BILINGUAL EXPERIENCE AND PSYCHOLINGUISTIC ABILITY

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The pros and cons of exposing small children to a second language, and the effects of this early bilingual experience on future school progress, appear almost daily in both lay and learned journals.

One large group in favor of early second language experience, led most prominently by Dr. Wilder Penfield[1], leans toward the belief that learning a second language at an early age is educationally 'good' for a child — that is, makes a contribution to his total basic cognitive framework. This notion is one that is quite at home with the *zeitgeist* of modern educational thought, described in Jerome Bruner's[2] words as offering subject matter that is "highly nutritious for its weight." By this Bruner means subjects which teach the child, in addition to their own content, something about thinking and learning.

On the other hand, negative reactions to the advisability of early bilingual experience are not without compelling logic. Adult bilinguals usually report that they suffer from some degree of word interference in one or both of their languages, which suggests that having two referents for the same objects, might seem — initially at least — to confuse a child and slow down his responses.

Bilingualism and Performance

The existing literature on the effect of bilinguality on children's performance and achievement in school also gives conflicting evidence.

The earliest studies in this field tended in the main to show that bilinguality handicapped a child's ability to think and to learn. Sear's[3] 1923 study of 1400 Welsh children, Pintner's[4] 1932 findings with 430 grade one New York school children, and M. E. Smith's[5] 1939 investigation of 1000 Hawaian nursery school children all showed monolingual children scoring significantly higher than bilingual children.

More recent investigations into the relationship between bilinguality and intellectual performance contradict these early findings. These latest results suggest that bilinguality heightens school achievement and favors intellectual functioning. Notable amongst these recent studies are the comprehensive investigations carried on at McGill into the intellectual functioning and scholastic achievement of Montreal school children of different language backgrounds.

The best known example of this work is the Peal and Lambert 1962 study of the relationship between bilinguality, school achieve-

ment, and scores on intelligence tests for ten-year-olds in six French-speaking schools of the Montreal Catholic School Commission. On all verbal tests, most of the non-verbal performance tests, and on attitude measures and scholastic achievement ratings, the bilinguals consistently out-scored the monolinguals. As a group, they performed significantly better on intelligence tests, did better in school, and were more favorably disposed towards English-speaking Canadians.

This conflict between the results of these later investigations on the relationship between bilingualism and performance and the earlier work in this field arises, it is herein suggested, from the confounding effects of the sociological factors involved. In these McGill studies, as in most of the previously cited data, bilingualism has been treated as a unitary phenomenon, capable in some statistical way of being extricated from the variables which influence it. But is this a valid assumption?

Historically, bilingualism — when found within a cultural group — has usually been a function of social upheaval, and has taken its significance from the character of that upheaval. In countries and areas of the world where two or more nations and languages live side-by-side — such as South Africa, Belgium, Canada, Ireland, and Wales — it is apparent how close is the association between bilinguality and revolution, war, rigid class groupings, and religious conflict. An individual living in one of these countries, opting for or against speaking a second language, is also making a whole spectrum of choices with regard to social class, religious, and national identity. Perhaps choice is too strong a term; it might be more accurate to say that the total interaction of all these factors is involved in determining whether or not a member of one of these societies speaks one or the other, or both, of the languages of the country. Bilingualism, as it develops within a family and cultural group in society, is a social phenomenon, and like all social phenomena reflects its significance to the individual from the context in which it is found. For example, in all of the studies cited, which document the depressive effect of bilingualism on intellectual functioning, the bilingual subjects are, without exception, members of an economically, occupationally and/or culturally underprivileged stratum within the society against whose norms they were measured.

In a country like the United States where there is only one official language, and where there is also strong pressure towards assimilation, bilingualism has often suggested the immigrant, and hence cultural disynchronism and lower socio-economic status. The effects of these variables on intellectual functioning have already been well established. In a setting such as Wales or Quebec, bilingualism has a slightly different implication. Here, the bilingual is usually the historical loser, and thus sociologically less privileged; but his bilingualism is a sign of his upward mobility, an index of his success in a kind of natural selection of the more intelligent or "bi-culturally able." The achievement involved in becoming such

a bilingual may thus, in Gardiner's and Lambert's[6] terms, be considered as a more "instrumental" adaptation.

Enquiries into the relationship between bilingualism on one hand and school and intellectual performance on the other must, then, be considered in the light of these sociological restrictions. Viewed thus, bilingualism appears to be operating as a multidimensional function of not well-defined social and psychological variables, variously subject to their interrelationship. Bilingualism is found to be alternately negatively and positively correlated with intellectual functioning, depending upon how these variables interact.

The McGill studies also illustrate a second difficulty in interpreting the results of all bilingual research data: what is the direction of the cause-effect relationship between second language acquisition and intelligence? It is not clear whether the Peal and Lambert study demonstrates, as the authors suggest, "the effect of bilingualism on intellectual functioning"[7] — or the effect, as noted above, of intellectual "natural selection" plus a whole host of additional social and psychological variables relating to the acquisition of a second language. These authors are much more careful than their predecessors in this field to consider the social psychology of second language acquisition in a bilingual community. They mention the duality of cultural participation as a source of possible social friction; they describe the effect of community stereotypes on bilingualism; and their evidence documents the role of attitude in acquiring a second language. But they stop short of asking the underlying question of their study — what forces operate, so that some ten-year-olds from French-speaking families in a bilingual city can speak English, while other ten-year-olds from similar families cannot? Are these forces largely intellectual, social, or conative? Do the brighter children become bilingual or do the bilingual children become brighter?

Some of the answers may be in the data which those authors "held constant" to avoid contaminating their results — IQ, socio-economic status, and school grades — all of which are reported as being significantly higher for the bilingual at the 1% level[8].

A further aspect of bilinguality that seems to have relevance in this connection has been investigated — the question of the origin of the individual's bilinguality: that is to say, where and under what conditions he acquired his second language. Writing in "Psycholinguistics," the special 1954 supplement to the *Journal of Abnormal and Social Psychology*, Ervin and Osgood[9], describe two types of bilinguality. They speak on the other hand of "coordinate systems," i.e. languages learned separately in different cultural contexts and from different people, for example when one language is learned at home and the other at school; and on the other hand of "compound systems," i.e. languages learned together in the same context and within the same associational field, for example when both languages are learned at home from birth.

A study by Lambert, Havelka, and Crosby[10] confirmed this

distinction as a meaningful one. These investigators likened the retroactive inhibition linkage of association theory to a bilingual's use of two word referents, that is, for each stimulus the bilingual has learned two responses. From this analogy they inferred that interference would be reduced by increasing the distinctiveness of the two language contexts. Using Ervin and Osgood's "coordinate" versus "compound" distinction, they tested thirty-two bilingual university students, classified by whether their languages had been learned in separated or fused settings respectively. The "separated" group showed significantly greater difference in meaning between translated verbal equivalents e.g. "church-église," than did the "fused" group, as measured by Osgood's semantic differential scale, and scored differently on a test of the re-learning of word lists. They concluded that "coordinate" ("separate") bilinguals appear to have more functionally independent language systems than do the "compound" ("fused") bilinguals, and to be able to use their two languages more separately.

And finally, before the cognitive effects of bilingualism can be evaluated, a distinction must be made between those bilinguals whose languages fall within the same language family, and those whose languages cross family lines. Bilinguals who know two languages within the same language family, such as French and English, both Indo-European languages, cannot be presumed to have learned the same things about language in general as have bilinguals whose two languages come from different language families, such as Engish and Chinese. The former are probably learning something about the regularities of both their languages when they progress in either, the latter are probably not. Whorf[11] has documented this distinction in his careful studies of the comparisons of Amerindian and English syntax and usage.

Within a language family, similar word-forms perform similar functions and are syntactically and semantically predictable from the context. For example, in both sentences, "a - must be cooked slowly" and "il faut cuisiner le - lentement," a noun must invariably be supplied. But the same probabilistic cues would not hold in crossing over to another language group where verb-noun relationships, for example, do not follow the same rule.

In summary, then, until now, studies of the effect of bilingual experience on future learning and test performance have been more a documentation of the effect of historical, cultural, group and family, and language type differences on children's performance and were examples of nothing so much as the influence of these factors on bilingualism and the psychology of its acquisition.

These studies suggest that bilingualism is associated with intelligence in some manner but the direction of the causative link is not yet established; also, that socio-economic, cultural and attitudinal factors, and the relationship between the languages learned all affect the nature of this linkage. They further suggest that where and from whom one learns one or both of the languages affects the unity and diversity of one's semantic structure. There-

fore, before the effects of learning two languages on future intellectual performance can be assessed, it is necessary to eliminate the confounding effects of these global socio-cultural determinants.

As this brief review of previous research reveals, approaches to the investigation of bilinguality and intellectual performance have closely followed the vogues in intellectual theory of each period: from the early emphasis on genetic and racial determinants of intelligence of the 1920's and early 1930's, through the preoccupation with differential abilities of the late 1930's and 1940's. It does, therefore, seem fitting to consider the question of the effects of bilingualism in the light of the current interest in learning theory and to elicit answers that might be translated into the newly expanded language of perception and readiness theory.

Bilingualism and Learning

The first question to be explored in considering bilingualism in terms of learning theory is: What is a child doing, in operational terms, as he acquires a second language? What kinds of behaviour are being reinforced? What behaviours are being practiced?

It has long been recognized that children entering school differ in their readiness to learn. In addition to the broad spectrum of genetic, developmental, and affective reasons assigned to these differences, a recent group of studies that might be classified under "readiness theory," and might be defined in Harlow's words as "learning to learn,"[12] suggest another source of variation which has important implications for the understanding of bilingual learning. This pre-learning state has been explored from several different view-points.

Bruner[13] speaks of "perceptual readiness," and postulates that one sees what one has been set to see by previous experience and current need. From experimental data[14] on the importance of previous learning on what one perceives, he demonstrates that the objective validity of perceptions depends principally on how efficiently one uses perceptual cues, and also upon how accessible are the appropriate cognitive categories into which one must sort these incoming cues. In other words, perception becomes more efficient with familiarity, i.e. learning. One dimension of this efficient use of environmental cues to perceive is the perceiver's ability to group and integrate the cues received. Another dimension of how well cues are used is "gating," a mechanism by which distracting sensory imputs are screened out, so that on-going perceptions are not disturbed.

These mechanisms of perceptual efficiency — grouping, integration, and gating or screening have two important things in common. They all depend on what has been called "higher cognitive judgement," i.e. something more than a fixed response to a given stimulus; and they all develop with previous experience, i.e. practice, in perceiving.

These data have interesting implications for learning theory and its relation to bilingual experience. A child who is exposed at an early age to a second language could be said to be practising the perception and discrimination of additional auditory language cues. He is receiving more practice in the efficient handling of such cues. He is practising being ready to perceive.

Pribram[15] speaks of "neurological readiness" to learn and suggests a neural model for learning in which novelty plays a crucial role in mobilizing the attention of the receptor system. Extending this thinking, he speaks of "reinforcement by cognition,"[16] another concept with valuable implications for learning theory and its relation to bilingual experience. A child learning a second language at an early age is receiving extra practice in attending to differences, or, in Pribram's model, is faced with and is responding to many instances of novelty. He could be said, in these terms, to be building up a greater need for cognitive reinforcement, e.g. an extended capacity, or even an extended requirement, for learning.

In summary, then, the data offer evidence at the neurological, perceptual and cognitive levels of the effects of differential states of readiness to receive and process incoming stimuli. They also document the importance of difference and novelty in eliciting and maintaining this state of readiness. And finally, there is evidence that increased experience in, or practice at attending — i.e. being in a state of readiness — should increase an organism's capacity for attending. He has "learned to attend." A child who has been exposed to a second language can be said to have had additional practice in organizing perceptual cues and using them to perceive.

These ideas on the effect of experience on one's ability to learn have been incorporated into recent thinking about the nature of intelligence itself. Just as the classical concept of perception has been widened to include the role of experience, recent inquiries into intelligence theory have questioned the classical notion of intelligence as a fixed, innate potential. Several models of intelligence have been based on this effect of previous experience, or practice, on the subsequent diversity of intellectual structure.

Wechsler's early investigation of what he describes as the "non-intellective factors" of intelligence leads him to conclude that "intelligence cannot be equated with intellectual ability, but must be regarded as a manifestation of the personality as a whole."[17]

Guilford's[18] "information theory" model of intelligence, wherein the learner is an "agent for dealing with information," leads to a concept of learning as the discovery of information; and the ability to learn, i.e. intelligence, as the ability to process information. He concludes, "every intellectual factor can be developed in individuals, at least to some extent, by practice."[19]

Hunt[20] with a comprehensive documentation of neurological and developmental findings, builds a theory of intellectual development as a function of the interaction of encounters between the organism and its environment, between capacity and experience.

If bilingual experience is considered to be experience in at-

tending, and practice in perceiving, then according to these models of intelligence, this experience should show up in a more diversified intellectual structure. A recent study at McGill by Yeni-Komashian[21] substantiated this effect of training, or practice, on subsequent performance. Dr. Yeni-Komashian gave a group of Montreal high school students training in distinguishing auditory differences in a foreign language and, later, compared their scores on a sound discrimination test with those of an untrained control group. She found that training significantly improves subsequent perceptual acuity. She also conducted a series of vocabulary learning tasks. In these she found that when vocabulary lists in two languages were presented "consecutively," i.e. each language separately as when a bilingual learns his two languages in a "fused" ("compound") system.

The assumption that training to learn aids learning also underlies the work in remedial learning being undertaken in centers like the Marianne Frostig Center for Educational Therapy in Los Angeles. According to Frostig, "in considering the various developmental areas of a child, one is regarding him as a dynamic organism, capable of change and progress, rather than as a static entity with an unalterable label,"[22] and "degrees of maturity in the various areas of an individual's development are not pre-determined by inherent characteristics, but may be influenced by experience."[23]

In other words, apart from how much or how well a child learns a second language, being exposed to this bilingual experience appears to provide him practice in learning, and it may be providing him practice in thinking as well.

Bilingualism and Psycholinguistic Development

And finally, evidence from the comparatively recent inquiry of psycholinguistics into the role of language in learning suggests that bilingual exposure may be expected to affect cognitive performance.

Early students of developmental cognition such as Vygotsky and Piaget, relied heavily on the role of language in building their theories. More recently, Brown and Lenneberg[24], Brown[25], and Carrol[26] , starting largely from Whorf's[11] anthropologically-based language theories, have described the relationship between cognition and language in more psychological terms. That is, they attempt to restate the previous data in the operational terminology of learning and reinforcement theory.

Brown starts with Bruner's premise that "language learning involves learning to group those sounds that are functionally equivalent, and to ignore those differences in sounds that make no difference as far as distinguishing words are concerned."[27] Language learning in this schema is learning to categorize, and what the learner learns to categorize are the criterial language cues upon which he must make his predictions about what comes next. It is from his previous experience with the language that he learns to predict ensuing changes from these cues. This learning of cue

criteriality is what occurs in language learning, whether one is learning a first, second or any succeeding language. This is further support for the argument that exposure at an early age to a second language offers a child additional practice in categorizing from criterial language cues, i.e. in predicting from probability of word structure and context.

A group of investigations of aphasia (Osgood[28] and Wepman, L. V. Jones, Bock, and Van Pelt[29]) sheds additional light on the structural linkage between language and the higher cognitive processes, i.e. how the cortex handles symbols. These studies were based on data from the brain explorations of Penfield and Roberts.[30] These brain exploration studies, which document ten years of neurological observations, have supplied evidence from which much subsequent understanding of language has come. Earlier, Hebb's[31] cell and phase assembly theory had provided a model to explain how incoming language (i.e. symbolic) stimuli are processed. Hebb's theory explained the function of the receptor system, and Penfield and Robert's work provided the structure — the cortical map of the domain of language, or to use Penfield's words, a view of "where words come from."[32]

Studies of the language disfunction of patients with cortical impairment, due either to brain injury or disease, have demonstrated that aphasia — the inability to handle symbols or language — can occur as a disability in receiving, recognizing or naming the incoming stimuli; or in choosing, naming or sending the outgoing responses.

Osgood[33] proposed a model of language behaviour to include all of these processes of symbol manipulation. This language model is designed to expand classical S-R theory to allow for these mediational operations without sacrificing behaviouristic rigor. In Osgood's model, the incoming auditory, visual, and tactual stimuli, and the outgoing vocal and motor responses, can be combined as pairs into six channels or routes:

auditory - motor	tactual - vocal
auditory - vocal	visual - motor
tactual - motor	visual - vocal

Each of these combinations can operate at any one of the three levels of complexity. These then are the ways the organism deals with symbols or language.

The first or *projection* level includes the simplest reactions — the stimulus-bound behaviour that is unaltered by learning. The second or *integrational* level includes learned automatic or habitual behaviour — the criterial or predicting behaviour developed on the basis of previously-learned contingencies. Here is the storehouse of regularities for predicting from probabilistic cues, which the organism builds up to reduce the cognitive strain of dealing anew with every incoming stimulus. From babyhood, a child absorbs the phonemes and morphemes of his language by first recognizing and later producing, countless repetitions of his native tongue. It is this dimension of a second language which seems

most easily learned at an early age. In "The Original Word Game," Brown suggests that a small child learning to speak is forming and testing hypotheses about which categories elicit which utterances. It is this integrational level of language behaviour, in Osgood's terms, which the child is practising.

Osgood's third or *representational* level deals with significance, meaning, and novelty, i.e. those language behaviours which engage the highest intellectual processes.

Finally, to complete his model, Osgood suggests three processes, namely the initial *decoding* of stimuli by the organism, the *association* of stimuli and response, and the terminal *encoding* of the responses. The organism may use these processes at any of the three levels.

The bilingual child could be expected to have more experience in attending to, categorizing, and predicting from criterial cues of structure and syntax. This is experience both in generalizing, i.e. recognizing likeness, and differentiating, i.e. recognizing difference — a crucial dimension in pre-learning readiness. It is precisely the behaviour described by Bruner when he speaks of what the organism does with the information it receives — how it orders, retains and manipulates it; in short, how concepts are formed.

Also, the child who has learned two referents for the same stimulus has learned several things about both language and the world it symbolizes. He has, for instance, been required to separate objects from their names — a difficulty of pre-schoolers documented by Vygotsky in his example "a cow could not be called 'ink' because 'ink' is for writing."[34] Such a child has also learned to judge differential cues for the appropriate switching from one language to another, and thus has had practice in "flexibility." In the McGill study, one pre-experiment hypothesis was that bilingual children would be more flexible mentally. However, this hypothesized difference failed to show up in the test results, and the investigators concluded that the pre-test instructions to be flexible had "set" the monolinguals, as well as the bilinguals, for maximum flexibility. But they further suggested that bilinguals, because of their frequent experience of switching from one language to another, are normally "set to switch."

From this data on how language behaviour operates, it is possible to draw inferences about the effects of bilingual experience on a child's readiness for future learning. With his increased practice in attending to differences and in predicting, from criterial language cues of probabilistic contingencies, he is getting increased practice in attending to differences and in predicting from criterial levels of thinking are dependent upon language," then this increased practice in language manipulation should lead to basic cognitive gains.

A Study of Bilingual Exposure and Psycholinguistic Ability

From these theoretical considerations an investigation was

undertaken to see whether or not these differences in the cognitive use of language do in fact show up between children having monolingual and bilingual experiences respectively.[35] The study was designed to examine some of the effects of being exposed to a second language — specifically, the effect of pre-school bilingual experience — on a child's psycholinguistic ability. As the results of previous studies demonstrate, it is difficult to extricate this effect from the social variables which accompany it. In order to do so, it was decided not to use natural bilinguals, i.e. children whose cultural and home settings had made them bilingual, but to use as subjects children who had been exposed to a relatively fixed and equal amount of bilingual experience.

For this purpose a sample of fifty-one children was chosen and tested shortly after the children had begun Grade One. The children at the time of testing were all students in one of eight public schools in the Western section of Montreal — two English-language and six French-language schools.

The sample was composed of three groups of seventeen children each: one experimental group and two control groups. All of the children in the sample came from English speaking homes in similar middle-class suburban neighbourhoods. Those in the experimental group had attended kindergarten for a year in French. The children in the two control groups were each matched with one of the children in the experimental group. In one control group these matched children had all attended kindergarten in their own language, English, and in the second control group were children who had never attended kindergarten. Since these two control groups were matched with the experimental group for sex (each of the three groups contained ten girls and seven boys) and as closely as possible for ability (as assessed by each Grade One teacher), the three groups differed on only one large independent variable — pre-school language experience. Within each of the three groups were ten children attending English Grade One, and seven children attending French Grade One.

Each child was administered a battery of seven tests of psycholinguistic performance. Four of these tests were from the *Illinois Test of Psycholinguistic Abilities (ITPA)*[36] which is based on Osgood's model of language behaviour. Two were measures of automatic language habits: the *auditory-vocal automatic* test, designed to measure the ability to predict from linguistic cues ("Here is an apple, Here are two . . ."), and an *auditory-vocal sequencing* test, designed to measure immediate auditory recall by having a child repeat a sequence of numbers. The other two tests were designed as more cognitive measures: an *auditory-decoding* test, testing the ability to understand the spoken word, and an *auditory-vocal association* test, measuring the ability to relate the spoken word in a meaningful way ("I eat with a spoon, I cut with a . . .").

The final three tests in the battery were taken from the *Gates Diagnostic Reading Tests (GDRT)*[37] designed by their author to test "the awareness of sounds in words." These were: a test of

the ability to recognize beginning sounds in words; a test of ability to recognize final sounds of words; and a test of ability to blend sounds into meaningful words, i.e. phonemes into morphemes.

It was hypothesized that children with bilingual experience would do better than monolingual children on tests of habitual language behaviour. It was further predicted that all of the children who had attended kindergarten, whether in their own or a second language, would do better on all the tests than the children who had not.

No direct hypothesis was offered for the results on the two measures of higher cognitive ability. They were included to test the following effect: if any kindergarten experience equally enriches and diversifies the intellect, then there should be no difference between the scores on these subtests for all children with kindergarten experience; and all of these children should score more highly than children who have had no kindergarten experience. If, however, bilingual experience is the key independent variable, the children with bilingual experience should score more highly on these tests than children with any other pre-school experience.

As for the expected results on the subtests from the Gates battery, from the theoretical implications in the literature, it was expected that auditory discrimination for beginning and ending sounds should be more highly developed in children with bilingual experience. They have had increased practice in attending to novel criterial verbal cues. So bilingual children could be expected to score more highly in these tests than all the other children.

All of the testing took place between October 15, 1965 and November 15, 1965, i.e. between the 6th and 10th week after the children had entered Grade One. Each child was tested individually by the same examiner. The tests were administered at the child's school, in each case in an unused resource or utility room where privacy was attainable. In two schools, this was the school library; in two others the staff room, in one, an unused classroom. All testing took place in the morning, as close to the starting of the school day as possible, always before lunch. In each case, the examiner was introduced to the child by the teacher or principal. A few minutes were spent adapting the child to the room, the examiner and the situation. Exact protocols were followed in introducing the entire battery and each sub-test.

Results

The results of this preliminary study suggest that bilingual exposure appears to affect a child's ability to use his own language in some areas.

The raw scores obtained by all children on all measures were used to compute a mean for each of the three groups, i.e. the experimental French kindergarten group (F.K.) and the two control groups, English kindergarten (E.K.) and no kindergarten (N.K.),

on each of the seven tests. Three main trends emerge from a comparison of these results:

A. *Effect of Pre-School Bilingual Experience*

The two control groups (E.K. and N.K.) were combined to comprise a "monolingual group," i.e. children whose pre-school language experience had been in a single language, and their performance compared with that of the experimental group (F.K.), designated as "bilingual," i.e. children whose pre-school experience included exposure to a second language.

This comparison showed that the bilingual group scored higher on four of the measures administered, although only on the test of auditory decoding is this difference significant. No difference appeared on two of the tests: recognition of beginning word sounds and blending sounds, and on the test of symbol association, results are the reverse of those hypothesized.

B. *Effect of Beginning Grade One in a Second Language*

Each of the three groups had ten children beginning Grade One in English and seven beginning Grade One in French. Although this variable was carefully matched to affect each group equally, the exact nature of the effect of beginning Grade One in a second language on the psycholinguistic performance of a six year old was not predictable. The performance of all children attending English Grade One (designated as sub-sample 1) was compared with that of all children attending French Grade One (designated as sub-sample 2). This comparison was made within each of the three groups (FK, EK, NK) as well as between all the children in English Grade One ($FK_2 + EK_1 + NK_1$) and all the children in French Grade One ($FK_2 + EK_2 + NK_2$).

Children in English Grade One score significantly higher (at the .01) level than those in French Grade One. Although the significance level of the intra-group differences varies within each of the three groups, this depression of scores for the children in French Grade One is noted. Since the measures used were not tests of ability in French, but of psycholinguistic performance in the child's first language, English, it appears that going to school in a second language lowers a child's performance in using his own language when this is measured at the beginning of the school year. However, within each Grade One group, English (sub-sample 1) and French (sub-sample 2) pre-school experience in French increased performance. Whether a child is enrolled in French Grade One, or English Grade One, his score is higher, in relation to those of his English-speaking classmates, if he has previously attended French Kindergarten. This is the same trend as noted in the total sample.

C. *Effect of Attending Kindergarten*

When the scores of the two control groups (EK and NK) were compared, it was found that contrary to the hypothesized superiority of children with kindergarten experience, on no test

did any significant difference appear between the two groups. On four of the sub-tests, the NK mean was higher than the EK mean; on the remaining three tests the reverse was true. Attending kindergarten had no systematic effect on psycholinguistic performance as measured in this sample.

In summary, the findings of this exploratory study were:

1. Attending kindergarten in a second language increases a child's scores on some measures of psycholinguistic ability in his own language. It significantly increases this performance on a test of comprehension of word meanings and increases his scores on tests of remembering final sounds of words and recalling a sequence of symbols, although not significantly. Children attending English Grade One and French Grade One both follow this trend.

2. Attending Grade One in a second language depresses a child's score on measures of psycholinguistic ability in his own language when this is measured at the beginning of the school year. All children in English Grade One perform better on these measures than all children in French Grade One.

3. Attending kindergarten in their own language does not increase scores on measures of psycholinguistic ability for children from middle-class homes. Children in this sample who have attented English kindergarten and those who have never attended kindergarten do not perform differently on these measures. Furthermore, analyses of variance performed on scores of the three groups for each of the seven tests and on a measure of overall psycholinguistic ability showed no significant differences on any tests. The children in this sample did not perform as three discrete groups (FK, EK, NK), but where any differences emerge, as two groups: monolingual and bilingual.

Discussion of Results and their Implications

The trend of scores on these tests indicates that pre-school experience in a second language increases a child's ability to use his native language, although significance cannot be claimed for this indication from this small study. The trend also suggests that with pre-school language experience in a second language, a child becomes less facile in associating word meaning in his own language, but more fluent in reproducing ordered sequences, comprehending words and recognizing final sounds of words in his native tongue.

The results of this study also suggest that bilingual experience operates, initially at least, to decrease a child's overall ability to make cognitive use of his own language. It is not difficult to suggest explanations for this. Spending five hours a day in a second language is a demanding task for a six-year-old, and when this is combined with his first experience with formal education and the beginning instruction in all basic skills, the effects of fatigue and anxiety might well be expected to depress scores on any measure of cognitive functioning. Furthermore, although

school is a completely French domain to these children they were approached and tested by the examiner in English. Much interference of response and consequent decreasing of encoding efficiency might be expected in such circumstances. Whether or not this depressive effect would persist after the children become more adapted to the situation and proficient in French, and their anxiety and fatigue abate with increased success, would be very interesting to examine.

No difference in psycholinguistic ability was found, in this research, to depend upon attendance at kindergarten. Differences, where they occur, appear to be related to the children having had pre-school experiences in a second language. This lack of difference in psycholinguistic performance between children attending kindergarten and those who have not in this sample is probably directly tied to the socio-economic level of their families. These families rank well above the average in the population in occupation and income on Blishen's occupational class scale[38]. They come from new suburban communities which are highly child-centered, abounding in recreational facilities and populated by highly child-centered families. In such a milieu, a small child gets much encouragement in testing and exploring his world. The experiences provided in a conventional kindergarten with language, music, color, shape, and movement, can be and are obtained by most of the children in such a middle-class community in their own and their neighbour's homes. Whatever may be the gains in social maturity and familiarity with a school setting, attending kindergarten in English does not appear to improve ability to make cognitive use of language for the children of this sample.

As has been noted, several questions raised by the results on this study remain unanswered. In order to get a clearer picture of the effects of sending English speaking children to kindergarten and/or Grade One in French, it would be desirable to re-test this sample of children at a later date. It would be particularly interesting to ascertain whether or not:

1. The gains in psycholinguistic performance demonstrated in this study by the experimental group, children from French Kindergarten, are maintained;

2. The lowered psycholinguistic performance of children in French Grade One is maintained;

3. The lowered associational fluency of children who had attended French Kindergarten is maintained.

Beyond the narrow frame of reference of this exploratory study, it would be most valuable to see if differences emerge when larger samples are used. Other measures of attention and sound discrimination also might better match the theoretical models hypothesized and might give more accurate assessments of the effects of the different experiences.

From the point of view of educational planning, the findings in this study suggest that in so far as kindergarten is considered to be preparation for future school learning, and in so far as learning is dependent upon language and is increased with increased ability to utilize language, then consideration might be given to offering children from such a background their kindergarten program in a second language. Heretofore, when such a plan has been considered, even for those in support, the gains envisaged have been linguistic gains. It is difficult to demonstrate that a child has made any gains in learning a second language from a brief exposure. It has been the aim of this study to show that some concommitant cognitive gains from such exposure can be demonstated. Its findings do, in fact, suggest that whether an English-speaking child is sent to Grade One in his own language, or in French, his psycholinguistic performance in some areas of language behaviour will be higher if he has previously attended French Kindergarten.

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