L2 (or L1) literacy skills? (3) Why do learning disabled (and non-disabled) children experience more difficulty in acquiring French in FSL programs than in immersion programs?

FIGURE 1
Range of contextual support and degree of cognitive involvement in communicative activities



This second set of questions concerns the nature of language proficiency (both L1 and L2) while the first set concerns its cross-lingual dimensions. These questions can be considered within the context of the framework presented in Figure 1 which is intended to allow the developmental interrelationships between academic performance and language proficiency in L1 and L2 to be considered (for an extended discussion of this and related frameworks, see Cummins, in press).

The horizontal continuum relates to the range of contextual support available for expressing or receiving meaning. The extremes of this continuum are described in terms of “context-embedded” versus “context-reduced” communication. They are distinguished by the fact that in context-embedded communication the participants can actively negotiate meaning (e.g. by providing feedback that the message has not been understood) and the language is supported by a wide range of meaningful paralinguistic (gestures, intonation etc.) and situational cues; context-reduced communication, on the other hand, relies primarily (or at the extreme of the continuum, exclusively) on linguistic cues to meaning and

may in some cases involve suspending knowledge of the “real” world in order to interpret (or manipulate) the logic of the communication appropriately. Thus, at this end of the continuum it is the *range* of cues to meaning which is reduced rather than the context itself.

In general, context-embedded communication derives from interpersonal involvement in a shared reality which obviates the need for explicit linguistic elaboration of the message. Context-reduced communication, on the other hand, derives from the fact that this shared reality cannot be assumed and thus linguistic messages must be elaborated precisely and explicitly so that the risk of misinterpretation is minimized. It is important to emphasize that this is a continuum and not a dichotomy. Thus, examples of communicative behaviours going from left to right along the continuum might be: engaging in a discussion, writing a letter to a close friend, writing (or reading) an academic article. Clearly, context-embedded communication is more typical of the everyday world outside the classroom, whereas many of the linguistic demands of the classroom (e.g. acquisition of literacy) reflect communication which is closer to the context-reduced end of the continuum.

The vertical continuum is intended to address the developmental aspects of communicative proficiency in terms of the degree of active cognitive involvement in the task or activity. Cognitive involvement can be conceptualized in terms of the amount of information that must be processed simultaneously or in close succession by the individual in order to carry out the activity.

Thus, the upper parts of the vertical continuum consist of communicative tasks and activities in which the linguistic tools have become largely automatized (mastered) and thus require little active cognitive involvement for appropriate performance. At the lower end of the continuum are tasks and activities in which the communicative tools have not become automatized and thus require active cognitive involvement. Persuading another individual that your point of view rather than hers/his is correct, or writing an essay on a complex theme are examples of such activities. In this situation, it is necessary to stretch one’s linguistic resources to the limit in order to achieve one’s communicative goals. Obviously, cognitive involvement, in the sense of amount of information processing, can be just as intense in context-embedded as in context-reduced activities.

As mastery is developed, specific linguistic tasks and skills travel from the bottom towards the top of the vertical continuum. In other words, there tends to be a high level of cognitive involvement in task or activity performance until mastery has been achieved or, alternatively, until a plateau level at less than mastery levels has been reached (e.g. L2 pronunciation in many adult immigrants).

How is this framework relevant to the interpretation of the data from immersion programs? In the first place, it provides a basis for carrying out a task analysis of language skills and for developing hypotheses about the

structure of language proficiency. For example, we would expect relatively little relationship between performance on language tasks that fall in quadrant *D* for a particular group of learners and those that fall in quadrant *A* (i.e. context-embedded, automatized). In concrete terms, after several years of an immersion program we would expect no more relationship between French-speaking fluency and French reading-proficiency than we would between speaking and reading in English. The findings of Genesee (1976(a)) and Bruck (1980) are consistent with such a prediction, as is the fact that more consistent differences between older and younger learners in rapidity of L2 acquisition are found for context-reduced as compared to context-embedded skills (e.g. Cummins et al., 1981; Lapkin et al., 1980).

Learning disabled children appear to have particular difficulties in processing language in context-reduced situations (Das and Cummins, 1982) but generally their face-to-face L1 skills are indistinguishable from those of their peers. Also, their non-verbal cognitive skills are usually adequately developed. Given these facts it is clear why learning disabled children have extreme difficulties in acquiring French in the context-reduced environment of the typical FSL class but relatively few problems in developing face-to-face French communicative skills in the context-embedded immersion situation.

To what extent are these continua equally applicable to L1 and L2 contexts? If they are applicable then we would expect strong relationships between L1 and L2 tasks that are similarly located in relation to the continua for specific groups of individuals. For example, for Grade 6 immersion students who have had the opportunity and presumably motivation to develop literacy in both French and English, we would expect literacy tasks to be strongly related across languages. We would also expect older L2 learners, whose L1 quadrant *D* (e.g. literacy) skills are better developed, to make more rapid progress in acquiring L2 quadrant *D* skills than younger L2 learners. By the same token, children who have developed quadrant *D* skills in L2 (e.g. French) would be able to transfer these underlying skills to L1 given motivation and adequate exposure to L1.

All of these hypotheses are supported in the data reviewed above. In order to interpret these data it is necessary to recognise that L1 and L2 literacy-related skills are interdependent, i.e. manifestations of a common underlying proficiency. In concrete terms, if an individual is proficient in manipulating, interpreting or evaluating his or her first language in context-reduced situations, these proficiencies will also tend to manifest themselves in a second language context given adequate motivation and exposure to L2 (Cummins, 1980).

Support for the hypothesis that some context-embedded aspects of language proficiency may also be interdependent across languages has recently been found by Cummins et al. (1981). Japanese immigrant

children's interactional styles in L1 and L2 were strongly related both to each other and to personality attributes of the children.

CONCLUSION

It is clear that the large amount of research conducted in Canada during the past 15 years has contributed to significant changes in our perceptions of bilingualism in children's educational development. Prior to the 1960s, it was commonly assumed that early bilingualism impeded academic and cognitive progress, that L1 development would suffer if a significant amount of time were devoted to L2, and that younger children were more efficient language learners than older children.

Contrary to these assumptions, the research findings suggest the following: (1) cognitive advantages may accrue to children who develop high levels of bilingual skills; (2) amount of instructional time through the minority language in a bilingual program is generally, but not invariably, related to achievement in the minority language; however, it is largely unrelated to achievement in the majority language; (3) older L2 learners make more rapid progress than younger learners in acquiring literacy-related aspects of L2.

It was also initially assumed by many administrators, teachers, and parents that immersion was suitable only for "brighter" students and that children who were potential academic problems should be screened out of the program. This tendency to view immersion as "too challenging" for certain categories of student is still widespread despite the fact that research has failed to identify any category of students who would experience differential learning problems in immersion as opposed to English programs. Bruck's findings strongly suggest that academic difficulties are basically the same whether they occur in an immersion or regular English program.

In order to more adequately interpret these findings a theoretical framework for relating "language proficiency" (in L1 and L2) to academic performance was described. The potential of such a framework is that, in principle, it permits findings from many different contexts to be integrated and to contribute more effectively to the development of a theory of language proficiency and its cross-lingual dimensions.

NOTES

¹ Although Macnamara does not interpret his findings in this way, his comparison of immersion and non-immersion groups shows significant differences in favour of the immersion group in L2 (Irish) proficiency and no differences in L1 (English) proficiency.

² Recent research provides some evidence for a link between right hemisphere functioning and both learning disabilities (Witelson, 1977) and bilingualism (Vaid and Genesee, 1980), and it is conceivable that Trites could try to make a speculative case for right hemisphere involvement in some immersion students' academic difficulties based on these relations.

However, considerably more research with measures whose validity is less uncertain than the TPT would be required before one could even begin to suggest policy implications.

REFERENCES

- Adiv, E., & Morcos, C. *A comparison of three alternative French immersion programs at the grade 9 level*. Instructional Services, The Protestant School Board of Greater Montreal, November, 1979.
- Albert, M. L., & Obler, L. K. *The bilingual brain*. New York: Academic Press, 1979.
- Bain, B. C. Toward an integration of Piaget and Vygotsky: Bilingual considerations. *Linguistics*, 1975, 160, 5-20.
- Bain, B. C., & Yu, A. Cognitive consequences of raising children bilingually: "One parent, one language." *Canadian Journal of Psychology*, 1980, 34, 304-313.
- Balkan, L. *Les effets du bilinguisme français-anglais sur les aptitudes intellectuelles*. Bruxelles: Aimax, 1970.
- Barik, H. C., & Swain, M. Evaluation of a French immersion program: The Ottawa study through grade five. *Canadian Journal of Behavioural Science*, 1978, 10, 192-201.
- Ben-Zeev, S. The influence of bilingualism on cognitive development and cognitive strategy. *Child Development*, 1977(a), 48, 1009-1018.
- Ben-Zeev, S. The effect of Spanish-English bilingualism in children from less privileged neighbourhoods on cognitive development and cognitive strategy. *Working Papers on Bilingualism*, 1977(b), no. 14, 83-122.
- Bruck, M. The suitability of early French immersion programs for the language-disabled child. *Canadian Journal of Education*, 1978, 3, 51-72.
- Bruck, M. *The consequences of switching out of French immersion: A pilot study*. Report submitted to the Quebec Ministry of Education, 1980.
- Bruck, M. *The suitability of the French immersion program for the language disabled child. A longitudinal study through the end of grade 1*. Unpublished manuscript, 1981.
- Carroll, J. B. *The teaching of French in eight countries*. New York: IEA, 1975.
- Committee on Irish Language Attitudes Research, (CILAR) *Report*. Dublin: Government Publications, 1975.
- Cummins, J. The influence of bilingualism on cognitive growth: A synthesis of research findings and explanatory hypotheses. *Working Papers on Bilingualism*, 1976, no. 9, 1-43.
- Cummins, J. Immersion education in Ireland: A critical review of Macnamara's findings. *Working Papers on Bilingualism*, no. 13, 1977(a).
- Cummins, J. A comparison of reading achievement in Irish and English medium schools. In V. Greaney (Ed.), *Studies in Reading*. Dublin: Educational Co. of Ireland, 1977(b).
- Cummins, J. Metalinguistic development of children in bilingual education programs: Data from Irish and Canadian (Ukrainian-English) programs. In M. Paradis (Ed.), *Aspects of bilingualism*. Hornbeam Press, 1978(a).
- Cummins, J. Immersion programs: The Irish experience. *International Review of Education*, 1978(b), 24, 273-282.
- Cummins, J. The cognitive development of children in immersion programs. *The Canadian Modern Language Review*, 1978(c), 34, 855-883.
- Cummins, J. Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, 1979(a), 49, 222-251.
- Cummins, J. Cognitive development and early French immersion. In B. Mlacak and E. Isabelle (Eds.), *So you want your child to learn French!* Ottawa: Canadian Parents for French, 1979(b).

- Cummins, J. Should the child who is experiencing difficulties in early immersion be switched to the regular English program? A reinterpretation of Trites' data. *The Canadian Modern Language Review*, 1979(c), 36, 139-143.
- Cummins, J. The cross-lingual dimensions of language proficiency: Implications for bilingual education and the optimal age question. *TESOL Quarterly*, 1980, 14, 175-187.
- Cummins, J. *Bilingualism and minority language children*. Toronto: Ontario Institute for Studies in Education, 1981.
- Cummins, J. Language proficiency and academic achievement. In J.W. Oller, Jr., *Issues in language testing research*. Rowley, Mass.: Newbury House, in press.
- Cummins, J., & Gulutsan, M. Bilingual education and cognition. *The Alberta Journal of Educational Research*, 1974, 20, 259-269.
- Cummins, J., & Lamont, D. *Cognitive development within a French-English bilingual program*. Unpublished manuscript, 1980.
- Cummins, J., & Mulcahy, R. Orientation to language in Ukrainian-English bilingual children. *Child Development*, 1978, 49, 1239-1242.
- Cummins, J., Swain, M., Nakajima, K., Handscombe, J., Green, D., & Tran, C. *Linguistic interdependence among Japanese and Vietnamese immigrant students*. Research report presented to Inter-America Research Associates, October, 1981.
- Darcy, N. T. A review of the literature on the effects of bilingualism upon the measurement of intelligence. *Journal of Genetic Psychology*, 1953, 82, 21-57.
- Das, J. P., & Cummins, J. Language processing and reading disability. In K. D. Gadow and I. Bialer (Eds.), *Advances in learning and behavioural disabilities* (Vol. 1). Greenwich, Conn.: JAI Press, Inc., 1982.
- Diebold, A. R. The consequences of early bilingualism in cognitive development and personality formation. In E. Norbeck, D. Price-Williams, & W. M. McCord (Eds.), *The study of personality*. New York: Holt, Rinehart and Winston, 1968.
- Duncan, S. E., & DeAvila, E. A. Bilingualism and cognition: Some recent findings. *NABE Journal*, 1979, 4, 15-50.
- Edwards, H. P., & Casserly, M. C. *Evaluation of second language programs in the English schools*. Annual report, Ottawa Roman Catholic Separate School Board, 1973.
- Ekstrand, L. H. Social and individual frame factors in L2 learning: Comparative aspects. In T. Skutnabb-Kangas (Ed.), *Papers from the first Nordic conference on bilingualism*. Helsingfors: Universitetet, 1977.
- Feldman, C., & Shen, M. Some language-related cognitive advantages of bilingual five-year-olds. *Journal of Genetic Psychology*, 1971, 118, 234-235.
- Game, A. The bilingual program (50/50): An alternative in the pursuit of bilingualism: Curriculum considerations. In B. Mlacak & E. Isabelle (Eds.), *So you want your child to learn French!* Ottawa: Canadian Parents for French, 1979.
- Gazzaniga, M. One brain - two minds? *American Scientist*, 1972, 60, 311-317.
- Genesee, F. The role of intelligence in second language learning. *Language Learning*, 1976(a), 26, 267-280.
- Genesee, F. The suitability of immersion programs for all children. *Canadian Modern Language Review*, 1976(b), 32, 494-515.
- Genesee, F. Is there an optimal age for starting second language instruction? *McGill Journal of Education*, 1978, 13, 145-154.
- Genesee, F., Tucker, G. R., & Lambert, W. E. Communication skills of bilingual children. *Child Development*, 1975, 46, 1013-1018.
- Genesee, F., Tucker, G. R., & Lambert, W. E. An experiment in trilingual education: Report 3. In S. T. Carey (Ed.), *The Canadian Modern Language Review*, 1978, 34, 621-643.

- Halstead, W. C. *Brain and intelligence: A quantitative study of the frontal lobes*. Chicago: University of Chicago Press, 1947.
- Ianco-Worrall, A. Bilingualism and cognitive development. *Child Development*, 1972, 43, 1390-1400.
- Kessler, C., & Quinn, M. E. Positive effects of bilingualism on science problem-solving abilities. In J. E. Alatis (Ed.), *Georgetown University Round Table on Languages and Linguistics 1980*. Washington, D.C.: Georgetown University Press, 1980.
- Klove, H. Clinical neuropsychology. *The Medical Clinics of North America*, 1963, 47, 1647-1658.
- Knights, R. M. *Normative data on tests for evaluating brain damage in children from 5 to 14 years of age*. Research Bulletin, no. 20, Department of Psychology, The University of Western Ontario, 1966.
- Krashen, S. D., Long, M. A., & Scarcella, R. C. Age, rate and eventual attainment in second language acquisition. *TESOL Quarterly*, 1979, 13, 573-582.
- Lambert, W. E., & Tucker, G. R. *Bilingual education of children: The St. Lambert experiment*. Rowley, Mass.: Newbury House, 1972.
- Lapkin, S., Swain, M., Kamin, J., & Hanna, G. *Report on the 1979 evaluation of the Peel County late French immersion program, grades 8, 10, 11 and 12*. Unpublished report, Ontario Institute for Studies in Education, 1980.
- Lewis, E. G. Bilingualism and bilingual education: The ancient world to the Renaissance. In B. Spolsky and R. Cooper (Eds.), *Frontiers of bilingual education*. Rowley, Mass.: Newbury House, 1977.
- Lezak, M. D. *Neuropsychological assessment*. New York: Oxford University Press, 1976.
- Liedke, W. W., & Nelson, L. D. Concept formation and bilingualism. *Alberta Journal of Educational Research*, 1968, 14, 225-232.
- Luria, A. R. *The working brain*. New York: Basic Books, 1973.
- Macnamara, J. *Bilingualism and primary education*. Edinburgh: Edinburgh University Press, 1966.
- Macnamara, J. Comparison between first and second language learning. *Working Papers on Bilingualism*, no. 7, 71-95, 1975.
- McDougall, A., & Bruck, M. English reading within the French immersion program: A comparison of the effects of the introduction of reading at different grade levels. *Language Learning*, 1976, 26, 37-43.
- McNab, G. Cognition and bilingualism: A reanalysis of studies. *Linguistics*, 1979, 17, 231-255.
- Milner, B. Intellectual function of the temporal lobes. *Psychological Bulletin*, 1954, 51, 42-61.
- Morrison, F. *French proficiency: Status of Ottawa and Carleton students in alternative programs*. Research Centre, The Ottawa Board of Education, Ottawa, 1979.
- Orpwood, S. *Trilingual children in a French immersion program*. Unpublished manuscript, The Ontario Institute for Studies in Education, 1980.
- Peal, E., & Lambert, W. E. The relation of bilingualism to intelligence. *Psychological Monographs*, 1962, 76, 546.
- Penfield, W. Conditioning the uncommitted cortex for language learning. *Brain*, 1965, 88, 787-798.
- Saif, P. S., & Sheldon, M. E. *An investigation of the experimental French programme at Bedford Park and Allenby Public Schools*. Toronto: Board of Education for the City of Toronto, 1969.
- Scott, S. *The relation of divergent thinking to bilingualism: Cause or effect?* Unpublished manuscript, McGill University, 1973.

- Stern, H. H., & Cummins, J. Language teaching/learning research: A Canadian perspective on status and directions. In J. Phillips (Ed.), *Action for the '80s: A political, professional and public program for foreign language education*. ACTFL Foreign Language Education Series, 1980.
- Stern, H. H., Swain, M., McLean, L. D., Friedman, R. J., Harley, B., & Lapkin, S. *Three approaches to teaching French*. Toronto: Ministry of Education, Ontario, 1976.
- Swain, M. More about primary French immersion classes. *Orbit*, 1975, 27, 13-15.
- Swain, M. French immersion: Early, late or partial? *The Canadian Modern Language Review*, 1978, 34, 577-586.
- Tremaine, R. V. *Syntax and Piagetian operational thought*. Washington, D.C.: Georgetown University Press, 1975.
- Trites, R. L. Children with learning difficulties in primary French immersion. *Canadian Modern Language Review*, 1976, 33, 193-207.
- Trites, R. L., & Price, M. A. *Learning disabilities found in association with French immersion programming*. Toronto: Ministry of Education, Ontario, 1976.
- Trites, R. L., & Price, M. A. *Learning disabilities found in association with French immersion programming: A cross-validation study*. Toronto: Ministry of Education, 1977.
- Vaid, J., & Genesee, F. Neuropsychological approaches to bilingualism: A critical review. *Canadian Journal of Psychology*, 1980, 34, 417-445.
- Vildomec, V. *Multilingualism*. Leyden: Sythoff, 1963.
- Vygotsky, L. S. *Thought and language*. Cambridge: M.I.T. Press, 1962.
- Witelson, S. F. Developmental dyslexia: Two right hemispheres and none left. *Science*, 1977, 195, 309-311.

Jim Cummins is an Assistant Professor in the Modern Language Centre, The Ontario Institute for Studies in Education, 252 Bloor Street West, Toronto, Ontario M5S 1V6