BILINGUALISM AND MENTAL DEVELOPMENT

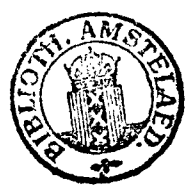
A STUDY OF THE INTELLIGENCE AND THE SOCIAL BACKGROUND OF BILINGUAL CHILDREN IN NEW YORK CITY

By SETH ARSENIAN

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN THE FACULTY OF PHILOSOPHY COLUMBIA UNIVERSITY

Published with the Approval of
Professor Rudolf Pintner, Sponsor

BUREAU OF PUBLICATIONS
TEACHERS COLLEGE, COLUMBIA UNIVERSITY
NEW YORK CITY
1937



Printed in the United States of America

MANUFACTURED BY THE HADDON CRAFTSMEN, INC.
CAMDEN, N. J.

ACKNOWLEDGMENTS

THE writer acknowledges his deep gratitude to Professor Rudolf Pintner, sponsor, whose constant encouragement, interest, and guidance have made the completion of this work possible. Professor Lester M. Wilson and Dr. Julius B. Maller, as members of the dissertation committee, have given generously of their time and advice, and the writer is greatly indebted to them. Dr. Maller gave the writer free access to his voluminous data on New York City Public Schools which was of considerable assistance in the selection of the desired population and schools for the investigation.

The writer is grateful to the Board of Education of the City of New York, to District Superintendents Katherine Bauer and Lizzie E. Rector, and to Principals Benjamin Sallen and Jesse C. Bell of Public Schools 16 and 176, Brooklyn, for permission to conduct his investigation in these schools. The full co-operation of Messrs. Sallen and Bell, and Misses Sara H. Boyle and E. Jane Allison, Assistant Principals, and the teaching staffs of both schools made the testing possible in the best possible circumstances. To all of these the writer extends his appreciation and gratitude.

The writer was extremely fortunate in having the services of a number of C.W.S. workers under project number 89 FB 190X, who assisted in testing, scoring, and tabulating the results. Mention should be made of the names of Miss Lillian F. Strammer, and Messrs. Harry B. Gilbert, Salvatore C. Mantione, Simon Ochoco, and Raymond G. Devine for their most careful and interested work. The writer takes this occasion to express his gratitude to the C.W.S. Office at Columbia University for its co-operation and helpfulness.

It is a pleasure at this time to acknowledge publicly my indebtedness to Director Paul Monroe and members of the International Institute of Teachers College who made it possible for

me to come to Teachers College for a program of studies on the graduate level, to Professor Clarence Linton and Dr. Walter E. Hager for their friendly interest in me and in my work, to Professor Charles Spearman who permitted me to print and use his Visual Perception Test, Part I, and to Dr. Joseph Zubin who brought this test to my attention and made some of his early results on the test available to me.

There are indeed many other individuals who through their interest in me and the work have contributed in one way or another to the completion of this investigation. The writer takes this occasion to thank them one and all for their services and to reiterate his appreciation of their friendship. The opportunity that this research created for new contacts and knowledge of many people has been one of the many pleasures the work has offered.

S.A.

January 12, 1937

CONTENTS

Bilingualism and Mental Development

CHAPTER I

BILINGUALISM

LANGUAGE

THE inquiry about the origin of language dates probably to the time of the Greek Sophists, who speculated whether it was due to "nature" or to "convention." (30)* Until the close of the eighteenth century, European linguistic science had advanced but little beyond the knowledge of linguistics achieved by the Greeks. (104) During the eighteenth century, under the influence particularly of the German philosopher Leibnitz, and because of the interest of Peter the Great and Catherine II of Russia, a considerable amount of material relating to linguistics was compiled, and several attempts at a classification of languages were made. With this background and the dominant desire for inquiry into the origin of things—so characteristic of the century—the philosophers and the philologists of the nineteenth century proposed several theories of the origin of language in the human race.

Of these a triad, known under the nicknames of "Bow-wow," "Pooh-pooh," and "Ding-dong," have been widely discussed in the literature on the subject. According to the "Bow-wow," or the onomatopoeic theory, attributed to Herder, primitive words were imitative of sounds in nature. The word "dog" or "bark" is explained by this theory to have originated in the sounds or noise that the animal in question makes. The "Pooh-pooh," or the interjectional theory, claims that language is derived from instinctive ejaculations called forth by pain or other intense sensations or feelings. The "Ding-dong," or the nativistic theory,

* This and other numbers in parentheses throughout the text refer to publications listed in alphabetical order in the bibliography at the end of the book. When the number in parentheses is followed by a colon and a second number, the latter refers to the page of the work cited.

proposed by Max Müller, and later abandoned by him—wisely, according to Jespersen (63)—maintains that man in his primitive state possessed a faculty which made it possible for every impression from without to receive its vocal expression within.[1]

As early as 1866 La Société de Linguistique of Paris, convinced of the fruitlessness of these speculative theories regarding the origin of language, formally barred from its program any communication relative to the subject. (63) In the light of recent research and knowledge these rival theories of the origin of language have lost even more of their former plausibility and prestige among the philosophers and philologists who have concerned themselves with the problem. The philosopher Dewey sees in them not theories of the origin of language, but mere "accounts, of some plausibility, of how and why certain sounds rather than others were selected to signify objects, acts, and situations." (32:175) The philologist Vendryes, after a critical review of the sources of data on which these theories depend, declares the data inadequate for the purpose, and the problem outside the jurisdiction of the linguist. (155)

Whatever the origin of language, it must be assumed, as indicated by Delacroix (29), that the human species had already achieved a certain intellectual maturity and was living in societies before the beginning of language was possible at all. The absence of the institution of language among the lower animals can be explained by the lack in them of that intellectual maturity, or the deficiency in the neuro-physiological mechanism responsible for it. According to Henry Barr, "The appearance of language on the evolutionary stage marked definitely the close

[1] Mention should also be made of two additional phylogenetic theories of the origin of language advanced subsequently by Noiré and Jespersen. Noiré's theory, nicknamed "Yo-he-ho," claims that it is a relief to the organism, when under strong muscular effort, to exhale, and that breath during this process passing repeatedly and vigorously over the vocal chords vibrates them, producing sounds which associated with events and objects simultaneously present give rise to words (96). Using the method of the history of language in his search for the beginnings of language, Jespersen finds that "language started with half-musical unanalyzed expressions for individual beings and solitary events." (63:441)

The ontogenetic approach of psychologists to the study of language will be dealt with in Chapter VI.

of zoological and the beginning of human history." (155:Foreword i)

The most general definition of language is that it is a system of signs for communication. This defines simultaneously the nature of language as symbolic, representative; and its function as the instrument par excellence for social communication and cooperation. Through its development, both in the race and in the individual, concepts and meanings arise and multiply and extend the scope of thinking.[2] Through it the child inherits the experience of his forbears accumulated through the long centuries. By means of it culture and civilization develop, human intelligence expands, human thought penetrates the past and visualizes the future, thus making human progress possible. Sapir aptly states: "Language is the most massive and inclusive art we know, a mountainous and anonymous work of unconscious generations." (127:235)

Whether all language originated from a single pristine form or emanated from several sources, it came, through differentiation in the course of numerous centuries of human history, to assume many forms. The differentiation of language is the result of many causes—usually geographical, economic, political, or religious in nature. It will be instructive to cite the example of the differentiation in the Arabic language described by Meillet. (93) Arabic was the language of a few tribes in the region of Mecca. Hand in hand with Mohammedanism this language spread over large territories covering the Near East, Northern Africa, and Spain. In the seventh century this was a unified language; as time went on, however, it assumed different aspects in different places until today it is spoken quite differently in Arabia, Syria, Egypt, Tunis, Algeria, Morocco, and Malta.

It is estimated that at present there are 1,500 different languages employed by the 1,800 million population of the globe. (97) According to Meillet there are in the world more recognized languages now than ever before in human history. The explanation of this phenomenon, he believes, is to be sought in the democratic ideal since the Reformation and more recently in the

[2] See Chapter VI for a discussion of the relation between language and thought.

principle of self-determination heralded after the Great War. There are attempts today to resurrect even the dead languages, like Hebrew in Palestine and in the Diaspora. Patriots in Ireland and in Wales are taking every measure to revive their old national tongues, and check their retreat before the spread of the English language. The Soviet Union has given every encouragement to the development of vernaculars, and has even created alphabets for little known languages, otherwise doomed to death.

BILINGUALISM AND ITS EXTENT

Bilingualism, or the use of two languages by the same person, is probably as old as the first occurrence in human history of mutually understood traffic between two people speaking different languages. The proximity or coexistence in the same political or geographical area of two or more languages has inevitably resulted in bilingualism of one type or another. Because of increased movement of peoples in modern times, and the more closely interdependent and interrelated nature of the present world, the contacts between language groups are more numerous and bilingualism is more widespread than ever before.

One of the main principles of the modern state, since the French Revolution, has been the enforcement of the state language upon the language minorities within its boundaries. The operation of this principle is apparent in practically all European states as well as in the re-formed or newly reconstituted states in Asia, such as Turkey, Iran, and Iraq. The Soviet Union may possibly be cited as an exception to this general practice. The policy of decentralization regarding national languages in this otherwise highly centralized Union is perhaps due to the need of the popularization of the Marxist doctrine. It is to be recalled that encouragement for the development of national languages was also witnessed in conjunction with the rise of Christianity, and at the time of the Protestant Reformation in Europe.

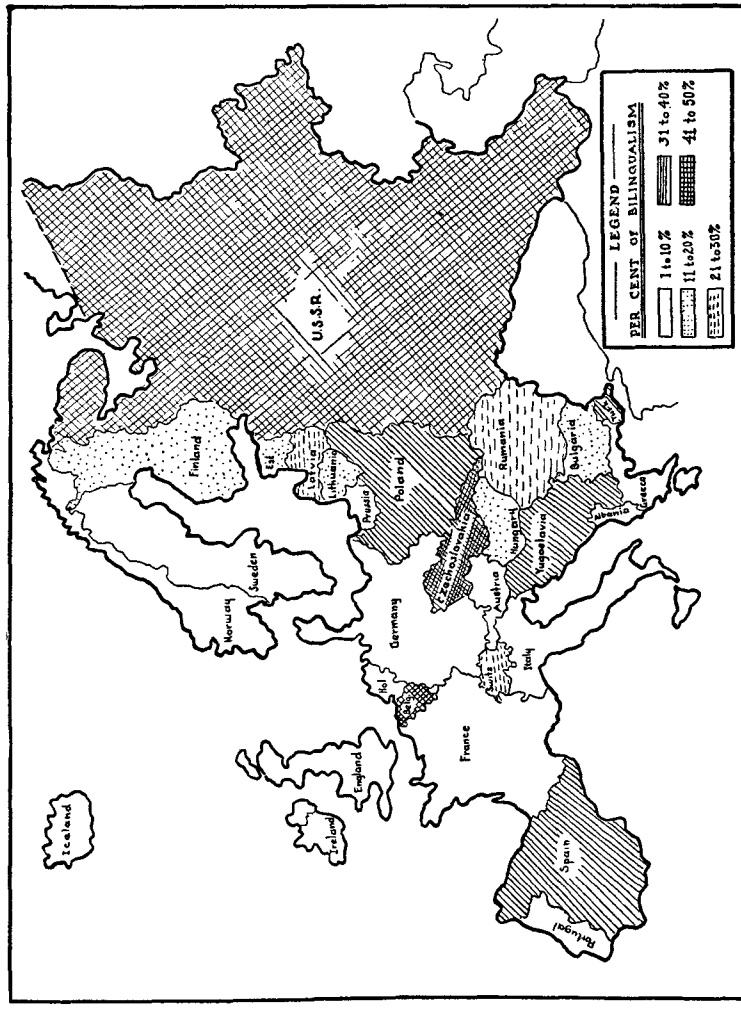
Bilingualism in Europe. By virtue of the operation of the aforementioned principle of the modern state, coupled with certain other unifying tendencies in contemporary civilization, members of the linguistic minority groups situated in Europe, if not

already bilingual, will become so at one time or another either by having to learn the language of the state in which they reside, or by learning one of the main languages of present-day European civilization—English, French, or German.

On this assumption, and on the basis of figures regarding language minorities in the European countries, as of December 31, 1926, supplied by Meillet (93), a map indicating the relative distribution of actual and potential bilingualism in Europe is presented on page 6. In arriving at the percentage figure for each state, the number of people speaking the principal language is subtracted in each case from the total population of the state and the remainder, which represents the number of people speaking a language other than the principal language, is expressed as a percentage of the total population. It should be noted that in the case of Belgium, the Flemish language has been regarded as the principal language since 51 per cent of the population of that country use Flemish as against 44 per cent using French and 5 per cent using German and other languages. In the case of Switzerland, German has been regarded as the principal language, since 71 per cent of the population are German-speaking. For the Soviet Union, the Great Russian has been regarded as the principal language, since the number of people speaking it constitutes 57 per cent of the total population of the Soviet Union in Europe. However, if the Great, Little, and White Russian languages—all Slavic and closely related—are together considered as constituting the principal language, then the percentage of language minorities in the Soviet Union will drop from 43 per cent to 16 per cent, and change our map. The language situation in Russia exemplifies a real Tower of Babel, and perhaps 43 per cent represents that Babel better than 16 per cent.

It is also to be noted that the spread of the linguistic minorities in any country is not as smooth as the map represents it. These minorities are concentrated in certain regions and their boundaries are not coincident with the political boundaries of the states.[3]

[3] Excellent maps of the spread of the different languages in Europe are to be found in *Les Langues dans l'Europe Nouvelle*, by A. Meillet, Paris, 1928, and also in the *Frontiers of Language and Nationality in Europe*, by L. Dominian, New York, 1917.



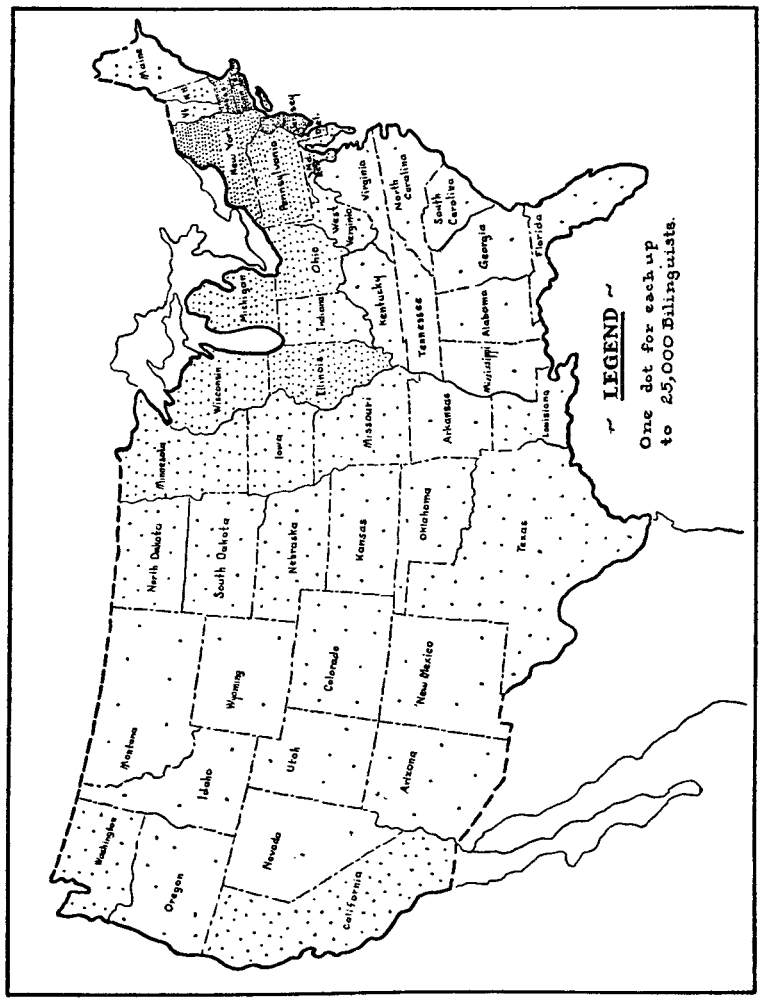
MAP I. Relative Distribution of Bilingualism in Europe

Portugal, Iceland, Lichtenstein, Monaco, and St. Marin are the only countries and principalities in Europe where language minorities do not exist. With the exception of Belgium and Switzerland, and Spain where the largest minority language is the Catalonian (a language akin to the Spanish), the bulk of language minorities is concentrated in Middle and Eastern Europe, representing the large body of peasant population of the European continent. There are 120 languages spoken in Europe today. (64)

Bilingualism in the United States. Because of immigration the United States of America has one of the largest actually bilingual populations in the world. On the basis of the figures of the last (1930) Census of the United States (39) it is estimated by the writer that 25 per cent of the population of this country is bilingual. In New York City, where there is a large concentration of immigrant population, the proportion of bilinguists is 60 per cent according to the same estimate.

The absolute and relative distribution of bilingualism in this country according to states is shown in Maps II and III on pages 8 and 10. The figures on the basis of which these two maps are made were taken from the *Fifteenth Census of the United States* (1930), "Population," Volumes I, II, and III. It is evident from the present study and that of Jordan (66) that along with English, another language is made use of by immigrants through at least two generations of residence in this country. Consequently it may be assumed that people classified in the Census under the headings of "foreign-born white" or "native white of foreign parentage" are bilingual. It may be assumed, further, that in the families of "mixed parentage" a certain degree of bilingualism will exist, and that the Mexicans, Indians, Chinese, Japanese, and "all others"[4] who are generally concentrated in certain localities will also be bilingual. On the basis of findings to be described later, and the assumptions made above, therefore, the number of "native-white of foreign parentage," "native-white of mixed parentage," "foreign-born white," Mexicans, Indians,

[4] Under "all others" are listed in the Census, Filipino, Hindu, Korean, Hawaiian, Malay, Siamese, and Samoan, amounting all together to 50,978 individuals in the United States.



MAP II. Absolute Distribution of Bilingualism in the United States

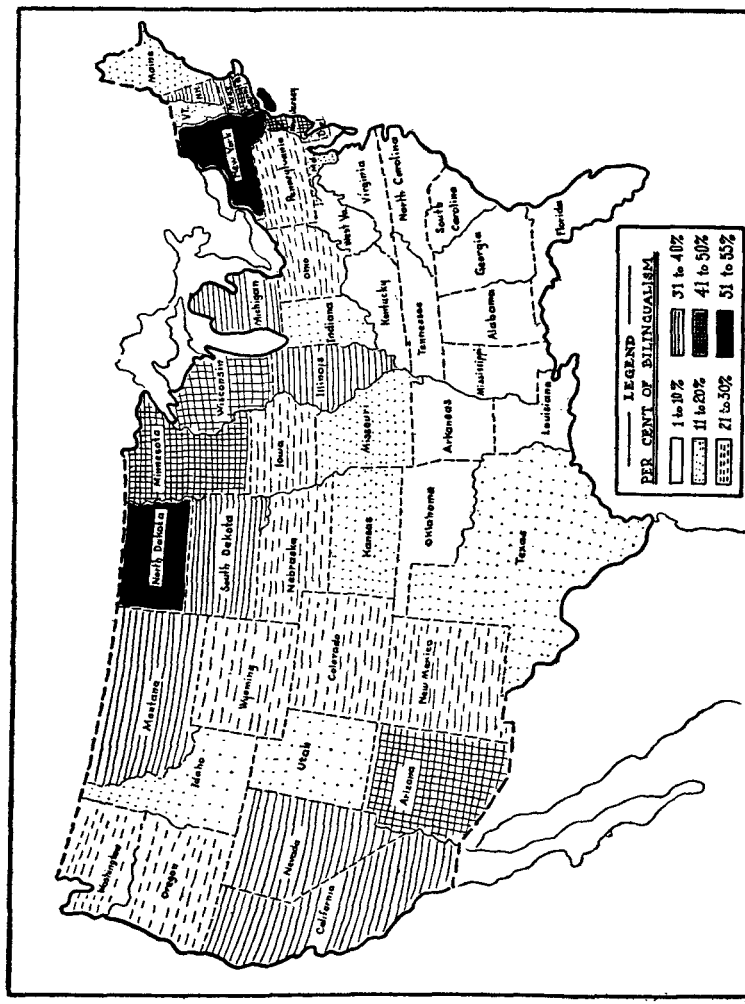
Chinese, Japanese, and "all others" were added together for each state. From this total was subtracted the number of persons from the British Isles, Canada (non-French), Newfoundland, and Australia, the assumption being that these people would have English as their mother tongue. This assumption was checked by comparing the figures given in the Census of people coming from these parts and having English as their mother tongue, and was found correct to a negligible margin of error.

Map II pictures the absolute distribution of bilingualism in the United States. One dot on the map represents up to 25,000 bilinguists. Large numbers of the bilinguists are to be found in three of the New England states, all of the middle atlantic and east north central states, and in California on the Pacific coast. The comparative paucity of bilinguists in the mountain and the southern states is to be noted.

Map III represents the spread of the bilingual population in terms of the total population of each state. It is of interest to note that there is 50 + per cent bilingualism in the states of New York and North Dakota, that bilinguists, small in absolute numbers in the mountain states, nevertheless constitute an appreciable proportion of the total population which is not large in these states, and that the proportion in the total population of bilinguists in the southern states is again negligible.

It is to be borne in mind that the people speaking French, as in some localities in the states of Maine, New Hampshire, and Vermont, or "Cajun" in Louisiana, are not included in this calculation of bilingualism in the United States.

Bilingualism in Other Countries. Canada is confronted with the problem of bilingualism by virtue of the presence in that country of large numbers of recent immigrants and the French-speaking population in the province of Quebec especially. (5) In the Union of South Africa we find two languages—Afrikaans and English—side by side and a system of bilingual education. (9) In India where one finds some 200 different tongues (97) in addition to English, which is becoming the *lingua franca* of the educated people, we meet the problem of bilingualism and multilingualism again. West remarks that "The Magh has Maghi as



MAP III. Relative Distribution of Bilingualism in the United States

his home language; he needs Bengali for local commerce, English for higher education and administration, Burmese for his ancient traditions and literature." (162:14) The 400 million population of China is subdivided into many, often mutually unintelligible, dialect groups, which hamper national unity. The present policy of the national government is to elevate the Mandarin dialect (modified as Gwoh Yǔ) to the position of state language, and make the study of it obligatory from the primary grades on. Although a large proportion of China's population, especially north of the Yangtse River, already uses this dialect (23), the result of its introduction into the school curriculum as an obligatory language all over China will make millions of the new generation of Chinese bilingual. Also many Chinese, especially in metropolitan centers like Shanghai, come to learn at least one European language, and thus become trilingual. The problem of bilingualism is encountered also in New Zealand, in Australia, and in many parts of Africa in connection with the government and the education of the natives; in Central and South America, by virtue of the increasing number of immigrants in these countries and in connection again with the education of the indigenous population.

Bilingualism, in its more inclusive sense, is to be found in almost every country in the world today. It occurs in the families constituted by mixed marriages, among government officials, businessmen, and missionaries in foreign lands, and among educated people who learn a second language for use. In a much more definite form it is present in all states where there are language minorities, and in countries of immigration and colonization.

The tendency in the modern world is for bilingualism to increase and spread over a larger area than ever before; and two apparently contradictory forces, present in our civilization of today, are contributing factors to this phenomenon. On the one hand, there is the segregating force expressed in the growing national consciousness among racial and ethnic groups each of which with a common past history and core of traditions, attempts jealously to guard its national tongue and, in the event of political

authority, to enforce it on other language groups within the limits of its political jurisdiction. There are numerous examples of this phenomenon in Europe. On the other hand, there are a group of uniting forces emanating from the greater interdependence of the present world. International conferences, of which the number is ever growing, scientific research, travel, commerce, the radio, the "talkie," and numerous other aspects of modern life are illustrations of these forces which militate against segregating frontiers of language.

The monoglot, especially the one from the small language group, will either share in the present civilization and therefore become a bilinguist, or be deprived of the benefits of it for the sake of his monoglotism. The following quotation from H. G. Wells epitomizes the situation aptly: "The inducements to an Englishman, Frenchman or German to become bilingual are great enough nowadays, but the inducements to a speaker of the smaller languages are rapidly approaching compulsion. He must do it in self-defence. To be an educated man in his own vernacular has become an impossibility. He must either become a mental subject of one of the greater languages or sink to the intellectual status of a peasant." (161:248)

BILINGUALISM AN EDUCATIONAL PROBLEM

Language is a potent force for national unity, for it is the reservoir of the traditions, the ideals, the common sufferings, and the proud achievements in the history of a people; it preserves that body of sentiments with which the members of a national group identify themselves and hence constitute a group separate from others. It has been the policy of conquering nations to suppress the language of the conquered national groups, and it has been the practice of the latter to resist vehemently such a suppression which would have led to their assimilation. History, especially prior to the Great War, is replete with illustrations of this phenomenon. The linguistic tragedy in Bohemia under Austrian domination, in Poland and Alsace-Lorraine under German rule, and in Armenia under the Tzarist regime are but few of numerous possible illustrations.

Since the Great War, by virtue of the principle of democracy, greater recognition has been given to national languages, and the rights of language minorities within different states are guaranteed by international treaties. Unfortunately, however, these treaties have remained impotent in checking linguistic suppression in many of the European states, and some of the worst examples of suppressive practices are to be found in those national states which won their independence after the War and which once experienced linguistic suppression themselves and were most vocal in decrying it. (6)

It should be noted, however, that while language helps to maintain national unity, this unity itself depends also on the differentiation which the language creates between one group and another. The solidarity of a national group feeds on its own distinction and difference from other national groups. Thus a national language, from the point of view of international co-operation, becomes a very serious obstacle, for such an international co-operation would of necessity demand a common medium for communication between separate language groups. Educationally, here is to be found one of the most important aspects of bilingualism.

If education maintains its belief in the principle of democracy, then it will have to recognize the right of existence and development of numerous languages—great or small. If, in addition, the aim of education is to introduce the individual to a fuller and more meaningful life, then he should be given access to the life and culture beyond the narrow limits of one language unit. No single language unit can possibly claim the possession of the entire wealth of human culture and civilization, or be so foolish as to assume the responsibility for its progress. A single language will admit an individual to but a limited area of human experience; for most people knowledge of more than one language will become necessary.

The problem of the harmonization between the practical functioning of language as a separating force and its ideal functioning as a unifying force of language groups has received considerable attention in the present century. People have thought that over

and above the numerous dialects and national languages a neutral language can be created to serve as a medium for international communication. To this end certain linguists have devised and proposed synthetic and other languages, eight in number at the present writing, namely: Esperanto, Ido, Volapuk, Nov-Esperanto, Latin without inflection, Occidental, Novial, and Basic English. (133) It would seem, however, that these attempts have served to increase the confusion of the Tower of Babel.

Whatever the future of a much desired medium for international communication may be, actually the educationist is faced with many urgent problems created by the coexistence in the same political unit of different living languages. Psychologically, early instruction through the vernacular has been regarded as an effective agency in education, and the principle of the mother-tongue medium has been adopted in countries such as Wales, Belgium, Switzerland, Puerto Rico, Canada, and South Africa. (5) It has also been observed, ever since the time of Petrarch and Dante, that the free development of national vernaculars has constituted a stimulating and propelling force and has led to a regeneration of national cultures.

Admitting the cogency of the psychological argument and the validity of the historical evidence regarding the development of the vernaculars and the national cultures in Europe, there arise numerous questions in connection with bilingual education. The limits of the present work permit only an enumeration of them.

Should all vernaculars be encouraged? There are many dialects as well as languages, like those of the native tribes in Africa, whose potentiality to assimilate and express the concepts of the present-day civilization is doubted. (82) Even if some of these languages did have this potentiality, they would still require a long time for their development as adequate media for present-day conditions. The number of people using a certain tribal language may be so small as to preclude the possibility of this development, or to circumscribe a narrow limit of possible benefits that may be derived from it. Before introducing a language into the curriculum an educationist should, therefore, consider these questions and their implication for the educational program.

A second question in connection with bilingual education in countries where two languages exist side by side is the time of the introduction of the second language into the curriculum. In Malta (5) the Italian or the English language is introduced to the Arabic Maltese-speaking child in the first grade. In Ceylon (5) and in Puerto Rico (146) the primary education is conducted in the native tongue and the second language is introduced by degrees thereafter. In Catalonia (165) a government decree has set the age of eight as the limit beyond which the study of the second language may begin. There is no general agreement with regard to the optimum time when the study of the second language should start.

To what extent will the two languages be used for instruction? Here is another problem on which both theory and practice vary in different bilingual countries. Aucamp, summarizing the practice regarding this matter in various countries, states: "In some cases the one language, the language of the majority, or the language of the more superior group, is used in all higher education, and the other in the lower grades only. Sometimes they are equally used throughout the school system. In many cases the dominant language is exclusively employed as medium of instruction and the other taught as second language." (5:178-9)

Still another question facing the educationist is the method of instruction in the second language. Should the new language be taught by the direct or indirect method, or the two combined? Should vernacular teachers teach the new language, or teachers whose vernacular is the new language? What is the proper emphasis on optimum sequence of various phases of learning a language?

Owing to the fact that language is ordinarily allied with national sentiment, religious affiliation, or patriotic loyalties of one type or another, the problem of education in bilingual countries assumes a complicated and at times very delicate character. Not long ago a Belgian government was forced to resign on the question of introducing the Flemish language in the University of Ghent. (97) Dr. W. J. Viljeon (114), in presenting the problem of bilingualism in South Africa at the British Imperial Conference

in 1923, made it a cardinal principle that the problem of bilingualism should be regarded as an educational problem and that politics should be excluded from it. This principle has received general recognition by educators, who have since given considerable attention to the problems of bilingualism. The World Federation of Educational Associations has devoted progressively more time to the problem in its biennial conferences.[5] In 1928, under the auspices of the Bureau of International Education, an international conference of educators and experts met at Luxembourg to study and recommend research related to the field of bilingualism. (12) A large section of the proceedings of the Sixth Annual Conference of the New Education Fellowship in Nice, 1932, is devoted to reports on various phases of bilingualism in different countries. (115) Further evidence regarding the interest in this problem is to be found in the increasing number of articles in educational and psychological journals dealing with this subject.

For his understanding and the solution of the problems of bilingualism the modern educationist will depend on the results of scientific inquiry and investigation. This attitude toward the problem was illustrated by the international conference in Luxembourg (12) which hailed the pioneer experimental approach of Saer to the study of bilingualism, and emphasized the need for further scientific research in this field. The conference drew attention particularly to the need for objective studies in the educational results of bilingualism. (12)

TYPES OF BILINGUALISM

Webster's New International Dictionary defines bilingualism as the possession or use of two languages, and up to this point in the present discussion the term has been used in this general sense. The generality of this definition, however, limits its serviceability for purposes of scientific investigation. The character of bilingualism is not one and the same in every locality where it is present. Depending upon certain conditions accompanying it, bilin-

[5] These conferences were held in San Francisco, 1923; Edinburgh, 1925; Geneva, 1927; Toronto, 1929; Denver, 1931; Dublin, 1933; Oxford, 1935.

gualism appears under different types, with degrees of variation within each type.

Sailors usually pick up a certain number of foreign words current in various ports at which they stop, waiters in large metropolitan restaurants and hotels respond to orders given in different languages; but the bilingualism of these people, if such it may be called at all, is different from the bilingualism of the student who acquires a second language in school, or from that of the scholar who learns another language to follow the researches in his domain of interest in the foreign tongue. In certain instances contact with another language occurs in connection with church ritual. Such is the case in the Catholic church where the ritual is conducted in Latin, in the Greek Orthodox and Armenian Gregorian churches where it is conducted in the ancient Greek and Armenian languages respectively, or in the Coptic church where the liturgy is in the Coptic language, while the members of that church speak Arabic—a language of an altogether different family. (155) If bilingualism is to be understood as the use of two languages, and if it is to be admitted that the use of a language may be either "impressive" or "expressive" or both, as indicated by Epstein (36), then the groups of people described above may be considered bilingual. However, the type of bilingualism represented by each of these groups is obviously different, and there is a great distance between them and the more genuine types of bilingualism to be described presently.

Mention has been made of language minorities in various states of Europe. In these countries the children belonging to the language minority receive at home their early education in the mother tongue, and later continue it, in most instances, in the community or parochial schools. Very soon, however, they come to learn and use the dominant language of the state in their daily contacts and for further education in school. It is to be noted that the bilingual child in these instances is in his native land and is surrounded and strongly influenced by the spiritual contents and connections of his mother tongue. For these reasons he is not likely to relinquish his mother tongue willingly. In some cases his mother tongue, compared with the dominant state lan-

guage, puts forward claims to superiority from the point of view of wealth of literature or general culture content, as in the case, for example, of the German-speaking minorities in Hungary, Rumania or Czechoslovakia. In other instances the claim of the two languages may be for equality, as is the case, for example, with German-speaking people in Alsace-Lorraine, or Luxembourg, or Bulgarian-speaking people in Rumania or Greece.

In countries of colonization the conditions for learning the two languages are similar to those of language minorities situated in a state using a language different from their own. In one particular respect, however, the situation in countries of colonization is significantly different. Here the native language is considered definitely inferior, the foreign tongue is the means of contact with modern civilization, and unless the native tongue, through long history or achievement, evinces some strength, the adoption of the second tongue becomes a forceful allurement for the native child but with deplorable results, according to Hardy (51).

A different situation obtains in countries of immigration. Taking the United States as an example, we note that the bilingual child is not in the country of his mother tongue, as in the previous instances, that the strong influences favoring his mother tongue and emanating from the multifarious contacts of life in the home-country are no longer present. In a diverse population of many tongues the language of the adopted country is the only adequate common medium. The numerous and forceful influences of the school, the church, the "talkie," the radio, the channels for play, amusement, and reading, as well as many other daily experiences of his life, teach him the language of the country. There is no organized opposition to the learning of the dominant language, as in some European countries. On the contrary, its learning is encouraged and, as results of the present study for Jewish and Italian children in New York City indicate, preferred by the child who finds it easier to express himself in English than in his mother tongue. The process of deserting the mother tongue and adopting the second language is much more rapid in this type of bilingual situation. It should be borne in mind also that, in further contradistinction to the earlier types of bilingualism

described, the learning of the second language in this instance does not occur at a later date, but the two languages are learned simultaneously from infancy on.

Mention should also be made of still other types of bilingualism. In certain well-to-do families foreign-language-speaking governesses are hired to teach children French, English, or German, as the case may be. In mixed marriages when husband and wife possess different mother tongues the children are exposed to a bilingual environment. In many instances of travel and residence in foreign countries, especially in the case of governmental representatives, businessmen, and missionaries, the children are introduced to a language other than the mother tongue. The circumstances in these instances admit of numerous variations from the point of view of the learning and the use of the second language.

DEFINITION OF BILINGUALISM

Undoubtedly, bilingualism as a phenomenon is to be closely scrutinized, limited, and defined for purposes of scientific investigation. It is suggested, however, that because of its numerous variations and the fluidity of its boundaries, a typological classification of bilingualism can not be definite enough for an objective treatment and fruitful research. For this purpose the writer proposes the limitation and the statement of the problem of bilingualism from the point of view of the following five conditions which invariably are present in a bilingual situation no matter what its type and which, it is believed, can be stated in definite and objective terms.

1. *Degrees of bilingualism.* Not all bilinguists are proficient to the same degree in the two languages used. The bilingualism of the very same person will vary in different periods of his life: one of the two languages may gain in ascendancy while the other declines. In other words, the proficiency of a bilinguist in two languages admits of variation, and this variation should, and can, be measured for scientific investigation. Hoffman (59), Prescott (115), and H. Saer (122) have already proposed means for the measurement of bilingualism.

2. *Degrees of difference between two languages in a bilingual situation.* Languages differ with reference to their morphology, grammar, or phonetics. The degree of difference between Rumanian and Italian, or French and Spanish—all derived from Latin—is apparently less than that between any of these languages and German or English, the latter belonging to the Teutonic group. Again, the degree of difference between any of the languages belonging to the Indo-European family, and Arabic or Japanese, belonging to other language families, is quite marked. It is probably safe to assume that from the point of view of learning two languages, as a bilinguist does, it makes a difference what two languages he is to learn. Other things being equal, for a Pole, let us say, to learn the Russian language is easier than for a Chinese to learn the English language. In the first instance, both the Polish and the Russian languages, belonging to the Slavic group, have many words derived from the same roots, the sounds in the two languages are quite similar, and the grammatical construction of the sentences almost alike. In the second instance, however, the Chinese and the English languages belong to two quite separate families: the Chinese language is a tonal language and has practically no inflections; it is a monosyllabic, ideographic, and pictographic language; it is written in vertical order from right to left and its pronunciation and grammatical construction of sentences are quite different from the English language. Shen (132) suggests that there are physiological differences in the mechanisms of eye movement for English and Chinese readers.

The degree of difference between the two languages of a bilinguist is important from the point of view not only of the learning mechanism, but also of the thinking process; because the difference between two languages usually denotes a difference in the culture and civilization of the two peoples using them, and hence denotes also a difference in the connotation of words which will influence the direction and the content of thought in the two languages.

It is important, therefore, that in studying bilingualism we take into consideration not only the degree of proficiency, but also

the similarity or difference between the two languages it has been the bilinguist's lot to learn and use.

3. *Age when learning the second language.* A more detailed discussion of this point will be presented in Chapter VI. It should be mentioned here, however, that consideration of the factor of age is important from the point of view of ease of learning and expression, and the strength and latitude of concepts in the two languages involved.

4. *Method of learning.* In New York City the child from an immigrant family, one or both of whose parents were born abroad, is subjected to a bilingual environment from his infancy. The two languages are learned by him simultaneously in the course of his everyday experience. His father may address him in one language and his brother in another, and he will talk with them according to the language which is ordinarily used by each of them.

Some children start their bilingualism at school, and the methods of teaching the second language may differ from one country and school to another. With other children the beginning of bilingualism may be in their play with children speaking another language. The bilingual play may or may not accompany the learning of a second language in school. Saer (120), in his explanation of the difference between rural and urban bilingual children in Wales, attributes great importance to the factor of bilingual play.

5. *Attitude toward the second language.* Reference has been made to the close connection of language with national, religious, or political sentiments. Because of this connection a person's attitude toward the learning of a second language may be favorable or unfavorable. The attitude of the Macedonian youth in Greece toward the learning of the Greek language is unfavorable. His environment impresses upon him the antagonism of his race against the ruling nation and makes him an unwilling learner of the new language. The same youth in this country would assumedly be a ready pupil to learn English. National, religious, and political sympathies or antipathies determine the affective tone or the attitude of a bilinguist toward the second language,

and they introduce, therefore, important differences among bilinguists.

Bilingualism, then, is not a simple concept and its appearance is not uniform everywhere. To study it objectively, account should be taken of the five conditions described above which invariably accompany it, cut across any typological classification, and determine its form and its significance for the bilingual person.

INTRODUCTION TO THE PRESENT INVESTIGATION

The present investigation is confined to a study of bilingual children in immigrant families in New York City. The main experimental groups are two in number, one composed of Italian children and the other, Jewish. Let us examine them in terms of the five conditions described in the previous section.

The Italian language is a direct descendant of the old Latin; the English language, while it belongs to the Teutonic group, has nevertheless a large number of words of Latin origin. The Latin influence on English, coming mostly through the Norman invasion of England, is noted not only in its vocabulary but also in its sentence construction. The two languages are similar from the point of view of script and direction and manner of orthography.

The Jews in New York City make use of the hybrid language known as Yiddish, which is patterned after the German language. Its script is different from English; in the matter of word order, pronunciation, and likeness of words, however, its similarity to English is somewhat greater than that of the Italian language. The European background of these Jews is urban, while that of the Italians is predominantly rural and semi-urban.

An objective measure to be described in detail later has been used in the measurement of the bilingual background of the subjects of this investigation.

These children have been subjected to a bilingual background from their infancy. The two languages have been present in numerous experiences of their daily life. Ordinarily in the families from which these children come the older members use

Italian or Yiddish, as the case may be, and the younger members use English. The two languages are used in their play; generally speaking, English is the dominant one since it is used in school, in talking pictures, and on the radio.

There is no organized opposition to the learning of the English language; on the contrary, the environmental influences favor it strongly. These children are desirous of learning English and prefer it to the language of the older members in the family.

This investigation is concerned in particular with the study of the relation between bilingualism and intelligence. Prior to the report of the results, it will be necessary, however, to present first a survey of previous work done in this field. This will be done in the next chapter.

CHAPTER II

THE BACKGROUND OF THE PROBLEM

OPINIONS ON ADVANTAGES AND DISADVANTAGES OF BILINGUALISM

THERE has been a great deal of speculation about the effects of bilingualism. Opinions conflict regarding its intellectual and educational advantages and disadvantages.

Owen Edwards, referring to English-speaking children in Wales, says: "Even where the child discontinues the study of Welsh before leaving school or soon afterwards, it is the experience of teachers that the learning of it has had an excellent effect not only on the development of intelligence but on the acquisition of English. We do not regard the bilingualism of our country as a disadvantage in any way. We look upon it as an advantage." (113:256)

Leathes states: "I think that bilinguals, like the Welsh, whose education is carried on in two languages, must get more from their elementary schools than the scholars of a country like England, where only one language is used in school." (78:81) Further in the same volume he says: "Having learned two languages he [the bilingual child] is probably the better fitted to learn others." (*op. cit.*:95)

Williams, referring particularly to the situation in Wales, remarks toward the end of his report dealing with the bilingual schools in Belgium and Alsace-Lorraine: "The conscience of educators is sufficiently enlightened for them to realize . . . that the learning of Welsh by English children within the borders of Wales in the habit forming period between six and twelve years of age is an intellectual advantage." (164:104)

Others do not think that bilingualism is an advantage.

Dawes, after a visit in 1899 to the schools of Belgium, states in his report: "The Director [of the Normal School of Ghent] told me that the Walloon Schools do better in the *concours*

général [annual competitive examination for all the secondary schools] than the Flemish, and he attributed this to the bilingual character of the Flemish schools. The pupils are somewhat confused with the two languages, and there is a great mental effort in changing from one language to another." (27:49) Further in the same volume he continues: "There is no doubt, however, that as far as the learning of modern languages is concerned, the Flemings [bilingual] are far in advance of the Walloons [monoglot]." (*op. cit.*:50)

Ghibu quotes Th. Ziegler as saying: "There is nothing more unfortunate than a child or a race who from the beginning learns to speak two languages. To speak two languages at once means being at home in neither." (44:39) L. Graf V. Pfeil, quoted by Ghibu again, states: "A great danger to the development in all directions of thought powers is brought about when children are taught a new language before they are fully certain of their mother tongue." (*op. cit.*:40)

Laurie is even more outspoken about the disadvantages of bilingualism: "If it were possible for a child or boy to live in two languages at once equally well, so much the worse for him. His intellectual and spiritual growth would not thereby be doubled, but halved." (77:18) And further, "It is almost a misfortune to be an adept in foreign tongues." (*op. cit.*:19)

Blocher gives a long list of advantages and disadvantages attributed to bilingualism, and the disadvantages seem to be greater in number. (13)

REVIEW OF PREVIOUS INVESTIGATIONS

Inquiry into the problem of bilingualism by the scientific method did not start until the beginning of the twentieth century, and especially until the last decade, after the development of objective measurements of intelligence and school achievement. To a review of these investigations in the various countries where they were made, we shall now turn our attention.[1]

[1] This review of investigations according to the countries in which they were made, makes no pretense of having exhausted all experimental work in the field of bilingualism. It is offered simply as a basis of classification and may serve perhaps to show the various techniques used in attacking the problem.

Belgium. Decroly (28) reports the results of the Ballard tests of intelligence administered in Walloon [unilingual] and Flemish [bilingual] schools. The mean performance of the Walloon schools is noticeably higher than that of the Flemish schools at ages 9, 10, 11, and 12. Beginning with age 13 the curves representing the performance of Walloon and Flemish children approach each other more and more, until at age 15 the Flemish curve surpasses the Walloon curve. On the basis of these results Decroly advances the hypothesis that the verbal, or at least the "school," intelligence of the Walloons is more developed than that of the Flemings. Be it noted, however, that the Flemish inferiority in the performance of these tests is not uniform everywhere; in Anvers the results of the Flemish performance are equal to and even higher than those of the Walloon performance in Liège. The explanation, it would seem, lies in the fact that the tests being administered in the French language the Walloons, whose mother tongue it is, were presumably favored by it, and that in regions where the Flemings' knowledge of French was strong, their performance on the tests was as good as that of the Walloons.

Decroly (12) studied 47 boys and 49 girls of ages 8-15 from professional classes. By means of a questionnaire sent to the parents with regard to the pupils' home language, and on the basis of the instructor's statements of the scholastic standing and the intelligence of these children, he found that "changing language or having two languages" is more detrimental to boys than to girls. He suggests further the possibility that bilingualism may present no handicap to children of superior intelligence, while children of inferior intelligence may suffer from it.

Toussaint (12) examined 12 unilingual and 20 bilingual children on dictation, history, geography, science, and arithmetic. The bilinguists were inferior to the monoglots in the subjects in the order listed above. However, the average of the difference between the two groups diminished with length of attendance at school. From 60 per cent at the end of the first year at school it fell to 37.5 per cent at the end of two years of attendance.

Verheyen (12) studied 123 boys and 94 girls of ages 13 and

14. Pictures of objects and events were presented and the pupils were required to name them in the Flemish language. Also two completion tests were administered. On the basis of correct answers the monoglots were found to be superior to the bilinguists.

Canada. The committee appointed to inquire into the condition of the schools attended by French-speaking pupils found that in the 450 schools in the Province of Ontario where both French and English are taught, the poorest records in written English and French occur in the same counties [Prescott and Russell]. These are French-speaking communities. In this area the environment is made hostile to the attainment of bilingualism by religious and racial animosities. They state further that "proficiency in the use of one language is assuredly no barrier to secure equal proficiency in the other if proper methods of organization and instruction are followed." (112:220)

Jamieson and Sandiford (62) tested close to 300 rural Indian pupils in southern Ontario. They found that the monoglots surpassed the bilinguists on both the National Intelligence Test A, Form I, and the Pintner Non-Language Test. The relation of the two groups was reversed, however, on the Pintner-Paterson scale of performance tests, the difference in the latter case being statistically less reliable.

China. Luh and Wu tested 128 children in China on the Pintner-Paterson performance tests and the Chinese revision of the Binet tests and found that the average intelligence quotient of these children on both tests was equal to approximately 108. This quotient is higher than those usually reported for the Chinese [bilingual] children in the United States and similar to the American norms "in so far as the Pintner norms are adequate for the general American population." (86:407)

Czechoslovakia. Couka (12) reports his observations during 1911-1914 on 13 second- and third-grade Czech children in a German school. He tested their vocabulary knowledge in Czech and German by having them name things and give definitions. He found that the vocabulary of these children was half as large in German as in the mother tongue. The children transferred words and grammatical forms of their mother tongue into the

sentences of the second language they were learning. There were also literal translations from one language to the other and confusion in plural forms and pronunciation caused by the influence of the mother tongue. The author believes that instruction in a language other than the mother tongue means a drawback for the child in the development of intelligence and in his spiritual life, and that it should therefore be avoided.

England. Davies and Hughes (26) tested 1,894 Jewish [presumably bilingual] and non-Jewish [presumably monoglot] children of ages 8 to 14 in London schools. The two groups came from similar social and economic backgrounds and attended similar schools. The Northumberland tests were administered and the teachers' estimates of the intelligence of these children were secured by means of the Biometric Laboratory Scale. The Jewish children were found to be "definitely superior" to the non-Jewish in both general intelligence and attainments in English and arithmetic at every age from 8 to 13.

France. The classical investigation in bilingualism is that of Jules Ronjat (118). In 1913 Dr. Ronjat reported carefully and in great detail on the linguistic development of his bilingual son, Louis. From the time of Louis' birth, his father and mother spoke invariably in French and in German respectively in the presence of the child or in speaking to him later on. This method —*une personne, une langue*—was followed because of a suggestion made by Professor Grammont that prior to his ability to speak, an *émmagasinement* or incubation with regard to vocabulary and pronunciation takes place in a child. The method was continued throughout. The relatives on the father's side and certain domestics spoke always in French to Louis, while the relatives on the mother's side and certain other domestics spoke always in German. The attempt was made to keep the two languages on as equal a level as possible. From the very start the child pronounced the two languages as well as a monoglot child in either language. There were very few cases of interchange in vocabulary or syntax from one language to the other, and these did not affect the general correctness of either language. At the end of the third year Louis was conscious of his bilingualism and

anxious to show off his ability as an interpreter. The bilingualism of Louis did not seem to have any influence on the modality of the child's *Krähen* or on the time of his first imitations. According to Ronjat, Louis' accent, pronunciation, knowledge of the two languages, and his intelligence were not retarded in any way to be attributed to bilingualism.

In a private communication in 1923 to Dr. West, Dr. Ronjat states: "Since the publication of my book, my son has carried on his work at a primary and a secondary school in French, and hence this language is the more familiar to him as far as the technical terms of grammar, mathematics and physics are concerned. He would, for instance, I think, find it difficult to express a geometrical theorem in German. But apart from that his knowledge of and taste for the German language have been maintained generally on an equality [with French], and his German even takes a higher place from the point of view of literary composition, and especially poetic composition. . . . To sum up, the situation as a whole is normal, and what was to be expected." (162:59-60)

In the same monograph Ronjat mentions the case of another bilingual child—Addi, whose parents did not use the method of *une personne, une langue* but used the two languages, French and German, interchangeably, although at the beginning the German language was used more. Very early the child would be asked names of objects and events *en allemand, auf französisch.* The child answered ordinarily in the language in which the question was put. The results were similar to those observed in the case of Louis. Addi's pronunciation and mental development were not different from that of the monoglot of the same age and cultural environment. There was only one difference: the consciousness of bilingualism appeared with Addi at about the age of two years and a half—earlier than in the case of Louis.

Pavlovitch (103) reports a similar experiment on his son, Douchan. At the time of Douchan's birth and during his earlier years his parents, both Serbian, lived in Paris. Douchan learned both Serbian and French, the latter from his fourteenth month. The acquisition of the phonetic elements in both languages was,

as in the case of Louis, that of the native child. The acquisition of the one did not retard that of the other language. The number of French words was less than the number of Serbian until the twenty-second month. However, almost from the very outset of Douchan's acquisition of the second language, the words in Serbian or in French for the same concept had the value of doublets or synonyms. The consciousness of bilingualism manifested itself progressively, and became more intense until he recognized the existence of the two systems of expression. Toward the end of the second year Douchan began to use French more, and did not make mistakes in addressing people whom he knew: to his Serbian friends he used the Serbian language; to his French friends, the French language. Hybridities in his speech were rare. At the beginning of his third year he spoke in Serbian to his father and mother, knowing well that they also used the French language. Thus the Serbian became the family language and the French was used in his social relations.

Both of these studies, valuable as they are, are not sufficient in themselves to prove that bilingualism presents no handicap to the infant. The controls are missing. We do not know whether or not these children, had they not been introduced to a second language in the manner described, would have manifested a superior accomplishment in their development. It is also unknown whether a child not endowed with as great a degree of intelligence as these children could achieve the same results. The co-twin technique, if at all feasible, would probably be the one to prove successful in the solution of this problem; whereby one of a pair of identical twins would be subjected to a bilingual and the other to a unilingual environment, similar in other respects, and the results compared.

Germany. Hauck (52) "finds upper Silesian children below the intelligence of middle or south German children and believes bilingualism is one cause for this. He supposes that bilingualism exercises an inhibiting influence upon mental development." (from Pintner: 108:532)

Hawaii. Symonds (147) investigated the effect of attendance at Chinese language schools on ability in the English language.

He found the effect to be negligible. He also compared children who came from English-speaking homes with those who came from Chinese-speaking homes. He found the former not at all superior in their English ability, and the two groups of about the same brightness.

Smith (139) made an analysis of the average length of sentence and proportion of each language in the verbatim records of a bilingual child's spontaneous conversation. She concludes: "Indications are that the bilingual child uses a shorter sentence, not only in English, but also in the combined languages, than does the monolingual child; and unless the home language is predominantly English, he may continue to confuse the two languages in the same sentence up to school age." (p. 693)

Holland. Henss (12) reports the case of his own son who grew up in Holland. He used both of his hands equally well up to the fourth year, when he was sent to a German school. His language development in German was rapid. At this time he started a preference for the use of his right hand. In the following eight weeks' vacation, however, when he practiced the Dutch language in his play with Dutch children, he discontinued his preference for the right hand. On entering the German school again he changed to the right hand. During this period he spoke an equal amount of German and Dutch, and began to stutter. This continued until he left Holland and forgot the Dutch language.

Mexico. Stecker (143), on the basis of the results of a nation-wide survey of 200,000 children, denies emphatically the asserted intellectual handicap of bilingual children. He admits that the linguistic perfection of a bilinguist in either language falls short of that of the monoglot. He believes that early bilingualism is indispensable, as few people find time for the study of a second language later on in life, that bilingualism becomes a distinct advantage after age 16 for a person's social relations, and that a bilinguist is usually able to acquire a third language with greater facility than the monoglot. The author does not report on the method and the actual data of his investigation on which he bases these conclusions.

Philippine Islands. In connection with the survey (145) of the educational system of the Philippine Islands in 1924 over 32,000 children were tested on achievement and intelligence tests in the English language. The curves of school attainment in all subjects by grades are lower than the American norms. Whether bilingualism may be a partial explanation of this can not be deduced from the data presented because of difference of race, cultural environment, educational practice, and opportunities, etc. The authors make no claims on the subject.

Puerto Rico. In 1925 a special commission surveying the public education system in Puerto Rico (146) administered 69,000 achievement and intelligence tests to children in public elementary and secondary schools. The Stanford Achievement Test, modified to meet the local conditions, was administered in the English language from the fifth grade on. At the time of the survey, be it remarked, English was the medium of instruction for all school work except physiology, beginning with the fifth grade, although the teaching of English as a second language started in the first grade. With the exception of spelling ability, in all subjects tested and in practically all grades the Puerto Rican performance was inferior to the grade norms for these tests in the continental United States.

Suspecting that the language handicap in English of the Puerto Rican child was probably responsible for his low school accomplishment, the surveying commission translated very carefully the Stanford Achievement Test into Spanish—the native language—and administered it through this medium. With the exception of the subtest in history, where a clear superiority of accomplishment in either language was not in evidence, the Puerto Rican children, when given the Spanish translation of the tests, surpassed in all subjects and all grades their own accomplishment in these same tests given earlier in the English language. Compared with American norms, however, the Puerto Rican performance was, with certain notable exceptions, still inferior.

On the basis of these results, bilingualism as a partial explanation of the lower school accomplishment by the Puerto Rican children can not be advanced on at least two considerations.

First, while the course of study in Puerto Rican schools was based completely on the organization of the curriculum materials in the schools of the continental United States, the teaching methods and opportunities as well as the allotment of time to the various subjects in the curriculum were not sufficiently equal to justify such a comparison. Second, the translation of the tests in Spanish did not guarantee equivalence of the two tests.

The Puerto Rican children from grades 3 to 8 were also given the Pintner Non-Language Test of Mental Ability. Compared with the American grade norms for this test the Puerto Ricans were superior in grades 3, 4, 5 and inferior in grades 6, 7, 8. It is to be noted, however, that the picture of school attendance in Puerto Rico[2] was different from that in the continental United States, and there is no guarantee that the ages compared in the corresponding grades were equal. On the basis of these data alone the difference in performance can not in any way be attributed to the bilingualism of Puerto Rican children, and no such explanation is proposed by the authors of the report.

Russia. Dizik and Lubina (34) administered intelligence tests in the Russian language to 300 Jewish adolescents whose mother tongue was Yiddish. The results were mediocre. Three months later 164 of these children were given other tests of intelligence which were translated into Yiddish. The results were much better than those of the first testing. Two applications of the same tests to a control group showed that the difference in the average intelligence scores of the Jewish adolescents between the first and the second testing can not be accounted for by learning. The authors conclude that the mother tongue should be used in intelligence tests.

Spain. Gali (12) studied commercial and university correspondence, and textbooks written for teaching in Catalonia from the point of view of correct grammar and sense of logic. He believes that the Catalonians, forced to speak two languages for centuries, do not really possess either language, and that it is impossible for them to express their thoughts with the facility and correctness of the expression of monoglots.

[2] 84 per cent of all the children attending school were enrolled in the four primary grades.

Switzerland. Epstein (36) states that two or more languages known by a person tend to inhibit each other mutually. This fact, he continues, leads inevitably to the conclusion that multilingualism is an obstacle in the way of verbal thought. To learn a second language means to diminish the clarity, the purity, or at least the rapidity of expressive power in languages learned previously. He believes that the learning and use of a second language introduces in the ideation a multitude of concurrent actions, which hamper thought or at least slow it down. Multilingualism, he declares, is a social plague. The sources of material on which these conclusions are based are data reported in literature [prior to 1910], occasional observations by the author of polyglot children and adults, a questionnaire circulated among well known professors who spoke several languages, and some observations on memory for foreign words learned by the direct method or by means of translation into the mother tongue made by Mr. Epstein in the elementary and normal schools of Switzerland during 1905.

Mr. Epstein interprets his, for the most part introspective, observations and data strictly on the laws of association of Müller and Pilzecker. Curiously enough, the group to whom he addressed his questionnaire represented eminent professors whose positions would presumably indicate that the intellectual hindrance or retardation caused by bi- or multilingualism can not have been very serious.

Meyhoffer (12) sent to the parents of pupils in the International School of Geneva a questionnaire requesting detailed information on the child's language background, the time and method of the acquisition of the second language, the effects that might be attributed to the learning of the second language, etc. There were 61 cases representing 21 countries and 16 languages. On the basis of the data thus collected the author declares that "multilingualism is a sure source of intellectual, moral and social enrichment for the child." (p. 97)

United States. McCarthy, in connection with her investigation of the language development of the preschool child, studied 14 bilingual children aged 18 to 54 months. She finds that "over

half of the occurrence of bilingualism is in the VI (unskilled labor) occupational group," and that "the learning of a foreign language in the home does not seem to be a handicap in linguistic development as it is measured by the mean length of response, which when applied to larger groups, has proved a very reliable index." (97:66)

Smith (137, 140) studied five and, at another time, eight bilingual children from two American families residing in China who later moved to the United States. She finds that change from a unilingual to bilingual environment, or vice versa, during the early period of a child's speech development results in mental confusion, and the child may cease further attempts at speech for a time. A change from a unilingual to bilingual environment affects a child's speech more than a change in the opposite direction. Judging from the larger vocabulary of the unilingual child, and from the fact that there was a rise in both vocabulary and I. Q. as one of these children forgot one of the two languages she knew, the author finds a "suggestion" of mental confusion in the case of preschool children who learn to use two languages at the same time.

Bere[3] (10), by means of a questionnaire of eleven items, divided the ten-year-old population of her study into five groups from "only foreign language" to "only English spoken in home." She finds that increase in the use of English at home is accompanied by increase on the ratings of both the Stanford-Binet and the Pintner-Paterson Performance Tests in the case of each of the three nationalities studied—Jewish, Italian, and Bohemian. The differences between groups were statistically significant in most cases. The total number of cases in each national group being one hundred, with the fivefold classification the numbers involved in the subgroups were necessarily small. Furthermore, in making these comparisons the socio-economic status of the families was not held constant. These two conditions should make us cautious in our interpretation of Miss Bere's results on this question.

Fukuda (42) reports the Stanford-Binet results on 257 ele-

[3] See summary table, page 44.

mentary school children in Illinois. He divided the population into two groups: 109 English-speaking (American, English, and Irish), and 148 non-English-speaking (Swedish, Polish, Jewish, Italian, etc.). The median I. Q. of the first group is 96 and that of the second 92. The author concludes: "High I. Q., high environment score [Whittier Scale], and brain work go with the people of the English-speaking class, and the reverse is true with those of the non-English-speaking class." (p. 139) He reports, however, that the English-speaking people are mostly in the "occupational and executive classes," and the correlation between the Whittier Scale and the Binet I. Q. for this population is .53. It would seem that if the two groups were equated on the basis of socio-economic status the differences might diminish or vanish altogether.

Murdoch, Maddow, and Berg (94) administered the Otis Advanced Intelligence Scale (verbal), the Thorndike Word Knowledge Test, and the International Test (non-verbal) to a group of 149 Jewish girls of 7A grade in New York City. One hundred and twelve of these pupils were born in this country and 37 abroad. By means of a questionnaire of fifteen items, they also determined the extent in which the English language was *spoken* in the home. They report correlation coefficients of .17, .15, and .10 for the whole group between the Language Questionnaire and Otis Intelligence, International, and Thorndike Word Knowledge tests respectively. They conclude: "Standard verbal tests when applied to Jewish children of foreign-born parentage who have reached grade VII A in school are valid measures of intelligence." (p. 353)

Yoshioka (168) tested 38 Japanese children of ages 9 to 15 in California on the National Intelligence Test, Scale A, Form 1 in English and in Japanese by means of a translation of the same test. He found that these children scored below both American and Japanese norms, and that the older children, 21 in all, between ages 12 and 15, did better on the Japanese form of the test than the younger. On the basis of this evidence the author writes: "It is suggested that bilingualism in young children is a hardship and devoid of apparent advantage, because bilingualism appears

to require a certain degree of mental maturation for its successful mastery." (p. 479) It is to be noted, however, that "the Japanese norms obtained from Tokyo children are from the best residential sections of the city" (p. 476) and the same can not be said of the subjects of this investigation; further, the Japanese translation of the test intended for children in Japan, contained in it expressions (weight, measures, etc.) not within the ordinary experience of the Japanese children in this country. Consideration should also be given to the fact that the older children would be better acquainted with the Japanese language because of their longer attendance at the Japanese school in this country, which would presumably account for their higher scores on the Japanese translation of the test. In any event, there is no evidence presented to show that the extent of the influence of the Japanese or English backgrounds of the two groups was equal. Perhaps the paucity of cases involved in this study is enough to make it impossible to draw any definite conclusions on the effects of bilingualism one way or another.

Mead (92) tested 276 children of grades 6 through 10 on the Otis Advanced Intelligence Examination, Form A. The group was divided into four sections on the basis of language spoken [by parents] at home, thus: only English, chiefly English, chiefly foreign language, and only foreign language. It is reported that the mean index of brightness increased steadily with the amount of English spoken at home.

Brunner (17) made a comparison of the Binet I. Q.'s of 1,987 children in four representative rural counties in relation to "foreignness of parents." This measure included three categories, namely, both parents born in this country, one parent born here and the other abroad, both parents born abroad. The I. Q. decreased in proportion to the foreignness of the parents. However, the differences between these groups "were so small as to be statistically insignificant." (p. 67) In the light of the data of the present investigation (p. 96), it may be assumed that "foreignness of parents" would correspond closely to degree of bilingualism.

In another comparison in the same study Brunner found that

818 children in Hunterdon County, New Jersey, whose parents speak only English, rate higher by three points on I. Q. than 123 children whose parents speak both English and their native tongue; and these in turn rate two points higher than 306 children whose parents speak a foreign language only. The last group is composed mostly of southern and eastern Europeans, while northern Europeans predominate in the first group. The author states: "While it is possible that the differences disclosed are due to the larger proportion of southern and eastern Europeans in the lower-score group, the small difference in these results, taken in connection with other data, would tend to show that ability to speak English rather than racial intelligence was the determining factor." (p. 69)

Grabo (47) reports that in monoglot (coming from English-speaking homes) and bilingual (from Italian-speaking homes) groups matched for mental ability, the total vocabularies in English and Italian of the bilingual group are equal to the total English vocabulary of the monoglot group, while the total English vocabulary of the bilinguists is 33 per cent below that of the monoglots.

Smith (138) set out to find whether learning two languages at the same time with different order of reading direction leads to greater confusion and more errors of reversal than learning one language at a time. She found that children studying two languages showed greater variability in type of performance, lower reading test scores, and more confusion of reading direction than did those studying only one.

Ladd (75), on the basis of a questionnaire of three items, divided the population of her study into three groups: (1) those who spoke and heard English in the home, 149 cases; (2) those who spoke English, but heard their parents speak a foreign language, 55 cases; and (3) those who spoke and heard a foreign language, 79 cases. The subjects were pupils from grades 3B to 5A, of various nationalities, the Jewish predominating. When the foreign-speaking groups were equated to the English-speaking group on chronological age and Pintner Non-Language mental age, it was observed that the reading age declined as the group became

more foreign, none of the differences, however, being as large as three times its standard error. On the Haggerty Intelligence Test (verbal) mental age, the part-foreign-speaking group showed somewhat higher rating than either of the other two groups, the differences being not statistically significant. It should be borne in mind that these groups represented a mixture of several nationalities. When the Jewish-speaking children, equated as above, were compared with the English-speaking group (composed of various nationalities in addition to 57 English-speaking children of Jewish birth), the entire foreign-speaking group obtained higher ratings than the part foreign group, both in reading and in Haggerty mental ages, and slightly higher rating than the English-speaking group in Haggerty mental age. The differences, however, were in no case statistically significant.

Sanchez (124, 125, 126) maintains that verbal intelligence tests ordinarily used in this country are not valid measures of intelligence of the bilingual child because of the latter's deficiency in the English language. He tested (123) 45 Spanish-American children in New Mexico at four intervals between December, 1928 and April, 1930 on the Haggerty Intelligence Tests, Delta 1 and Delta 2. The average gain in I. Q. during this period was 20.5 points for the whole group, which he attributes mostly to the influence exerted by the increase in reading and language facility.

Andrews (3) studied 366 high school freshmen with reference to the amount of English spoken at home and their performance on a vocabulary test and the Otis Intelligence Test, Advanced. His results are as follows:

	Number	Otis I. Q.	Vocabulary
English used at home exclusively	135	98	81
English used at home chiefly	147	96	81
English used at home occasionally	71	93	74
English used at home not at all	13	103	76

He infers that the vocabulary handicaps of many of these boys are due chiefly to the fact that they do not hear English at home; and that this factor explains the difference between the various national groups and perhaps also the differences in I. Q., since

the correlation between the Otis and the vocabulary tests in this study amounts to .68.

Fritz and Rankin (41) administered the Otis Self Administering Test of Mental Ability, the New Stanford Achievement Test, and the Sims Socio-Economic Score Card to 201 junior high school pupils in Kansas. They divided the group into two sections, viz., only English-speaking and usually foreign-speaking. In comparing the two groups they found that the averages on the achievement test showed a greater advantage for the English-speaking group in the English language part than in the other (history, geography, hygiene, arithmetic reasoning, and computation). The foreign language group was on the average several months older and secured lower ratings on the Otis test and in socio-economic status. When 12 English-speaking pupils matched for grade, age, mental ability, and home environment were compared with the foreign-speaking group, the former were found to excel the latter by about five times as many points in the English as in the non-English sections of the Achievement Test. The foreign-speaking child, they maintain, suffers from a language handicap.

Schiller (128), "on the configuration of the answers" of ten items relative to the amount of bilingualism, divided 395 Jewish elementary pupils in New York City into two groups: mostly English-speaking and mostly Yiddish-speaking. "These groupings," she states, "are admittedly neither definitely quantitative, nor objective." (p. 25) The two groups were compared with each other on the results of verbal tests, such as vocabulary, analogies, sentence completion, and reading. While the differences were mostly in favor of the English-speaking group, they were not significant statistically. The author states: "It is obvious that these Jewish children are not penalized on English verbal tests by being subjected to a greater amount of non-English speech." (p. 25)

Halpern (50) administered the Stanford-Binet Test and the Pintner-Paterson Performance Scale to 100 ten-year-old Jewish girls coming from a poor neighborhood in New York City. She divided the subjects of her study into four groups according to

the amount of English used at home, using Schiller's questionnaire (referred to above). She found no definite trend or significant differences in comparing the four groups with each other. She concludes: "Jewish girls of the social status tested in this study apparently do not suffer from a language handicap."

N. Klineberg (72) administered the Stanford Revision of the Binet Test to 100 ten-year-old Italian girls in New York City. The pupils were divided into five groups, from "only English-speaking" to "only Italian-speaking." She found that, with the exception of one group, there was a small and continuous decrease in average I. Q. accompanied by an increase in amount of Italian spoken. The difference in I. Q. between the bilinguists and the monoglots was in favor of the latter and statistically significant. The author is inclined to attribute the lower performance of the bilinguists to "the mental conflict arising out of bilingualism." It should be noted, however, that the questionnaire used was not such as to differentiate between true monoglots and lower degree bilinguists, the number of cases in the various categories was small, and the factor of language facility of the various groups not held constant, which probably accounts for the differences noted.

Hoffman (59), using the same measure of bilingualism as the one in the present study, found no correlation between bilingualism and the Pintner Non-Language Test scores in the case of 114 Jewish and Italian children of grades 5 and 6 in New York City. The correlation between bilingualism and the Otis Intermediate Test (verbal) scores is $-.35$ for the Italian group and $+.24$ for the Jewish group of grade 6, suggesting different "effects" in the two racial groups. "The numbers involved are very small, especially for the Jewish group, and definite generalizations are, therefore, unwarranted," the author states. (p. 62)

Hill (57) attempted to weigh the effect of bilingualism on the scores of a variety of recognized tests of intelligence by comparing Italian children who heard and spoke Italian at home with Italian children who heard and spoke English at home. He equated 36 children in the two groups in grades 1 and 3 and 50 children in grade 6 as to age, sex, educational and socio-economic

environment, mental age, and intelligence quotient. The groups compared at the three grades differed in their ability to use and understand the Italian dialect of the community, which ability was determined by a questionnaire and by tests of comprehension of spoken Italian and of Italian word meaning. The investigator found no reliable difference in scores on verbal, non-verbal, and performance tests between the Italian children who hear and speak Italian at home and Italian children who hear and speak English at home. It would seem, however, that the original equation of the two groups on mental tests would introduce a strong selective factor particularly for the Italian-speaking and -hearing group and preclude the possibility of any reliable differences in the other measures applied later.

Up to this point have been reported only those studies in the United States which have attacked the problem of bilingualism directly or have taken cognizance of the foreign-speaking child's imperfect acquaintance with English and have attempted to measure it in some way. The review of the literature relating to bilingualism in this country would, however, be incomplete without mention of the controversy on the question of the language handicap of foreign-speaking child which has arisen especially in connection with the study of natio-racial differences during the past decade. From the summary of the investigations presented on pages 44 and 45 it will be seen that 60 per cent of the investigators cited emphasize the language handicap of the foreign-speaking child in their explanation of the differences in intelligence and school achievement between the "American" and other natio-racial groups. About 30 per cent consider the language handicap of slight importance, and believe that inferior accomplishment on tests of foreign-speaking children in this country is due to the inherent inferiority of the racial stock, or to cultural and socio-economic factors. About 10 per cent of the investigators find no evidence of language handicap at all.

This difference in the results obtained is in itself symptomatic of deficiencies in these investigations. However, to evaluate the underlying assumptions and the techniques employed in these studies of natio-racial comparisons, in connection with which the

question of the language handicaps of the foreign-speaking child has arisen, would lead us far afield. An able discussion of the whole question has recently been presented by O. Klineberg (73). Brigham, whose *A Study of American Intelligence* (14) was, in his own words, "one of the most pretentious of these comparative racial studies" (15:165) reviews in an article (15) recent theories of intelligence and test findings, and in the light of this review declares that his own work was "without foundation" and that it together "with its entire hypothetical superstructure of racial differences collapses completely." (15:164) He continues further in this memorable article: "For purposes of comparing individuals or groups, it is apparent that tests in the vernacular must be used only with individuals having equal opportunities to acquire the vernacular of the test. This requirement precludes the use of such tests in making comparative studies of individuals brought up in homes in which the vernacular of the test is not used, or in which two vernaculars are used. The last condition is frequently violated here in studies of children born in this country whose parents speak another tongue. This is important, as the effects of bilingualism are not entirely known." (p. 165)

With reference to bilingualism proper, the investigations listed in the summary table (pp. 44 f.), even though some of them are at times referred to by certain European workers in bilingualism (55, 143) to support their favorite hypotheses, fail to establish any valid conclusions. If we assume for a moment that there is no language handicap, and that the tests measure truly the native ability of the foreign child, then we do not know whether to attribute the inferiority to his being the member of a certain race, or to his being bilingual.

Wales. The most extensive and most frequently quoted investigations in the field of bilingualism are those of D. J. Saer and Frank Smith. These investigations will be reviewed in detail.

D. J. Saer (119, 120, 121) tested approximately 1,400 children from 7 to 12 years of age in five rural and two large urban districts. The tests used were the Stanford Revision of Binet's 1911 scale and Burt's version of the Binet not included in the Stanford Revision. The tests were translated into the mother

SUMMARY TABLE OF COMPARATIVE STUDIES ON THE INTELLIGENCE OF FOREIGN-SPEAKING CHILDREN IN THE UNITED STATES

No.	Author	Year	Place	Number of Cases	Age and Grade	Groups Studied	Tests Used	Conclusion*
1.	Terman (149)	1918	Calif.	132	Miscel.	Italian and Portuguese	Vocabulary and Stanford-Binet	S. H.
2.	Mann (91)	1921	Penna.	2 sch.	Kgtn.	"American and Foreign"	Stanford-Binet	H.
3.	Jordan (66)	1921	Minn.	2,490	Elem. grades	Various natio-racial groups	Omnibus	H.
4.	Berry (11)	1922	Mich.	10,000	First grade	Various natio-racial groups	Detroit First Grade	H.
5.	Brown (16)	1922	Mich.	913	Miscel.	Various natio-racial groups	Stanford-Binet	S. H.
6.	Young (169)	1922	Calif.	..	12-year-old	"American," Italian, Portuguese, Spanish-Mexican	Alpha and Beta	S. H.
7.	Pintner and Keller (109)	1922	Ohio	1,041	Kgtn. to 2 grade	Various natio-racial groups	A Revision of Stanford-Binet and Pintner Non-Language	H.
8.	Pintner (106)	1923	N. Y.	286	3 and 4 grades	"American," Italian, Polish, German	N. I. T. and Pintner Non-Language	H.
9.	Colvin and Allen (24)	1923	R. I.	100	5 to 8 grades	"American" and Italian	Stanford-Binet and N. I. T.	H.
10.	Giardini and Root (45)	1923	Penna.	340	First grade	"American" and Italian	Detroit First Grade in Italian and English	N. H.
11.	Bere (10)	1924	N. Y.	300	10-year-old	Jewish, Italian, Bohemian	Stanford-Binet and Pintner-Paterson	S. H.
12.	Walters (156)	1924	N. Y.	165	6 and 7 grades	Various natio-racial groups	Stanford-Binet	H.
13.	Sereta (131)	1924	Penna.	100	6-year-old	Italian	Stanford-Binet and Performance Test	H.
14.	Feingold (38)	1924	Conn.	3,584	High school	Various natio-racial groups	Modified Alpha	H.
15.	Madsen (88)	1924	N. Y.	16	First grade	Italian	Stanford-Binet (retest)	N. H.
16.	Darsie (25)	1925	Calif.	658	10–15-year-old	Japanese	Stanford-Binet, Beta, Stanford Achievement, Teachers ratings	H.
17.	Kirkpatrick (71)	1926	Mass.	883	11-year-old	Various natio-racial groups	Beta, Illinois Examination	S. H.
18.	Hirsch (58)	1926	Mass.	5,504	1 to 9 grades	Various natio-racial groups	Pintner-Cunningham, Dearborn A and C	S. H.

19.	Wang (157)	1926	Ohio	474	University	"American," Negro, Chinese, Russian	Ohio Univ. Intelligence	H.
20.	Goodenough (46)	1926	Several states	2,457	Elem. grades	Various natio-racial groups	Goodenough Drawing	S. H.
21.	Graham (49)	1926	Calif.	103	12-year-old	"American" and Chinese	N. I. T. and a number of verbal and non-verbal tests	H.
22.	Mead (92)	1927	N. J.	336	6 to 10 grades	"American" and Italian	Otis Group Intelligence	H.
23.	Jones (65)	1928	Penna.	562	8–16-year-old	"American" and "foreign"	Stanford-Binet oral vocabulary list	H.
24.	Rigg (117)	1928	Mo.	10,079	Elem. grades	Various natio-racial groups	N. I. T., reading and arithmetic tests	S. H.
25.	Koch and Simmons (74)	1928	Tex.	3,316	Elem. grades	"American," Mexican, and Negro	Myers Pantomime, Detroit First Grade, Pintner-Cunningham	H.
26.	Garretson (43)	1928	Tex.	314	Elem. grades	"American" and Mexican	N. I. T., Myers Pantomime, Pintner-Cunningham	N. H.
27.	Lester (79)	1929	N. Y.	47	First grade	Mostly Polish	Stanford-Binet, Knox Cube, Healey Form Board	H.
28.	Wright and Manuel (166)	1929	Tex.	876	High school and college	Spanish-Mexican	Paragraph meaning	Doubtful
29.	Delmet (31)	1930	Calif.	341	Elem. grades	Mexican	Stanford Achievement and various mental tests	S. H.
30.	Haught (53)	1931	N. M.	4 sch.	Elem. and high school	Spanish-Mexican	Pintner-Cunningham, Terman Group, N. I. T.	N. H.
31.	Pintner (107)	1932	N. Y.	430	First grade	"American," Jewish, Italian, Bohemian	Pintner Primary Non-Language, Pintner-Cunningham	H.
32.	Senour (130)	1934	Ill.	453	Fourth grade	Various natio-racial groups	Haggerty, Pintner Non-Language	H.

* H. means emphasis on the language handicap of the foreign-speaking child.
S. H. means that this handicap is believed to be very slight.
N. H. means no language handicap.
It is realized that this threefold classification, necessary for the sake of simplicity and saving of space, is made at the risk of a certain amount of inaccuracy in the report of these studies.

tongue for the benefit of the Welsh-speaking children. The results were as follows:

Urban bilingual group	I. Q. = 100
Urban monoglot group	I. Q. = 99
Rural bilingual group	I. Q. = 86
Rural monoglot group	I. Q. = 96

The investigation disclosed that the inferiority of the rural bilinguists became consistently greater in degree with each year from 7 to 11 years of age.

With respect to vocabulary a sharp rise in the mean range occurred between 9 and 10 years of age in the case of both the bilinguists and the monoglots in the urban areas. In the rural areas the monoglots' vocabulary showed the sharpest rise at 8 and 9 years of age, while that of the bilinguists occurred at 10 years of age. Here again no difference is to be noticed between the monoglots and the bilinguists in the urban areas, while in rural districts there is a retardation of "a year or more" in vocabulary acquirement of the bilingual child.

The bilinguists showed greater clarity and correctness in their compositions written in Welsh than in those written in English.

Six hundred seventy-nine bilinguists and 281 monoglots of 8 years and upwards were examined as to dextrality. The children were asked to show their right hand, left ear, or in a picture to show the right hand, ear and foot. In both reversals and confusions or hesitations the monoglots had the advantage over the bilinguists whether in urban or in rural districts.

Three hundred thirty-nine unselected children in an urban school were tested as to their sense of rhythm. They were asked to tap and sing "la." The results were inconclusive for the tapping test—the monoglots showed themselves superior at ages 8, 11 and 12 and the bilinguists at ages 7, 9 and 10. In the "la-ing" test the monoglots were superior at each age.

Verbal intelligence tests were also administered to 939 students in the University College of Wales. A "clear superiority" of the monoglots over the bilingual student coming from rural districts in Wales was found, while the difference between these linguistic groups from urban and industrial districts was "inconsiderable."

With the exception of the results in the dextrality and rhythmic sense tests, the difference in the performance of monoglots and bilinguists seems to exist only in the rural sections. Saer offers the following explanation to account for the difference. "Where the language of play is also that of the home and of the church, as is the case with Welsh-speaking children in the rural areas of Wales, the child's word symbols are formed in that language with a strong affective tone." (120:37) Saer thinks that the contact with the English language at school gives rise to a conflict between the child's "self-regarding sentiment or positive self-feeling" and his "negative self-feeling or his instinct for submission." This is not true of the urban child who resolves this conflict since his play language invades the home and the church at an earlier age, and "he [the urban child] thus enjoys almost the same emotional freedom from language conflict as the monoglot in the same district, for play has some cathartic influence in its tendency to relieve the tension due to the dominance of the reality principle." (*ibid.*)

Relative to the inferiority in performance of the bilinguists on the dextrality tests, Saer comments: "These results suggest that a confusion has been carried over from the brain area concerned with language to the related specialized areas connected with the functioning of the right hand in gesture." (121:54) The plausibility of such an explanation depends on an assumption of the localization of brain centers, and in the light of the works of Head (54) and Lashley (76) it is hardly tenable. Besides, the correlation between intelligence and dextrality as well as between intelligence and rhythmic sense or musical ability is shown to be very slight. (108)

Now, without entering into a discussion of Saer's explanatory hypothesis with respect to the conflict in the experience of the rural bilinguists, the following remarks with reference to the results of his experiments would seem justifiable.

1. The translation of a test, as has been remarked earlier in this chapter, does not guarantee equivalence of difficulty, and therefore the comparison of the two groups may be obscured by that fact.

2. Assumedly, by translating the tests into the Welsh language,

the performance of the Welsh bilinguist was thereby benefited more than if the tests were given in the English language. However, not all the bilinguists were of the same degree of efficiency with regard to the languages involved, and as an objective measure of the extent of bilingualism was not made use of we can only hope that the averages would smooth the differences. For this we can, however, only hope, and can not be certain. Besides, Saer himself finds that the vocabulary of the monoglot children in English was higher than that of bilingual children either in English or in Welsh. It is apparent from this that the bilingual child in these experiments suffered a vocabulary handicap, which plausibly was reflected in his performance on the verbal tests in either language. The presence of the language factor in tests of intelligence tried on the bilingual child will always make the results with respect to the bilinguist's intelligence of doubtful interpretation.

3. The question arises as to how much a rating on a verbal intelligence test is due to linguistic ability and how much to intelligence as such. While the correlation between the two is not perfect, neither is it negligible. Saer's correlations between intelligence quotient and English vocabulary score range from .32 at the age of 9 for the rural to .69 at 11 years in the case of the urban children. Burt states: "Linguistic ability and linguistic attainments exert upon the Binet-Simon tests a special and positive influence of their own." (19:184) Rather than interpreting the results of this investigation as indicating the superior intelligence of the monoglot, they may well be interpreted to mean that the monoglot child is superior to the bilingual child in respect to linguistic ability or attainment, which would not be surprising at all in view of Saer's own results or those in the United States reviewed above.

4. Saer's explanation of the difference between the bilingual child in the rural and the urban areas in terms of "resolution of conflict," or "catharsis," or "positive" versus "negative self-feeling" is difficult to accept in view of the vagueness for scientific purposes of the meaning of these terms and in the absence of their objective demonstration. One wonders if a simpler ex-

planation does not lie in the fact that, as suggested by West (162:88), the English-speaking child in the rural areas has more opportunities for his language development because of the greater facility of the English language, its enormous vocabulary, or the cheapness and greater number of books in it as compared with the facilities in the Welsh language for the bilingual child. Or, it may be that these results reflect simply the particular method of instruction in these rural areas which were intended for monoglots and not for bilinguists, as suggested by Jones. (12:179)

Smith (136) investigated the school performance of monoglot and bilingual children of ages 8 to 11 in four urban schools. Four tests were used: (1) two free composition exercises of 15 minutes duration each, (2) the Whipple's Word Building Test, (3) a mutilated passage test consisting of two fables from each of which fifteen words were omitted, and (4) an analogies test of twelve items. The children were tested on these three times at intervals of one year. The reliabilities on these tests in successive administrations as reported by Smith were as follows:

> Composition—"about .8"
> Word building test—"from below .5 to over .7"
> Mutilated passage test—"in nearly every case over .8"
> Analogies test—"between .5 and .7"

The results were as follows: (1) In the composition test the monoglots had the advantage in each school. (2) The completion test showed advantage of monoglots in three out of four schools. (3) In the Analogies Test the results were as in (2). (4) In the word building test the bilinguists showed advantage in two schools and the monoglots in the other two.

When the results of all four schools are combined the advantage is on the side of the monoglot child in each one of the tests. The investigator concludes: "So far from bilingualism being an 'intellectual advantage,' it seems to be exactly the reverse, at least under the present organization of schools in Wales." (p. 282)

It should be noted that two of the tests used were not sufficiently reliable. The remaining two depend on knowledge of language, and the criticisms offered on this point for Saer's work hold here. In addition, it should be borne in mind that the scor-

ing of the composition test is subjective, that the groups compared are not equated on age, socio-economic status or mental ability. The statistical significance of the actual differences is not indicated, and it is not therefore known whether the differences are due to sampling errors, especially as the subgroups include sometimes 5, 6, or 8 cases.

Barke (8) administered the Pintner Non-Language Test and the Northumberland Standardized Tests (verbal) to 697 children of ages 10 to 14 inclusive in three mixed "bilingual" schools and two "monoglot" schools in a mining district in South Wales. The socio-economic status was judged as similar in the various groups, although no objective measure was used.

In the "bilingual" area Welsh is the dominant language. In answer to a questionnaire, 86.2 per cent reported that they used the Welsh language at home. Instruction in the schools in this area is in the Welsh language in the infants' department. The learning of the English language starts with Standard I, at about 7 years of age, and beginning with Standard II English is the medium of instruction. In the "monoglot" area English is the dominant language. Only 3.4 per cent of the boys and 3.9 per cent of the girls indicated that they spoke Welsh at home. In the schools there is a compulsory Welsh lesson every day, but English is the medium of instruction throughout.

A comparison on the basis of the mean mental age of the two groups shows the monoglots to be superior by an average of .8 M.A. a year on the verbal test, while the bilinguists are found to be superior .44 M.A. a year on the non-language test. The inferior performance of the "bilinguals" on the verbal test is attributed "to language difficulties."

H. Saer (122) attempted to use the controlled association technique in the measurement and investigation of bilingualism. Fifty simple English words, mostly monosyllabic, which should have entered significantly into the life of a child by the time he was three years of age, were selected with their Welsh equivalents. These words were administered to the testee in random order and the response as well as the time for response was noted. A ratio between the words in the two languages was thus worked out.

If a child's response $\frac{\text{English}}{\text{Welsh}}$ was equal to hundred, the child was regarded as truly bilingual in relation to the emotional value of that word. By this method, according to the author, types of bilinguists can be distinguished whose bilingualism can be related to the individual history of the subject. Miss Saer studied by this method 50 girls of 11 to 19 years of age.

SUMMARY AND SUGGESTIONS FOR RESEARCH

The results of the investigations reported above are not sufficiently in agreement to lead to any definite generalizations regarding the intellectual advantages or disadvantages of bilingualism. This difference in the results is not surprising in view of the differences in methods of investigation and the conditions of bilingualism in the various localities where the experiments were carried out.

In accordance with the usual experience, objective research has disclosed that bilingualism is not a simple datum with either uniformly good or bad effect on mental development, as thinkers with a speculative method of approach would have it. The experiments cited above, conflicting as their results are, point nevertheless to several valuable findings and suggestions to be pursued by further research in the field. These are:

1. Bilingualism is not of a single kind, uniform in its appearance and its results for the individual always and everywhere. The social and psychological conditions accompanying bilingualism and varying from place to place influence most probably its results and should be clearly stated in each instance. H. Saer's work (122) suggests an extreme position, in that it may even be necessary to measure a person's bilingualism with regard to each single word in his vocabulary. A discussion of conditions determining bilingualism has already been presented in the first chapter, and will not be repeated here.

2. The experiments in Wales suggest that besides age the method and the circumstances in which a second language is acquired play important roles with respect to effects of bilingualism. This question is again discussed in the previous chapter.

3. Decroly (12) points out that bilingualism may be an added and harmful burden to the mentally retarded, and that, on the other hand, it may be an advantage to the mentally bright.

4. Possibly the interference of a second language occurs more in the expressive phase of language (Epstein), and the learning of a second language should be limited to the impressive phase, or the reading use of it (West).

5. The work in the United States points to a deficiency in the vocabulary in either language of bilingual children. This condition, however, is not general but depends upon the age and educational opportunities surrounding the bilingual child.

This review of previous work in the field indicates clearly that the scientific study of bilingualism is merely at its beginning.

From the point of view of optimum methods to be employed in further research these same investigations indicate that:

1. A clear definition of bilingualism in each instance and an objective measurement of the same are necessary.

2. A statement in each case of social, economic, educational, and, in particular, affective elements (racial, religious, or other inducements and animosities) attending bilingualism, their measurement if possible, and the segregation of their effects in an experimental situation from the relation that bilingualism bears to mental development is essential.

3. Because of the unknown relationship of linguistic ability to intelligence, the use of verbal tests of intelligence, or these tests alone, in the measurement of the mental ability of the bilingual child, will not lead to unequivocal conclusions and hence is not advisable.

4. When several natio-racial groups are involved, as in the United States, a comparison of high or low bilinguists or monoglots should be within the same natio-racial group, with proper care, of course, for the constancy of other environmental factors.

5. Proper care should be taken in selecting representative samples, and when testing groups, large enough numbers should be included for each age and sex to secure statistical reliability.

It is with these considerations in mind that the present investigation was planned.

CHAPTER III

THE PURPOSE, THE MATERIAL, AND THE PLAN OF THE PRESENT INVESTIGATION

PURPOSE

ONE of the recommendations of the International Conference on Bilingualism at Luxembourg in 1928 (12) was to study the relationship between bilingualism and mental development in countries of immigration. It was the general feeling of that conference that, in order to avoid the difficulties encountered by earlier experimentation in this field, such a study should make use of an objective measure of bilingualism and non-language tests of mental ability, if adequate tests of this nature could be found.

The present research, motivated largely by the deliberations of the conference at Luxembourg, and cognizant of its recommendations, sets as its purpose the investigation of the following two problems:

1. Bilingualism in its relation to certain social and economic factors in a country of immigration such as the United States.

2. Bilingualism in its relation to the mental development of children from 9 through 14 years of age, when the "effect" of certain social factors attendant on the bilingual situation is held constant.

MATERIAL

Population. The following considerations led to the selection of the particular group of population used in this study:

1. The population should be large enough to permit of adequate samples when certain subdivisions are made.

2. Comparisons of any sort should be made *within* natio-racial groups, in order to eliminate the moot question of racial differences.

3. Large samples of at least two natio-racial groups, known to be different from each other, should be selected. In studies of racial comparisons the Italians and the Jews are placed usually toward the lower and the higher ends respectively on curves indicating the performance of these groups on intelligence tests. The preference for the selection of these two natio-racial groups toward the opposite ends of the curve is based on the hypothesis that if results as to the effect of bilingualism proved to be similar within these two groups they would, then, assumedly be expected not to be different within other natio-racial groups represented on the performance curve between the Italians and the Jews. Coupled with this consideration was another of a more practical nature, namely, that these two groups would be expected to give a wide range in degree of bilingualism and would be represented in large numbers in New York City[1] where the experiment was to be carried out.

4. The environment and educational opportunities of the members within each natio-racial group should be similar.

5. Subdivisions should be made on basis of age rather than grade. The grade classification usually involves several ages and obscures comparisons of results.

With these considerations in mind the records[2] relative to the racial composition of the schools in New York City were carefully examined. Two large public schools were finally selected and permission for the experimentation secured from the proper authorities. These schools are Public School No. 176 and No. 16, both in Brooklyn, and each comprising in its student body approximately 90 per cent of Italian and Jewish children respectively. Public School 176 is a school with grades from kindergarten to the 8B grade. It is located in Bensonhurst in an area populated predominantly by Italians from Southern Italy and

[1] According to the Fifteenth Census of the United States, 1930, the number of Italian-born, and native-born of Italian or mixed parentage totals 1,070,355 in New York City. This makes 15 per cent of the total population of the city. According to the estimate of the American Jewish Committee in 1927 (80) Jews make up 29.6 per cent of the population of New York City.

[2] These records were made available to the writer by the kindness of Miss May Lazar of the Board of Education of New York City.

Sicily. It is not unusual to hear Italian spoken in the streets. Some of the stores in this area advertise their sales in the Italian language. Public School 16 also with grades from kindergarten to 8B is located just beyond the Williamsburg Bridge in an area populated predominantly by Jews from Austria, Hungary, Galicia, Poland, and Russia. Yiddish is heard in the streets, and quite a number of the stores carry advertisements in the Hebrew or Yiddish languages. The economic status of the population contributing to the student body of Public School 176 is two points below, and that of Public School 16 is equal to, the median economic status for the entire New York City.[3]

Tests were administered in these two schools to all children in the ungraded classes and from 4B to 8B grades inclusive, together with all children at age 10 or above in grades lower than 4B. Altogether 3,090 children were tested. From this number were omitted the records of 312 pupils; 149 because of incomplete information and 163 because they belonged to ages 8 or 15, 16, 17, and 18. The numbers represented at these ages were not large enough to justify their inclusion in the experimental population, which comprises ages 9 to 14 inclusive. Table 1 shows the distribution of the experimental population by age, sex, race, and place of birth.

In this study we are concerned mainly with the native-born Italian and Jewish children, 1,152 and 1,196 in number respectively. The other groups, represented by small numbers, will be subsidiary, and will receive treatment in so far as they throw light on the problems of this investigation.

It is to be noted that each of the two main experimental groups comes from one school and neighborhood. By virtue of this fact the population constituting each of the two groups should be regarded as coming from similar environment in so far as school, play, and certain other environmental influences are concerned. With this condition, therefore, our fourth criterion, stated above, is satisfied. The similarity of the environment and the neighbor-

[3] Reported to the writer personally by Dr. J. B. Maller, who in 1932 made a survey of the public elementary day schools in New York City. See reference 90 in the Bibliography.

TABLE I

DISTRIBUTION BY AGE, SEX, RACE, AND PLACE OF BIRTH OF PUPILS 9–14 YEARS OF AGE TESTED IN PUBLIC SCHOOLS NOS. 16 AND 176, BROOKLYN, NEW YORK

Age	BORN IN THE UNITED STATES									BORN ABROAD									Omitted	Grand Total
	Italian			Jewish			Mixed			Italian			Jewish			Mixed				
	B*	G	T	B	G	T	B	G	T	B	G	T	B	G	T	B	G	T		
9.....	34	38	72	71	85	156	16	14	30					2	2				15	275
10.....	108	123	231	154	133	287	22	28	50	5	8	13		8	8	3	1	4	30	623
11.....	103	108	211	122	144	266	24	27	51	6	6	12	4	7	11		2	2	28	581
12.....	130	108	238	130	130	260	31	33	64	5	6	11	7	5	12	2	2	4	27	616
13.....	124	125	249	86	97	183	29	24	53	5	14	19	7	17	24	1	1	2	23	553
14.....	80	71	151	17	27	44	19	12	31	8	4	12	6	6	12	2	1	3	26	279
Total...	579	573	1152	580	616	1196	141	138	279	29	38	67	24	45	69	8	7	15	149	2927

RACIAL COMPOSITION OF THE UNITED STATES-BORN MIXED GROUP

Mixed marriages	98	Lithuanian	8	Syrian	2
"American"	38	Spanish	8	Albanian	1
German	24	Russian	5	Dutch	1
English	18	Swedish	3	French	1
Norwegian	18	Ukrainian	3	Slav	1
Polish	18	Armenian	2		279
Irish	16	Danish	2		
Greek	10	Mulatto	2		

*B=Boys. G=Girls. T=Total.

hood within each group is essential, especially in view of the important differences in the neighborhoods or areas in New York City disclosed by Maller. (90)

An Objective Measure of Bilingual Background. Hoffman (59) in 1933 developed his Bilingual Schedule, which has been used in the present investigation. The schedule consists of fourteen questions, including altogether thirty-seven items purporting to determine the amount of the bilingual background of the child. Not only the "expressive," or speaking, but also the "impressive," or hearing and reading, aspects of the child's language situation are taken into account. The following are typical questions in the Schedule:

Question 1. Do the following speak to you in any language other than English?

(a) Father	Never	Sometimes	Often	Mostly	Always
(b) Mother	Never	Sometimes	Often	Mostly	Always
(c) Grandfather	Never	Sometimes	Often	Mostly	Always
(d) Grandmother	Never	Sometimes	Often	Mostly	Always
(e) Brothers and Sisters	Never	Sometimes	Often	Mostly	Always
(f) Relatives	Never	Sometimes	Often	Mostly	Always

Question 2. Do you speak to the following in any language other than English?

(The above six categories are repeated here.)

Question 6. Do the following read any newspapers in a language other than English?

(a) Father	Never	Sometimes	Often	Mostly	Always
(b) Mother	Never	Sometimes	Often	Mostly	Always
(c) You (Yourself)	Never	Sometimes	Often	Mostly	Always

Write the names of the newspapers in a language other than English which any of the above read.

(Question 6 is repeated for the reading of books, writing letters, attending lectures, and the theater.)

Question 14. Are there any books in a language other than English in your home? None Some Many Most All

It is carefully and repeatedly explained to the child at various intervals that he is to underline: "Never" if his father *never* speaks to him in a language other than English; "Sometimes" if his father speaks *less than half* of the time in a language other

than English; "Often" if the father speaks to him *half* of the time in a language other than English; "Mostly" if the father speaks *most* or *more than half of the time* in a language other than English; "Always," if his father speaks to him always in a language other than English.

In the scoring of the Schedule the items *Never*, *Sometimes*, *Often*, *Mostly*, *Always* as underlined are given the numerical values of 0, 1, 2, 3, and 4 respectively. The numerical total thus received is then divided by the total number of items attempted by the child, and the quotient, multiplied by 10 in order to get rid of the decimal, constitutes the child's bilingual score. The range in the present study of the bilingual scores of the children tested was from 0 to 35.

The questions on which the bilingual score is based are printed in a very explicit manner on the two inside pages of the four-page questionnaire. On the first page of the questionnaire the child fills out: his or her name, sex, age, grade, date, and place of birth; birthplace, years of residence in the United States, and nationality (race) of his father and mother separately; names, age, school, and grade of his brothers and sisters separately; and five questions with reference to the languages understood or spoken by father, mother, and the child. For further check and information the present investigator added these five questions:

1. What language, besides English, is usually spoken at your home?
2. What language did you speak FIRST when a child?
3. At about what age did you start speaking English?
4. Do you find it easier to speak English than some other language? (underline) YES NO
5. What language, besides English, are you studying?

TABLE

DIFFERENCE IN THE EXTENT OF BILINGUAL BACKGROUND

Race	NATIVE-BORN			FOREIGN-BORN		
	Number	Mean	σ	Number	Mean	σ
Italian	1152	13.01	8.17	67	23.21	5.67
Jewish	1196	11.44	7.20	69	18.70	6.87
Mixed	109	9.34	8.11	15	21.40	7.26

Hoffman (59:48) reports a validity coefficient of .73 ± .034 (Pearson product-moment) and .77 ± .030 (Eta) between the scores of 82 Jewish bilingual children and the ratings on a scale of 0 to 10 of a principal of a supplementary Hebrew school where the schedule was administered. The principal was well acquainted with the children's family background. A Pearson product-moment coefficient of .82 ± .03 is again reported by Hoffman (*ibid.*) between the bilingual scores of 52 Italian children and the ratings on a scale of 1 to 8 of an Italian interviewer who visited the children's homes. Further data relative to the validity of the schedule are adduced by Hoffman (*op. cit.*: 48ff.) on the bases of comparisons between children attending parochial and public schools, and also between children born in this country and children born abroad.

Further evidence of the validity of the Schedule on the basis of the results of the present investigation is reported in Table II. It will be seen that a highly significant difference exists between the extent of the bilingual background of the foreign-born and the native-born children of Italian, Jewish, or mixed parentage, as was to be expected.

The reliability of the Schedule is reported by Hoffman (59:46) as .81 by retest, and .92 by the split-halves technique. Since the present investigation included 618 siblings, the correlation coefficient between the bilingual scores made by these siblings taken in random order was calculated and found to be .793 ± .0102. As pointed out by Hoffman (*ibid.*) we should not necessarily expect a very high correlation between the bilingual scores of siblings, since the influence of the bilingual background may be

II

BETWEEN NATIVE AND FOREIGN-BORN CHILDREN

Race	σ Average Native-Born	σ Average Foreign-Born	σ Diff.	Actual Diff. in Means	$\frac{\text{Diff.}}{\sigma \text{ Diff.}}$
Italian	.24	.69	.73	10.21	14.00
Jewish	.21	.82	.85	7.26	8.54
Mixed	.74	1.88	2.02	12.06	6.00

different for each individual child. There were, however, 18 pairs of twins in the present study, and here we should expect a rather close agreement, which indeed we find. The mean and the standard deviation of the two groups of twins are as follows:

	Number	Mean	S.D.
Group I	18	14.44	7.52
Group II	18	14.11	8.37

The coefficient of correlation is .884 ± .0340.

It should be noted here that in developing the schedule Hoffman used as his population children in New York City of the same race and age as those used in this study. The Hoffman Schedule is, therefore, a satisfactory instrument for the measurement of the bilingual background of the children studied in this investigation. Because of its system of quantification it is also a very sensitive instrument in measuring the thing that it purports to measure.

Measurement of Socio-Economic Status. For the measurement of socio-economic status seven questions adapted from the Sims Score Card (134) were used. A similar adaptation used by Dr. J. B. Maller in connection with his Character Sketches (89) correlated with the score on the Sims Score Card to the extent of .86.

The seven questions used in this study were added to the fourth page of the Hoffman Schedule and they run as follows:

1. (a) How many rooms does your family occupy?
   2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, more.
   (b) How many persons occupy these rooms?
   2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, more.
2. Do you have a radio in your home? Yes No
3. Do you have a piano in your home? Yes No
4. Do you have a library (at least 50 books) in your home? Yes No
5. Do you have a telephone in your home? Yes No
6. Do you have an automobile, other than a truck? Yes No
7. (a) Write your father's occupation on this line
   .....
   (If your father is unemployed now, write the occupation he had when he was employed.)
   (b) Does he own Part All None of his business?

(c) Does he have a title such as president, manager, foreman, boss, etc.? Yes No

(d) If he does have such a title, write it on this line

.....

(e) How many persons work for him?

None 1 to 5 5 to 10 More than 10

Detailed and appropriate directions were given to help the children underline the correct answers to these questions.

In scoring these questions numerical values were assigned, as follows:

1. Father's occupation. Professional, 40; commercial, 30; proprietor, 20; skilled worker, 10; unskilled worker, 0.
2. Home. The number of rooms occupied was divided by the number of persons in the home carrying the division to one decimal place and the ratio was converted into scores as follows:

Rooms in home / People in home	Score
Less than .4	0
.4 through .9	10
1.0 through 1.5	20
1.6 through 2.1	30
2.2 and higher	40

A numerical value of 4 was assigned to each of the remaining questions when answered in the affirmative.

The total combined score on this questionnaire ranges from 0 to 100 and is the socio-economic measure used in this study.

To check on its reliability the correlation coefficient of the scores of the 618 siblings was calculated, and was found to be .832 ± .0084. The scores of the 18 pairs of twins were as follows:

	Mean	S.D.	*r*	P.E.*r*
Group I	32.44	11.22		
Group II	31.55	8.75	.853	.0419

The Hoffman Bilingual Schedule and the Socio-economic Questionnaire require together from 30 to 45 minutes for administration.

A Measure of Age-Grade Status. Several methods are used in the measurement of retardation or acceleration of pupils in the

elementary grades. The method used in this investigation was to compare a child's age and grade location with the modal age for the grades in day elementary schools in New York City for the school year of 1932-1933. The modal ages of 704,550 day elementary pupils in New York City, reported in the *Thirty-Fifth Annual Report of the Superintendent of Schools*, are as follows (116:528):

Grade	Age	Grade	Age
1A	6 – 6½	5A	10 –10½
1B	6½– 7	5B	10½–11
2A	7 – 7½	6A	11 –11½
2B	7½– 8	6B	11½–12
3A	8 – 8½	7A	12 –12½
3B	8½– 9	7B	12½–13
4A	9 – 9½	8A	13 –13½
4B	9½–10	8B	13½–14

A child in this investigation whose age fell between the limits of 10–10½, and who was in the 5A grade was given a score of 0, i.e., normal for his age; if in 5B he was marked 1; if in 6A, 2; and so on up indicating acceleration. If the same child was to be found in 4B grade his score would be −1; if in 4A grade, −2; and so on down indicating retardation. The age-grade status score by this method ranges from −8 to through 0 to +8.

Mental Tests. The following three criteria were used in the selection of tests for the measurement of mental ability:

1. The tests should be non-language, in order to eliminate the factor of language ability or understanding.

2. The material involved should be of as high a level of symbolic or abstract quality as possible, in view of the fact that most non-language tests are imputed to measure concrete rather than abstract abilities, and it is the latter with which this study is particularly concerned.

3. The tests should conform to the usual requirements of validity, reliability, objectivity, and suitability for the particular ages involved in this study.

With these considerations in mind all available non-language tests were carefully examined, and the following tests selected:

The Pintner Non-Language Test. This test is so well known and widely used that a detailed description is unnecessary. It consists of six subtests: Imitation, Easy Learning, Hard Learning, Drawing Completion, Reversed Drawings, and Picture Reconstruction. It requires approximately 30 minutes for its administration. In a study of the most widely used non-verbal tests Liu (81:48) found this test to be the best measure of intelligence because

a. It correlates highly with final criterion (r=.78).
b. It does not take a long time to give.
c. It is easy to score.
d. The individual tests also correlate highly with the criterion. (A five-item criterion was used, including age, school marks, school progress, teachers' estimates of intelligence, and composite test scores of five group intelligence scales.)

Pintner (105) reports a retest reliability of .79 ± .017 for this test.

The Spearman Visual Perception Test—Part I. This test was selected especially in answer to the demand of criterion 2 for the selection of tests. This test was devised by Professor Spearman of England for the purpose of indicating ability in eduction of relations. This particular ability, according to Spearman, is one of the most fundamental and important aspects of intelligence. (141) The test is, assumedly, highly saturated with "g."

This test as originally devised comprises six forms, or subtests, and a practice form, each containing 120 items or geometrical figures. There are 10 items to each of the 12 lines in each form. For the solution of the items in each line a particular type of relation is to be educed. These relations range from very easy to very difficult, and 7 minutes are allowed for work on each form. The test is administered by means of verbal directions. However, in order to eliminate the language factor and conform to the requirements of criterion 1 the Visual Perception Test was adapted by the writer for administration by means of pantomime directions. The adapted form was first tried in a graduate class in mental testing in Teachers College, Columbia University, then tried in three different grades in Public School

157, Manhattan, and only then applied to the experimental population of this study. As a result of the preliminary testing it was decided to allow 5 minutes for work on each of the separate forms, and to use only five forms, devoting form 1 to demonstration and fore-exercise. An account of the methods of the administration of this test and the results thereon will be given by the writer elsewhere. (4)

Two adult groups of 40 each, equated person per person on age and score on the Thorndike CAVD Test, were given the Visual Perception Test by means of verbal and pantomime directions. The correlation between CAVD scores and scores of the Spearman Test administered by verbal directions was .4797 and between CAVD scores and scores of the Spearman Test administered by pantomime directions .5808. This would indicate that there is no essential difference, in so far as the relation of the Spearman Visual Perception Test, Part I, to the CAVD is concerned, between this test when administered by means of verbal directions and when given by means of pantomime directions. It should be stated, however, that the group which took the test by pantomime directions scored, on an average, 65 points less than the equated group which took the same test by means of verbal directions. The reliability coefficient of the test by the split-halves method for this adult group is reported as .9346. (83)

By correlating the scores on Forms 2, 4, 6 against those on Forms 3 and 5 for 589 12-year-old children the experimental population of the present study, a correlation coefficient of .794 $\pm$ .0101 was obtained. Applying the Spearman-Brown formula, the self-correlation of the complete test is .882 $\pm$ .0062.

The correlation between scores on the Spearman Visual Perception Test and the Pintner Non-Language Test for the same 12-year-old population of 589 is .61 $\pm$ .0174.

The Spearman Test requires 50 minutes for its administration.

Conditions for Testing. The testing program was carried through in the months of February and March, 1934. The children of Public School 16 were tested first. The order in which the tests were administered was as follows: (1) Hoffman Schedule and the Socio-economic Questionnaire, (2) the Pint-

ner Non-Language Test, and (3) the Spearman Visual Perception Test. The Pintner test was administered first in order to help the children in their understanding of the pantomime directions for the Spearman test, which is a more difficult test. The two tests followed each other with an interval of from 1 to 5 days. No class was tested twice the same day. A class tested on the Pintner test in the morning was given the Spearman test in the afternoon on another day, and vice versa. The examiner was in complete charge of the class when testing started; the class teacher either left the room or withdrew to the back of the classroom and in no way interfered with the testing program.

In giving the non-language tests the children were told as follows: "This is an exercise that we give to deaf children, or children who do not speak English; for that reason I am not going to use any language in giving this exercise to you. See how well you can understand what I tell you to do without using words, and do the exercise."

Care was taken to pronounce the words of this introduction slowly, distinctly, and with due amount of loudness and emphasis to be understood by everyone in the class. There is no reason to believe that any of the words of this paragraph were beyond the understanding of the 9-year-old child.

The Hoffman Schedule and the Socio-economic Questionnaire were administered by Dr. Hoffman, the author of the schedule, by two postgraduate students trained for the purpose, and by the writer. In the ungraded classes the teachers in charge filled out the questionnaire by means of individual conferences with each child, assisted by their own knowledge of the children's background which they had known for at least one school semester. The correctness of the answers to the Hoffman Schedule can easily be verified by the consistency in underlined items. The questionnaire of every child was therefore checked with this point in mind, and whenever an inconsistency was noted or complete information withheld an individual conference was arranged with the child. This was especially true in the lower grades where large groups of children were individually re-examined on the schedule. In each school a large room was placed at the disposal

of the examiners for conferences and for carrying out the testing program.

The Pintner Non-Language Test was administered by a graduate student in psychology who had received his Master's degree at Columbia University and had had considerable experience in testing. The Spearman Test was administered by the writer.

Scoring and Tabulation. All tests were scored twice and, in cases of doubt three times, by the writer and assistants. All necessary information, such as name, age, sex, grade, length of residence of parents, their nationality, the scores made on the tests, was entered on separate cards for each individual child. All tabulations and calculations were rechecked.

The dates of birth of children were secured from the official records of the schools. The median date of testing in each school[4] was accepted as the date in reference to which the ages of children were calculated.

The race of the child was determined by the racial descent of both parents and the language spoken by them.

PLAN

The description of the materials and methods used for the collection of data has no doubt indicated partly the plan of this investigation. In the treatment of these data the plan will be:

1. To examine bilingualism, expressed by the score on the Hoffman Schedule, in its relationship to age, sex, socio-economic status, age-grade status, and length of residence of parents in this country for each of the experimental groups separately. This will be done in Chapter IV.

2. To study carefully the relationship of bilingualism to the mental ability and development of the children measured by the two intelligence tests used in this study. This will be done by means of the correlational method, and two methods of comparison between groups equated with reference to certain factors. Chapter V will be devoted to this phase of the study.

[4] The length of testing in each school was no longer than 18 days.

CHAPTER IV

THE BILINGUAL BACKGROUND AND ITS RELATION TO CERTAIN SOCIAL FACTORS

CERTAIN ASPECTS OF IMMIGRANT ADJUSTMENT TO THE CONDITIONS OF LIFE IN THE UNITED STATES

THE problem of bilingualism in the United States is one phase of the larger problem of immigrant adjustment to the conditions of life in this country. Political, economic, social and personal motives and considerations have caused large groups of people to migrate from various parts of the world to the United States of America. Varieties of cultures, represented by these immigrant groups, have in some way or other adjusted themselves to the culture and civilization of this country. To be sure, this adjustment has been neither sudden nor yet a one-way process. Man may not change his customs, traditions, or his psychological make-up as suddenly and as completely as he may change his abode. The immigrant adjustment to the ways of living in this country has been a gradual process—a process still going on. This adjustment, furthermore, does not consist in wholesale substitution of one culture for another. The influence of the immigrant on the culture of America is not well known; its existence can not, however, be denied. (37) The psychological study of the processes of this adjustment, and its bearing on the adult immigrant or his children, has so far received little attention.

Certain phases of this adjustment within the compass of the data of the present investigation, and to the extent that they contribute to an understanding of the background of the bilingual child in this country will now be presented, before we examine the relationship of bilingualism to certain other specific factors.

Length of Period of Residence of Parents in the United States and the Bilingual Status of Their Children. One of the most

important aspects of the immigrants' adjustment to the ways of living in this country—an aspect which probably epitomizes the whole process of this adjustment—is that of language. For it is through language that contact with the life of the country is best achieved. The length of time and the gradualness of the language adjustment of the immigrant are demonstrated by an examination of the relationship of the length of the period of residence of parents in this country with the bilingual status of their children.

The figures in Table III and their graphical representation in Graph 1 indicate that:

1. The decrease in the bilingual status of these Italian and Jewish children is dependent upon the length of residence of their parents in this country.

2. The process of this language adjustment continues into the second generation; in other words, Italian and Jewish children whose parents were born in the United States tend to be bilingual.

3. A regular drop of approximately 3 points in the extent of bilingual background for each interval is to be noted, moving from short to long period of residence of parents in this country. The last two intervals, indicating drops of approximately 5 points, in the case of the Italians form an exception.

4. The Italian curve for bilingual status, starting from a higher point than the Jewish, overtakes and passes the latter. The Italian curve has a sharper incline, beginning with the category of "31+ years in U. S." and it is probable that it will require a shorter time to reach the abscissa than will the Jewish curve.

These results tend to confirm the belief in the strength of the American "melting pot" in so far as the ultimate adoption by the immigrant of the English language is concerned. The time required for "melting," as indicated by these figures, is probably longer than is believed by most people.

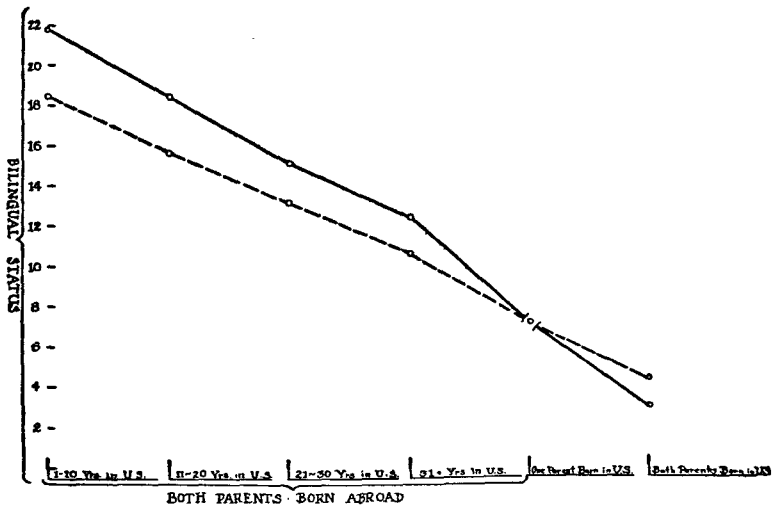
These data do not countenance the explanation of the rate of adoption of English by the immigrants in this country in terms of their intelligence, or that alone. The curves indicate that Italian children, at least one of whose parents was born in this country, adopt the English medium more readily and to a greater extent than those whose parents, born abroad, have been in residence

TABLE III

LENGTH OF PERIOD OF RESIDENCE IN THE UNITED STATES OF PARENTS AND THE BILINGUAL STATUS OF THEIR CHILDREN

Length of Residence	ITALIAN			JEWISH		
	Number	Mean	σ	Number	Mean	σ
1. Both parents born abroad—in U. S. from 1 to 10 years.....	89[1]	21.82	6.50	81[2]	18.49	6.81
2. —in U. S. from 11 to 20 years	252	18.39	7.35	280	15.66	6.98
3. —in U. S. from 21 to 30 years	354	15.14	6.57	371	13.09	6.15
4. —in U. S. 31+ years	168	12.43	7.59	102	10.60	6.66
5. One parent born in U. S., the other abroad[3]	208	7.22	5.40	194	7.11	4.80
6. Both parents born in U. S. ...	92	2.84	3.24	138	4.26	3.64

[1] 67 out of 89 children born abroad.
[2] 69 out of 81 children born abroad.
[3] Average number of years of residence in U. S. of the other parent is 26.33 years for the Italians and 28.76 years for the Jews.



LEGEND: ———— Italian, - - - - - - - Jewish

GRAPH 1. Length of Period of Residence in the United States of Parents and the Bilingual Status of Their Children

here for twenty or thirty years. There is, however, no reason to believe that the former are endowed with a greater amount of intelligence than the latter. There are other factors besides intelligence that determine the rate of adoption of English, or the rate of desertion of the mother tongue by the immigrants. The slowness of the descent of the Jewish curve of bilingual status in comparison with the Italian curve toward the end should probably be explained by the greater tenacity of the Jews in the observance of their traditions and religion.

It has been noted that the bilingual status of the Italians starts from a higher point than that of the Jews. It should also be observed that the bilingual status of the Italians remains on a higher level, as compared with that of the Jews, throughout the first generation of births in this country. From this it may be inferred that the initial resistance of the Italians to the English language, and possibly to the American ways of living, is greater than that of the Jews. This phenomenon offers two possible explanations: first, the Italian language is more dissimilar to English in comparison with Yiddish—the language spoken by the Jews—and hence the transfer somewhat more difficult; second, the Italian immigration is recruited more often from rural districts of Italy, while the Jews usually come from urban and semi-urban areas of Europe and hence find it easier to adjust themselves to the American urban ways of living.

Length of Residence in the United States and the Socio-Economic Status of Families. From the figures in Table IV and the graphical representation of the same in Graph 2 it is evident that:

1. There is a steady improvement in the socio-economic status of both the Italians and the Jews accompanied with length of residence in this country. The immigrant in changing his abode does not transport over the Atlantic a large number of material possessions. These are acquired after his settlement here, and, for most of the items on which our measurement of the socio-economic status is based, not until steady work of some sort is secured and the need of possession of these conveniences is felt.

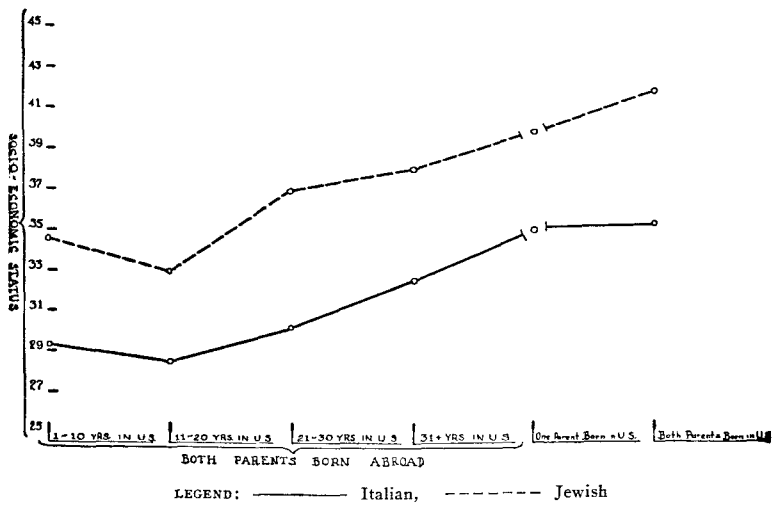
2. The Jews have a higher socio-economic status than the Italians in this study. In examining the occupations of the fam-

TABLE IV

LENGTH OF PERIOD OF RESIDENCE IN THE UNITED STATES OF PARENTS AND THE SOCIO-ECONOMIC STATUS OF THE FAMILIES

Length of Residence	ITALIAN			JEWISH		
	Number	Mean	σ	Number	Mean	σ
1. Both parents born abroad—in U. S. from 1 to 10 years	89[1]	29.27	12.90	81[2]	34.55	15.70
2. —in U. S. from 11 to 20 years	252	28.40	13.38	280	32.91	13.30
3. —in U. S. from 21 to 30 years	354	30.08	13.93	371	36.83	16.10
4. —in U. S. from 31+ years ...	168	32.45	13.85	102	37.80	16.00
5. One parent born in U. S., the other abroad[3]	208	34.85	14.95	194	39.65	15.55
6. Both parents born in U. S.	92	35.17	15.22	134	41.62	16.80

[1] 67 out of 89 children born abroad.
[2] 69 out of 81 children born abroad.
[3] Average number of years of residence in U. S. of the other parent is 26.33 years for the Italians and 28.76 years for the Jews.



LEGEND: ———— Italian, – – – – – – – Jewish

GRAPH 2. Length of Period of Residence in the United States of Parents and the Socio-Economic Status of the Families

ily heads there is indication that the Jews have more independent business enterprises and are represented in the professions in larger numbers than the Italians, in so far as the samples in this study are concerned.

3. A slowing down of the rate of improvement of the socio-economic status in the case of the Italians is to be noted beginning with the category of "one parent born in U. S.," while that of the Jews continues steadily. This may probably be due to the greater infiltration of the Jews into the professions.

4. Both the Jews and the Italians who have lived in this country from 1 to 10 years have a higher socio-economic status than the Jews and Italians respectively who have been here from 11 to 20 years. This apparent anomaly may be ascribed either to the unreliability of the figures for the first group because of the small sampling, or to the fact that immigrants entering since 1924 have been financially better off than their predecessors who entered during or immediately after the War.

Length of the Period of Residence in the United States of Parents and the Age-Grade Status of Their Children. The rise in the age-grade status of the Italian and the Jewish children as related to length of residence of their parents in this country is not as consistent for all the six categories as in the previous two comparisons. A rise, however, there is; and in order to indicate it certain of the categories have been combined, and the number of categories has thus been reduced to four. From the figures in Table V and the graphical representation of the same in Graph 3 the following may be noted:

1. There is a rise in the age-grade status of children accompanied by the length of residence in this country. This rise is to be explained most probably by the reduction in their bilingual background and the improvement in socio-economic status as evidenced by the previous comparisons, and the general adjustment of these children to the school situation in this country.

2. The sharpest rise in the age-grade status takes place in the first decade of residence of parents in this country. Most of the children in this category are foreign-born, and the difficulty of their initial adjustment to the school situation in this country

must not be underestimated. This fact most probably explains the sharp rise of the age-grade status of the children in both natio-racial groups.

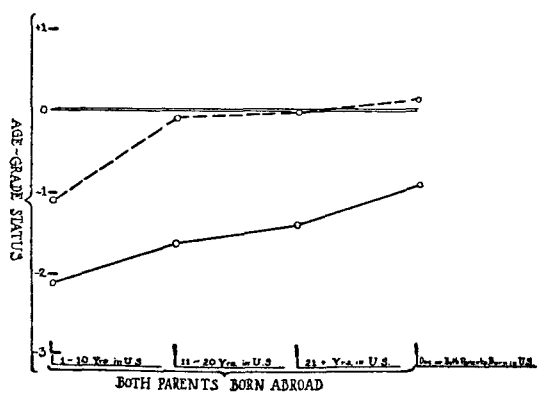
3. The Jewish group is much higher in age-grade status than the Italian group. After the initial period of adjustment the Jews soon catch up with the modal age-grade status and exceed it, while the Italians, even though indicating a consistent and de-

TABLE V

LENGTH OF PERIOD OF RESIDENCE IN THE UNITED STATES OF PARENTS AND THE AGE-GRADE STATUS OF THEIR CHILDREN

Length of Residence	ITALIAN			JEWISH		
	Number	Mean	σ	Number	Mean	σ
1. Both parents born abroad—in U. S. from 1 to 10 years	63*	−2.14	2.01	69	−1.10	1.80
2. —in U. S. from 11 to 20 years	276	−1.64	1.80	305	− .08	1.10
3. —in U. S. from 21+ years ...	553	−1.40	1.75	471	− .02	1.24
4. One or both parents born in U. S.	297	− .93	1.61	334	+ .15	1.03

* The children in the ungraded classes have been excluded from this and all subsequent calculations where age-grade status has been a factor, since no standard of age-grade status exists with which their standing could be compared.



LEGEND: ——— Italian, - - - - - Jewish, ▬▬ Modal Age-Grade Status for Entire New York City Day Elementary Schools

GRAPH 3. Length of Period of Residence in the United States of Parents and the Age-Grade Status of Their Children

termined rise toward the modal line, fall considerably short of it. This difference between the two natio-racial groups should not, however, be misconstrued to mean necessarily a difference in the inherent capacities of the groups involved. It should be borne in mind that these groups come from two different schools. Maller points out that in New York City schools: "Acceleration and retardation are not determined on the basis of objective measures and often depend upon local conditions and upon the educational views of the teachers, principal, and superintendent. Promotion is determined by relative rather than actual achievement." (90: 100) This statement is certainly true of the promotional policies of the two schools in this study.

Place of Birth of Parents, Socio-Economic Status, and Number of Children Per Family. As a further example of the immigrants' adjustment to the ways of life in this country, the trend of fertility of the two racial stocks, as represented by the samples in

TABLE VI

PLACE OF BIRTH OF PARENTS, SOCIO-ECONOMIC STATUS, AND NUMBER OF CHILDREN PER FAMILY

Place of Birth of Parents	Range of Socio-Economic Status	JEWISH			ITALIAN		
		Number of Families	Number of Children	Average per Family	Number of Families	Number of Children	Average per Family
Both parents born abroad	1–40	524	1957	3.75	644	3469	5.39
	41–80	252	869	3.45	152	678	4.46
Both or one parent born in U. S.	1–40	178	541	3.04	205	819	4.00
	41–80	151	372	2.46	95	322	3.40

this study, may be examined. The figures for this are presented in Table VI. It is to be noted that:

1. There is a definite tendency for the average number of children per family to decrease in both racial groups, in respect to both higher socio-economic status of the families and the birth of parents in this country. This result is in harmony with the findings of Fairchild (37), Lorimer and Osborn (85), and Maller (90).

2. The average number of children per family is larger for the Italians than for the Jews. This is in agreement with the results of Maller in his study of the birth rate of the immigrant groups in New York City (90).

In the light of the religious traditions and observances of the two racial groups, the reduction of the size of the family may perhaps be interpreted to indicate the forcefulness of the influence of the social milieu in this country to which these immigrants have to adjust.

In all the comparisons so far presented it is obvious that these Jewish and Italian immigrants, recruited mostly from rural and semi-urban communities of Europe, pass through a period of adjustment in relinquishing or modifying their traditions and customs and adopting American urban ways of living. Their bilingualism is one of the phases of this general process of adjustment.

BILINGUALISM IN RELATION TO CERTAIN SPECIFIC FACTORS

Bilingualism and Age. The averages and the standard deviations of bilingual status for each age from 9 to 14 for the United States-born Italians and Jews are presented in Tables VII and VIII respectively. The critical ratios for the actual differences in the means between succeeding ages in terms of the standard deviation of these differences are also given in these tables. These figures indicate that:

1. There is no general trend in the increase or decrease of bilingual status for these groups from age 9 to 14.

2. The differences between ages are somewhat larger and more irregular for the Italian group than for the Jewish. In neither group, however, are the differences between ages statistically significant.

These results are in harmony with those of Hoffman who found practically zero correlation between chronological age in half-year intervals and the bilingual background of 547 Jewish and Italian children from ages 9 to 14. (59:55)

Bilingualism and Racial Groups. The averages and the standard deviations in bilingual status for ages 9 to 14 of Italian,

TABLE VII

MEAN AND σ OF BILINGUAL STATUS AT EACH AGE FROM 9 TO 14 AND THE SIGNIFICANCE OF DIFFERENCE BETWEEN AGES

U. S.-Born Italian Group

Age	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	72	11.50	7.98	.94			
					1.12	2.12	1.90
10	231	13.62	9.15	.60			
					.85	.48	.57
11	211	14.11	8.67	.60			
					.79	.89	1.13
12	238	13.21	8.07	.52			
					.70	1.50	2.12
13	249	11.71	7.41	.47			
					.72	1.33	1.84
14	151	13.04	8.17	.55			

TABLE VIII

MEAN AND σ OF BILINGUAL STATUS AT EACH AGE FROM 9 TO 14 AND THE SIGNIFICANCE OF DIFFERENCE BETWEEN AGES

U. S.-Born Jewish Group

Age	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	156	11.13	7.77	.62			
					.75	.29	.38
10	287	11.42	7.20	.43			
					.63	.47	.75
11	266	11.89	7.53	.46			
					.65	.40	.62
12	260	11.49	7.35	.46			
					.64	.46	.71
13	183	11.03	6.15	.45			
					1.01	.33	.33
14	44	11.36	5.97	.90			

Jewish, and mixed groups, when from the latter are excluded American, Irish, and English monoglots and children from mixed marriages, are as follows:

	Number	Mean	S.D.
Italian	1152	13.01	8.17
Jewish	1196	11.44	7.20
Mixed races	109	9.34	8.11
Children from mixed marriages	98	3.05	3.18

It is seen that the bilingual status of the Italian group is somewhat higher than that of the Jewish group. In order to compare

the length of residence in this country of parents of the Italian and the Jewish children unit numerical values from 1 to 6 were assigned to each of the six categories in Table III. Thus, a numerical value of 1 was given to the category "Both parents born abroad—in U. S. from 1 to 10 years," and this was multiplied by the number of cases involved in that category. A numerical value of 2 was assigned to the next category and so on, the value of each category being multiplied by the number of cases involved in it. The sum total of the six results was then divided by the total number of cases. For the Italian group this final figure was 3.37 and for the Jewish group 3.38. This equality of the length of the period of residence in this country of the parents of the Jewish and Italian children in this study precludes the possibility of the explanation of the higher bilingual status of the Italians in terms of shorter stay of parents here. The explanation of this situation, offered on page 70, will therefore continue to hold.

No inferences may be drawn from the figures for the mixed races in view of the dissimilarity of national backgrounds, and the varying lengths of residence of parents in this country. It is interesting to note, however, that in comparison with the mixed, and the other natio-racial groups, the average bilingual score of the children from mixed marriages is much lower. This is to be accounted for by the longer stay of the parents of these children in this country, and by the necessity for the adoption of a common medium of communication—English—between parents speaking different languages.

Bilingualism and Sex. The figures presented in Tables IX and X throw light on the question of sex differences as related to bilingual background. It will be seen that the Italian boys have a higher average bilingual score than the girls for all ages except age 11. These differences are somewhat greater for ages 10, 13, and 14. However, both for ages separately, and for the entire Italian group, the ratio of the actual difference in means to the standard deviation of the difference does not quite reach 3 to make these differences statistically significant.

In the Jewish group the differences between the sexes are

practically negligible. The girls seem to have a slightly higher bilingual score than the boys. The differences are, however, highly unreliable statistically.

These results are again in harmony with those of Hoffman who compared the bilingual score of 241 boys and 204 girls of both Italian and Jewish parentage and found small and highly unreliable differences. (59:56)

TABLE IX

MEAN AND σ FOR SEXES AT EACH AGE FROM 9 TO 14 AND THE SIGNIFICANCE OF DIFFERENCE BETWEEN SEXES

U. S.-Born Italian Group

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Boys	34	11.59	7.02	1.20	1.86	.17	.09
	Girls	38	11.42	8.73	1.42			
10	Boys	108	15.10	8.46	.81	1.17	2.79	2.39
	Girls	123	12.31	9.28	.84			
11	Boys	103	13.64	8.37	.82	1.19	.92	.77
	Girls	108	14.56	8.97	.86			
12	Boys	130	13.60	7.74	.68	1.06	.85	.80
	Girls	108	12.75	8.40	.81			
13	Boys	124	12.95	7.35	.66	.93	2.47	2.67
	Girls	125	10.48	7.24	.65			
14	Boys	80	14.01	7.26	.81	1.08	2.07	1.91
	Girls	71	11.94	6.06	.72			
9–14	Boys	579	13.69	7.92	.33	.48	1.38	2.86
	Girls	573	12.31	8.34	.35			

Bilingualism and Maternal Influence. The hypothesis may be advanced that since the mother in an immigrant family usually stays at home and has less contact with the English-speaking world, she may be more responsible for the higher bilingual status of the children than the father who engages in work outside the home and is assumedly under the necessity of learning and using the English language. On the assumption, justified by the fact that birth of parent in this country is accom-

panied by lower bilingual score of children (see page 69), the following test of the above-mentioned hypothesis was made. The group of children, one of whose parents was born in this country and the other abroad, was divided into two sections according to the birthplace of either parent. The average length of residence in this country of the parent born abroad was then equalized as to whether it was the father or the mother that was born abroad.

TABLE X

MEAN AND σ FOR SEXES AT EACH AGE FROM 9 TO 14 AND THE SIGNIFICANCE OF DIFFERENCE BETWEEN SEXES

U. S.-Born Jewish Group

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Boys	71	11.10	7.52	.89	1.25	.06	.06
	Girls	85	11.16	8.07	.88			
10	Boys	154	11.91	7.47	.60	.87	1.07	.81
	Girls	133	10.84	7.27	.63			
11	Boys	122	11.62	7.11	.64	.91	.30	.32
	Girls	144	11.92	7.74	.65			
12	Boys	130	11.27	7.26	.64	.93	.44	.47
	Girls	130	11.71	7.65	.67			
13	Boys	86	11.15	5.79	.62	.91	.22	.24
	Girls	97	10.93	6.45	.66			
14	Boys	17	11.06	5.73	1.39	1.82	.50	.27
	Girls	27	11.56	6.12	1.18			
9–14	Boys	580	11.52	7.11	.30	.42	.17	.41
	Girls	616	11.35	7.35	.30			

The figures are presented in Table XI. According to these figures, then, the extent of bilingual background of Italian children whose mother was born in this country and whose father was born abroad is somewhat less than that of Italian children whose father was born in this country but whose mother was born abroad. This relationship is reversed in the case of Jewish children. The differences in means for each of the two natio-racial groups are, however, highly unreliable. To the extent, therefore, that the

TABLE XI

COMPARISON OF BILINGUAL STATUS OF CHILDREN ONE OF WHOSE PARENTS WAS BORN ABROAD

Natio-Racial Group	Parent Born Abroad	Average Number of Years of Residence in U. S.	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	$\frac{\text{Diff.}}{\sigma \text{ Diff.}}$
Italian	Mother born in U. S., Father born abroad	25.75	164	7.09	5.40	.42	1.15	.65	.56
	Father born in U. S., Mother abroad	25.74	35	7.74	6.36	1.07			
Jewish	Mother born in U. S., Father abroad	27.07	82	7.40	4.45	.49	.70	.24	.34
	Father born in U. S., Mother abroad	27.05	77	7.16	4.38	.50			

assumptions underlying these comparisons are valid, it would seem that both parents share equally in their influence on the bilingual status of their children.

Bilingualism and Socio-Economic Status. The Pearson product-moment correlations denoting the association between bilingual background and socio-economic status are presented in Table XII. It will be noticed that for the two main experimental groups of this study involving large numbers—the native-born Italian and Jewish groups—the coefficient of correlation between the two factors studied is —.20. In order to find the maximum limit (70:240) of relationship that may exist between the two factors for our two groups the Eta, or correlation ratio, for the total population of ages 9 to 14 was calculated for each racial group separately. For the Italian group ηxy is .21 and ηyx .22; for the Jewish group ηxy is .24 and ηyx .20.[1]

These results would be interpreted to mean that to the extent indicated by the correlation figure, higher bilingual status is accompanied by lower socio-economic status. Or, expressed in another way, the more well-to-do and socially more advanced people seem to relinquish their foreign language background more quickly, while economically and socially less fortunate people adhere more tenaciously to their older language background and to the traditions and literature expressed in that language. It should be remarked, however, that the correlation figure is rather small and that there are undoubtedly many exceptions to the general tendency indicated. It should further be noted that the range of socio-economic status in the groups represented is limited, and that very probably with a greater range in the socio-economic status the correlation between this factor and bilingual background would be higher.

From the averages and standard deviations in Table XII it is to be noted that both the Jewish and the mixed groups represent a higher average and indicate slightly greater variability in socio-economic status than the Italian groups, either native or foreign-born.

[1] The formulas used for the calculation of correlation ratio are those described by Holzinger (60:179-82).

TABLE XII

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN BILINGUAL BACKGROUND AND SOCIO-ECONOMIC STATUS. MEAN AND STANDARD DEVIATION OF SOCIO-ECONOMIC STATUS*

Age	ITALIAN GROUP					JEWISH GROUP					MIXED GROUP				
	No.	r	P. E. r	Mean	σ	No.	r	P. E. r	Mean	σ	No.	r	P. E. r	Mean	σ
9	72	.007	.0796	33.70	14.70	156	−.144	.0530	35.40	14.15					
10	231	−.247	.0417	30.45	14.00	287	−.217	.0378	37.90	15.25					
11	211	−.239	.0439	28.90	13.00	266	−.240	.0390	36.55	15.25					
12	238	−.198	.0420	31.68	14.65	260	−.172	.0406	36.70	15.40					
13	249	−.224	.0406	32.05	14.10	183	−.171	.0488	37.00	14.95					
14	151	−.205	.0528	31.20	13.50	44	−.202	.0965	33.80	12.20					
9–14	1152	−.207	.0180	31.05	14.10	1196	−.200	.0180	36.70	15.00	253**	−.095	.0422	36.40	16.15
	FOREIGN-BORN ITALIAN GROUP					FOREIGN-BORN JEWISH GROUP									
9–14	67	−.381	.0706	27.70	11.60	69	−.107	.0797	36.10	15.35					

* For means and σs of bilingual background see p. 76.
** Absolute monoglots excluded.

Bilingualism and Age-Grade Status. The figures with regard to bilingualism and age-grade status are presented in Table XIII, and they indicate, that:

1. For the Jewish group, either native or foreign-born, age-grade status is not associated with bilingual background. Absence of any association between the two variables is to be noted also for the mixed group.

2. For the Italian group there is a negative relationship between bilingual background and age-grade status, and this relation is somewhat more accentuated in the foreign-born group.

3. At every age and for the whole group, either native or foreign-born, the Italian child shows higher school retardation than the Jewish child.

4. Retardation indicates slight tendency of increase from age 9 to 14 in the case of the Italian children.

5. The higher retardation in the Jewish group is apparent at ages 13 and 14. The groups at these ages represent a selected sampling since the brighter ones have already moved to high school or have left the school.

6. Both the Italian and the Jewish children who were born abroad have a higher school retardation than Italian and Jewish native-born children respectively. This is in agreement with the result reported earlier in this chapter (p. 73) regarding the comparatively large school retardation of children whose parents have been in this country from 1 to 10 years.

The maximum limit of association between bilingualism and age-grade status, as represented by Eta is for the native-born Italian group $\eta xy = .27$, $\eta yx = .24$, and for the native-born Jewish group $\eta xy = .10$, $\eta yx = .08$.

It may be argued that the relationship between bilingual background and age-grade status is affected by socio-economic status, since the latter bears a relation to both of the factors whose true association with each other we are seeking. In order to eliminate the influence of the socio-economic status, partial correlations were calculated between bilingual background and age-grade status, holding socio-economic status constant. The partial correlations are:

TABLE XIII

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN BILINGUAL BACKGROUND AND AGE-GRADE STATUS.* MEAN AND STANDARD DEVIATION OF AGE-GRADE STATUS

Age	ITALIAN GROUP					JEWISH GROUP					MIXED GROUP				
	No.	r	P. E. r	Mean	σ	No.	r	P. E. r	Mean	σ	No.	r	P. E. r	Mean	σ
9	72	−.096	.0788	.23	.84	156	−.139	.0530	.63	.59					
10	223	−.305	.0412	− .94	1.38	285	.017	.0400	.10	.90					
11	207	−.153	.0455	−1.15	1.56	263	−.079	.0416	.08	1.10					
12	229	−.307	.0405	−1.30	1.89	256	−.021	.0421	.15	1.15					
13	239	−.194	.0420	−1.37	1.61	183	−.112	.0496	− .46	1.34					
14	135	−.259	.0542	−2.68	1.43	44	.119	.0991	−2.02	1.03					
9–14	1105	−.218	.0180	−1.28	1.72	1187	−.04	.0190	.01	1.17	250	.062	.0425	−.72	1.77
	FOREIGN-BORN ITALIAN GROUP					FOREIGN-BORN JEWISH GROUP									
9–14	66	−.294	.0755	−2.85	2.07	69	−.006	.0806	−1.36	1.82					

* Ungraded children excluded.

For the native-born Italian group	—.186
For the native-born Jewish group	—.015
For the native-born Mixed group	+0.85
For the foreign-born Italian group	—.215
For the foreign-born Jewish group	—.020

The general tendency is toward a reduction of the amount of association between bilingual status and age-grade status when the influence of the socio-economic status on these two variables is held constant by the technique of partial correlation. The change in the relationship of the two factors studied is, however, by no means appreciable.

Keeping in mind the fact mentioned earlier in this chapter, that the promotional policies are quite different in the two schools from which the two racial populations are drawn, it is legitimate to infer from the figures in Table XIII that in the present set-up of the schools which these children attend high bilingualism is accompanied by low age-grade status to the extent of an r of at least .20 in case of the Italian children. No association between the two factors considered exists in case of Jewish children. The results reported for the mixed group can not be reliable in view of the fact that they are drawn from both of the schools.

Socio-Economic Status and Age-Grade Status. Before closing the chapter it may be valuable to examine also the relationship that exists between socio-economic status and age-grade status. The figures are given in Table XIV. It is seen that the correlation between the two factors ranges from +.125 to +.274 for the five total groups, that it is lower for the Jewish group than for the Italian and the mixed groups, and that it is somewhat higher for the foreign-born groups in comparison with the native-born.

The maximum limit of relationship between the two factors studied, as represented by Eta, is for the native-born Italian group $\eta xy = .22$, $\eta yx = .23$ and for the native-born Jewish group $\eta xy = .16$ and $\eta yx = .16$.

The relationship between the two variables studied is rather small, and this is no doubt to be partly accounted for by the limited range of the socio-economic status of these groups, to which

TABLE XIV

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN SOCIO-ECONOMIC STATUS AND AGE-GRADE STATUS

Age	ITALIAN GROUP			JEWISH GROUP			MIXED GROUP		
	No.	r	P. E. r	No.	r	P. E. r	No.	r	P. E. r
9	72	.302	.0724	156	.006	.0540			
10	223	.282	.0419	285	.082	.0398			
11	207	.252	.0432	263	.131	.0411			
12	229	.270	.0413	256	.205	.0405			
13	239	.105	.0431	183	.202	.0483			
14	135	−.045	.0580	44	−.044	.1004			
9–14	1105	.192	.0190	1187	.125	.0190	250	.221	.0406
	FOREIGN-BORN ITALIAN GROUP			FOREIGN-BORN JEWISH GROUP					
9–14	66	.274	.0774	69	.141	.0790			

reference has already been made. However, to the slight extent indicated by the correlation figures, higher socio-economic status is accompanied by higher age-grade status. Higher socio-economic status of families provides better educational opportunities for their children outside of school, and this reflects on the grade location of these children in school. The somewhat lower relationship of socio-economic status to age-grade status in the case of Jewish children is probably explained by the fact that the age-grade status figures for these children, especially at the lower ages, cluster heavily at the normal, present a limited range of distribution, and thus lower the correlation figure.

SUMMARY

Certain Aspects of Immigrant Adjustment to the Conditions of Life in the United States

1. Bilingualism in the United States is one aspect of the general adjustment of the immigrant to the conditions of life in the adopted country, and it probably epitomizes the whole process of this adjustment.

2. The ratio of foreign language to English language back-

ground decreases quite regularly with the increase of the period of residence of families in this country.

3. The rate of the decrease of the bilingual background for the second generation families in this country is faster for the Italians than for the Jews.

4. Under present conditions bilingualism continues in the second generation of births in this country for both the Italians and the Jews.

5. An improvement in the socio-economic status for both the Italians and the Jews is accompanied by longer residence of families in this country.

6. The Jews in this study have a higher socio-economic status than the Italians.

7. The rate of improvement in socio-economic status in relation to length of stay in this country slows down considerably with the second generation of Italians. It continues unabated for the Jews, however. This fact is probably explained by their greater infiltration into the professions and their possession of independent business.

8. A rise in age-grade status of children accompanies the longer period of residence of their parents in this country. This rise is sharper between the first and the second decade of residence here of the parents.

9. A decrease in the average number of children per family accompanies longer residence in this country and higher socio-economic status of these families. The latter phenomenon is in harmony with the general tendency of reduction in fertility in this country.

10. The average number of children per family is larger for the Italian than for the Jewish group in this study.

Bilingualism in Relation to Certain Specific Factors

1. The extent of bilingual background does not vary significantly from age to age for ages 9 to 14 in either the Italian or the Jewish group.

2. The average bilingual score for the Italian children is larger than that for the Jewish children. The data indicate that the

initial resistance of the Jewish group to the English language is less.

3. The average bilingual score of children from mixed marriages is very decidedly lower in comparison with the average scores of the other groups.

4. Statistically no significant differences exist between the extent of bilingual background of boys and girls in both the Italian and the Jewish groups.

5. The influence of parents on the extent of bilingual status of their children would seem to be shared equally by father and mother.

6. The native and foreign-born Jewish and the mixed racial groups have a higher average and slightly greater variability in socio-economic scores than the native and foreign-born Italian groups.

7. Bilingualism is associated with socio-economic status to the extent of a correlation coefficient of —.20.

8. The Italians show greater school retardation than the Jews. It should be borne in mind, however, that the policies for promotion in the two schools from which the children of the two racial groups come are different.

9. The school retardation of the foreign-born children is much higher than that of the native-born groups.

10. The correlation coefficient between bilingualism and age-grade status is practically zero for the Jewish group, and at least —.20 for the Italian group.

11. The relationship, as expressed by the Pearson product-moment correlation coefficient, between bilingualism and age-grade status for either the Italian or the Jewish group is not changed when the socio-economic status is held constant.

12. Higher socio-economic status of families is accompanied by higher age-grade status of children from those families to the extent of a correlation of .125 to .274. That the correlation coefficient between these two factors is higher for the Italian children is due probably to larger range and greater variability of their age-grade status.

CHAPTER V

BILINGUALISM AND MENTAL DEVELOPMENT

DISCUSSION OF THE TESTS

BEFORE proceeding to the main topic indicated by the title of this chapter, it is necessary to present additional information to that presented in Chapter III regarding the tests of intelligence employed for this research.

The reason for the selection of non-language tests, in preference to verbal intelligence tests in either the mother tongue of the bilingual children or in English, was, it will be recalled, to eliminate the influence on the test results of linguistic facility or ability of the subjects in either language. It is recognized that in the solution of even non-linguistic problems, verbalization of some sort on the part of the subject may take place, as indicated by the experiments of Warden (158) and by the observations on nursery school children by Baldwin and Stecher (7). In using the non-language tests it is assumed that this verbalization on the part of the bilingual child will take place in the language—whether home language or English—to which he is more accustomed, and in which he finds greater facility for his thinking. It is further assumed that the material involved in these non-language tests, as compared with material in any verbal test, is much less, if at all, subject to differential reaction due to the specific symbolic education or the cultural milieu of our experimental groups. This point is often and justly made by anthropologists in their criticisms of certain applications of intelligence tests.

The Spearman test had not previously been standardized, and it was not deemed advisable to standardize it on the population of the present investigation alone. Consequently, for the most part comparisons involving the measures of mental ability are made in terms of the raw scores of the tests. In view of the fact

that our comparisons are made on separate age levels, the use of mental ages or intelligence quotients is not necessary; in a way this is an advantage because we shall thereby avoid the introduction in our comparisons of the performance of an external group—that on which the test may have been standardized.

After careful study and consideration it was decided not to combine, by any formula whatever, the scores for each child on the Pintner and the Spearman tests. The scores on the two tests are therefore treated separately in all our calculations and comparisons.

Sex and Intelligence. The figures indicating the performance on the two intelligence tests of boys and girls at each age from 9 to 14, and for each natio-racial group separately are given in Tables XV through XVIII. The statistical significance of the differences between the performance of the two sexes at each age for each of the two experimental groups is also indicated in these tables. Their examination will show that:

1. On the Pintner Non-Language Test the performance of the boys is superior to that of the girls at each age level and for both of the natio-racial groups. These differences, however, are not statistically reliable. This result is in agreement with the results reported by Pintner on this same test (105).

2. On the Spearman Visual Perception Test the superiority of neither sex is consistently evident for the two experimental groups at various age levels. For the two groups taken together, each sex is superior to the other six times in the twelve comparisons. The differences, as in the case of the Pintner Non-Language Test, are not statistically reliable.

On the basis of these findings, it will be justifiable in the subsequent treatment of the results of the intelligence tests to combine the two sexes. It should be recalled here that, as indicated in the previous chapter, no reliable differences were disclosed between sexes in regard to the extent of their bilingual background.

Age and Intelligence. The figures representing the average performance and the standard deviation at each age from 9 to 14 for the two natio-racial groups separately and for each of the

TABLE XV

THE PERFORMANCE OF THE U. S.-BORN ITALIAN GROUP ON THE PINTNER NON-LANGUAGE TEST

Mean and σ for Sexes at Each Age from 9 to 14 and the Significance of Difference Between Sexes

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Boys	34	220.00	68.50	11.75	16.74	16.50	.98
	Girls	38	203.50	73.50	11.93			
10	Boys	108	233.75	82.50	7.94	10.97	4.25	.39
	Girls	123	229.50	84.00	7.57			
11	Boys	103	287.75	89.50	8.82	11.53	9.00	.78
	Girls	108	278.75	77.25	7.43			
12	Boys	130	323.50	90.50	7.94	11.27	22.75	2.02
	Girls	108	300.75	83.25	8.00			
13	Boys	124	348.75	84.50	7.58	11.02	24.75	2.24
	Girls	125	324.00	88.75	8.00			
14	Boys	80	326.50	88.50	9.90	15.04	11.00	.73
	Girls	71	315.50	95.50	11.33			

TABLE XVI

THE PERFORMANCE OF THE U. S.-BORN ITALIAN GROUP ON THE SPEARMAN VISUAL PERCEPTION TEST

Mean and σ for Sexes at Each Age from 9 to 14 and the Significance of Difference Between Sexes

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Mean	Diff. / σ Diff.
9	Boys	34	117.70	56.40	9.67	14.58	9.20	.63
	Girls	38	126.90	67.20	10.91			
10	Boys	108	100.10	77.40	7.45	9.79	19.00	1.94
	Girls	123	119.10	70.60	6.36			
11	Boys	103	137.50	70.00	6.90	9.62	5.40	.56
	Girls	108	142.90	69.60	6.70			
12	Boys	130	167.30	70.00	6.14	9.37	12.60	1.34
	Girls	108	154.70	73.60	7.08			
13	Boys	124	170.70	58.40	5.24	8.32	1.60	.19
	Girls	125	172.30	72.40	6.47			
14	Boys	80	183.00	61.80	6.91	9.81	12.30	1.25
	Girls	71	170.70	59.40	7.05			

TABLE XVII

THE PERFORMANCE OF THE U. S.-BORN JEWISH GROUP ON THE PINTNER NON-LANGUAGE TEST

Mean and σ for Sexes at Each Age from 9 to 14 and the Significance of Difference Between Sexes

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Mean	Diff. / σ Diff.
9	Boys	71	227.50	68.00	8.07	10.89	16.00	1.47
	Girls	85	211.50	67.50	7.32			
10	Boys	154	267.25	91.25	7.35	9.57	11.00	1.15
	Girls	133	256.25	70.75	6.13			
11	Boys	122	308.50	87.75	7.94	10.51	12.75	1.21
	Girls	144	295.75	82.75	6.89			
12	Boys	130	337.25	82.75	7.26	10.31	11.75	1.14
	Girls	130	325.50	83.50	7.32			
13	Boys	86	362.50	72.00	7.77	11.96	31.25	2.61
	Girls	97	331.25	89.50	9.09			
14	Boys	17	366.00	72.50	17.80	21.58	36.50	1.69
	Girls	27	329.50	63.50	12.21			

TABLE XVIII

THE PERFORMANCE OF THE U. S.-BORN JEWISH GROUP ON THE SPEARMAN VISUAL PERCEPTION TEST

Mean and σ for Sexes at Each Age from 9 to 14 and the Significance of Difference Between Sexes

Age	Sex	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Mean	Diff. / σ Diff.
9	Boys	71	128.30	68.40	8.12	11.10	10.80	.97
	Girls	85	117.50	68.80	7.57			
10	Boys	154	142.10	73.60	5.93	8.30	9.80	1.18
	Girls	133	151.90	67.00	5.81			
11	Boys	122	159.70	68.80	6.22	8.26	1.40	.17
	Girls	144	158.30	65.20	5.43			
12	Boys	130	185.50	68.00	6.00	8.26	5.00	.61
	Girls	130	180.50	64.60	5.67			
13	Boys	86	175.50	61.20	6.60	8.64	9.00	1.04
	Girls	97	184.50	55.00	5.58			
14	Boys	17	190.70	40.80	9.90	14.07	5.20	.37
	Girls	27	185.50	52.00	10.00			

two intelligence tests are given in Tables XIX and XX, and represented in a graphical form in Graphs 4 and 5.

It is seen that for the more representative ages, namely 10, 11, 12, and 13, the curves of mental development approximate closely the pattern of curves of this nature. The populations of ages 9 and 14 are not representative for the respective ages in view of the fact that the brighter 14-year-olds have already completed the 8B grade and have gone to high school or left the school entirely, and it is only the brighter 9-year-olds who have progressed to the 4B grade and are therefore included in this study. The testing, as will be recalled, did not go below the 4B grade except for children at age 10 and above in these lower grades. The figures and the curves for the 9- and 14-year-olds should be interpreted, therefore, with great caution; this is especially true in the case of 9-year-old Italians and 14-year-old Jews represented by small and highly selected samples.

The Natio-Racial Groups and Intelligence. Further examination of the tables and graphs discussed in the foregoing section will disclose the facts that:

1. The performance of the Jewish group is superior to that of the Italian group at every age and on both of the tests, with the single exception of the very slight superiority of the Italian group on the Spearman test at age 9, which is highly unreliable statistically.

2. The differences in the average performance of the two natio-racial groups are statistically significant for the Spearman test at the four ages where more adequate sampling obtains. On the Pintner test the difference between the two groups is significant at age 10, at which age the sampling is most adequate.

The Spearman test is unquestionably the more difficult and assumedly deals with material on a more abstract level than the Pintner test; it evidently taxes the abilities of the Italian child more. We are not here concerned, however, with racial differences in intelligence; these figures are presented for the bearing they may have in the study of the relation of bilingualism to the mental development in these two natio-racial groups. A word of caution should, however, be mentioned here: there is no evidence

TABLE XIX

SCORES ON PINTNER NON-LANGUAGE TEST

Mean and σ at Each Age From 9 to 14 for U. S.-Born Italian and Jewish Groups and the Significance of Difference.

Age	U. S.-BORN ITALIAN GROUP				U. S.-BORN JEWISH GROUP				SIGNIFICANCE OF DIFFERENCE		
	Number	Mean	σ	σ Average	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Mean	Diff. / σ Diff.
9	72	210.50	71.00	5.42	156	218.70	67.80	8.24	9.86	8.20	.83
10	231	232.30	83.00	5.46	287	261.70	82.60	4.87	7.31	29.40	4.02
11	211	295.00	84.00	5.78	266	301.50	86.00	5.27	7.82	6.50	.83
12	238	313.70	89.40	5.80	260	329.72	82.74	5.14	7.74	16.02	2.07
13	249	335.70	88.20	5.59	183	346.50	80.20	5.92	8.14	10.80	1.32
14	151	324.90	89.60	7.29	44	334.10	92.20	13.90	15.69	9.20	.58
9–14	1152	291.50	95.80	2.82	1196	295.50	92.00	2.66	3.88	4.00	1.03

TABLE XX

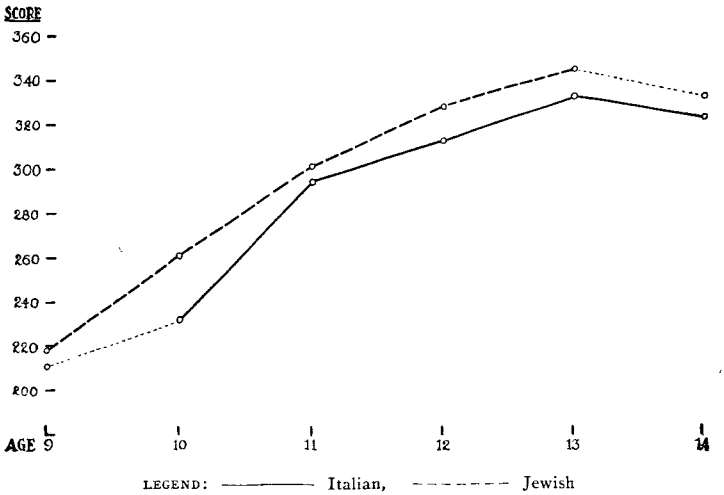
SCORES ON SPEARMAN VISUAL PERCEPTION TEST

Mean and σ at Each Age From 9 to 14 for U. S.-Born Italian and Jewish Groups and the Significance of Difference.

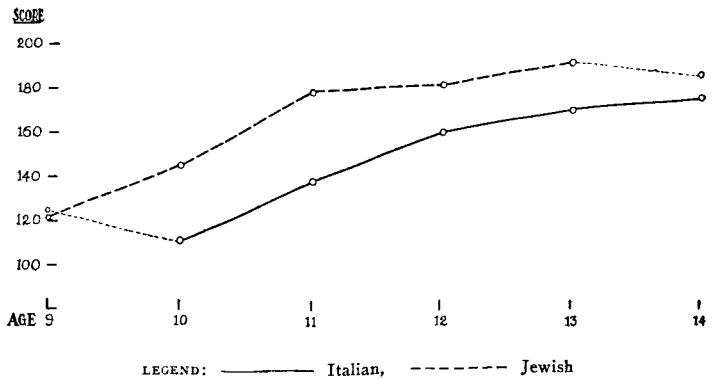
Age	U. S.-BORN ITALIAN GROUP				U. S.-BORN JEWISH GROUP				SIGNIFICANCE OF DIFFERENCE		
	Number	Mean	σ	σ Average	Number	Mean	σ	σ Average	σ Diff.	Actual Difference in Mean	Diff. / σ Diff.
9	72	124.30	62.40	7.35	156	122.50	65.60	5.25	9.03	1.80	.20
10	231	110.70	74.60	4.91	287	146.70	70.80	4.18	6.43	36.00	6.43
11	211	138.70	70.40	4.84	266	179.90	67.20	4.12	6.35	41.20	6.48
12	238	161.29	71.36	4.62	260	182.95	66.30	4.11	6.18	21.66	3.50
13	249	171.50	66.00	4.18	183	192.90	59.40	4.39	6.06	21.40	3.53
14	151	177.30	71.00	5.77	44	187.30	47.40	7.15	9.19	10.00	1.09

to prove that either the Jewish or the Italian groups represented in this study are adequate samples for the representation of the Jews and the Italians generally.

Socio-Economic Status and Intelligence. The Pearson product-moment correlation coefficients between the scores on the socio-economic status questionnaire and the intelligence tests separately



GRAPH 4. Average Raw Scores on Pintner Non-Language Test for Ages 9 to 14, Italian and Jewish Groups



GRAPH 5. Average Raw Scores on Spearman Visual Perception Test for Ages 9 to 14, Italian and Jewish Groups

TABLE XXI

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN SOCIO-ECONOMIC STATUS AND PINTNER NON-LANGUAGE TEST

Age	U. S.-BORN ITALIAN GROUP			U. S.-BORN JEWISH GROUP			U. S.-BORN MIXED GROUP		
	Number	r	P.E.$_r$	Number	r	P.E.$_r$	Number	r	P.E.$_r$
9	72	.156	.0776	156	−.054	.0540			
10	231	.164	.0433	287	.026	.0396			
11	211	.219	.0443	266	−.005	.0410			
12	238	.121	.0431	260	.149	.0409			
13	249	.225	.0405	183	.139	.0493			
14	151	−.127	.0543	44	−.051	.1003			
9–14	1152	.140	.019	1196	.048	.019	253	.118	.0420
	FOREIGN-BORN ITALIAN GROUP			FOREIGN-BORN JEWISH GROUP					
9–14	67	.220	.0784	69	−.006	.0806			

TABLE XXII

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN SOCIO-ECONOMIC STATUS AND SPEARMAN VISUAL PERCEPTION TEST

Age	U. S.-BORN ITALIAN GROUP			U. S.-BORN JEWISH GROUP			U. S.-BORN MIXED GROUP		
	No.	r	P.E.$_r$	No.	r	P.E.$_r$	No.	r	P.E.$_r$
9	72	.181	.0770	156	.060	.0538			
10	231	.111	.0439	287	.050	.0395			
11	211	.051	.0464	266	−.036	.0412			
12	238	.018	.0437	260	.020	.0418			
13	249	.090	.0423	183	.069	.0501			
14	151	−.162	.0537	44	.252	.0943			
9–14	1152	.055	.019	1196	.038	.019	253	.280	.0393
	FOREIGN-BORN ITALIAN GROUP			FOREIGN-BORN JEWISH GROUP					
9–14	67	.260	.0778	69	−.100	.0798			

are given in Tables XXI and XXII. To find the maximum limit of the relationship of the two variables the correlation ratio for the entire population in each natio-racial group was calculated: The Etas in the case of the Pintner test for the Italian and Jewish groups are respectively: $\eta xy = .18$, $\eta yx = .21$; $\eta xy = .13$, $\eta yx = .12$. In the case of the Spearman test the Etas for the Italian group are: $\eta xy = .10$, $\eta yx = .12$, and for the Jewish group, $\eta xy = .09$, $\eta yx = .10$.

The relationship between the two variables is for the most part positive but very slight; it is somewhat higher for the Italian than for the Jewish group, and slightly higher again in the case of the Pintner than the Spearman test.

Chapman and Wiggins (21), Stroud (144), Chauncey (22), Sirkin (135), Stoke and Lehman (142) report correlation coefficients between socio-economic status and verbal intelligence tests ranging from .20 to .40. The measure used for socio-economic status was not the same in all these studies.

RELATION BETWEEN BILINGUALISM AND MENTAL DEVELOPMENT

The conflicting beliefs and results of investigations bearing on this problem have already been outlined in Chapter II. It is interesting to note that Schwesinger and Osborn, as recently as 1933, in *Heredity and Environment*, a compendium of researches in intelligence testing, review only three investigations in bilingualism, namely those of Saer, Smith, and Jamieson and Sandiford,[1] and conclude: "The finding common to all three researches is that parallel learning of two languages during the developmental period results in some mental confusion and lower I. Q. when tested in either language." (129:279)

The study of this very problem constitutes the main object of the present research. The Italian and the Jewish children of this investigation learned simultaneously two languages—the home language and English—from infancy, and through the developmental period. Do these children, therefore, by virtue of their bilingualism, suffer some "mental confusion"? Is their capacity for symbolic organization hampered thereby? What is

[1] See Chapter II.

TABLE XXIII

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN BILINGUAL BACKGROUND AND INTELLIGENCE ON PINTNER NON-LANGUAGE TEST

Age	U. S.-BORN ITALIAN GROUP			U. S.-BORN JEWISH GROUP			U. S.-BORN MIXED GROUP		
	No.	r	P.E.$_r$	No.	r	P.E.$_r$	No.	r	P.E.$_r$
9	72	−.186	.0770	156	−.020	.0540			
10	231	−.217	.0423	287	.079	.0394			
11	211	−.140	.0455	266	−.080	.0411			
12	238	−.126	.0430	260	−.084	.0416			
13	249	.008	.0427	183	−.090	.0499			
14	151	.014	.0551	44	.088	.0997			
9–14	1152	−.103	.019	1196	−.025	.019	253	−.098	.0422
	FOREIGN-BORN ITALIAN GROUP			FOREIGN-BORN JEWISH GROUP					
9–14	67	−.079	.0819	69	−.193	.0777			

TABLE XXIV

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN BILINGUAL BACKGROUND AND INTELLIGENCE ON SPEARMAN VISUAL PERCEPTION TEST

Age	U. S.-BORN ITALIAN GROUP			U. S.-BORN JEWISH GROUP			U. S.-BORN MIXED GROUP		
	No.	r	P.E.$_r$	No.	r	P.E.$_r$	No.	r	P.E.$_r$
9	72	−.078	.0791	156	.113	.0534			
10	231	−.126	.0437	287	−.012	.0396			
11	211	−.084	.0462	266	−.136	.0405			
12	238	−.120	.0431	260	.118	.0412			
13	249	−.155	.0417	183	−.018	.0503			
14	151	.100	.0545	44	−.137	.0987			
9–14	1152	−.104	.019	1196	.004	.019	253	−.015	.0427
	FOREIGN-BORN ITALIAN GROUP			FOREIGN-BORN JEWISH GROUP					

the relation between bilingualism and mental ability and development?

It is proposed to attack the problem by three different methods.

The Correlational Method. The use of this method assumes that if bilingualism has an influence on mental ability and development, then the greater the amount of bilingualism, the greater will this influence be, either positive or negative, and the correlational method should indicate any such relationship. The scores on the bilingual background questionnaire were therefore correlated with the raw scores on each of the two tests of mental ability at each age from 9 through 14 for the two main experimental groups separately. Since no trend of increase or decrease in relation to age in average bilingual score of the groups was disclosed, as reported in the previous chapter, the two variables were also correlated for the whole age range from 9 through 14 in each of the experimental groups separately. Because of the smallness of the sample, the foreign-born mixed group was excluded. From the figures presented in Tables XXIII and XXIV the following may be noted:

1. The coefficients are all very small—almost negligible. With the exception of three cases, the coefficients are not as many as four times their respective probable errors, and are therefore insignificant.

2. For the most part, the coefficients are negative. However, approximately 24 per cent of all thirty-four correlations reported in these two tables are positive in sign, a fact which suggests that probably these coefficients represent variants in positive and negative directions around a true relationship of zero between the two variables.

3. There are no essential differences in the results on the two tests—the coefficients are of approximately equal size; note especially the coefficients of the entire population of the two main experimental groups.

4. Considering the two main experimental groups again, it may be noted that for the entire United States-born Italian population the coefficient of correlation between bilingualism and intelligence is slightly higher in comparison with that for the

Jewish group. In the latter group 36 per cent of the coefficients are positive in sign and the likelihood of zero as the true coefficient of correlation between the two variables is greater. In the Italian group the coefficients with positive sign constitute 21 per cent of all correlations in that group. It should also be noted that the coefficient for the entire United States-born Italian population is slightly more than four times its probable error. However, the coefficient of correlation between socio-economic status and intelligence in this group was also higher (pp. 98), and when the factor of socio-economic status is held constant the coefficient of correlation between the bilingual background and intelligence is further reduced, as will be seen later.

5. On the basis of these figures the conclusion can not be drawn that the relationship between bilingual background and intelligence is essentially different in the various groups considered. Apparently, then, these United States-born Italian and Jewish children who are subjected from their infancy to a bilingual environment show no retardation in intelligence as measured by the tests any more than do Italian and Jewish children born abroad who become bilingual some time between ages 1 and 6.

6. There is no noticeable trend of increase or decrease in the relationship between the two variables in successive ages from 9 to 14. Apparently the lack of any appreciable relationship between bilingual background and intelligence is as true for one age as for another within the limit of ages from 9 to 14.

The socio-economic status may have some influence on the relationship between bilingual background and intelligence. In order to eliminate this influence partial correlations between bilingual status and intelligence with socio-economic status constant were calculated. These coefficients are as follows: For the entire United States-born Italian sample the partial coefficient of correlation between bilingual background and intelligence as measured by the Pintner test is $-.0762$. For the same group, using the scores on the Spearman test, the partial coefficient is $-.0947$. For the United States-born Jewish group the partial coefficients between bilingual background and intelligence on the Pintner and Spearman tests are $-.0157$ and $+.0036$ respectively.

It is seen from these figures that while the influence of the socio-economic status is very slight, with its elimination further reduction toward zero in the coefficients of correlation between bilingual background and intelligence takes place, rendering the relationship between the two variables wholly insignificant.

It may be, however, that the assumption of linearity of the means in the arrays is incorrect and the Pearson product-moment correlation therefore does not adequately represent the relationship between bilingual background and intelligence. In order to check this, Pearson's correlation-ratio, or Eta—which is a more general measure expressing association between two variables—was calculated. It should be borne in mind, however, that the value of Eta depends materially on the number of arrays, and the larger the number of arrays the larger is Eta. The arrays in the present case numbered from 17 to 29. To eliminate the error emanating from this source the calculated Etas were corrected by the use of the Pearson formula for the purpose.[2] The results are presented in Table XXV.

Be it observed that, as before, the relationship between the bilingual scores and the scores for each of the tests for the two main experimental groups is not essentially different. It should be recalled that Eta expresses the maximum limit of relationship between two variables, and is always at least equal to, or larger than r. As expected, therefore, the Etas presented in Table XXV are all slightly larger than the Pearson product-moment correlation coefficients between these variables for the same groups presented earlier. However, these Etas, checked by Woo's tables,[3] are found to be non-significant, and this is corroborated by a careful examination of the correlation charts where no trend of

[2] Corrected $\eta^2 = \dfrac{\eta^2 - \dfrac{(k-3)}{N}}{1 - \dfrac{(k-3)}{N}}$. See Pearson, Karl, "On the Correction Necessary for the Correlation Ratio," *Biometrika*, XIV, 412-417, 1923.

[3] The check assumed 1,000 as the number of the population involved since this is the upper limit of N in Woo's tables. See Woo, T. L., "Tables for Ascertaining the Significance or Non-significance of Association Measured by the Correlation-ratio." *Biometrika*, XXI, I, 1929.

TABLE

CORRELATION RATIOS BETWEEN BILINGUAL BACKGROUND AND INTELLIGENCE PERCEPTION

Group	Age	No.	PINTNER NON-LANGUAGE TEST							
			ηxy "raw"	ηxy corrected	P.E.*	$\sqrt{N}\sqrt{\eta xy^2-r^2}$	ηyx "raw"	ηyx corrected	P.E.	$\sqrt{N}\sqrt{\eta yx^2-r^2}$
U.S.-born Italian	9–14	1152	.17	.130	.019	2.448	.19	.125	.019	2.414
U.S.-born Jewish	9–14	1196	.15	.100	.019	3.147	.18	.104	.019	3 458

* The formula used is $\left(\frac{1-\eta^2}{\sqrt{N}}\right)$ .6745, which, however, is only an approximation (170 : 352).

curvilinearity of the means of the arrays is evident. The differences between the Etas and r's were also checked by the now somewhat dubious Blakeman Test. Using the corrected Etas, in all eight cases $\sqrt{N}\ \sqrt{\eta^2-r^2}$ was found to be less than 4.047, the critical figure for linearity (60). These various checks indicate that our assumption of the linearity of the means in the arrays is correct, that the Pearson-product-moment correlation coefficient is an adequate measure to express the relationship between the two variables studied, and that this relationship, as already stated, is insignificant.

The Comparative Method—A. The assumption underlying the use of this method may be stated as follows: If bilingualism is a cause of lower accomplishment on the tests of intelligence, then it is reasonable to expect that the accomplishment of the high bilingual child will be less than that of the low bilingual child.

The children of the two main experimental groups were divided into low and high bilingual groups equated on socio-economic status, for each age from 9 through 14 and for each natio-racial group separately. In the low bilingual group were placed children with bilingual scores from 0 to 6 and in the high bilingual group children who had a bilingual score from 18 to 35—the upper range limit. With this arrangement the low and high bilingual groups each comprise approximately 21 per cent of children at each end of the range of bilingual distribution for each age from

XXV

MEASURED BY THE PINTNER NON-LANGUAGE AND THE SPEARMAN VISUAL TESTS

SPEARMAN VISUAL PERCEPTION TEST							
ηxy "raw"	ηxy corrected	P.E.	$\sqrt{N}\sqrt{\eta xy^2-r^2}$	ηyx "raw"	ηyx corrected	P.E.	$\sqrt{N}\sqrt{\eta yx^2-r^2}$
.18	.143	.019	3.332	.16	.113	.019	1.496
.12	.042	.020	1.418	.13	.052	.020	1.764

9 through 14. The two groups are compared on their accomplishment on the intelligence tests. The figures for this comparison are presented in Tables XXVI through XXIX and represented graphically in Graphs 6 through 9. If we bear in mind that the samples at ages 9 and 14 are not representative of these ages because of the operation of a selective factor explained earlier, the curves for mental development for each natio-racial group and on each of the two tests conform in the main to curves of mental development for the ages in question. (151)

The important fact with which we are especially concerned is that the curves for the mental development of the low and high bilinguists cross each other at a number of points and do not indicate any consistent observable difference between the two groups. The actual differences in means at each age, for each test and within each of the two natio-racial groups, are found statistically not significant and therefore unreliable. No differences are evident between the two natio-racial groups—the absence of a real difference between the low and the high bilingual children is as apparent in the Italian as in the Jewish group.

In view of this last circumstance and in order to smooth out the curves by a representation of a larger number of subjects at each interval of comparison, the Italian and the Jewish groups were combined and again a comparison between the accomplishment of the low and high bilinguists was made at each age and for each test. The figures for this comparison are given in Tables

TABLE XXVI

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE PINTNER NON-LANGUAGE TEST

U. S.-Born Italian Group

Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	$\frac{\text{Diff.}}{\sigma \text{ Diff.}}$
9	Low	21	2.76	32.00	222.00	73.60	16.00	24.50	28.32	1.15
	High	19	22.60	32.00	193.68	81.30	18.60			
10	Low	60	3.16	30.60	255.53	65.70	8.60	13.20	25.08	1.90
	High	60	23.40	30.60	230.45	77.70	10.00			
11	Low	45	2.87	32.40	292.60	65.20	9.70	14.14	10.44	.73
	High	55	23.78	32.40	282.16	76.60	10.30			
12	Low	50	3.30	31.00	325.16	83.30	11.80	15.20	8.03	.52
	High	53	22.87	31.00	317.13	69.90	9.60			
13	Low	50	2.96	29.80	331.72	85.50	12.10	16.50	23.14	1.40
	High	50	22.32	28.00	354.86	79.50	11.20			
14	Low	22	3.77	31.20	326.14	85.00	18.10	25.10	27.26	1.08
	High	22	22.30	31.00	353.40	81.70	17.40			

TABLE XXVII

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE PINTNER NON-LANGUAGE TEST

U. S.-Born Jewish Group

Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Low	36	3.83	31.60	223.86	49.60	8.3	14.70	9.36	.63
	High	31	23.00	31.60	214.50	68.10	12.2			
10	Low	60	3.90	34.20	259.07	74.20	9.6	14.59	8.44	.57
	High	55	21.64	34.60	268.51	81.50	11.0			
11	Low	55	4.47	32.50	314.22	78.00	10.5	24.95	11.68	.46
	High	55	22.50	32.50	302.54	79.00	10.6			
12	Low	56	3.70	34 00	334.73	79.40	10.6	14.40	13.19	.92
	High	55	22.10	34.10	321.54	72.60	9.8			
13	Low	30	3.26	33.00	349.13	78.00	14.2	20.94	14.72	.70
	High	29	20.72	31.30	334 41	82.80	15.4			
14	Low	6	2.30	30.60	287.17	60.20	24.6	46.40	33.16	.71
	High	6	22.00	30.00	320.33	96.60	39.4			

TABLE XXVIII

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE SPEARMAN VISUAL PERCEPTION TEST

U. S.-Born Italian Group

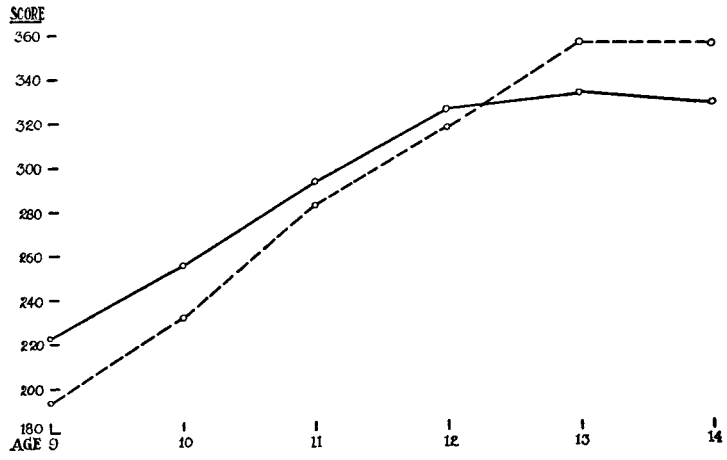
Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	$\frac{\text{Diff.}}{\sigma \text{ Diff.}}$
9	Low	21	2.76	32.00	137.30	39.80	8.7	19.18	14.93	.78
	High	19	22.60	32.00	122.37	74.60	17.1			
10	Low	60	3.16	30.60	118.86	69.30	9.0	13.15	8.31	.63
	High	60	23.40	30.60	110.55	74.60	9.6			
11	Low	45	2.87	32.40	140.93	57.60	8.6	12.57	1.27	.10
	High	55	23.78	32.40	142.20	68.50	9.2			
12	Low	50	3.30	31.00	177.76	58.00	8.2	12.25	13.26	1.08
	High	53	22.87	31.00	164.50	66.70	9.1			
13	Low	50	2.96	29.80	187.42	65.60	9.2	12.33	18.82	1.50
	High	50	22.32	28.00	168.60	58.40	8.2			
14	Low	22	3.77	31.20	169.95	49.30	10.5	13.64	19.65	1.44
	High	22	22.30	31.00	189.50	40.80	8.7			

TABLE XXIX

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE SPEARMAN VISUAL PERCEPTION TEST

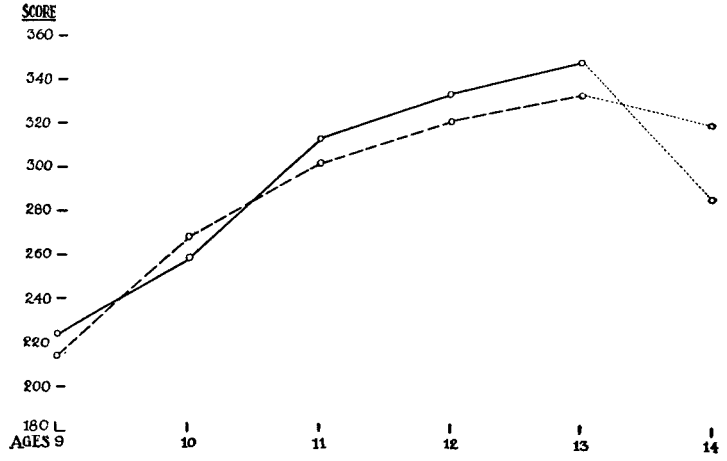
U. S.-Born Jewish Group

Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Low	36	3.83	31.60	110.03	67.20	11.2	16.40	26.74	1.63
	High	31	23.00	31.60	136.77	67.20	12.0			
10	Low	60	3.90	34.20	143.75	63.00	8.1	11.70	5.83	.50
	High	55	21.64	34.60	149.58	63.20	8.5			
11	Low	55	4.47	32.50	162.62	67.00	9.0	12.73	5.35	.42
	High	55	22.50	32.50	157.27	67.00	9.0			
12	Low	56	3.70	34.00	175.55	63.30	8.4	11.40	20.70	1.81
	High	55	22.10	34.10	196.25	58.20	7.8			
13	Low	30	3.26	33.00	184.80	56.60	10.3	15.36	14.92	.97
	High	29	20.72	31.30	199.72	61.40	11.4			
14	Low	6	2.30	30.60	180.17	43.30	17.7	24.56	12.17	.50
	High	6	22.00	30.00	168.00	41.30	17.0			



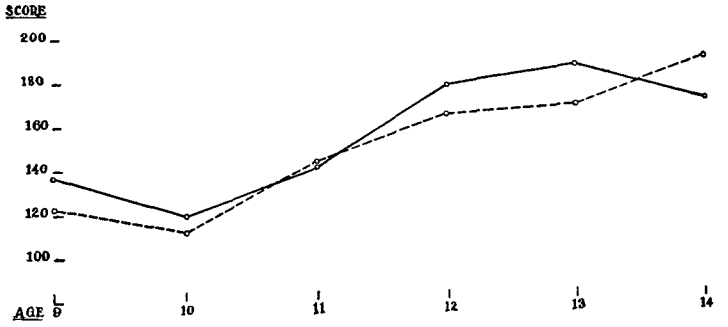
LEGEND: ———— Low Bilinguist, - - - - - - - High Bilinguist

GRAPH 6. Average Raw Scores on Pintner Non-Language Test for Low and High Italian Bilinguists of Ages 9 to 14



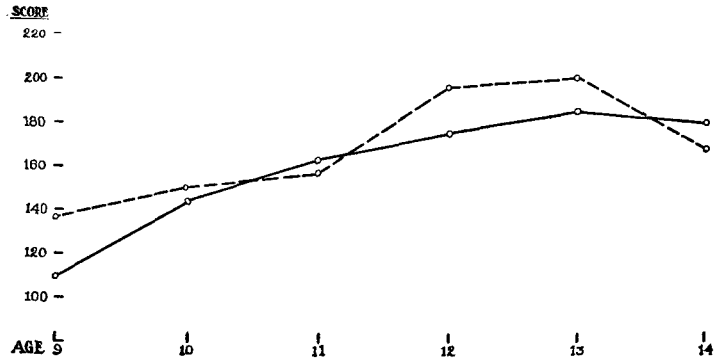
LEGEND: ———— Low Bilinguist, - - - - - - - High Bilinguist

GRAPH 7. Average Raw Scores on Pintner Non-Language Test for Low and High Jewish Bilinguists of Ages 9 to 14



LEGEND: ———— Low Bilinguist, - - - - - - - High Bilinguist

GRAPH 8. Average Raw Scores on Spearman Visual Perception Test for Low and High Italian Bilinguists of Ages 9 to 14



LEGEND: ———— Low Bilinguist, - - - - - - - High Bilinguist

GRAPH 9. Average Raw Scores on Spearman Visual Perception Test for Low and High Jewish Bilinguists of Ages 9 to 14.

XXX and XXXI and the same are represented graphically in Graphs 10 and 11.

It is seen from the figures presented in the two tables that the actual differences are statistically as insignificant as they were when the comparisons were made within the natio-racial groups separately. The graphs tell the story even more emphatically. There is no difference in the shape of the curves indicating the mental development of the two groups from ages 9 to 14. In the case of the Pintner test the curve of the mental development

TABLE XXX

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE PINTNER NON-LANGUAGE TEST

U. S.-Born Italian and Jewish Groups Combined

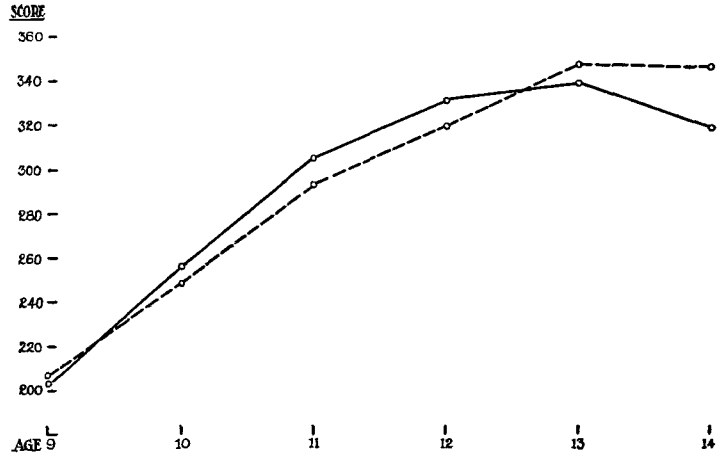
Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Low	57	3.44	31.68	223.16	59.62	7.9	13.11	16.58	1.26
	High	50	22.82	31.76	206.58	74.08	10.5			
10	Low	120	3.32	32.50	257.30	68.10	6.2	9.80	8.65	.88
	High	115	22.55	32.55	248.65	81.73	7.6			
11	Low	100	3.75	32.52	304.49	73.10	7.3	10.45	12.17	1.16
	High	110	23.13	32.44	292.32	78.67	7.5			
12	Low	106	3.51	32.62	330.21	81.50	8.0	10.50	10.83	1.04
	High	108	22.47	32.57	319.38	71.07	6.8			
13	Low	80	3.07	31.02	338.25	82.87	9.3	13.10	9.10	.70
	High	79	21.73	29.19	347.35	81.26	9.1			
14	Low	28	3.46	31.07	317.80	81.76	15.4	22.43	28.52	1.27
	High	28	22.21	30.57	346.32	86.24	16.3			

TABLE XXXI

COMPARISON OF LOW AND HIGH BILINGUISTS ON THE SPEARMAN VISUAL PERCEPTION TEST

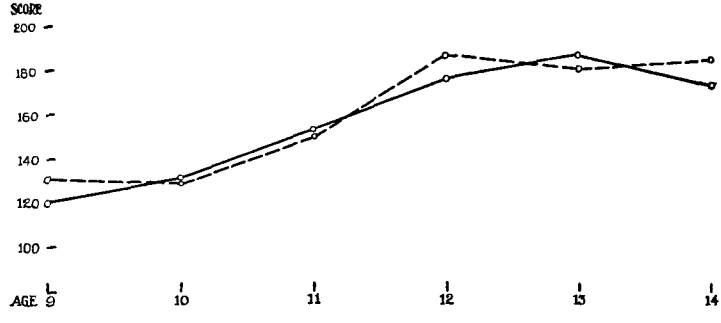
U. S.-Born Italian and Jewish Groups Combined

Age	Bilingualism	Number	Mean Bilingual Score	Mean Socio-Economic Score	Mean Intelligence Score	σ	σ Average	σ Diff.	Actual Difference in Means	Diff. / σ Diff.
9	Low	57	3.44	31.68	120.05	60.24	8.0	12.81	11.25	.88
	High	50	22.82	31.76	131.30	70.53	10.0			
10	Low	120	3.32	32.50	131.31	66.69	6.1	9.06	2.09	.23
	High	115	22.55	32.55	129.22	72.21	6.7			
11	Low	100	3.75	32.52	152.86	63.65	6.4	9.11	3.13	.34
	High	110	23.13	32.44	149.73	68.15	6.5			
12	Low	106	3.51	32.62	176.60	63.10	6.1	8.70	4.07	.47
	High	108	22.47	32.57	180.67	64.54	6.2			
13	Low	80	3.07	31.02	186.44	62.51	7.0	9.90	6.44	.65
	High	79	21.73	29.19	180.00	61.31	7.0			
14	Low	28	3.46	31.07	172.14	48.31	9.1	12.04	12.72	1.05
	High	28	22.21	30.57	184.86	41.80	7.9			



LEGEND: ———— Low Bilinguist, – – – – – – – High Bilinguist

GRAPH 10. Average Raw Scores on Pintner Non-Language Test for Low and High Italian and Jewish Bilinguists of Ages 9 to 14



LEGEND: ———— Low Bilinguist, – – – – – – – High Bilinguist

GRAPH 11. Average Raw Scores on Spearman Visual Perception Test for Low and High Italian and Jewish Bilinguists of Ages 9 to 14

of the high bilingual group is slightly below that for the low bilingual group up to and including the twelfth year, but rises above it thereafter. In the case of the Spearman test the curves for the mental development of the low and high bilingual children are intertwined throughout the range of ages and are almost identical. These data indicate that there is no difference in the

mental development of low and high bilingual children from ages 9 to 14, and that, therefore, in the ages and groups studied a mental retardation, as measured by the two intelligence tests, on the part of bilingual children has not been demonstrated.

It is recognized, of course, that the observation of the developmental progress is not made on the same children at each age from 9 to 14 inclusive; however, with the exception of ages 9 and 14, the samples at each age are large enough in size and sufficiently unbiased in selection to justify the inference that the trend and characteristics of the curve of mental development in the groups observed would not have been essentially different had we observed the developmental progress of one and the same group at each age from 9 to 14. This inference is justified by the fact that the curves of the mental development for these ages for both the low and the high bilinguists do not indicate any marked departure from the type and characteristics of the usual curves of mental development of other populations for these ages.

Further comparisons between the low and high bilingual groups may be made.

Since in the case of the Pintner Non-Language Test intelligence quotients could be calculated, the entire low and high bilingual groups from ages 9 through 14 and within each natio-racial group separately were compared on the basis of I. Q. The figures in Table XXXII show clearly that there is no difference in the average intelligence ratings of low and high bilinguists in the Italian and the Jewish groups.

It may be assumed that children with high bilingualism will be more retarded in their school progress than children who have a low degree of bilingualism. The low and high bilingual groups are compared with reference to the rate of their school progress, and the figures for this comparison are also presented in Table XXXII. It will be noted that in the Jewish group the difference between the low and high bilinguists in average age-grade status is practically nil. In the Italian group the average age-grade status of the high bilinguists is noticeably lower, indicating a possible handicap that they may have in their progress through

TABLE XXXII

COMPARISON OF LOW AND HIGH BILINGUISTS ON PINTNER NON-LANGUAGE I. Q. AND AGE-GRADE STATUS

Measure	Group	Age	LOW BILINGUISTS			HIGH BILINGUISTS			SIGNIFICANCE OF DIFFERENCES				
			Number	Mean	σ	Number	Mean	σ	σ Average Low	σ Average High	σ Diff.	Actual Diff. in Means	Diff. / σ Diff.
Pintner Non-Language I. Q.	Italian	9–14	248	97.51	20.59	259	97.50	16.50	1.3	1.0	1.64	.01	.006
	Jewish	9–14	243	101.95	17.07	231	101.36	18.00	1.1	1.2	1.62	.59	.36
Age-Grade Status	Italian	9–14	248	−.77	2.76	259	−1.33	4.81	.17	.30	.34	.56	.60
	Jewish	9–14	243	−.04	1.20	231	−.03	.98	.07	.06	.09	.01	.11

the elementary grades, where so much emphasis is placed on language—a language with which the high bilingual child may be expected to be not as well acquainted as the low bilingual or the English-speaking monoglot child. It should be noted, however, that this difference in the means, noticeable enough, is not statistically significant. However, the difference between the variabilities of the two groups is significant, since the actual difference in the two standard deviations is eight times the standard deviation of the difference. This fact would seem to indicate large individual differences of high bilingual Italian children in reference to their age-grade status. It is probable that some of these highly bilingual children are appreciably handicapped, so far as the knowledge of the English language is concerned, and thereby retarded in the grades.

A further assumption may be made and tested in part. It may be assumed that high bilingual children come from less intelligent families, and low bilingual children, on the contrary, from more intelligent families. Unfortunately we do not have the intelligence ratings of the other members of the families of these children to test this hypothesis completely. It may perhaps be assumed, however, that more children at age 15 and below of more intelligent families will be found in the high school than would be the case with less intelligent families. The number of siblings of the low and high bilingual children who are below age 16 and in high school were counted. The results are presented in Table XXXIII.

It is evident from these figures that the low bilingual group has as many siblings under the age of 16 present in high school as the high bilingual group, and it may be inferred, therefore, that

TABLE XXXIII

NUMBER OF SIBLINGS AT AGE 15 AND BELOW IN HIGH SCHOOL

Group	LOW BILINGUAL		HIGH BILINGUAL	
	Number of Cases	Number of Siblings in High School	Number of Cases	Number of Siblings in High School
Italian ...	248	32	259	32
Jewish ...	243	41	231	42

to the extent that the assumptions made above are correct, the degree of intelligence of the families from which the low bilinguists come is probably not different from that of those families from which the high bilinguists come. It should be borne in mind, of course, that these groups have been equated on the socio-economic status.

The Comparative Method—B. It may be argued that bilingualism, no matter what its amount, may have a special effect on children and that, therefore, the method of comparing low and high bilinguists will fail to indicate the results of bilingualism on mental ability and development. To check this hypothesis it is necessary to compare the intelligence and achievement of monoglots with that of bilinguists.

The Hoffman Bilingual Schedule, as stated previously, is a very sensitive instrument for the measurement of the thing it purports to measure. On account of this fact, and because of the character of the population of this study only 38 children were discovered who could be called absolute monoglots; that is, these children experienced no bilingual background that could be measured by the Hoffman Bilingual Schedule, and their score therefore on this schedule was equal to zero. This group of 38 monoglots was composed of 24 Italian, 11 Jewish, and 3 German children. These children were person per person equated on race, sex, age in months, and socio-economic status with an equal number of bilinguists, and the two groups were compared with reference to their performance on the intelligence tests and their age-grade status. The figures for this comparison are presented in Table XXXIV, and it is apparent that the results of the two groups compared are practically identical.

On the basis of these data we should conclude, therefore, that there is no difference between these monoglot and bilingual children, either in accomplishment on the two non-language intelligence tests or in age-grade status determined by the method described earlier in this work. This conclusion holds, whether we interpret bilingualism to mean the ratio of foreign language background to the English language, or comparative equality in the children's background of the influence of two languages. This

TABLE XXXIV

COMPARISON OF MONOGLOTS AND BILINGUISTS

Equated Person Per Person on Race, Sex, Age in Months, and Socio-Economic Status

Measure	MONOGLOTS				BILINGUISTS				SIGNIFICANCE OF DIFFERENCE		
	Number	Mean	σ	σ Average	Number	Mean	σ	σ Average	σ Diff.	Actual Diff. in Means	Diff. / σ Diff.
Bilingual Score	38	0	0		38	9.34	8.46				
Pintner Non-Language Score	38	305.84	86.20	14.00	38	302.20	94.25	15.30	20.74	3.64	.17
Pintner Non-Language I. Q.	38	100.92	15.20	2.47	38	100.00	13.00	2.11	3.25	.92	.28
Spearman Visual Perception Score	38	160.00	60.90	9.89	38	165.13	71.04	11.53	15.19	5.13	.34
Age-Grade Status	38	−.34	1.30	.21	38	−.39	1.20	.19	.28	.05	.18

latter consideration is based on the fact that the average bilingual status of the bilingual group in this comparison is very nearly the average bilingual status of the general population of this study.

In conclusion, it should be stated that by all three methods of examination there was disclosed no retardation or acceleration in the mental development of children from ages 9 through 14 in the groups studied which might be attributed to bilingualism as such. In view of the similarity of results with reference to the relationship of bilingualism to mental development in the Italian, the Jewish, and the mixed groups, it may be inferred that probably the relationship between these two factors is not different for children of the same ages in similar immigrant communities in this country.

While the data of this investigation do not definitely prove or disprove the possibility of a relationship between bilingualism and mental development in ages earlier than 9, they do strongly suggest its improbability. For it is reasonable to expect that, had such a relationship existed in ages earlier than 9 for the children studied, it would have persisted and manifested itself in some way in the period of ages investigated. It can be definitely stated, however, that whatever may be the influence of bilingualism on mental development in ages earlier than 9, its operation for the ages 9 to 14 has not been disclosed by the data of this investigation.

It may be argued that had these children not been bilingual, their accomplishment on the tests of intelligence would have been higher. The data of this study, again, neither definitely prove nor disprove an argument of this sort; they point out, however, that the truth in such a contention is of doubtful nature, since the curves for the mental development from ages 9 to 14 of the subjects studied do not show any characteristics essentially different from what would have been ordinarily expected in an unselected population.

If bilingualism tends to "mental confusion," or if it hampers a child's capacity in symbolic organization, as has been claimed (12, 129), then we should expect to find among the children

studied in this research a definite negative relationship between bilingualism and mental ability. The measurement of the latter ability by means of the tests used depended directly upon the capacity of symbolic organization and its application. All three methods of examination attempted fail consistently to indicate a "mental confusion," or retardation in capacity for symbolic organization as measured by the intelligence tests used among bilingual children of ages 9 through 14 in the groups studied.

SUMMARY

1. No significant sex differences in intelligence as measured by the Pintner Non-Language Test or the Spearman Visual Perception Test are disclosed in the population studied in this investigation.

2. The curves of mental development from ages 9 to 14 of the two experimental groups on either test are similar to the curves of mental development for these ages generally reported for other groups of children on other intelligence tests.

3. The performance of the Jewish children in these tests is superior to that of the Italian children, this difference being more evident and statistically more significant on the Spearman test. It is not, however, the object of this investigation to study natio-racial differences, and there is no evidence that the experimental groups in this study are representative of their respective natio-racial groups generally.

4. In the total population of the two main experimental groups the relationship between socio-economic status and intelligence measured by the two non-language tests is positive, but very slight, r varying from .038 to .140. This is decidedly lower than the relationship expressed by the Pearson product-moment correlation between socio-economic status and intelligence measured by verbal intelligence tests reported by other workers.

5. Three methods were used for the investigation of relationship between bilingualism and mental ability and development. These methods were:

1) The Correlational Method, whereby coefficients of correlation were calculated between the scores on the bilingual

background questionnaire and the scores on both of the intelligence tests for each age and group separately.

2) The Comparative Method—A, whereby the "low bilingual" children (score from 0 to 6) and the "high bilingual" children (score from 18 to 35) were compared with reference to their intelligence, age-grade status, and the number of siblings below age 16 in high school.

3) The Comparative Method—B, whereby paired groups of monoglots and bilinguists were compared with reference to intelligence and age-grade status.

6. Using the Correlational Method:

1) Practically no relationship—expressed by the Pearson *r*—was disclosed between bilingualism and intelligence for each of the five experimental groups separately, and for each age from 9 to 14 within the two main experimental groups. The *r*'s ranged from −.217 to +.100.

2) By holding the factor of socio-economic status constant by means of the partial correlation technique, the earlier relationship—expressed by the Pearson *r*—between bilingualism and mental ability was not appreciably changed.

3) The relationship—expressed by Eta—between bilingualism and intelligence for the total population of the two main experimental groups, slightly higher than *r*, was insignificant. The Etas (corrected) ranged from .042 to .143.

7. Using the Comparative Method—A:

1) No essential difference between the mental development of "low" and "high" bilinguists from age 9 to 14 was disclosed for the two natio-racial groups either separately or combined.

2) The intelligence, expressed by the intelligence quotients of the Pintner Non-Language Test, was practically the same for "low" and "high" bilinguists in the Italian and the Jewish groups separately.

3) No statistically significant difference was disclosed between the age-grade status of "low" and "high" bilingual children within each natio-racial group.

4) It was found that "low" and "high" bilinguists have an

equal number of siblings at age 15 or below attending high school.

8. Using the Comparative Method—B:
   No reliable differences in intelligence or age-grade status were disclosed between two groups of monoglot and bilingual children matched person per person for race, sex, socio-economic status, and age in months.

On the basis of the evidence of this research it is concluded that bilingualism does not influence—favorably or unfavorably—the mental development of bilingual children of ages 9 through 14 in the various groups studied.

CHAPTER VI

A DISCUSSION OF BILINGUALISM IN RELATION TO INTELLIGENCE AND THINKING

INTRODUCTION

PRIOR to the nineteenth century the problem of language in its relation to thought constituted unchallenged territory for the speculation of philosophers. The problem received treatment especially in that chapter of philosophy known as epistemology. The two antagonistic schools of medieval philosophy—Nominalism and Realism—assumed diametrically opposite theories of the relation between language and thought. In the nineteenth century, under the influence particularly of the idea of biological evolution, philologists attempted the study of language. The approach to this study was phylogenetic and it concerned itself in particular with the origin of language. The result of this attempt was the famous triad of explanations enumerated at the beginning of the first chapter of the present work. Toward the end of the nineteenth century and especially in the present century a new approach to the study of language was made by psychologists, namely the ontogenetic approach, which concerned itself with the study of the growth of language as well as thought in the infant.

Among modern psychologists Wundt, who has been recognized as the father of modern psychology, was the first to advance a phylogenetic theory of language. He traces the beginnings of language to gesticulation, and for the support of this theory he relies not so much on data regarding the growth of language in the child, since at his time very little work was done in this field, but on evidence from primitive languages and the medium of communication used by the deaf and dumb. (167) In more recent years a theory regarding the beginning of language in the race has been proposed by Allport. He believes that "self-

adaptation and control of others by inarticulate laryngeal sounds evolved as the earliest language of mankind"; that this "narrow emotional repertory of the glottis" was extended to a large array of random articulated syllables which were fixated in the individual by means of circular reflexes of the ear-vocal sort; and that finally the denomination of objects and situations occurred quite accidentally at first but later was developed and extended deliberately. (1:194) Mention should also be made of the theory of language presented by De Laguna. According to her both the origin and the function of language should be explained from the point of view of social cooperation. (30) In general, psychologists have described the sound and the semantic development, and the social character of language in the child and have not concerned themselves greatly with the origin of language in the race.

Now, as to theories regarding the relation of language to thought, they may be classified in three typical categories, summarized by Dewey as follows: ". . . First, that they are identical; second, that words are the garb or clothing of thought, necessary not for thought but only for conveying it; and third, that while language is not thought, it is necessary for thinking as well as for communication." (32:230)

Before accepting any one of the theories mentioned above, it is proposed first to examine and try to define language, thought, and the relation between the two in the light of more recent experimental findings. Any conclusions reached on the matter will be helpful, it is felt, in the further discussion of the problem of bilingualism in relation to intelligence and thinking.

DEFINITION OF LANGUAGE

The widest and the most general way of defining language would be to call it a system of signs. By signs we should understand all symbols capable of serving as a means of communication.[1] Signs, as such, can be of various kinds, for any sense organ may afford numerous sign situations and thus create a language; the ants and the bees, for example, are said to use a language based on tactile and olfactory signs. However, owing

[1] See Chapter I, page 3.

to the variety of the means of expression that it provides, the visual and auditory language is no doubt the most important. Even in this latter category a variety of sign situations, and therefore languages, may be designated, such as the finger or lip movements used by the deaf, or mathematical figures and formulas, maps, diagrams, graphs, and blue prints, which are signs certainly and are used by those who understand them. The present discussion is concerned primarily with articulate language, namely that language which uses words as sign situations.

Language is also and more generally defined in terms of its functions. Wundt, the first psychologist, according to Bühler, who gave a systematic treatment to language, defined it in terms of its function as the expression or manifestation of the mental processes of the speaker. (18) Other students of the subject since Wundt, taking into consideration the larger total language situation including not only the speaker but also the hearer and the referent, have attributed additional functions to language; thus, to mention only a few, Paulhan (102) enumerates two; Bühler (18), three; and Ogden and Richards (98) list as many as five separate functions which language serves. For the present purposes the treatment of Bühler (18) has been found more serviceable, and it will therefore be cited here in some detail.

The signs used in the human language carry the sense, according to Bühler, in three principal directions. First, in the direction of the speaker, whose state of mind they indicate; this is the manifestation (*Kundgabe*) of Wundt. Second, in the direction of the hearer, in whom they provoke certain mental states and certain forms of behavior; this is the evocative function of language. Third, in the direction of objects, and objective relations which they designate; this leads to the third function of language, which is representative. The first two functions of language, manifestation and evocation, are common to human speech as well as to the semantic mechanisms of the animal world, while the third, the function of representation, belongs properly to man, and it is by virtue of this function that language renders incomparable services to the organization of human thought.

According to Bühler again, the development of language in the

child follows the functions enumerated above, the first two functions appearing first, and the third—the substitution of words for outside objects and relations—appearing relatively late, at about the end of the infant's second year.

The acquisition of language by the child is conditioned by his social environment. It is essentially a habit, and as such, it is subject to the laws governing all habit formation. An analysis of the process of language learning would necessarily include not only the stimulating conditions, both internal and external, but also the central neural and physiological processes and the response of the individual to the total situation. Head negates emphatically Broca's theory of the anatomical localization of speech at the third frontal convolution of the cortex. In his classical work on *Aphasia and Kindred Disorders of Speech*, he states: "All high-grade aptitudes acquired by conscious effort, such as the use of language, are carried out with practice more and more unwittingly; the functional processes upon which they depend become gradually engulfed in the automatic activities of the central nervous system. Thus a complete act of speech comes to be a widespread response of the organism to each fresh situation; this employs conscious, subconscious, automatic and purely physiological processes." (54:440-441)

DEFINITION OF THOUGHT

The words "thought" or "thinking" are applied to a variety of psychological phenomena ranging from mere awareness to the capacity for learning, from the phantasy of the daydream to discursive logical reasoning.

Lorimer advances the thesis that thought processes ". . . are continuous with other physiological and social processes, and the evolving structure of intellectual activity (including the *forms* discovered by logical analysis) is a function of the total growth of life prior to and including the growth of verbal activity." (84:4) From a functional standpoint he distinguishes four distinct levels in the evolution of intellectual activity, which he defines in terms of *adaptation*, namely, "the establishment of a new equilibrium in an individual organism in relation to some

tual tasks. This merely indicates that thought is a function of the activity of the total organism, as was stated above. To say that these muscular movements *are* thought is to run the risk of identifying Mrs. Belfeather with the troupe of dogs accompanying her when she walks in the park, as Wickham remarks. (163:62)

Todd makes the following statement: "It is to be doubted that thought can be purely cerebral. The behaviorist, at least, does well in emphasizing the vocalizing activities or vestigial tendencies (subvocal dispositions) in thinking. The young child in mastering his native language and the student in thinking and speaking a 'foreign' language are greatly guided by these 'ideomotor' tendencies. In the beginning they predominate in the attempts to think in the new language, but with motor automatization they gradually sublimate. Thus 'thought content' and oral expression are not absolutely inseparable." (154:131)

There is evidence showing that intellectual activity of a sort does occur without the intermediary of language. In dream life, in phenomena of Eidetic imagery fairly frequent in normal children (2), among people who have vivid imagery, we have examples of presence of certain thought forms in the absence of language. The congenitally deaf have intellectual activity, inferior though it may be.

Watson himself recognizes that ". . . a great deal of organization goes on without verbal parallels, viz., (1) all organization put on in infancy; and (2) all organization put on throughout life in the visceral or emotional field." (159:275)

"Thought," says Head, "presupposes the existence of language, but exceeds it widely in range, and there are many forms of behavior, the result of thinking, which do not require the intervention of a symbol." (54:513)

The evidence cited above points to the conclusion that language and thought are not identical. Thinking, as an adjustment of the individual to his environment, as the solving of problems, is by no means restricted to words alone; visual, tactual, auditory, and kinaesthetic sensations, their recall and reconstitution, images and attitudes, as well as numerous symbolic schemata other than oral or written language, contribute to thinking and make it pos-

sible. Otis aptly states: ". . . language constitutes only one of the various kinds of symbolization, and symbols constitute only one type of material of thought." (100:408) With reference to its physiological substratum, thinking is again not restricted to language mechanism alone; both neural and muscular, central and peripheral, mechanisms take part in its process, making it a function of the total organism in its correlated entirety.

It is to be admitted, however, that thinking, especially discursive or abstract thinking, would be seriously impaired and limited in scope without language. What Goldstein calls "categorical" thinking (67), or what Head understands by "symbolic formulation and expression," or the human ability in "propositionizing" as named by Hughlings Jackson (54) would be hardly possible without language. We may imagine a continuous graduated line from concrete to abstract thought in the realm of "free intelligence." Linguistic and non-linguistic schemata for thought are probably present all along the line, but somewhere on this line, as we proceed from the concrete to the abstract end, a dominance of linguistic schemata begins and increases progressively. It is possible to believe that the human race could, without the institution of language, create some civilization—build shelter for its protection or implements for its use—and some culture, as expressed in dances and music; it is, however, impossible to believe that it could ever create a science, or achieve a literature, without a linguistic equipment.

Head, whose extensive work in aphasia brought him possibly nearest to an examination of the relation of thought to language, states as follows: ". . . Thus, the employment of substitute signs facilitates and secures consecutive thinking; in fact logical thought would be impossible without them. The statement of a problem in symbolic terms increases the ease and certainty of its solution. For their use gives permanence to perceptual and other non-verbal methods of thinking, records similarity and difference in all kinds, and avoids the cumbrous procedure of trial and error. It enables us to subject a situation to analysis or to synthesize details into a coherent whole and so permits of the widest categorical distinctions and generalizations." (54:532)

BILINGUALISM AND INTELLIGENCE

The concept of intelligence, whether it is defined from biological, educational, "faculty," or empirical standpoints (108), is not in conflict with the definition of thinking presented above. In fact, Terman, one of the best known students in the field of intelligence and its measurement, defines intelligence as ability to carry on abstract thinking. (150:128) The problem of bilingualism in relation to intelligence may be considered, therefore, as one aspect of the larger problem of the relation of language to thought. In the discussion of the latter topic in the preceding pages it was indicated that thought may be conducted by images, visual, auditory, tactual, kinaesthetic perceptions, and other non-language symbolic schemata besides the written and spoken language, and that the latter, therefore, comprises only one section of the total area of thought. With this limitation it is immediately apparent 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 the particular section where linguistic symbolism and schemata are involved in the thinking process.

The question arises whether the acquisition of two languages instead of one from infancy interferes with the intellectual development of a person. The bilingual child learns "two names to monoglots' one for the same thing or event." Putting the problem in this form, the logical corollary would be to say that, therefore, the monoglot child can go ahead and learn many more words, meanings, and skills while the bilingual child is wasting his time by learning two appellations for the same thing or relation. And certain writers have transformed this logical corollary into a categorical dictum. Lauries' statement that a bilinguist's intellectual and spiritual growth is halved,[3] or Jespersen's agreement with Schuchardt's statement that the two strings to a bilinguist's bow are rather slack (63) are based seemingly on this logical corollary. In arriving at this corollary, however, certain assumptions are made, experimental evidence for the support of which is lacking. The assumption is made that a child possesses

[3] See Chapter II, page 25.

a certain constant amount of energy, that this energy is always at work extending the child's experience, and if it is not wasted in the effort of learning two names for the same thing, then it surely is used in learning other useful things. The psychological process may not, however, necessarily justify the logical development of these assumptions. In the first place, the denominations of certain objects, events, or relations are usually known to a bilinguist either in the mother tongue or in the other tongue only, and to the extent that this is true there is no duplication. Secondly, the two words for the same thing, event, or relation may not be exact equivalents or carry the same content. Words are not learned in isolation but in a total context both external and psychological, as explained by Ogden and Richards (98) and by Graff (48). The two 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. The writer's own experience would seem to bear this out. He has used five languages, and at different periods of his life at least two languages have been in constant use; shifting from one language to another has always meant shifting to another field of experience. It would be impossible probably to measure and compare the fields of experience of a bilingual or multilingual person with that of a monoglot. To claim, however, that a bilinguist's intellectual growth is halved is to make a claim without substantiation. Thirdly, to claim, as Jespersen does, that "the brain effort required to master two languages instead of one certainly diminishes the child's power of learning other things" (63:148) is again going beyond the known facts. As Findlay remarks: "We simply do not know enough about human capacity, nor about pedogogics, to lay down the law as to what children or we ourselves can achieve." (40:117) Besides, there is no assurance that the monoglot child, who has more free time at his disposal than the bilingual child, according to the argument above, may use that time for useful purposes. Ordinarily, men learn when they have to.

The experimental evidence does not seem to sustain the claims made by those who consider bilingualism a cause for mental re-

tardation. The reports of Ronjat (118), Pavlovitch (103), McCarthy (87), Schiller (128), and the present investigation have in no way indicated the assumed mental inferiority of the bilingual children studied. In connection with the present research it may be argued that since the tests used were non-language tests the more abstract phases of the intellectual ability of the children were not tapped. To answer this argument it should be stated in the first place that, as already indicated (p. 62), the two tests used in this study were selected among other non-language tests because of the greater abstract quality of their contents. Secondly, as Hildreth points out, the correlation of mental abilities is the rule rather than otherwise, so that children who are superior in their performance on verbal tests are generally superior also in their performance on non-verbal tests. (56) In the third place, Pintner and Arsenian found that in 469 cases of Jewish children of grades 6 and 7 the correlation between the scores on the Hoffman Bilingual Schedule and the Pintner Intelligence Test—a verbal test—is $-.059$ P.E. $\pm.031$. (110) This result is in substantial agreement with the results obtained by Murdoch, Maddow, and Berg for Jewish children in grade 7A reported in Chapter II of the present study.

The indications are that, for the ages and groups studied at least, bilingualism has no detrimental influence on mental ability. Will this be true always, especially in adulthood? Some people doubt it. Jespersen puts this rhetorical question: "Has any bilingual child ever developed into a great artist in speech, a poet or orator?" (63:148) There are a number of people who have expressed themselves in a language not their own and have achieved eminence. As examples may be cited the Renaissance writers who had their vernacular but who wrote in Latin, the German philosopher Leibnitz who wrote in French, the Pole Conrad who became one of the foremost English writers, Khalil Gibran, the Syrian mystic poet who wrote in English, and Ernest Dimnet who relinquished his French for English in his literary work. As for bilingual orators, Belgium, Canada, Wales, and South Africa would furnish us with the names of many.

Dimnet, in his autobiography, comments in some detail on his

experiences in learning languages. For him learning the foreign languages brought a valuable extension in experience, as is the case with the present writer. Dimnet writes: "The consciousness [of his knowledge of English] gave me singular confidence as if I had gained a vantage I had never suspected before. . . . My life, without my introduction to England (through its language), would have lost a good deal of its light; without my partial adoption by America it would have missed its warmth." (33:175) On another page of his interesting book he says: "Kind, interested people will sometimes ask: Do you think in English? do you mentally translate what you say? do you ever dream in English? I did once experience the little torture of mentally seeing each one of my sentences written in French on scrolls hanging from the ceiling of the hall in which I was speaking. I was addressing the officers of the Naval War College, Newport, and entirely engrossed by the subject I was treating, I resented this practical joke played on me by some imp. In a few minutes it stopped as it had begun, unconscious to myself, and I have never been a victim to it again. I prefer to speak in public in English; the sight of an audience of any nationality starts me in English.

"As for thinking or dreaming in one language rather than another, the question has no meaning. We dream, as we think, by unrolling a series of tableaux, distinct in dreams, extenuated in thought, over which float elusive little labels in any of the languages we happen to know. Only the conclusion of the process is formulated in a clearer sentence, often left unfinished because our mind is made up before it is quite concluded and it does not matter.

"Probably the question people have in mind should best be expressed by asking in what language one jots down one's notes. Mine are in English when they deal with psychology, sentiment or picturesqueness. They are in French if I think of philosophy or criticism. My poets are English, my analysts are French." (33:172)

It will be interesting to follow the bearing of Dimnet's last statement quoted above, on the contention of West "that the words of the mother-tongue will have a peculiar potency, a pecul-

iar closeness of bond with the life of emotion and feeling unattainable by the words of any speech subsequently learned." (162:44) West refers to the case of Louis Ronjat, who in his adolescent period found that the German language (used by his mother) satisfied his sentimental self; he enjoyed poetry and literature in this language, while in French (used by his father) he read in mathematics and science. Dimnet's experience would seem to indicate that West's contention does not necessarily hold. Either the sentimental or the intellectual interests and satisfactions of a bilinguist may be connected with either the mother tongue or the other tongue, depending upon the conditions of the associations made.

DIFFICULTIES OF BILINGUALISM

Let us now examine certain difficulties that may possibly accompany bilingualism. It is realized, of course, that a general discussion of the problem is somewhat hazardous, for so much depends on the actual conditions present in a bilingual situation.

In the literature on bilingualism one often finds references made to the extra load of learning that a bilingual child must carry since he is forced to learn two languages, while the unilingual child is free from such a burden pressing his shoulders. It is a mistake to exaggerate the heaviness of this burden, especially if the acquisition of the second language by the bilingual child dates from infancy. For during this period the child's language is learned spontaneously, unwittingly, without an awareness of the difficulty, and this is certainly much less of a burden than learning a second language at school during the adolescent period, the way most unilingual children attending secondary schools will have to do. It is difficult to measure the consequences of this supposed bilingual load; if it were certain that the time and effort consumed in the acquisition of an extra language, if released, would be utilized in other channels more beneficial to the child, then the bilingual load would be a clear disadvantage. As hinted before, however, we do not know the limits of the possibilities of a child's learning, nor can we be certain that the time and effort thus released would be turned to pursuits which

would so promote the mental and social development of the child that the advantages of bilingualism would be overshadowed. For it should be borne in mind that bilingualism is forced upon the child by his immediate social environment, and it is to his advantage to adapt himself to the demands of that environment.

There is some evidence as reported by Saer (119) in Wales, and Sanchez (125) and Grabo (47) in this country, that the size of vocabulary of the bilingual child in either mother or other tongue is smaller than that of the unilingual child, and the inference may be drawn that the bilinguist's limited vocabulary will also prescribe a limit to his intellectual ability. It should be remarked that the evidence of a bilinguist's limited size of vocabulary is not uniformly corrobated; witness the work of Murdoch, Maddow, and Berg (94) and the investigation at Rutgers University reported by Prescott (115). These results are not, however, as contradictory as they appear; they merely indicate that the size of vocabulary of a bilingual child, as compared with that of the unilingual child depends upon the age, the period of acquaintance, and other circumstances attendant on the acquisition of the two languages. In other words, as compared with the vocabulary size of monoglot children of the same age, mental ability and educational opportunities, the extent of vocabulary in either language is not necessarily smaller for all bilinguists all of the time. Some bilinguists at different periods or throughout their lives, depending upon the conditions of the acquisition of the two languages, may have a smaller vocabulary. With regard to the influence of the limited vocabulary on intelligence nothing very definite may be said. Generally the correlation between word knowledge and intelligence is high and some people regard the former as a close approximation to intelligence. (149) However, the intelligence tests used in these cases are verbal tests. Sanchez reports that by language instruction he was able to raise the I. Q. on a verbal test of some Spanish-speaking children in New Mexico from 72 in the second grade to 100 in the fourth grade. (126)

There is also the possibility, although no clear experimental evidence exists, that the meanings of words known by the bilingual child are not set with as much accuracy, definiteness, or

clearness of particular nuances, as is the case with the monoglot child. And this accounts possibly for the somewhat roundabout, jumbled, at times grammatically incorrect expression encountered among bilingual people. Gali (12) in Spain calls attention to this phenomenon in an examination of commercial correspondence, and so do Saer, Smith, and Hughes (121) in Wales, studying school compositions of bilingual children.

Attention is also called at times by the critics of bilingualism to the fragmentariness and inadequacy of the expression of bilingual people when in a state of emotional excitement or weakened physiological condition. (36) This same phenomenon may, however, be also observed among unilingual persons. The extent that it may be due to bilingualism as such has not been experimentally verified.

Other difficulties which a bilingual person may experience are in the matter of pronunciation (63), in rapidity and comprehension of reading (75), and in purity and adequacy of expression. Epstein calls attention to the latter difficulty in remarking that the expression of a bilingual person is affected by translation, and by introductions into one language of idioms and ways of expressions peculiar to the other language known by him. Applying the association laws of Müller and Pilzecker to the learning of languages he calls attention further to associative interferences and inhibitions in the linguistic expression of a bilingual person. (36)

In the literature on bilingualism one finds allusion at times also to undesirable emotional consequences of bilingualism. The bilingual person in his social life in a unilingual company may suffer a feeling of inferiority because of the inadequacy of his linguistic expression. This would be true, seemingly, especially in circumstances where one of the two languages in question carries with it a prestige of social superiority over the other. An example of this situation would be that of the speaker in Yiddish in old Russia, or possibly present-day Germany. Emotional consequences of a different nature may be present in a situation of acute national consciousness where a bilingual person indicates publicly his preference for one language to another, described by

Hughes. (115) In situations of this type, where language symbolizes national consciousness, the social psychology of bilingualism assumes interesting and important aspects.

It has been indicated so far that language is but one part—though an important one—of symbolic schemata at the disposal of man; that thought is a function of the total endowment and action of the organism—both muscular and neural, central and peripheral; that the range and possibilities of thought exceed the boundaries of language; that the acquisition of two language systems by a bilinguist does not seem to affect adversely his mental ability and development. Bilingualism may be advantageous in allowing an extension in one's experiences; it may on the other hand involve certain difficulties in mastery of language, in facility and accuracy of expression, in rapidity and comprehension of reading, in pronunciation, and may even have certain temporary or even permanent emotional consequences not altogether desirable. There is a dearth of experimental data on these problems. For the present at least there are available no detailed and definite conclusions applicable to all cases of bilingualism. The problem should be studied and dealt with in each case within the scope of conditions present in the bilingual situation in which it occurs.

EDUCATIONAL IMPLICATIONS

The present tendency of our civilization, as discussed in the first chapter of this work, is in the direction of an increase in the bilingualism of the world. While, on the one hand, under the impulsion of the principles of democracy and self-determination men have come to respect the right of existence of separate national languages, on the other hand, because of greater accentuation and realization of the economic, social and scientific interdependence of the world, men are forced to emerge and establish relations beyond the narrow national boundaries. For the most part, one language is coming to be more and more insufficient for men to keep abreast with the demands of present-day civilization.

Bilingualism is essentially an educational problem: in its wider aspect it is not different from the problem of learning foreign languages. A question that arises immediately is the optimum time of learning a second language. It has been generally assumed in practice that the period from 8 to 14 is the optimum time. A recent decree in Spain set age 8 as the time when Catalan children should be taught the Castilian language. In America and elsewhere the study of a foreign language is introduced in the curriculum of the secondary school. It would seem that this practice, honored by long usage, depends on the assumption that language learning is definitely a conscious, reasoning, process and should not, therefore, be started until the child's maturity permits it. The conception that language learning is necessarily a conscious process, bears the hallmark of the logician and the grammarian, and is hardly in accord with the psychological process involved. Unfortunately, modern psychology has so far neither evinced great interest nor collected much material in the study of language, as the practical omission of this subject from its textbooks would indicate.

Palmer (101) insists that language must be learned unconsciously, spontaneously. This view would seem to be justified by the manner in which children learn their mother tongue and are successful to an extent seldom attained by a person who learns a language by conscious processes at a time in life later than infancy or early childhood. Indeed, it is believed ordinarily that the later in life a person takes up the study of a second language the more difficult the task becomes, and the fewer chances there are for a complete success. Judd says: "The person who acquires a foreign language late in life always finds himself handicapped. He is, in the first place, defective in pronunciation. The reason for this is that the sounds of his native tongue monopolize his habits of articulation. . . . On the other hand, a child can acquire two languages in early youth and make a complete success of both. The child is plastic in his habits." (69:137)

Returning to the problem of bilingualism, whereby two languages are learned simultaneously from infancy, one wonders

if it is not as good a method of learning another language as any. If it can be established definitely by further experimentation that bilingualism does not cause any intellectual harm or other undesirable results, and in the absence of a more efficient method of language learning at a later age than infancy or early childhood, than known now, the question may well arise if the learning of a second language should not be introduced in the nursery schools or even at an earlier age wherever that is possible.

Castillejo reports that in the experimental school of language learning in Madrid the Spanish, English, German, and French languages are taught from kindergarten on. On the basis of the experience of four years of this school he states: "So far, the children of ten and eleven years have been sent to take examinations in other schools and this test has enabled us to verify that they are not in the least retarded compared with children of the same age, who have received twice the number of hours of teaching in the mother tongue." (20:9-10)

Palmer, whose contributions to the method of language teaching are well known, writes: "What evidence is afforded by bilingual children who have learned two languages simultaneously, children of mixed parentage, children whose care has been entrusted to foreign nurses, children who live abroad with their parents? In nearly all the cases of which we have any record it would appear that the two languages have been acquired simultaneously without mutual detriment; there has been practically no confusion between the two, and the one has had little influence on the other. Both have been acquired by the natural language-teaching forces." (101:40-41)

Limiting the discussion to the bilingual situation in the United States it should be noted that the policy toward bilingualism has ranged from encouragement to prevention, according to Dr. W. Carson Ryan, Jr. of the Department of Interior in Washington. He indicates that the public opinion and the municipal public schools have "snuffed out" the native language of the immigrant groups. "That there were real losses in this attitude, both to the newcomer and to America, we know now, too late." (165:53) It is difficult to estimate the amount or the consequence of this

loss either for the immigrant or for American culture. Zimmern remarks: "You can not make a Jew, or an Italian, or a Pole into an inheritor of Puritan or Virginian culture by waving a flag before his eyes. But what you can do is to kill in him what was the best thing he brought across the Atlantic, far more precious than the bundle he guarded so carefully in the steerage—his own little special inheritance." (171:208)

Professor Judd says: ". . . languages are carriers of literatures. Literatures in turn are embodiments of the national history of the peoples who produced them. Literatures are to society what individual memory is to each one of us." (68:190) By "snuffing out" the immigrant's vernacular we have separated him from his national literature and the traditions and the popular ideals that that literature carries in it. Undoubtedly America has failed to utilize in full the immigrant contributions toward the achievement of a richer culture that this country might otherwise have had. What the methods are whereby a harmonious amalgamation of immigrant and native cultures may be achieved it is impossible to say on the basis of present knowledge. It is evident, however, judging from the literature on the subject, that not enough attention has yet been paid to the problem. And in view of the extent of bilingualism present in this country it is not too late to direct our efforts toward this fruitful problem.

Our data indicate (see Chapter IV) that a considerable amount of bilingualism still exists in certain immigrant groups. In families, the period of whose stay in this country has not been long, little English is spoken. It is evident that children from these families entering the kindergarten or the first grade of the public school know much less English than children coming from English-speaking homes. And yet the methods of instruction used in the public schools are practically the same everywhere; they recognize no distinction between the English- and the foreign-speaking children. A great deal of the school retardation we find among the children of bilingual background may well be due to this inadequate beginning of their study in the English language. According to Ide: "The foreign child sits in kindergarten for a year or more and yet does not learn more than the meanings of half

a dozen commands during the whole time he is there. He often enters the first grade with no knowledge of English. He may pick up enough of the language to get on to second grade the first year, but the chances are that he remains in the first grade at least two years before he has acquired enough language to read at all. . . . Many children who *apparently* understand a great deal of English, really understand their *teachers*—their gestures, the inflection of their voices—and it is *these* they obey, and not the words which the teacher uses in her commands." (61:220) The reports of Sanchez (125), Tireman (153), O'Hern (99), and others calling attention to the deficiency of foreign-speaking children in their knowledge and comprehension of English seem to indicate the prevalence of the situation just described.

It is evident that the same method of instruction should not be applied to children coming from English-speaking and foreign-speaking homes until the latter have a fair mastery of the English language. The instruction in the kindergarten and the lower grades in immigrant communities should be diversified to meet the educational needs of the foreign-speaking child.

RECOMMENDATIONS FOR RESEARCH

The need of research in the field of bilingualism is great and the possibilities are numerous. Many suggestions for research have already been made in the course of the present discussion. For the sake of conciseness and clarity these various suggestions may be classified in the following categories.

Intellectual Effects. The relationship of bilingualism to intelligence should be studied by the methods of the present research and other methods to check these results and to extend the age range both below and above the ages studied in the present investigation. The problem should be studied in all the different conditions in which bilingualism obtains.

Two problems are of special importance and will require years of research: first, the optimum age the child may become bilingual; and second, optimum methods used to acquire languages.

There is some claim (78), waiting for experimental verification, that bilingualism facilitates the learning of a third language.

It would be valuable to investigate the problems of bilingualism from the point of view of the greater difference or similarity of the two languages learned. Is the problem the same for the Chinese child who studies his own monosyllabic, ideographic language, together with, say English, as for the German- or Yiddish-speaking Jewish child, between whose native language and English there is some similarity?

Language Facility and Habits. Under this category may be mentioned the problems of pronunciation, reading rapidity and comprehension, habits of expression in oral and written language, and the discovery of methods whereby the bilingual load in schools may be decreased, and the efficiency of the bilingual child in the two languages increased.

Affective Conditions. Another problem for research in the field of bilingualism may be put in question form: Is bilingualism a cause, or a contributing factor, toward emotional maladjustment? Is the bilingual child afflicted by a feeling of inadequacy or inferiority?

There is some claim (Henss, 12), to be verified by evidence, that the bilingual child, especially in countries of immigration, is a *déraciné*, an uprooted person, since he is at home neither with his native culture nor with that of the adopted land.

The social psychology of bilingualism presents a number of challenging problems for those who wish to investigate the psychological problems of nationalism and international relations.

The American and the Canadian committees on modern languages, after reviewing previous investigations in bilingualism, conclude their report on this topic thus: "Perhaps, there is no problem in language learning of more vital significance to persons on this continent than that associated with bilingualism. Large groups of our population are perforce bilingual, a circumstance which language teachers have been eager to encourage. It is not probable that the final word has been written on the problem, and educationists should welcome the opportunity to investigate thoroughly the intellectual and educational resultants of bilingualism in children." (111:52-53)

CHAPTER VII

GENERAL SUMMARY

THE origin of language is unknown. It is believed, however, that homo sapiens had achieved a certain level of intellectual maturity and was living in societies when language made its beginnings. By means of language, as a symbolic system at its disposal, the human race was able to direct and organize, record and communicate. Through language human progress took great strides, the scope of civilization and culture was extended and has now reached to fields and forms beyond the imagination of our speechless forefathers.

Whether starting from the same pristine origin, or emanating from several sources, through a process of differentiation human language has come to assume today approximately 1,500 different forms. To this huge number should perhaps be added hundreds of dialects within various languages, some of which are as mutually unintelligible as separate language systems.

Because of movements of populations through migrations and conquest, and in more recent historical periods through immigration, colonization, and annexations of territory, groups of people speaking different languages have been thrown together in daily contact and communication. The coexistence of two languages within the same political unit or geographical region has given rise to the phenomenon of bilingualism, whose extent today is probably greater than ever before in human history, because of a greater mixture of populations and easier means of communication in the present world. There are two sets of dynamic factors, which create segregating and uniting forces respectively in our present civilization. They are: nationalism, democracy, and self-determination on the one hand, and a greater consciousness of the interdependence of the present world together with the necessity for greater intercommunication on the other hand. The

operation and the interplay of both of these forces contribute toward an increase in the extent of bilingualism.

With the exception of Portugal, Iceland, and a couple of principalities, no country in Europe is free of national or language minorities and, therefore, of the problem of bilingualism in one form or another. In Europe today there are 120 spoken languages. In the United States one-fourth of the population is bilingual. The problem of bilingualism is present in Canada, in South Africa, in India—briefly, in all countries of immigration and colonization and in all states where there are language minorities. In addition, it is to be found among government officials, businessmen, and missionaries in foreign lands, in the families constituted of mixed marriages, and among many educated people where a second language is learned for use.

The educationist is faced with numerous problems posed by bilingualism wherever it is present. Should any two or more languages, as long as they are represented in the particular community which a school serves, be introduced in the curriculum? If not, what are the bases on which one language should be encouraged and given a larger place in the curriculum? When is the optimum time for a child to begin the study of a second language, and what methods should be used in teaching it? Are the educational results of bilingualism detrimental? The interest of educationists in these problems has increased during the past several decades, judging from conferences and literature on the subject. The international conference on bilingualism held in Luxembourg in 1928 recommended the application of scientific methods to the study of the problems of bilingualism.

Bilingualism is not a simple concept and its form and appearance everywhere are not uniform. There are many types of bilingualism; however, because of the fluidity and the indefiniteness of these types and their boundaries, a typological classification is not believed to be useful for scientific purposes. It is recommended that the scientific study of bilingualism should always consider at least five conditions which cut across all different types of bilingualism and are capable of objective statement. These are: (1) degree of bilingualism, which refers to

the proficiency of a bilinguist in the two languages known; (2) degree of difference or similarity between two languages in a bilingual situation; (3) age when a person is introduced to the study of the second language; (4) the method of learning the second language; and (5) the affective tone of the language situation, since languages are usually closely connected with religious, national and political sympathies and antipathies.

The problem of bilingualism has existed for long centuries of human history. People interested in it have attributed various advantages and disadvantages to it. The experimental study of the problem did not, however, start until the beginning of the present century and particularly since the twenties, after the development of the means of objective measurement of intelligence and other human abilities. Investigations bearing on various aspects of bilingualism conducted in seventeen different countries have been reported in Chapter II. It is difficult, however, on the basis of the results reported, to draw definite conclusions with reference to the relation of bilingualism to mental ability and development because of the dissimilarity of conditions of bilingualism and the variety of methods of research used.

Most of the results of the studies concerned with the problem and reported in the second chapter of this work are difficult of interpretation because of certain apparently vitiating factors present in some one-or other of these investigations: These include such factors as (1) small number of cases involved; (2) wide range of ages combined into a unit for treatment; (3) absence of an objective measure of bilingual status; (4) failure to segregate and eliminate factors, such as socio-economic status, which may be associated with either intelligence or bilingualism; (5) failure to eliminate language ability as such in the measurement of intelligence; and (6) use of *inter*-racial instead of *intra*-racial comparisons.

The present research was confined to a study of the intelligence and of the social background of bilingual children of ages 9 through 14 in New York City. The two main experimental groups consisted of 1,152 United States-born Italian, and 1,196 United States-born Jewish children. There were also 67 foreign-born

Italian, 69 foreign-born Jewish, 279 United States-born, and 15 foreign-born children of mixed races. The total population included, therefore, 2,778 cases. The children came from two large municipal public schools, one of which was located in a predominantly Italian neighborhood, the other in a predominantly Jewish neighborhood. The socio-economic status of these neighborhoods approached the median for the entire city. With the exception of the foreign-born, children in these groups are subjected to the influence of their native and the English language simultaneously from their infancy. The English language is the dominant language; the importance of learning it is enhanced especially by the school environment of these children. No antipathies toward the learning of the English language are apparent; on the contrary, the "affective tone" of the language situation tends to favor its acquisition.

The following indices were employed in the present research:

1. The Hoffman Bilingual Schedule for the measurement of the extent of bilingual background

2. An adaptation of the Sims Score Card for the measurement of socio-economic status

3. The Pintner Non-Language Intelligence Test, and the Spearman Visual Perception Test, Part I, in non-language form, as measures of intellectual ability

4. Age-grade status; this was determined by comparing the age and the grade location of these children with the modal age-grade status of children in all elementary day schools in New York City.

RESULTS

Immigrant Adjustment to the Conditions of Life in the United States of America.

1. Bilingualism in the United States is one aspect of the general adjustment of the immigrant to the conditions of life in the adopted country, and it probably epitomizes the whole process of this adjustment.

2. There is progressive decrease in the extent of the bilingual background of the Italian and Jewish children in this study ac-

companied with the increase of the length of the period of residence of their parents in this country.

3. For the first decade of the residence of parents in this country the Italians show a higher bilingual status than the Jews; however, beginning with the third decade of residence the rate of the decrease in bilingual status is faster for the Italians than for the Jews.

4. Under present conditions the influence of the foreign language background for both the Italians and the Jews will most probably disappear in the third generation of births in this country.

5. There is general improvement in the socio-economic status for both the Italians and the Jews, accompanied with the increase in length of residence of the families in this country.

6. The Jews in this study have a higher socio-economic status than the Italians.

7. The rate of improvement in socio-economic status slows down considerably when one or both Italian parents are born in this country, while it continues steadily for the Jews, who in comparison with the Italians show a larger representation in the professions, or in the possession of independent business enterprises.

8. A rise in the age-grade status of both Italian and Jewish children is accompanied with the increase in the length of residence of their parents in this country. This rise is sharpest between the first and the second decade of residence of parents in the United States.

9. The Jewish group has a higher age-grade status than the Italian group. After the initial period of adjustment the Jewish children soon catch up with the modal age-grade status for the entire New York City and surpass it, while the Italian children, even though indicating a consistent and determined rise toward the modal line, fall considerably short of it. It should be borne in mind, however, that the promotional policies are different in the two schools from which the two racial groups come.

10. A decrease in the average number of children per family is accompanied with longer residence of parents in this country and with higher socio-economic status of the families, in harmony

with the general tendency of reduction in fertility in this country.

11. The average number of children per family is higher for the Italian than for the Jewish group in this study.

Bilingualism in Relation to Certain Other Factors

1. Bilingualism and age. The extent of bilingual background does not vary significantly from age to age in ages 9 through 14 in either the Italian or the Jewish group.

2. Bilingualism and the racial groups. The average bilingual score of foreign-born Italian, Jewish, and mixed groups is higher than the averages for these same racial groups born in the United States. In the United States-born population of this study the Italian group has the highest average bilingual score and is followed, in the order listed, by the averages of the Jewish group, of the mixed racial group, and of the group of children from mixed marriage families, the average of the latter being decidedly lower than that of all the other groups.

3. Bilingualism and sex. No consistent or statistically significant differences exist between the extent of the bilingual background of boys and girls in either the Italian or the Jewish groups.

4. Bilingualism and parental influence. The influence of parents on the bilingual status of their children is shared equally by father and mother.

5. Bilingualism and socio-economic status. Bilingualism is associated with the socio-economic status of the groups studied to the extent of a correlation coefficient of —.20.

6. Bilingualism and age-grade status. The correlation coefficient between bilingual status and age-grade status is practically 0 for the Jewish group, and at least —.20 for the Italian group. Elimination of the influence of the socio-economic status, by means of the partial correlation technique, does not change the relationship between the two factors. The difference in the promotional policies of the two schools from which these racial groups come should again be borne in mind in interpreting these results.

7. Socio-economic status and age-grade status. Socio-economic status is accompanied with age-grade status to the extent of a correlation coefficient of .125 to .274. The association between

the two factors is greater for the Italian children, probably because of the larger range and the greater variability of their age-grade status in comparison with that of the Jewish children.

The Relation of Intelligence, Measured by the Two Non-language Tests, to Sex, Age, Race, and Socio-economic Status

1. Intelligence and sex. No significant sex differences in intelligence as measured by the Pintner Non-Language Test and the Spearman Visual Perception Test are disclosed in the population studied in this investigation.

2. Intelligence and age. There is a definite increment in amount of intelligence from age to age, to be noted especially in the more representative ages of 10, 11, 12, and 13. The curves for the mental development on each intelligence test and for both of the racial groups separately approximate closely the general pattern of curves for mental development of other groups of children for the same ages on other intelligence tests.

3. Intelligence and the natio-racial groups. The performance of the Jewish children on these tests is generally superior to that of the Italian children, the difference being more evident and statistically more significant on the Spearman test. The present study is not, however, concerned with natio-racial differences, and there is no evidence that the experimental groups in this investigation are representative of their respective natio-racial groups generally.

4. Intelligence and socio-economic status. The correlation between intelligence measured by the two non-language tests and the socio-economic status of the two main experimental groups studied is positive but very slight, the r varying between .038 and .140. This is decidedly lower than the correlation between socio-economic status and verbal intelligence tests reported by other workers, and is possibly due in part to the limited range of the socio-economic status of the two groups studied.

Bilingualism and Intelligence

1. Correlational method. The scores on the bilingual background questionnaire were correlated against the raw scores on

each of the two intelligence tests for each group and age separately.

Results:

a. Practically no relationship—expressed by the Pearson *r*—was disclosed between bilingualism and intelligence for each of the five experimental groups separately, and for each age from 9 through 14 within the two main experimental groups. The 34 correlation coefficients that were calculated varied between the limits of −.217 and +.118.

b. Holding the factor of socio-economic status constant by means of the partial correlation technique the relationship between the two factors indicated no essential change.

c. The relationship expressed by Eta, between bilingualism and intelligence for the two main experimental groups, while slightly higher, was statistically insignificant. The Etas (corrected) ranged from .042 to .143.

2. Comparative method—A. The children of the two main experimental groups were divided into low and high bilingual groups, at each age from 9 through 14 and for each natio-racial group separately. These groups were equated on socio-economic status and compared in regard to intelligence and other factors.

Results:

a. No essential difference between the mental development of low and high bilingual children from age 9 through 14 was disclosed, either for the two natio-racial groups separately or for the two groups combined.

b. The intelligence expressed by the intelligence quotients of the Pintner Non-Language Test for the low and high bilingual groups within each natio-racial classification was practically the same.

c. No statistically significant differences were found between the age-grade status of the low and high bilingual groups within each natio-racial classification.

d. Within each natio-racial group, the number of siblings at age 15 or below attending high school was equal for the low and high bilingual groups.

3. Comparative method—B. No reliable differences in intelligence or age-grade status were disclosed between a group of monoglot and a group of bilingual children, matched person per person on race, sex, socio-economic status, and age in months.

On the basis of the tests used and in the light of the results obtained in this research it is concluded that bilingualism does not influence—favorably or unfavorably—the mental development of children of ages 9 through 14 in the various groups studied in this investigation. In view of this finding it is inferred that it is unlikely that the relation of bilingualism to mental ability and development would be different in ages below 9 or above 14, since any differences in the relation of the two factors in those ages would have been reflected in the period of ages from 9 to 14 to which the present investigation was limited.

Theoretically the relation of bilingualism to intelligence may be considered as one aspect of the wider problem of the relation of language to thought. An examination of various theories of language and thought and the relation between the two seems to indicate that language and thought are not identical; that language is one part—though important—of symbolic schemata at the disposal of man; that thought is adaptive behavior and is a function of the total endowment and action of the organism—both muscular and neural, central and peripheral; that the range and possibilities of thought exceed the boundaries of language, but that without language, abstract, logical thinking would be seriously handicapped; that acquisition of language is essentially habit formation and is conditioned by the child's social environment. The acquisition of two language systems of the bilinguist in place of one system, as is the case with the monoglot, does not seem from the data of the present study to have a detrimental influence on mental ability and development. Bilingualism may be advantageous in providing an extension in one's experiences and contacts with the achievements of other cultures; it may on the other hand involve certain difficulties in the mastery of any language, in facility and accuracy of expression, in rapidity and comprehension of reading, in pronunciation, and may even have

certain emotional consequences not altogether desirable. There is a dearth of experimental data on all these problems. At the present time at least, no detailed and definite conclusions are available to be applied to all cases of bilingualism. The problem should be studied and dealt with in each case within the scope of conditions present in a bilingual situation.

The need and the possibilities of research in the field of bilingualism are numerous. Problems waiting for experimentation are those pertaining to intellectual, emotional, and educational resultants of bilingualism; those connected with the time and methods for acquisition of languages; and those relating to certain aspects of national life and international relations.

Further findings in future experimental investigations of the problems of bilingualism are likely to lead to formulations of important educational policies in regard to the optimum time or methods for the acquisition of languages, to the encouragement or discouragement of bilingualism in countries where people speaking different languages live together, to the development of methods for greater harmony and co-operation between language groups in the interest of a richer culture and civilization.

BIBLIOGRAPHY

1. ALLPORT, F. H. Social Psychology. Houghton, Mifflin and Co., New York, 1924.
2. ALLPORT, G. W. "Eidetic Imagery." British Journal of Psychology, 15:99-120, 1924.
3. ANDREWS, F. E. "The Handicap of a Limited Vocabulary." Chicago Schools Journal, 11:128-130, December, 1928.
4. ARSENIAN, S. "Results on the Spearman Visual Perception Test, Part I, with Pantomime Directions." To be published in *British Journal of Educational Psychology.*
5. AUCAMP, ANNA J. Bilingual Education and Nationalism with reference to South Africa. Van Shaik Ltd. Pretoria, 1926.
6. AUERHAN, JEAN. Die Sprachlichen Minderheiten in Europa. Verlag Hensel and Co., Berlin, 1926.
7. BALDWIN, B. T. and STECHER, L. I. Psychology of the Preschool Child. D. Appleton and Co., New York, 1924.
8. BARKE, ETHEL M. "A Study of Comparative Intelligence of Children in Certain Bilingual and Monoglot Schools in South Wales." The British Journal of Educational Psychology, Vol. 3, Pt. 3, November, 1933.
9. BARNOUW, ADRIAAN J. Language and Race Problems in South Africa. Martinns Nijhoff, The Hague, 1934.
10. BERE, MAY. A Comparative Study of the Mental Capacity of Children of Foreign Parentage. Bureau of Publications, Teachers College, Columbia University, New York, 1924.
11. BERRY, CHARLES S. "Classification by Tests of Intelligence of 10,000 First Grade Children." Journal of Educational Research, 6:185-203, 1922.
12. Le Bilinguisme et l'Education. Travaux de la Conference Internationale tenue a Luxembourg, 1928. Bureau International d'Education, Genève, 1929.
13. BLOCHER, EDUARD. Zweisprachigkeit, Vorteile und Nachteile. Verlag Hermann Beyer und Sohne, Langensalza, 1909.
14. BRIGHAM, C. C. A Study of American Intelligence. Princeton University Press, Princeton, N. J., 1932.
15. BRIGHAM, C. C. "Intelligence Tests of Immigrant Groups." Psychological Review, 37:158-165, 1930.
16. BROWN, G. L. "Intelligence as Related to Nationality." Journal of Educational Research, 5, 324-327, 1922.

17. BRUNNER, EDMUND DES. Immigrant Farmers and Their Children. Doubleday, Doran and Co., Garden City, N. Y., 1929.
18. BÜHLER, KARL. Les Lois Générales d'Evolution dans le Langage de l'Enfant. Journal de Psychologie, 23:597-607, 1926.
19. BURT, CYRIL. Mental and Scholastic Tests. London County Council, London, 1921.
20. CASTILLEJO, JOSÉ. "Modern Language in an International School." The New Era, January, 1933.
21. CHAPMAN, J. C. and WIGGINS, D. M. "Relation of Family Size to Intelligence of Offspring and Socio-Economic Status of Family." Pedagogical Seminary, 32:414-421, 1925.
22. CHAUNCEY, M. R. "The Relation of the Home Factor to Achievement and Intelligence Test Scores." Journal of Educational Research, 20:88-90, 1929.
23. China Year Book. The North China Daily News and Herald Ltd., 1935.
24. COLVIN, S. S. and ALLEN, R. D. "Mental Tests and Linguistic Ability." Journal of Educational Psychology, 14:1-20, 1923.
25. DARSIE, M. L. "The Mental Capacity of American Born Japanese Children." Comparative Psychology Monograph, Vol. III, No. 15, 1925.
26. DAVIES, M. and HUGHES, H. G. "An Investigation into the Comparative Intelligence of Jewish and Non-Jewish Children." British Journal of Psychology, 18:134-146, 1927.
27. DAWES, T. R. Bilingual Teaching in Belgian Schools. Cambridge University Press, London, 1902.
28. DECROLY, O. "Essai d'Application du Test de Ballard dans les Ecoles Belges." Année Psychologique, 27:57-93, 1926.
29. DELACROIX, HENRI. Le Langage et la Pensée. Librairie Félix Alcan, Paris, 1924.
30. DE LAGUNA, G. A. Speech, Its Function and Development. Yale University Press, New Haven, 1927.
31. DELMET, D. T. "A Study of the Mental and Scholastic Abilities of Mexican Children in the Elementary School." Journal of Juvenile Research, 14:267-279, 1930.
32. DEWEY, JOHN. How We Think. D. C. Heath and Co., New York, 1933.
33. DIMNET, ERNEST. My Old World. Simon and Schuster, New York, 1935.
34. DIZIK, Z. J. and LUBINA, E. S. (The Mother Tongue in Test Examinations.) Soviet Psikhotekh, 5:37-44, 1932. Summarized in L'Année Psychologique, 1932.
35. DOMINIAN, LEON. Frontiers of Language and Nationality in Europe. Henry Holt and Co., New York, 1917.

36. EPSTEIN, IZHAC. La Pensée et la Poliglossie. Librairie Payot, Lausanne.
37. FAIRCHILD, H. P. Immigration. Macmillan Co., New York, 1925.
38. FEINGOLD, G. A. "Intelligence of the First Generation of Immigrant Groups." Journal of Educational Psychology, 15:65-82, 1924.
39. Fifteenth Census of the United States. Population, Vol. I, II, III, Pt. I and II. Government Printing Office, Washington, D. C., 1931.
40. FINDLEY, J. J. Modern Language Learning. The Gregg Publishing Company, Ltd., London, 1928.
41. FRITZ, R. A. and RANKIN, N. R. "The English Handicap of Junior High School Pupils from Foreign Speaking Homes, and Remedial Suggestions." Journal of Educational Research, 27: 412-421, 1934.
42. FUKUDA, TENAN. "A Survey of the Intelligence and the Environment of School Children." American Journal of Psychology, 36: 124-139, 1925.
43. GARRETSON, O. K. "A Study of the Causes of Retardation Among Mexican Children." Journal of Educational Psychology, 19:31-40, 1928.
44. GHIBU, O. Der Moderne Utraquismus oder die Zweisprachigkeit in der Volksschule. Verlag Hermann Beyer und Sohne, Langensalza, 1910.
45. GIARDINI, G. and ROOT, W. T. "A Comparison of the Detroit First Grade Tests given in Italian and English." Psychological Clinic, 15:101-108, 1923.
46. GOODENOUGH, F. L. "Racial Differences in the Intelligence of School Children." Journal of Experimental Psychology, 9:388-397, 1926.
47. GRABO, R. P. A Study of the Comparative Vocabularies of Junior High School Pupils from English and Italian Speaking Homes. Schenectady, New York, 1930. From Bibliography of Research Studies in Education. Bull. No. 13, 1931. Office of Education, U. S. Department of Interior, Washington, D. C.
48. GRAFF, WILLEM L. Language and Languages. D. Appleton and Co., New York, 1932.
49. GRAHAM, V. T. "The Intelligence of Chinese Children in San Francisco." Journal of Comparative Psychology, 6:43-71, 1926.
50. HALPERN, F. The Intelligence of Bilingual Jewish Girls as Measured by the Stanford-Binet and the Pintner-Paterson Performance Tests. Unpublished Master's Thesis, Columbia University, New York, 1933.
51. HARDY, G. Le Probleme de la Langue Véhiculaire dans l'Enseigne-

ment Colonial. International Education Review, 1:442-449, 1931.
52. HAUCK, E. Zur Differentiellen Psychologie des Industrie und Landkindes. Langensalza, Beltz, 1929.
53. HAUGHT, B. F. "The Language Difficulty of Spanish-American Children." Journal of Applied Psychology, 15:92-95, 1931.
54. HEAD, H. Aphasia and Kindred Disorders of Speech. Two vol. Cambridge University Press, London, 1926.
55. HENSS, W. "Das Problem der zwei—und mehr—Sprachigkeit und Seine Bedeutung fur den Unterricht und die Enziehung in deutschen Greng Auslandschulen." Zeitschrift fur Padagogische Psychologie, 28:393-414, 1927.
56. HILDRETH, G. "Mental Ability Measured by Verbal and Non-Verbal Tests." Teachers College Record, 34:134-142, 1932-1933.
57. HILL, H. S. "The Effect of Bilingualism on the Measured Intelligence of Elementary School Children of Italian Parentage." Unpublished Ed. D. Thesis, Rutgers University, 1935.
58. HIRSCH, N. D. M. "A Study of Natio-Racial Mental Differences." Genetic Psychology Monographs, Vol. 3 and 4, 1926.
59. HOFFMAN, M. N. H. The Measurement of Bilingual Background. Bureau of Publications, Teachers College, Columbia University, New York, 1934.
60. HOLZINGER, K. J. Statistical Methods for Students in Education. Ginn and Co., New York, 1928.
61. Ide, G. G. "Spoken Language an Essential Tool." Psychological Clinic, 13:218-221, 1921.
62. JAMIESON, E. and SANDIFORD, P. "The Mental Capacity of Southern Ontario Indians." Journal of Educational Psychology, 19: 313-328, 1928.
63. JESPERSEN, O. Language, Its Nature, Development, and Origin. Henry Holt and Co., New York, 1922.
64. JESPERSEN, O. "A New Science—Interlinguistics." Psyche, 43: 57-67, 1931.
65. JONES, A. M. "A Vocabulary Study of Children in a Foreign Industrial Community." Psychological Clinic, 17:13-21, 1928.
66. JORDAN, R. H. Nationality and School Progress. Public School Publishing Co., Bloomington, Ill., 1921.
67. Journal de Psychologie, Nos. 1-4. Numero Special consacré à la Psychologie du Langage, 1933.
68. JUDD, C. H. The Psychology of Social Institutions. The Macmillan Co., New York, 1927.
69. JUDD, C. H. Reading: Its Nature and Development. University of Chicago Press, Chicago, 1918.
70. KELLEY, T. L. Statistical Method. The Macmillan Co., New York, 1923.

71. KIRKPATRICK, C. Intelligence and Immigration. Williams and Wilkins, Baltimore, 1926.
72. KLINEBERG, N. "Bilingualism and Intelligence in 10 Year Old Italian Girls." Unpublished Master's Thesis, Columbia University, New York, 1932.
73. KLINEBERG, O. Race Differences. Harper and Brothers, New York, 1935.
74. KOCH, H. L. and SIMONS, R. "A Study of the Test Performance of American, Mexican and Negro Children." Psychological Monographs, 35: No. 5, 1928.
75. LADD, M. R. Relation of Social, Economic and Personal Characteristics in Reading Ability. Bureau of Publications, Teachers College, Columbia University, New York, 1933.
76. LASHLEY, K. S. Brain Mechanisms and Intelligence. Chicago University Press, Chicago, 1929.
77. LAURIE, S. S. Lectures on Language and Linguistic Method in the School. Third Edition, Revised. Oliver and Boyd, Edinburgh, 1899.
78. LEATHES, S. What Is Education? G. Bell and Sons, Ltd., London, 1913.
79. LESTER, O. P. "Performance Tests and Foreign Children." Journal of Educational Psychology, 20:303-309, 1929.
80. LINFIELD, H. S. The Jews in the United States. The American Jewish Committee, New York, 1929.
81. LIU, H. C. Non-Verbal Tests for Use in China. Bureau of Publications, Teachers College, Columbia University, New York, 1922.
82. LORAM, C. T. The Education of the South African Native. Longmans, Green and Co., London, 1917.
83. LORGE, I. and ARSENIAN, S. A Comparison of the Results on the Spearman Visual Perception Test, Part I, Administered by Verbal and Pantomime Directions. (To be published.)
84. LORIMER, F. The Growth of Reason. Harcourt, Brace and Co., New York, 1929.
85. LORIMER, F. and OSBORN, F. Dynamics of Population. Macmillan Co., New York, 1934.
86. LUH, C. W. and WU, T. M. "A Comparative Study of Chinese Children on the Pintner Performance and the Binet Tests." Journal of Social Psychology, 2:402-408, 1931.
87. MCCARTHY, D. A. The Language Development of the Preschool Child. University of Minnesota Press, Minneapolis, 1930.
88. MADSEN, I. N. "Some Results with the Stanford Revision of the Binet-Simon Tests." School and Society, 19:559-562, 1924.
89. MALLER, J. B. Manual of Directions for Character Sketches.

Bureau of Publications, Teachers College, Columbia University, New York, 1932.

90. MALLER, J. B. Vital Indices and Their Relation to Psychological and Social Factors. Human Biology, 5:94-121, 1933.
91. MANN, C. "Failures due to Language Deficiency." Psychological Clinic, 13:230-237, 1921.
92. MEAD, M. "Group Intelligence Tests and Linguistic Disability among Italian Children." School and Society, 25:465-468, 1927.
93. MEILLET, A. Les Langues dans L'Europe Nouvelle. Payot, Paris, 1928.
94. MURDOCH, K. A., MADDOW, D. and BERG, N. L. "A Study of the Relation between Intelligence and the Acquisition of English." The 27th Yearbook of National Society for the Study of Education, Pt. I:343-353. Public School Publishing Co., Bloomington, Ill., 1928.
95. MURPHY, G. General Psychology. Harper and Brothers, New York, 1933.
96. NOIZE, L. The Origin and Philosophy of Language. Open Court Publishing Company, Chicago, 1917.
97. OGDEN, CHARLES K. Debabelization. Kegan Paul, Trench, Trubner and Co., London, 1931.
98. OGDEN, C. K. and RICHARDS, I. A. The Meaning of Meaning. Harcourt, Brace and Co., New York, 1923.
99. O'HERN, J. P. "The Reading Problem in the Public School as Affected by Actual Measurement." Journal of the New York State Teachers Association, 6:81-83, 1919.
100. OTIS, A. S. "Do We Think in Words?" Psychological Review, 27:399-419, 1920.
101. PALMER, H. E. The Principles of Language Study. World Book Co., Yonkers, N. Y., 1921.
102. PAULHAN, F. Le Double Fonction du Langage. Félix Alcan, Paris, 1929.
103. PAVLOVITCH, M. La Langue enfantine. Champion, Paris, 1920.
104. PEDERSEN, H. Linguistic Science in the 19th Century. Trans. by Spargo, J. E. Harvard University Press, Cambridge, 1931.
105. PINTNER, R. "Results Obtained with the Non-Language Group Test." Journal of Educational Psychology, 15:473-483, 1924.
106. PINTNER, R. "Comparison of American and Foreign Children on Intelligence Tests." Journal of Educational Psychology, 14:292-295, 1923.
107. PINTNER, R. "The Influence of Language Background on Intelligence Tests." Journal of Social Psychology, 3:235-240, 1932.
108. PINTNER, R. Intelligence Testing. Henry Holt, New York, 1931.

109. PINTNER, R. and KELLER, R. "Intelligence Tests of Foreign Children." Journal of Educational Psychology, 13:214-222, 1922.
110. PINTNER, R. and ARSENIAN, S. "The Relation of Bilingualism to Verbal Intelligence and School Adjustment." (To be published.)
111. Publications of the American and Canadian Committees on Modern Languages, Vol. 8. The University of Toronto Press, 1928.
112. Report of the Committee Appointed to enquire into the conditions of the Schools attended by French speaking pupils. Department of Education, Provincial Parliament Building, Canada, 1927.
113. Report of the Imperial Education Conference, London, 1911.
114. Report of the Imperial Education Conference, London, 1923.
115. Report of New Educational Fellowship—Sixth World Conference. Nice, 1932.
116. Report of the Superintendent of Schools, New York City, 1933. Board of Education, New York, 1933.
117. RIGG, M. "Some Further Data on the Language Handicap." Journal of Educational Psychology, 19:252-256, 1928.
118. RONJAT, J. Le Développement du Langage observé chez un Enfant Bilingue. Champion, Paris, 1913.
119. SAER, D. J. "An Inquiry into the Effect of Bilingualism upon the Intelligence of Young Children." Journal of Experimental Pedagogy, 6:232-240, 266-274, 1922.
120. SAER, D. J. The Effect of Bilingualism on Intelligence. British Journal of Psychology, 14:25-38, 1923.
121. SAER, D. J., SMITH, F. and HUGHES, J. The Bilingual Problem. The University College of Wales, Aberystwyth, 1924.
122. SAER, H. "Experimental Inquiry into the Education of Bilingual Peoples." Education in a Changing Commonwealth, p. 116-21. Published by the New Education Fellowship, London, 1931.
123. SANCHEZ, G. I. "Scores of Spanish Speaking Children on Repeated Tests." Pedagogical Seminary and Journal of Genetic Psychology, 40:223-231, 1932.
124. SANCHEZ, G. I. "Group Differences and Spanish Speaking Children—A Critical Review." Journal of Applied Psychology, 16: 549-558, 1932.
125. SANCHEZ, G. I. "The Implications of a Basal Vocabulary to the Measurement of the Abilities of Bilingual Children." Journal of Social Psychology, 5:395-402, 1934.
126. SANCHEZ, G. I. "Bilingualism and Mental Measures." Journal of Applied Psychology, 18:765-772, 1934.
127. SAPIR, E. Language. Harcourt, Brace and Co., New York, 1921.
128. SCHILLER, B. Verbal, Numerical and Spatial Abilities of Young

Children. Archives of Psychology, No. 161. Columbia University, New York, 1934.

129. SCHWESINGER, G. and OSBORN, F. Heredity and Environment; Studies in the Genesis of Psychological Characteristics. Macmillan Co., New York, 1933.

130. SENOUR, A. C. "Necessity for the Use of Non-Language Mental Tests in Group Intelligence Testing." Journal of Educational Research, 27:435-441, 1934.

131. SERETA, K. E. "A Comparative Study of 100 Italian Children at the Six Year Level." The Psychological Clinic, 16:216-231, 1924.

132. SHEN, E. "An Analysis of Eye Movements in the Reading of Chinese." Journal of Experimental Psychology, 10:158-183, 1927.

133. SHENTON, H. N. "Can Social Engineers Improve the International Language Situation?" Psyche, 41:6-20, 1930.

134. SIMS, V. M. Measurement of Socio-Economic Status. Public School Publishing Company, Bloomington, Ill., 1928.

135. SIRKIN, M. "Relation between Intelligence, Age and Home Environment of Elementary School Pupils." School and Society, 30:30-308, 1929.

136. SMITH, F. "Bilingualism and Mental Development." British Journal of Psychology, 13:271-282, 1923.

137. SMITH, M. E. "A Study of Five Bilingual Children from the Same Family." Child Development, 2:184-187, 1931.

138. SMITH, M. E. "The Direction of Reading and the Effect of Foreign Language School Attendance on Learning to Read." Journal of Genetic Psychology, 40:422-451, 1932.

139. SMITH, M. E. "A Study of Language Development in Bilingual Children in Hawaii." Psychological Bulletin, 30:692-693, 1933.

140. SMITH, M. E. "A Study of the Speech of Eight Bilingual Children of the Same Family." Child Development, 6: No. 1, March, 1935.

141. SPEARMAN, C. The Nature of Intelligence and the Principles of Cognition. Macmillan and Co., London, 1925.

142. STOKE, S. M. and LEHMAN, H. C. "Intelligence Test Scores of Social and Occupational Groups." School and Society, 31:372-377, 1930.

143. STECKER, VON H. "Erfahrungen und Studien über Zweisprachigkeit in Ibero-Amerika." International Education Review, 1:598-605, 1931-1932.

144. STROUD, J. B. "A Study of the Relation of Intelligence Test Scores of Public School Children to the Economic Status of Their Parents." Pedagogical Seminary and Journal of Genetic Psychology, 35:105-111, 1928.

145. Survey of the Educational System of the Philippine Islands. Bureau of Publications, Teachers College, Columbia University, New York, 1925.
146. Survey of the Public Educational System of Porto Rico. Bureau of Publications, Teachers College, New York, 1926.
147. SYMONDS, P. M. "The Effect of Attendance at Chinese Language Schools on Ability with the English Language." Journal of Applied Psychology, 8:411-423, 1924.
148. TAINE, H. "Acquisition of Language by Children." Mind, 2: 252-259, 1877.
149. TERMAN, L. M. "The Vocabulary Test as a Measure of Intelligence." Journal of Educational Psychology, 9:452-466, 1918.
150. TERMAN, L. M. Intelligence and Its Measurement (Symposium). Journal of Educational Psychology, 12:127-131, 1921.
151. THORNDIKE, E. L. ET AL. The Measurement of Intelligence. Bureau of Publications, Teachers College, Columbia University, New York, 1927.
152. THORSON, A. M. "The Relation of Tongue Movements to Internal Speech." Journal of Experimental Psychology, 8:1-32, 1925.
153. TIREMAN, L. S. "Reading in the Elementary Schools of New Mexico." Elementary School Journal, 30:621-626, 1929.
154. TODD, J. W. The Psychological Fundamentals to Linguistic Achievement in Prognosis Tests in Modern Foreign Languages. In Publications of the American and Canadian Committees on Foreign Language, Vol. 14, 138-143. Macmillan Co., New York, 1929.
155. VENDRYES, J. Language—A Linguistic Introduction to History. Alfred A. Knopf, New York, 1925.
156. WALTERS, F. C. "Language Handicap and Stanford Revision of Binet Simon Tests." Journal of Educational Psychology, 15:276-284, 1924.
157. WANG, S. L. "Demonstration of the Language Difficulty Involved in Comparing Racial Groups by Means of Verbal Intelligence Tests." Journal of Applied Psychology, 10:102-106, 1926.
158. WARDEN, C. J. "Relative Economy of Various Modes of Attack in the Mastery of a Stylus Maze. Journal of Experimental Psychology, 7:243-275, 1924.
159. WATSON, JOHN B. "The Unverbalized in Human Behavior." Psychological Review, 31:273-280, 1924.
160. WATSON, JOHN B. The New Behaviorism. W. W. Norton and Co., New York, 1925.
161. WELLS, H. G. Anticipations of the Reaction of Mechanical and