

Unit B4

Bilingualism and cognitive ability extended

In this unit, we will read extracts which shaped the research on the relationship between cognitive ability and bilingualism. The focus in the reading will be on the methodology and conclusions drawn by the researchers and the ramifications of this research on current practices.

As discussed in Unit A4, the research in this area can be categorized into the period before and after 1962. Before the publication of Peal and Lambert's 1962 study, bilingualism was predominantly associated with negative effects, but after 1962, researchers paid more attention to the issues of methodology and the ways in which poor control of variables could compromise the outcome.

METHODOLOGICAL CONCERNS

In Unit A4, we discussed how methodological concerns plagued the studies which reported detrimental effects of bilingualism. Major methodological errors included the poor identification of bilingual samples and, often, the lack of rigorous justifications in the choice of tasks.

One of the most challenging factors which researchers into bilingualism have to deal with is the issue of sample selection. For example, Torrance et al. (1970) found that bilingual children in Singapore performed poorly in tests of creative flexibility. However, this study was compromised by the authors' poor understanding of the sociolinguistic situation in Singapore. Children who attended bilingual schools were classified as bilingual despite the fact that most of them were functionally learning two new school languages. Most Chinese children spoke a different Chinese language at home, and at school learned Mandarin and English, both of which were second languages. Thus, sample selection is a critical issue and without careful sampling, most results can be interpreted only with caution. In the first extract, we will examine how this problem of sampling was overcome in Peal and Lambert's (1962) study (briefly discussed in Unit A4).

PEAL AND LAMBERT (1962): THE PIONEER STUDY

Peal and Lambert's research was considered a watershed as it reoriented the way researchers approached the issue of bilingualism. By carefully reviewing the major shortcomings of the previous studies, they pointed out that bilinguals were defined at best inadequately and at worst totally haphazardly and arbitrarily. As indicated in Unit A1, bilingualism as a concept is notoriously difficult to capture. Parentage, range of usage or competence alone cannot fully describe a bilingual population, and not only did early studies not pay sufficient attention to the issue of sampling, they also failed to control adequately for socio-economic status (SES). Therefore, there was a tendency for bilingual groups to be conflated with lower SES.

After carefully reviewing the literature, Peal and Lambert hypothesized that in a comparison of the French-English bilingual and English monolingual population:

- There should be no difference in non-verbal IQ for bilinguals and monolinguals.
- Monolinguals were expected to be superior to bilinguals in verbal IQ tests.

The study also explored the relationship between bilingualism and school grades as Morrison (1958) had found bilinguals to lag 1.5 years behind their monolingual counterparts in school grade. Attitudinal aspects were also included, but this was discussed in Unit A7.

The participants in the study were 364 ten-year-old schoolchildren from six French schools in Montreal. All the schools were classified as middle-class schools by the School Commission and the children were carefully matched on SES, sex and age. They were tested on language, intelligence and attitude. We begin by looking at some of the key methodological concerns Peal and Lambert raised before examining how they selected their samples and tasks.

E. Peal and W.E. Lambert (1962) The relation of bilingualism to intelligence. *Psychological Monographs*, 76 (27): 1-23.

Psychologists and linguists have wondered whether bilingualism affects intellectual functioning since as early as the 1920s when Saer (1923) and Smith (1923) reported research on the topic. Numerous studies since then have attempted to determine whether monolingual and bilingual young people differ in intelligence as measured by standard tests. A large proportion of investigators have concluded from their studies that bilingualism has a detrimental effect on intellectual functioning. The bilingual child is described as being hampered in his performance on intelligence tests in comparison with the monolingual child. A smaller proportion of the investigations have found little or no influence of bilingualism on intelligence, in that no significant difference between bilinguals and monolinguals on tests of intelligence was apparent. Only two empirical studies were encountered which suggest that bilingualism may have favorable intellectual consequences. An attempt will be made to understand these seemingly contradictory findings by critically reviewing representative studies reporting each type of effect. The studies will be evaluated mainly in terms of how well

SECTION

B

Text BA.1
E. Peal and
W.E. Lambert

Extension

other relevant variables were controlled, particularly certain personal characteristics which are known to be related to intelligence and which should be taken into account when the effect of bilingualism on intelligence is examined.

In the design typically used, where two groups of subjects are being compared on intelligence, it is necessary to match the groups on as many features known or suspected to correlate with intelligence as possible so that the difference between the groups, if any, may be attributed to linguality itself. This model requires a clear definition of monolingualism and bilingualism in order that the two can be objectively determined without risk of overlap or confusion. Socioeconomic status has been repeatedly found to be related to intelligence and linguistic development (Jones, 1960; McCarthy, 1954). McCarthy states that 'there is considerable evidence in the literature to indicate that there exists a marked relationship between socioeconomic status of the family and the child's linguistic development' (p. 586). From past research it is well established that girls are more advanced than boys in language development, especially in the early years. They have a larger vocabulary and are more skilled in the use of words. Since most intelligence tests draw heavily on verbal skills, it would be advisable to have approximately equal numbers of boys and girls in the groups to be compared. Furthermore, groups should also be matched for age. The educational background of children may also affect their performance on standardized tests of intelligence. This variable could be approximately controlled by using subjects from the same schools or school system. The intelligence tests should be constructed and standardized on a population similar to the one being tested, especially with respect to language. A translation of a test from one language to another, without standardization, might bias the results for or against one group. Also, the tests should be given in the language in which the bilinguals are most proficient.

Theoretical considerations

Theoretically, what would be the expected effects of bilingualism on intelligence or mental development? Few of the psychologists who have studied this problem have attempted any explanation beyond rather vague references to a 'language handicap' or 'mental confusion.'

An inquiry into the effects of the learning of two languages on mental development demands a serious consideration of the broader question of the relation between language and thought, and modern psychology has generally eschewed this question. The apparent belief of many is that at least partial answers to the broad question may appear from the study of the interrelation of language and intelligence. Arsenian (1937), after examining various theories of language and thought, hypothesized that language and intelligence are not identical. In line with this hypothesis, he maintained that:

the influence of bilingualism, whatever for the moment we may suppose it to be, does not extend to the whole area of thinking or intelligence, but to that particular section where linguistic symbolism and schemata are involved in the thinking process.

Susanne Langer (1942) made a distinction between speech and thought. She argued that: 'It [speech] is the normal terminus of thought. But in fact, speech is the natural

Text BA.1

E. Deal and

W. E. Lambert

outcome of only one kind of symbolic process'. Assuming then, that language and thought are not isomorphic, how would the learning of two languages influence scores on intelligence tests, which obviously require thought?

Several writers, assuming a lack of identity between language and thought, suggest that the learning of two languages from childhood has favorable effects on the thinking process. Two writers in particular have made this point. Leopold (1949a), after extensive observations of the mental development of his own child, felt that the bilingual child learns early to separate the sound of a word from its referent. He writes:

I attribute this attitude of detachment from words confidently to the bilingualism. Constantly hearing the same things referred to by different words from two languages, she had her attention drawn to essentials, to content instead of form (p. 188).

S. J. Evans of Wales (1953) also argues that the:

teaching of Welsh along with English does what the efficient study of any two languages must do: it frees the mind from the tyranny of words. It is extremely difficult for a monoglot to dissociate thought from words, but he who can express his ideas in two languages is emancipated (p. 43).

These arguments, suggesting that a bilingual has an intellectual advantage over a monolingual because his thinking is not restricted by language, give support to those few studies which found favorable effects of bilingualism on intelligence and mental development. In view of these arguments, it also seems possible that the type of benefit that comes from bilingualism might not become apparent on standard intelligence tests. It could be argued that the studies finding no difference or a deficit for bilinguals were simply using inappropriate measures.

O'Doherty (1958) suggests that it is necessary in any consideration of the influence of bilingualism on intelligence to distinguish between two types of bilinguals for whom the effects may differentiate the pseudo-bilingual and the genuine bilingual. The pseudo-bilingual knows one language much better than the other and does not use his second language in communication. The true bilingual masters both at an early age and has facility with both as means of communication. O'Doherty states that there can be no question that bilingualism of the genuine kind is an intellectual advantage. The pseudo-bilingual is the real problem, since very often he fails to master either language, while the bilingual by definition has mastered both' (p. 285). Thus, O'Doherty's writings lend additional support to the notion that 'genuine' bilingualism may be an asset.

Can we find any theoretical support for the detrimental effects of bilingualism on intelligence? Weinreich (1953) makes the point that any individual who speaks two or more languages will experience interference due to the contact between them. That is, a bilingual's speech in each language will be different than it would have been had he only learned one language. The extent of the interference in any particular case will depend in part on certain linguistic differences between the two language systems.

The more numerous the mutually exclusive forms and patterns in each, the greater is the learning problem and the potential area of interference. But the mechanisms of interference would appear to be the same whether the contact is between Chinese and French or between two subvarieties of English (pp. 1-2).

SECTION**B**

Text B4.1
E. Peal and
V.E. Lambert

Extension

The language handicap reported for bilinguals could thus be attributed to interlingual interference. The effect of this interference would show up on verbal tests, but could be expected to influence performance on non-verbal tests only in so far as these depend on verbal skills.

It could be hypothesized that bilingualism might affect the very structure of intellect. Such a hypothesis could be developed from a current conceptualization of intellect as consisting of factors. Guilford (1956) and others propose that intelligence is composed of a general factor and many different specific factors, each of which may be isolated by factor analytic methods. Ferguson (1954) has put forth the thesis that human abilities are learned. Stated another way, a large proportion of an individual's intellectual ability is acquired through experience and its transfer from one situation to another. The 'factors of intellect' are gradually developed through a series of learning situations. This learning process may proceed in different ways for different individuals depending on their experiences. Thus the structure of intellect will very likely vary from one individual to another. The developmental process for monolinguals and bilinguals is certainly different in respect to language, and the learning of abilities depends greatly on language. Bilinguals could have different and more complex contexts for learning than monolinguals. Arsenian (1937) states that, 'The two different words in two different language systems for the same referent may carry different connotations and put the bilingual person in contact with two worlds of experience.' We could, therefore, hypothesize that the structure of the intellect of monolinguals and bilinguals might differ in various aspects. Guilford (1956) states: 'to the extent that factors [of intellect] are developed by experience, they would appear at such ages as the effects of experience have sufficiently crystallized' (p. 287). That is, the emergence of an intellectual factor is dependent on the accumulation of experiences. From this notion, it seems reasonable to propose that such factors would appear at different ages in monolinguals and bilinguals, since their linguistic and cultural experiences are quite different. It may therefore be important to discover the nature of the effects of bilingualism on intellectual functioning.

**Task B4.1.1**

- What is Peal and Lambert's view about the relationship between language and intelligence?

General methodological framework of Peal and Lambert's study

Peal and Lambert used tests such as the Word association test, Word detection test and Peabody Vocabulary tests to gauge the level of bilingualism of each child. The tests were administered in both French and English, and the purpose was to evaluate the level of language dominance in each child. In addition, the children were also asked to rate themselves on a set of self-evaluation scales. On the basis of these tests, the sample of 364 subjects was divided into three groups:

- clearly monolingual
- clearly bilingual



- a third group which could not be unambiguously classified as monolingual or bilingual.

The third group was excluded from the next stage of testing. After this initial stage of screening, they were left with 164 children: 75 were monolinguals and 89 were bilinguals (96 males, 68 females). The screening was carefully monitored to ensure that only those with extremely high bilingual skills were included in the group of bilinguals. The children were also administered three types of intelligence tests as well as a series of complex attitudinal measures. The intelligence tests include cognitive tests for both verbal and non-verbal intelligence.

Method

Subjects

The subjects were 10-year-old school children from six French schools under the jurisdiction of the Catholic School Commission of Montreal. Three of these schools were located in the western region of Montreal, and the remainder in the extreme eastern region of the island. All were roughly classified as middle class schools by the School Commission. In each school all the 10-year-olds available were tested, regardless of school grade.

Procedure

The testing took place in the classroom and was divided into five sessions of 1 hour each, spaced about a week apart. All instructions to the children were given in French by native speakers of French, except for the test of English vocabulary which was administered by a native speaker of English.

In the first session, all the 10-year-olds were administered a questionnaire and several tests to determine degree of bilingualism. The questionnaire sought general information about the child and his family, specific information about his language history, and details about his father's occupation. Three tests were used to determine whether the child was a *balanced bilingual*, that is, equally skilled in French and English, or whether he was a monolingual. His own self-ratings of his ability in English were also taken into account.

Criteria for Selection of Subjects

Word Association Test. The first test of bilingualism was based on an association fluency technique developed by Lambert (1956). Modifications were introduced to make the technique appropriate for use with children in a group setting. French and English words were presented alternately and the children were asked to write down as many words as they could think of in the same language as the stimulus which seemed to 'go with' or 'belong with' that word. An interval of 60 seconds was allowed for association to each word. For each subject the sum of the associations to all the French words was calculated (NF). The same was done for the associations to the English words (NE). These two sums were used to form a balance score:

$$\text{Balance} = \frac{\text{NF} - \text{NE}}{\text{NF} + \text{NE}} \times 100$$

SECTION

Extension

Test #4-1
G. J. Ireland
W. E. Lambert

A zero score indicates perfect balance between the two languages, a plus score means French dominance, and a minus score English dominance.

Word Detection Test. This test was also a modification of one developed by Lambert, Havelka, and Gardner (1959). It was postulated that bilingualism would express itself in the facility of finding short embedded English and French words in a series of letters such as DANSONODEND. The subjects were given four such series and allowed 1½ minutes to work on each. Approximately equal numbers of English and French words were embedded in each group of letters. A balance score was obtained here, similar to the one described above.

Peabody Picture Vocabulary Test. This test, derived from Dunn (1959), was used because it made possible a distinction between oral and graphic language skills. It was thought that there might be bilinguals who were not able to read or write English, but who would nevertheless be balanced bilinguals in the oral sense. Such bilinguals might be at a disadvantage on the two previous tests which required some knowledge of written English. The test consists of a series of plates, each of which has four pictures of objects or actions numbered 1-4. The examiner says one English word aloud and the subject has to point to the picture corresponding to the word. To adapt this for use with a group, we flashed each plate on a screen by means of an epidiascope, and an examiner pronounced the word in English. The children wrote down the number of the picture which corresponded to the English word pronounced. In this way, no graphic skills in English were required of the subjects. Twenty-one plates of increasing difficulty were presented. A score of the number of correct responses out of 21 was obtained for each child.

Subjective Self-Rating Score. The subjects were asked to rate their ability to speak, read, write, and understand English on 4-point scales ranging from 'not at all' (scored 1) to 'very fluently' (scored 4). For each subject an oral self-rating score was obtained by summing his weights on 'speak' and 'understand,' and a graphic score by doing the same on 'read' and 'write.' The maximum possible score was 8 on each (oral and graphic scores).

On the basis of these tests, the entire sample of 364 subjects originally contacted was divided into three groups: one group composed of monolinguals, a second group of bilinguals, and a third group which could not be unambiguously classified as either monolingual or bilingual. Only the first two of these groups were further tested. The third group was not used again.

The criteria used in the classification of subjects were as follows: (a) Monolinguals - Word Association Test, a balance score of at least +75; Word Detection Test, a balance score of at least +75; Peabody Picture Vocabulary, a score of not more than 6; Subjective Self-Rating, a score of not more than 7 in oral and graphic skill in English (combined). (b) Bilinguals - Word Association Test, a balance score of 0 ± 30 ; Word Detection Test, a balance score of 0 ± 30 ; Peabody Vocabulary, a score of at least 15 out of 21; Subjective Self-Rating, a score of at least 13 out of a possible 16 in oral and graphic English (combined).

Two judges consulted on the classification of each subject. In some cases where the different criteria were in disagreement, more weight was given to the Vocabulary score than to the others.

Our selected sample was composed of 164 subjects: 75 monolinguals and 89 bilinguals; 96 boys and 68 girls. These subjects were tested four additional times.

Measures of Intelligence

Lavoie-Laurendeau (1960) *Group Test of General Intelligence* (Variables 6–9; Variables 16–23). Previous studies pointed to the importance of using a test of intelligence standardized in the native language of the subject and preferably prepared for use in that language community. The Lavoie-Laurendeau test, standardized by psychologists at the University of Montreal on a Montreal French-speaking school population, seemed to meet these requirements. It is based on several other well-developed tests (Wechsler-Bellevue, WISC, Barbeau-Pinard) using those sections which could best be adapted for group testing. The nonverbal and verbal sections of this test were administered to each group. Nonverbal, verbal, and total IQ scores were calculated for each subject. A ratio score was obtained by dividing the verbal IQ by the nonverbal IQ and multiplying by 100.

Raven (1956) *Progressive Matrices Test* (Variable 10). The colored form of this (Sets A, Ab, and B) was administered as a group test. This was included as a measure of basic intelligence (pure 'g'). A total raw score was obtained for each subject (maximum 36).

Thurstone (1954) *Primary Mental Abilities* (Variables 11–15). An attempt was made to select those subtests from the Primary Mental Abilities which draw least directly on verbal skills. The following five were chosen and administered in French: Space, Figure-Grouping, Perception, Number, and Verbal Meaning. This test was translated by a linguist at McGill.

Task B4.1.2

- As is evident, Peal and Lambert were very careful in screening the bilingual proficiency of the bilinguals. Consider the three language tests the children took and comment on the type of linguistic ability each one measures. Do you think they are representative of general language proficiency skills? What are some concerns you may have with using such tasks for measuring language proficiency?

Achievement measures

From the teachers, ratings were obtained of how well each child did in school in relation to the others in his class. The teacher rated each child along a five-point scale in terms of his achievement in general (Variable 24), in French (Variable 25), and in English (Variable 26) if this happened to be one of his subjects. We also obtained the marks in French that each subject received in *dictée* (Variable 27), *lecture* (Variable 28), and *composition* (Variable 29) at midterm.

The following measures were based on information from the original questionnaire filled out by each subject.

Sex (Variable 1); *School Grade* (Variable 4); *Number of Years Speaking English* (Variable 5); *French Skills of Parents* (Variable 30). Each subject rated the ability of his father and mother to speak, read, write, and understand French. These were scored in the same manner as his self-ratings of his English ability. The scores for mother and father were summed.

English Skill of Parents (Variable 31). This variable was derived in the same way as above, using the items about English in place of those about French.

Balance between English and French Skills of Parents (Variable 32). The score on Variable 30 was subtracted from the score on Variable 31 and a constant of 100 added. A score

Text B4.1
F. Peal and
W.E. Lambert



Text B4.1
F. Peal and
W.E. Lambert

SECTION



Text B4.1
E. Peal and
W.E. Lambert

Extension

of 100 on this variable indicates that the parents are equally skilled in French and English. A score of less than 100 means that the parents are more skilled in English than in French, and vice versa.

Socioeconomic Class (Variable 3). Realizing the relevance of socioeconomic class to language learning, we decided to investigate its role in detail. On the basis of information received from the child, the school records, the school principal, and the parents themselves when necessary, we placed each child into one of the seven categories outlined by Warner, Meeker, and Eelis (1949). A small sample of 110 children was selected from the large sample so that there were equal numbers of bilinguals and monolinguals in each of the seven classes.



Task B4.1.3

- Why do you think Peal and Lambert were interested in the children's English and French achievement scores?
- Similarly, what information can we gather from the parents' skills in both French and English?
- What are some of the common ways of measuring SES?

Generally, the findings indicate that the bilingual group performed significantly better than the monolingual group on most non-verbal tasks. Contrary to the hypothesis, the bilinguals performed better than the monolinguals in verbal IQ tasks as well, and, overall, bilinguals were found to be cognitively more flexible than monolinguals. Peal and Lambert's study was significant because it highlighted the importance of paying careful attention to sampling issues for results to be interpretable.

BIALYSTOK'S CONTROL AND ANALYSIS HYPOTHESIS (2001)

Following Peal and Lambert, several studies explored the relationship between various levels of metalinguistic awareness and bilingualism. In Unit A4, we noted that positive effects were not consistently reported across all samples and all tasks even in the cases where careful attention had been paid to controlling sample selection. Bialystok (2001b) explained that these differences were due to the different cognitive demands of the tasks. In the next extract, we will read more about Bialystok's hypothesis about the cognitive processes underlying different metalinguistic tasks.

In Unit B2, we discussed the need to differentiate between different types of bilingual proficiencies. The Analysis and Control framework can be used to explain the cognitive processes underlying different task demands. In general terms, metalinguistic tasks require us to pay explicit attention to form. Bialystok identified metalinguistic tasks which require children to ignore distracting information and

pay attention to relevant information. Recall that in the symbol substitution task, children were asked to replace 'the boy' with 'pencils' when given the sentence 'The boy sings loudly'. For this task, the children have to pay attention to the correct substitution even though the substitution itself may violate grammatical rules in the language. Here, the violation of the rule is a misleading factor which the children have to ignore. These tasks are categorized by Bialystok as being 'high in control'.

Tasks which are 'high in analysis' are tasks which require children to have detailed knowledge about the language data around them and to be able to develop mental representations of this knowledge. Tasks that involve explanations (e.g. asking children to explain why particular sentences are ungrammatical) are 'high in analysis'. In the following extract, Bialystok looks at how these differences in cognitive demands influence a range of metalinguistic tasks.

E. Bialystok (2001) Metalinguistic aspects of bilingual processing. *Annual Review of Applied Linguistics*, 21: 169-181.

Extracting the pattern

The group comparisons provided little ground for claiming a consistent core to the tasks described as metalinguistic. Bilingual and monolingual children acquired aspects of these concepts on different schedules, even undermining any consistency in the subcategories of linguistic competence. Therefore, instead of defining 'metalinguistic' in structural terms by pointing to a set of tasks that indicate the ability, it will be considered in processing terms, identifying the cognitive components that are implicated in the solution to specific metalinguistic tasks.

The processing description, elaborated elsewhere (Bialystok, 1993, 2001a), is based on two cognitive processes that are implicated in language acquisition and other cognitive developments. These processes are called analysis of representational structures and control of selective attention. Greater involvement of each makes tasks more difficult, and this difficulty results in behavior appearing to be increasingly metalinguistic. However, no specific boundary in the development of either process signals a category shift into metalinguistic performance; it is a gradual transition into a continuously evolving domain.

The first process, analysis of representational structures, is children's ability to construct mental representations with more detail and structure than was part of their initially implicit knowledge. Representations that are more explicit are more amenable to conscious access and to intentional manipulation. Karmiloff-Smith (1992) articulates a theory in which representational redescription is the central mechanism for cognitive development. Although not identical to the process of analysis, there is much common ground in the two descriptions. This processing component captures the need for metalinguistic behavior to be based on knowledge that is more explicit or more formal than that needed for more ordinary linguistic performance.

The second process, control of attention, is responsible for directing attention to specific aspects of either a stimulus field or a mental representation as problems are

14

1991042
Bialystok

Defined in terms of underlying processes, any task that places high demands on these processes is metalinguistic. This processing criterion allows different metalinguistic tasks to be compared in more detail. A selection of some metalinguistic tasks with their processing demands is illustrated in Figure B4.2.1.

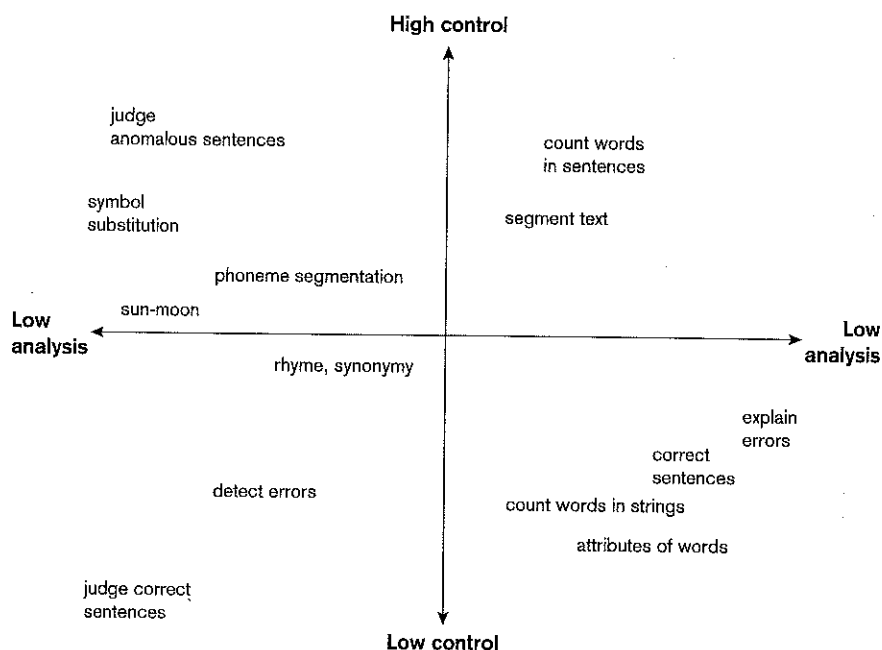


Figure B4.2.1 Some metalinguistic tasks with an estimate of their demands for analysis and control

Task B4.2.1

- The central idea in Bialystok's argument is the different demands made by two cognitive processes: 'analysis of representational structures' and 'control of selective attention'. Tasks which produced a bilingual advantage are considered to be high in control and tasks which did not produce a bilingual advantage are considered to be high in analysis. Look at the two metalinguistic tasks (Table B4.2.1). Discuss how these tasks differ in their demand for control and analysis.

Table B4.2.1 Two metalinguistic tasks

<i>Tasks which produced a bilingual advantage</i>	<i>Tasks which did not produce a bilingual advantage</i>	<i>Explanation of task</i>
count words in sentences	count words in strings	Words were presented either in meaningful sentences 'I love eating ice-cream' or in a scrambled string, e.g. 'love I ice-cream eating.'
phoneme segmentation	phoneme substitution	In phoneme segmentation, the children were asked to determine the number of phonemes in each word. In phoneme substitution, they were instead asked to replace one phoneme in a word with another, e.g. 'Take away the first sound from cat and put in the first sound from mop. What do you get?'

This processing framework provides a means for re-interpreting the results of monolingual and bilingual comparisons of metalinguistic development. Simply put, tasks that are high in their demands for control of attention are solved better by bilinguals than monolinguals; tasks that are high in their demands for analysis of representations are not necessarily solved better by either group. The bilingual advantage, therefore, is in the ability to control attention when there is misleading information.

Consider some of the tasks used in the research described in this review. The following tasks produced an advantage for bilingual children: count words in sentences, symbol substitution, sun-moon problem, use novel names in sentences, word-referent problem ('giraffes'), judge grammaticality of anomalous sentences, and phoneme segmentation. The following tasks did not produce a bilingual advantage: count words in strings, describe attributes of words, determine ambiguity, explain grammatical errors, judge grammaticality of incorrect (but meaningful) sentences, understand count-mass distinction, and phoneme substitution. The difference is in the primary demands imposed by each set of tasks. The tasks in the former group include misleading information, making them high in their demand for control of attention. The tasks in the latter group require detailed knowledge, making them high in their demand for analysis of representations. The effect of bilingualism on children's development is that it enhances their ability to attend to relevant information in the presence of misleading distractions. There is no domain description that defines this bilingual advantage: some metalinguistic tasks are solved better by bilinguals and others are not. Even the subcategories of word awareness, syntactic awareness, and phonological awareness do not capture what is unique about the access to these problems by bilingual children. It is only at the level of underlying processing that the pattern becomes clear.

The conclusion from this interpretation is that bilingual children do not have different control over a domain of knowledge than monolinguals. Specifically, there is no evidence that metalinguistic ability per se is developed more easily or more quickly in bilingual children. It is the case, nonetheless, that bilingual children consistently outperform monolinguals on some metalinguistic tasks. Rather than

Text B4.2

E. Hulstijn

SECTION**Extension**

Text B4.2
E. Bialystok

attributing this advantage to privileged access to a domain of knowledge, however, the benefit is traced to a specific cognitive process that develops more readily in bilingual children. This process, control of attention, is central to certain metalinguistic problems, and it is in solving these problems that bilingual children excel. Although this analysis leaves little ground for claiming a bilingual superiority in an important developmental ability, it isolates nonetheless a formidable advantage in cognitive processing. The potential impact of this cognitive process goes well beyond the domain of metalinguistic, or even linguistic competence.

Bialystok argues that mental activity is distributed across the brain and cannot be decomposed, even abstractly, into independent units. That is, if bilingualism has a positive effect, the positive effect should be seen across all domains and should not just manifest itself in a specific domain like metalinguistic awareness. In her framework, bilingualism affects mental functioning by influencing the way information is processed, rather than by qualitatively affecting a part of the mind. As she indicated in the extract, in many ways this claim has far-reaching implications for the different ways in which bilingualism can enhance our life.

Summary

In Unit B4, we read two extracts; one focused on the way the researchers conduct the sampling of the bilinguals and the tasks used to measure 'cognitive functioning', and the other examined the specific cognitive process which is enhanced by exposure to two languages. The research questions asked in these two studies are indicative of the development in this field of research. Beginning with the broad question of whether bilingualism has positive or negative effects on cognition, the question has now evolved to more refined investigation into the specific types of influence bilingualism has on underlying cognitive processes.