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The Relationship Between Degree of Bilingualism and Cognitive Ability: A Critical Discussion and Some New Longitudinal Data

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In 1962, Elizabeth Peal and Wallace Lambert of McGill University published a monograph entitled "The Relation of Bilingualism to Intelligence." The research, conducted in Montreal with 10-year-old children, compared the performance of monolinguals to that of bilingual, French/English-speaking subjects on a variety of standard tests of intelligence. In contrast to previous research on bilingualism and intelligence, Peal and Lambert (1962) discovered that their bilingual sample showed superior performance on measures of verbal intelligence and on nonverbal tests "involving concept-formation or symbolic flexibility [p. 14]." What differentiated the study from its ancestral relatives was the care with which Peal and Lambert exercised control over sample selection. They drew a distinction between true, "balanced bilinguals" who are proficient in both their first (L1) and second language (L2) and "pseudo-bilinguals" who, for various reasons, have not yet attained age-appropriate abilities in their second language. According to Peal and Lambert (1962): "The pseudo-bilingual knows one language much better than the other, and does not use his second language in communication. The true (or balanced) bilingual masters both at an early age and has facility with both as means of communication [p. 6]." Into their sample of bilinguals, only those considered "balanced" were admitted.

Peal and Lambert's study had substantial impact on two fronts. First, it raised the consciousness of researchers on the problem of selecting appropriate

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sample bilingual samples to an extent such that the prototype of subsequent studies on bilingualism became group comparisons of balanced bilinguals to monolingual counterparts matched on appropriate variables. Second, the results served to allay commonly held fears concerning the products of bilingual education, namely, that it would produce retarded, poorly educated, anomic individuals without affiliation to either ethnolinguistic group and incapable of functioning in either language (Tucker & d'Anglejan, 1971). Bilingual education would not create, the study assured, a social or cognitive Frankenstein.

In this chapter, we provide a brief review of research prior to Peal and Lambert's study and more recent studies on bilingualism and intelligence (for an earlier review with a linguistic focus, see Lindholm, 1980; for an expanded and detailed review of the first six decades of research, see Diaz, 1983). In the course of the review, we point out both theoretical and methodological weaknesses inherent in the typical bilingual-monolingual comparison. In addition, we stress the paucity of longitudinal investigations that allow for the assessment of statements concerning the cause-effect relations between bilingualism and cognitive abilities. Then, we report preliminary results from our own study, which attempts to correct for these weaknesses. We conclude with some theoretical speculations regarding the nature of the relationship between bilingualism and thought.

THE FIRST 4 DECADES OF RESEARCH

Psychological studies of the relation between bilingualism and cognitive abilities began in the early 1920s out of concern raised by the flourishing of psychometric tests of intelligence. The concern was that bilingual children would suffer from some linguistic disadvantages, which could, in turn, prevent fair assessment of their intellectual abilities and potential. The fact that the measurement of intelligence is heavily dependent on verbal abilities made psychologists and educators deeply concerned (and rightfully so) about the validity of such tests for bilingual children. As expected, the majority of studies prior to Peal and Lambert's (1962) study found that bilinguals were linguistically deficient in comparison to their monolingual counterparts. Among other things, bilinguals were shown to have deficient articulation (Carrow, 1957), lower standards in written composition, more grammatical errors (Harris, 1948; Saer, 1924), and a considerably reduced vocabulary (Bake & Williams, 1938; Grabo, 1931; Saer, 1924). The consistent finding was that bilinguals suffered from a so-called "language handicap" (see reviews by Arsenian, 1937; Darcy, 1953, 1963; Macnamara, 1966).

Unfortunately, consistent findings about bilinguals' "language handicap" led too quickly to statements regarding the negative effects of bilingualism

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rather than to a serious questioning of the validity of psychometric tests of intelligence for this population. Negative, and rather harsh, statements condemning bilingualism as a social plague (Epstein, 1905) or as "a hardship devoid of apparent advantage" (Yoshioka, 1929) were common in the early literature. In short, the measured language handicap of bilinguals was interpreted as a linguistic confusion that deeply affected children's intellectual development and academic performance up to the college years (Saer, 1940).

The majority of early studies in the area, however, suffered from a wide range of methodological problems, and as a result, most current investigators in the field regard the findings of early studies as totally unreliable (see Cummins, 1976). A good number of early studies, for example, failed to control for group differences in socioeconomic status between bilingual and monolingual samples. As early as 1930, McCarthy pointed out that bilingualism in the US was seriously confounded with low socioeconomic status. She found that more than half of the bilingual school children could be classified as belonging to families from the unskilled labor occupational group. Along the same lines, Fukuda (1925) alerted researchers to the fact that high-scoring English-speaking subjects were mostly in the occupational and executive classes; he reported a correlation of .53 between the Whittier (socio-economic) Scale and the Binet IQ in his sample. Nevertheless, prior to the early 1960s, most studies investigating the effects of bilingualism on children's intelligence did not take into account group differences in socioeconomic status.

A second major methodological flaw of early studies is that it was often questionable whether the "bilingual" subjects were in fact fluent in both languages. Brunner (1929), for example, assumed that children's bilingualism would be estimated by the foreignness of their parents. Brunner divided his bilingual sample into three categories: (1) both parents born in this country; (2) one parent born here and the other abroad; and (3) both parents born abroad. The classification was simply assumed to represent various degrees of children's bilingualism. In other studies, the sample's bilingualism was assessed through family names or even place of residence (see Darcy, 1953, for a review). As recent investigators have repeatedly stated, it is impossible to

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scribed briefly in the introduction, took steps to assure the selection of true, balanced bilinguals. In addition, it recruited wisdom from previous studies in controlling for socioeconomic level.

PEAL AND LAMBERT (1962): THE PUNCTUATION POINT IN RESEARCH

Both bilingual and monolingual samples for the Peal and Lambert study were selected from the same school system in Montreal. All 10-year-old children in the system were included in the initial screening by four measures, the composite of which was used to determine whether the child should be considered monolingual or balanced bilingual. The measures were: (1) the relative frequency of words provided in a word association task in L1 and L2; (2) the relative frequency of words in L1 and L2 detected in a series of letters; (3) the frequency of words recognized in L2 (English) from a subset chosen from the Peabody Picture Vocabulary Test; and (4) subjective self-ratings on ability in speaking, understanding, reading, and writing in L2. Children who fell in the extremes of these scales were determined to be monolingual or balanced bilingual. The final sample consisted of 75 monolinguals and 89 bilinguals; all children were administered a modified version of the Lavoie-Laurendeau Group Test of General Intelligence (Lavoie & Laurendeau, 1960), the Raven's Coloured Progressive Matrices (Raven, 1956; Raven, Court, & Raven, 1976), and a French version of selected subtests of the Thurstone Primary Mental Abilities Test (Thurstone & Thurstone, 1954).

Contrary to the findings of earlier studies, the results of the Peal and Lambert study showed that bilinguals performed significantly better than monolinguals on most of the cognitive tests and subtests, even when group differences in sex, age, and socioeconomic status were appropriately controlled. Bilingual children performed significantly higher than monolinguals on tests of both verbal and nonverbal abilities; the bilinguals' superiority in nonverbal tests was more clearly evident in those subtests that required mental manipulation and reorganization of visual stimuli, rather than mere per-

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