

PROJECT II

AN INVESTIGATION INTO THE PERFORMANCE OF INDIAN STANDARD
SIX STUDENTS IN INTELLIGENCE AND SCHOLASTIC TESTS IN
RELATION TO THEIR BILINGUALITY AND EFFICIENCY IN ENGLISH

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A STUDY OF THREE CURRENT PROBLEMS OF INDIAN EDUCATION

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(A) INTRODUCTION:

As pointed out in the general introduction, Project II was concerned with a study of the relationship between bilingualism in Indian standard six pupils and their efficiency in English, on the one hand, and their performance in intelligence and scholastic tests, on the other. Both the terms "Indian" and "bilingualism" need clarification.

The population of Durban according to the most recent count was made up as follows (Kuper, Watts and Davies, 1958):-

TABLE I
RACE COMPOSITION OF THE POPULATION OF DURBAN: 1951 CENSUS

RACE	NUMBER	%
Africans	136,279	31.68
Coloureds	16,489	3.83
Europeans	131,293	30.51
Indians ¹⁾	146,183	33.98
Total	430,244	100.00

1) The 1951 Census figures are for Asiatics, but the number of Asiatics, other than Indians, in the Union as a whole is very small. Thus the Durban figure for Indians includes 73 Chinese (Kuper, Watts and Davies, 1958).

Indians in South Africa do not constitute a homogeneous group; they do not profess a single religion and use a variety of home languages as shown in the table below, which has been adapted from those presented by Kuper, Watts and Davies (1958):-

TABLE II
RELIGIOUS AFFILIATION AND HOME LANGUAGES OF INDIANS¹⁾
IN DURBAN: 1951 CENSUS

Religious Group	%	Home Language	%
Christian	6.68	Afrikaans	0.02
Buddhist	0.13	Chinese	0.05
Confucian	0.02	English	5.71
Hindu	73.87	English and Afrikaans	0.01
Moslem	16.03	Gujurati	6.00
Parsi	0.02	Hindi	25.37
Quasi-Religious, No	3.25	Tamil	37.72
Religion, Unspeci-		Telegu	11.68
fied		Urdu	9.32
		Other Indian Languages	3.92
		Other Languages	0.13
		Unspecified	0.07
Total	100.00	Total	100.00

The term "bilingual" is defined in The Shorter Oxford Dictionary On Historical Principles (1950) as "having or characterised by two languages" and in The Concise Oxford Dictionary of Current English (1954) as "having, speaking, spoken or written in, two languages". In their Dictionary of Psychological and Psychoanalytical Terms, English and English (1958) write: "bilingual: adj. 1. speaking as mother tongues two languages learned at about the same time. Dist. fr. BIGLOTTAL (n. BIGLOT-TISM), having facility in a second language. 2. loosely but commonly, speaking two languages with approximately equal facility. --n. bilingualism".

1) Included here are 73 Chinese-speaking persons who live in Durban. They probably account for all the Confucians and some of the Buddhists in the religious category and for all the Chinese-speaking persons in the home language category.

For the Central Advisory Council for Education, Wales, (1953) bilingualism implies "the simultaneous learning of, though not necessarily an equally proficient control over, two languages by an individual child, sometimes from an early age, on account of compulsions within his social environment". Leopold (1939) says: "Bilingualism is the ability to speak two languages which are spoken equally well for all purposes of life. In practice only approximations to this ideal can be expected. Bilingualism is a fact even when one language is spoken better and more extensively than the other, as long as both are regularly employed as media of intercourse".

Pintner and Arsenian (1937), in their study of a group of Jewish children in the United States, defined a bilinguist as "a person who is born and brought up in a family where two languages are used interchangeably". They point out that this situation obtains in families of more recent immigrants (to the United States) where the native language of the immigrant is used together with English. A child's bilingualism in this instance comprises the understanding or the speaking, and more usually both aspects, of the two languages involved. They emphasise that no reference is made here to the acquisition or possible use of a second language learned at school by a unilingual child.

The bilingual situation of Durban Indian school children is similar. There must be very few Indian children in Natal, if any at all, who hear English for the first time at school. They generally have some familiarity with English, acquired in the home, the street and the playground, before coming to school. This is particularly true in an urban area where the present study had its location. The linguistic situation of the subjects of this investigation resembles that of the Jewish sample of Pintner and Arsenian more than it does any other.

Though the Union of South Africa has two official languages, English and Afrikaans, Natal Indians have, up to the present, concentrated on the mastery of English rather than of Afrikaans¹⁾. Hence, whenever bilingualism is mentioned in this report with reference to Natal Indians, the use of one of the Indian tongues relative to English will be implied.

Arsenian (1937) suggests that five factors should be taken into account when considering a bilingual situation, as follows:-

1. The degree of proficiency of the individual in the two languages.
2. The degree of similarity or difference between the two languages that the bilingual person possesses.
3. Age when the learning of the second language occurred.
4. Method of learning - informal or formal, at home or in school, by direct or indirect methods.
5. Attitude towards the second language, whether favourable or unfavourable.

The importance of the fifth factor is reiterated by Pintner and Arsenian (1937) as follows:- "Languages, unless already dead, cannot be adequately considered without the people which use them and the environment in which they exist. The writers consider it important that in any discussion of bilingualism its socio-psychological environment be stated, for affective elements are necessarily connected with languages and the influences emanating from this source most probably bear relation to the resultants of bilingualism".

In terms of the five factors mentioned by Arsenian, the Natal Indian bilingual situation may be described as follows:-

1) Afrikaans is, however, rapidly coming into prominence in primary and post-primary Natal Indian schools (Director of Education (Natal), 1956, 1957, 1958).

1. The degree of proficiency in the two languages varies, ranging from the individual who cannot speak, read or write English but who is highly versed in the home language to the individual who is a master of spoken and written English but who possesses only a pidgin form of the mother tongue.
2. The differences between English and the Indian languages are very marked. The characters are different, certain sounds obtaining in English are unknown in some of the Indian tongues (e.g., the w sound in Gujarati and the aspirated h in Tamil), while, in the case of Urdu, writing (and reading) proceeds from right to left. The differences in script are illustrated below where the English sentence has been literally translated into the various Indian forms.

English

The little boy picked up his books and ran off to school.

Gujarati

નાના છોકરાએ પાઠ્યક્રમ ઉઠાવીને દોડી ગયો.

Hindi

वह छोटा लड़का अपनी पुस्तकें लेकर पाठशाला के लिये दौड़ा

Tamil

சிறுவன் தன் புத்தகங்களை எடுத்து
பாடசாலைக்கு ஓடினான்.

Telegu

ఆ చిన్న పిల్లవాడు తన పుస్తకములను తీసికొని పాఠశాలకు పరుగు వేసి వెళ్ళాడు.

Urdu

ایک نادان لڑکا اپنی کتابیں اٹھا کر مدرسہ کو ہجرت کیا۔

3. Learning of the second language begins to take place informally in the home during the preschool years, at least in the urban areas.

The child hears the English spoken in the home particularly by older siblings who attend school and by strangers in the home surroundings. However, the English heard is generally elemental and of poor quality.

4. Formal instruction in English commences on entry into school. The method of teaching is direct, English being the medium of instruction in all Natal Government and Government-Aided schools at present throughout all grades. At the same time much informal learning of English takes place at school in the playgrounds, corridors, etc.
5. The attitude towards the learning of English is favourable. The general feeling seems to be that a western education is indispensable for economic survival in a western context and a knowledge of English is regarded as the core of such an education.

Soffietti's analysis of the concept of bilingualism (1955) is also germane to the present study. He says that bilingualism is not only a matter of two distinct patterns of linguistic habits but that it also involves two distinct patterns of cultural habits in all of their anthropological meaning. The problem then becomes not merely one of bilingualism, but also one of "biculturalism". He says that by keeping a clearcut distinction between the two concepts the following four basic types of situations may be distinguished:-

- (a) bicultural - bilingual;
- (b) bicultural - monolingual;
- (c) monocultural - bilingual; and
- (d) monocultural - monolingual.

Such a classification is a useful one for characterising the situation of Indians in this country. Living as they do in a western context they have to adapt themselves not only to the official language or languages of the country but also to the dominant culture, which is European. The culture which the early settlers brought with them from

India has undergone and is still undergoing changes in many different ways and the adoption of English as the lingua franca by Indians in this country is one aspect of the process of acculturation (Cooppan and Lazarus, 1956).

It should not be thought that all the different Indian religious-mother-tongue groups are westernising at the same rate. It may be expected that those groups to whom adjustment to the new conditions is an urgent necessity for economic and social well-being will take to western methods of life more readily than those who are economically and culturally more secure. From this point of view, one may expect the "passenger" class of immigrants from India (cf. Kuper, 1956a), i.e., those who did not come under indenture but to trade or render professional and religious services to their countrymen, will form the hard core of resistance to adoption of the new culture. Evidence for this will be presented later.

On the whole, it seems that the Indian in Natal is at a bi-cultural-bilingual stage at present. He belongs to two cultures and has to cope with at least two languages, his Indian home tongue and English¹⁾. At the moment he is neither a typical Indian by the standards of India, his motherland, nor a typical westerner by European standards; he cannot speak, read and write his own language as well as his brothers in India, nor can he speak, read and write English as well as the South African English-speaking European. Being restricted and inadequate in both languages, his bilingualism is of the "bifurcated type" (a phrase used by Anastasi and Cordova (1953) to describe the lingual situation of Puerto Ricans in the United States). He is in the midst of change, with himself as one of the changing elements, neither truly one nor truly the other.

1) Apart from being conversant with his mother tongue and English, the average Natal Indian has some acquaintance with Zulu. Strictly speaking he is multilingual rather than bilingual.

(B) ACKNOWLEDGMENTS:

The schools that participated in this project were as follows:- Anjuman Islam, Centenary Road, Dartnell Crescent, Depot Road, Gandhi, Greyville, Hindu Tamil Institute, Kathiawad, May Street Madressa, St. Anthony's, Surat Hindoo, Temple Girls', Clairwood High, H.S. Done, Merebank, St. Aidan's Boys', St. Aidan's Girls', Sea View, S.R.S. and Umgeni. The principals and staffs of these schools are thanked for their co-operation. The Centenary Road School was also used extensively as a workshop for the preliminary testing of the instruments used in this project. The Principal is warmly thanked for tolerating the partial disorganisation of class routine that this work so often entailed.

(C) THE PROBLEM:

The problem of the effects of bilingualism on the scholastic and mental development of Indian children was taken up for study as a result of evidence from two sources that the Indian child was, in fact, at a stage where he was seriously handicapped by the change-over from his mother tongue to English, namely, from evaluations of the standard of work in Indian schools by inspectors and from the results of mental testing among Indian children.

(a) Language Handicap in School Subjects:

English is officially recognised as, and termed, the "main" language of virtually all Natal Indian school children, but school inspectors have stressed for a long time that the standard of spoken and written English in Indian schools is low as compared with the standard in those European schools where the "main" language is also English (and where most of the pupils come from English-speaking homes). The annual reports of the Director of Education, Natal, have pointed this out year after year,

for example, the reports of 1944, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957 and 1958.

Going beyond the alleged weakness in English, some of the reports stress that the handicap experienced by Indian children in comprehending English has an adverse influence on their performance in problem arithmetic, whereas their attainment in mechanical arithmetic is relatively unaffected, for example, the reports of 1947, 1948, 1949, 1950, 1951, 1952 and 1958.

The following excerpts from annual reports give some idea of the problems mentioned above:-

"There are very few Indian homes where English is spoken as the home language, but the children, on proceeding to a Government or Government-Aided School, receive all their instruction through the medium of English. In past years beginners have spent three years in the infant classes instead of two as in the European schools, the first introductory year being devoted almost entirely to teaching the child to speak English and to accustom himself to the new environment. Pressure on accommodation has made it essential to abolish the introductory year and the Indian child has now, despite his lack of familiarity with the medium of instruction, to complete the infants' course in two years. There has always been a weakness in English in Indian schools at all stages, and most of the failures in the public examinations are in this subject" (1950).

Another report mentions the importance of the child's world outside the school in the development of efficiency in English. It states: "English continues to provide the most serious problem for the primary school teacher. The causes which give rise to ^aweakness in this language are well known. The cure is, however, not so easy to achieve. It is doubtful whether the school alone can provide all that is necessary in

order to give its pupils a reasonable command of the language. The home environment, out of school activities, contacts in the world outside must play their part, and if these are conducted in a language other than English, the experience necessary to consolidate the work of the school is lacking. The time spent in school is hardly long enough in itself to give mastery in this subject" (1947).

A third report reads: "In the public examinations Indian candidates have to compete on level terms in English with European candidates, whose mother tongue it is and who have a far wider background of reading and general knowledge Very often the teachers themselves, though they do not realise it, have an inadequate command of the language and teach the pupils unidiomatic and unusual forms of the language. Those who have taken English as a major degree subject are inclined to use polysyllabic words, far beyond the comprehension of the pupils It cannot be too strongly stressed that every teacher, whatever his subject, should also regard himself as a teacher of English" (1952).

With regard to the influence of efficiency in English on performance in problem arithmetic, the following extracts are representative of the comments made in several of the reports:-

"In the mechanical arithmetic he (the Indian child) soon reaches a good standard. A lack of familiarity with English increases the difficulty he experiences in the solution of problems, and because of this the standard of arithmetic tends to fall in the upper classes. Although able to carry out the processes, the pupil is frequently unable to determine just what is required" (1950).

And finally: "Reports on the progress of arithmetic in Indian schools indicate that in the lower classes the standard reached in this subject compares favourably with that in European schools. It is in the

upper classes of the school that weaknesses become evident, due to a lack of proper command of English. Difficulties arise not because processes are not known but because what is required is not comprehended" (1947).

(b) Language Handicap in Test-Intelligence:

From the field of mental testing in South Africa evidence has also been forthcoming that imperfect mastery of English or Afrikaans has been partially responsible for the inferior performance of non-European subjects generally in verbal intelligence tests framed in those languages, relative to the performance of Europeans. In an attempt to avoid the injustice that might accrue to non-European groups through the use of verbal tests constructed in the European languages, most investigators into inter-racial differences in intelligence in South Africa have resorted to non-verbal or performance tests of intelligence. A comprehensive survey of the existing literature on the subject will be made when Project III is described but one study that has a direct bearing on the Indian situation in Durban may be mentioned here.

Logue (1954) administered the (old) South African Group Test of Intelligence to Indian primary school children in Durban, ranging in standard from II to VI and in age from 10 to 15 years. The test was largely of a verbal nature and was administered in English. The mean I.Q. for 1,242 subjects was 87.4 as against 100 for South African European children. He found a steady decline in test-intelligence as age increased, thus:-

<u>Age (Years)</u>	<u>I.Q.</u>
10	102
11	98
12	94
13	90
14	89
15	88

Logue accounted for the difference of 12.6 points of I.Q. between European and Indian scores in the following terms: "The purpose of this investigation was to consider the suitability of the South African Group Test for Indian pupils in Durban. In order to do this adequately certain criteria were applied to the group of pupils being tested. It is felt that, of these, the only factor that might be considered a serious handicap to the Indian testees is their relative weakness in the English language. For most of them, English falls somewhere between a first and a second language. Even though many Indians use English in the local public examinations with tolerable success, it is in the finer shades of word meaning that they are weak. They lack that intangible, but very real knowledge of the language which comes, not from a study of grammar books, but from the daily contact of individuals mixing from birth in an environment which uses English as its means of communication. This weakness, often revealed in poor scores on English comprehension tests, is also a severe handicap to any Indian child attempting certain of the items in the South African Group Test".

In view of this presumed difficulty, Logue (1956) chose to construct a non-verbal rather than a verbal test of intelligence for Indian children. Explaining his preference for a non-verbal test, he wrote: "..... it was felt that to eliminate the language factor as far as possible would add to both the reliability and validity of a test for a school population where one can't assume some minimum common competency in the English language. Failure to recognise this point in the past has often resulted in investigators jumping to unwarranted conclusions".

(c) Hypotheses:

Both the reports of the Director of Education and the comments of Logue expressly make a comparison between the performances of European

and Indian pupils and both suggest that the basic cause of the poorer showing of Indian children relative to Europeans is the Indians' inferior home background of English.

Their evidence, however, lacks precision and factual support. True enough, the inspectorial reports are based on many years of professional experience and first-hand acquaintance with the work done in both European and Indian schools, but in the absence of precise data the views expressed cannot rise above the level of informed opinion, valuable though this might be. There is no means of knowing, for instance, how far Indian children are behind Europeans in the school subjects mentioned by inspectors. It will be shown later, in the description of Project III, that such comparative figures are available for African and European pupils.

The position is somewhat different in the case of Logue's evidence. Here the inferiority of Indian, relative to European, performance on a verbal test of intelligence was objectively established. But as soon as he went beyond the figures obtained and sought reasons for the lower Indian mean, opinion again crept in. Logue had no means of ascertaining precisely the contribution of language handicap to the inferior performance of his Indian subjects, nor was this the main purpose of his study. He expressed the opinion that disability in English was the main operative factor. Other possible factors such as socio-economic status, nutritional condition and quantity and quality of schooling were regarded as being of lesser importance.

The foregoing account makes it clear that a host of problems connected with the bilinguality of Indian children in relation to their scholastic and mental development called for controlled investigation at depth. The present project was such an attempt. Its purpose was to test objectively the validity of the views outlined above and in doing so to shed light on the broader problem of bilingualism and its effects.

Specifically, the following working hypotheses were adopted:-

- (1) Indian pupils would score relatively lower than English-speaking Europeans in intelligence and scholastic tests that demanded a greater degree of familiarity with English than in intelligence and scholastic tests that did not require such a high standard of English.
- (2) Since Indian pupils varied in the amount of English they used and heard in the home vis a vis the mother tongue (that is to say, in degree of bilinguality), those children who had a richer background of English would tend to score relatively higher in tests that demanded a high degree of familiarity with English than those children with a poorer background.
- (3) Apart from the influence of the home, the varying levels of actual individual achievement of Indian children in scholastic tests of English ("achieved English") would, to some extent, be related to their performance in intelligence and scholastic tests which required knowledge of English.

The hypotheses were tested in the order in which they have been given above.

(D) REVIEW OF PREVIOUS LITERATURE:

(a) General:

The problem of bilingualism is of considerable general interest to psychologists, sociologists and educationists, but, as James (1960) points out, in addition to its academic aspect, the problem also has political overtones for it has often become a matter of national concern as in Canada, Wales and South Africa. Usually arising in a scene that has been the battleground of two nation-groups, it has aroused much

passion (Hughes, 1937). That the problem is a very live one is indicated by the fact that, at the moment of writing, an international seminar on the educational significance of bilingualism is in progress at Aberystwyth (Wales) ("The Natal Daily News", 23/8/1960).

Existing literature on the problem is voluminous and often contradictory. According to Jones (1959), however, the contradiction is often more apparent than real, arising largely from methodological differences between the various investigations and from the absence of an agreed definition of bilingualism; in some cases the precise interpretation of the results is rendered more difficult by the investigator's failure to isolate the bilingual from other environmental influences and by the intrusion of complicated natio-racial factors into the experimental situation.

Fortunately, the existence of four good reviews (Rumyanec, 1931; Arsenian, 1937 and 1945; and Darcy, 1953) makes it possible to avoid too many detailed references and to make mention only of those works that are of direct relevance to the present study.

Before systematic investigations into bilingualism came to be undertaken, all sorts of views with regard to its effects were prevalent. Summarising unsophisticated views on the matter, Pintner and Arsenian (1937) say: "Speculative thinking has attributed great advantages as well as great disadvantages to bilingualism. Some claim that bilingualism retards mental development, that it hampers school progress and impedes seriously the flow of thought and speech. Others maintain that bilingualism per se has no influence on the growth of intelligence and other handicaps attributed to it can be explained on the basis of factors other than bilingualism. With regard to the development of personality there again are to be found two divergent opinions - some hold that the bilingualist

through his early and immature contact with two languages and cultures is not sufficiently at home in either and that this deficiency leads to a feeling of inadequacy, insecurity and inferiority¹⁾. The opponents of this thesis maintain that the contact with two languages and cultures is a valuable advantage which the bilingual person has over the unilingual since it contributes to the formation of a more tolerant, and world-minded individuality, appreciative of the contributions of other national cultures".

It has been during the present century, particularly since 1920, that experimental methods have been brought to bear on the problems of bilinguality (Arsenian, 1945). Generally, these studies have taken the fact of bilingualism in subjects (usually school children) as the starting point and have investigated its relationship to personality characteristics and achievement.

The first problem in these studies has been that of measuring objectively the degree of bilingualism of a given individual. Four methods have been resorted to by investigators, namely, questionnaires, association techniques, direct tests of knowledge of the second language and rating scales (Arsenian, 1945).

A well-known example of the questionnaire method is that of Hoffman (1934). The subject is asked a number of questions and he has to make one of a given number of responses, e.g.:-

1) Christophersen (1948) quotes Lagardi-Quost as saying that in most bilinguals there lurks a latent schizophrenia or split personality!

Do the following speak to you in any language other than English:-

<u>Father:</u>	Never	Sometimes	Often	Mostly	Always
<u>Mother:</u>	Never	Sometimes	Often	Mostly	Always

Questions pertain also to newspapers, magazines, books, letters received at home or written by members of the family or by the child himself, etc. Thus Hoffman's questionnaire takes into account not only the "expressive" or speaking but also the "impressive" or hearing and reading aspects of the subject's language situation.

Association techniques take many forms. A simple version is to present two parallel series of, say, ten words, ten in each language orally to the subject with a fixed time interval between words and call for a reproduction of the words after they have all been presented. Here immediate verbal memory is involved. Chain association has also been used as when subjects are asked to call out as many words that come to mind as possible, in each language separately, within a specified time (e.g., Johnson, 1953). Or words may be presented alternately in two languages and the subject is asked to give within a fixed time any words in either language that come to mind. Here reaction time is taken into account as well as the response. A possible weakness of association techniques is that emotional factors such as "blocking" may interfere in what should be a pure test of linguistic facility.

Examples of direct tests of knowledge in the measurement of bilingual status may be taken from South Africa. Malherbe (1946), in his monumental study, used equivalent tests of vocabulary, same-opposites, story completion and speed and comprehension of reading with his English- and Afrikaans-speaking subjects. Meiring and Van Rensburg (1950) gave the same Afrikaans and English language tests to English- and Afrikaans-speaking children in the Cape Province. Their method of assessing the

relative degree of bilinguality of the two groups consisted of calculating the percentage of second language pupils reaching or exceeding the median, lower quartile and tenth percentile of home language scores. And McConkey (1951) used an Afrikaans and English vocabulary test to ascertain the bilingual status of Natal European children in standards seven, eight and nine.

With regard to rating scales, Saer (1928) and Malherbe (1946) have distinguished broad grades of bilingualism.

Saer recognises three bilingual types and monoglot. The monoglot are those individuals who have no effective comprehension of a second language. The lowest degree of bilingualism is shown by those who comprehend simple questions in the second language but fail to make use of it in their answers. Next come the average bilingualists who possess a good comprehension of the mother tongue and a good degree of facility in using it, together with a lower ability in using and understanding the second language. Finally, there are the bilingualists who speak their mother tongue regularly and take enough interest in it to read it, but who have also arrived at a good degree of facility in speaking the second language and make good progress in reading and writing it.

Malherbe constructs his scheme on the premise that bilinguality represents a continuum extending from 0 to the ideal 100%. According to him, the question should not be "Is a man bilingual or not?" but "How much, or to what extent, is he bilingual?" And this "how muchness" can be graded like steps on a ladder. Referring specifically to South Africa, he proposes that bilingualism be rated in the second language, as follows:-

Stage I: At this stage a man must be able to follow intelligently an ordinary conversation, speech or sermon in the second language, both in its written and spoken form. The ability to speak the second language

with any degree of fluency is not a sine qua non at this stage.

Stage II: This stage requires, in addition to the above, an ability to converse intelligibly and with a fair amount of fluency in the second language. The accent need not be perfect nor the idiom pure, but the person should be able to make himself understood for all practical purposes.

Stage III: This stage includes all the requirements of Stage I and II and, in addition, the ability to write the second language correctly. A perfect accent is still not a sine qua non; what is required here is an efficient paper-language.

Stage IV: In addition to the requirements mentioned in the foregoing stages, this stage demands not only correctness on paper but a correct and convincing power of expression both in writing and speaking the two languages. This should be the minimum requirement of the bilingual teacher. Speech must be fluent, and both accent and idiom must be such that they can serve as fit models for growing minds to imitate.

Stage V: This stage is represented by the attainments of those selected few who both as users and as students of the two languages would probably reach the upper 10 percentile in both languages.

Stage VI: This is the unapproachable ideal, namely 100% perfection in both languages.

Various studies have been made of the relationship between bilingualism and the following characteristics:-

- (a) Mental development.
- (b) Language development.
- (c) School achievement.
- (d) Speech and other motor functions.

(e) Personal and social achievement.

(f) Learning a second language.

Of these, only (a), (b) and (c) above are relevant to the present investigation and will be discussed.

For the sake of clarity in exposition the literature on bilingualism will, from this point, be reviewed under two heads, namely, that pertaining mainly to mental development and that concerned largely with educational development.

(b) Literature Pertaining Mainly to the Influence of Bilingualism on Mental Development:

The method generally adopted to study the relationship between bilingualism and mental development has been to administer tests of intelligence to bilingual and monoglot children and to compare the results. Some investigators have used only verbal tests, others only non-verbal, and still others, both verbal and non-verbal to the same group of children. In a few cases verbal intelligence tests have been administered in the two languages of the bilingual child and scores compared.

In some cases the performance of the bilingual child has been compared with that of his monoglot contemporaries of his own natio-racial group, at other times with a different or a mixed group.

A few studies have been longitudinal - the observations and testing having been made on the same child at different periods of growth. But most of the studies are cross-sectional - the observations and testing being made at one point in the child's development.

The results of all these studies are not uniform. After examining nearly one hundred investigations in America and abroad up to 1945, Arsenian (1945) summarises the findings as follows:-

1. "Bilingual children as compared with monoglot children of the same age and environment are neither retarded nor accelerated in their mental development. This conclusion is especially evident when the two groups are compared on non-language tests of intelligence.
2. "When verbal tests of intelligence are used for comparison, the bilingual children fall short of their monoglot contemporaries in the majority of cases, the disparity being greater the more verbal the content of the test is. This generalization must however be limited by two observations:-
 - (a) On the whole, the older the bilingual child and the higher the level of his educational attainment, the smaller is the discrepancy between his verbal intelligence test performance and the performance of a monoglot of the same age or educational attainment.
 - (b) The verbal intelligence tests show that the apparent retardation of bilingual children varies from place to place and from group to group. Bilingual children in urban areas, like the Welsh children in the cities and the Jewish children in London or New York, show either no retardation or a slight superiority to the norms of monoglot children, while in rural Wales the Welsh children, and in the southwest of the United States the Spanish-speaking children according to these verbal intelligence tests show a serious handicap".

He concludes: "This summary points to the conclusion that bilingualism neither retards nor accelerates mental development, and that language handicap is most likely the factor responsible for the discrepancy between the performances of bilingual and monoglot children on verbal tests of intelligence".

With regard to the relationship between bilingualism and language development, Arsenian (1945) summarises the position up to 1945 as follows: "On the whole, these studies show a language deficiency for the bilingual child. However, the extent and period of such deficiency seem to depend on certain factors, such as, the extent of educational opportunities, the intelligence of the bilingual children, and the methods of organization and instruction in schools". He adds: "The higher we go on the educational level the more opportunity does the bilingual child have to catch up with the monoglot in his knowledge of the vocabulary of the dominant language. Terman's finding is of great interest in this connection. He discovered that for the bilingual student, vocabulary is lower than mental age up to the third or fourth grade, but that after twelve years of age vocabulary is equal to mental age".

Arsenian's own investigation into bilingualism and its effects (1937) is one of the most careful and most comprehensive in this field. It will be described in some detail as the present study is, in some measure similar to his. Arsenian's aim was twofold. Firstly, he wished to examine bilingualism, expressed by the score of the Hoffman Schedule, in its relationship to age, sex, socio-economic status, age-grade status and length of residence of parents for a group of Italian and a group of Jewish children separately. Secondly, he wished to ascertain the relationship of bilingualism to the mental ability and mental development of the children, as revealed by two intelligence tests.

Nearly all the studies of the effects of bilingualism in the United States between 1918 and 1934 had taken the form of comparing children of native-born American parents with children of foreign-speaking immigrants, thus introducing unknown natio-racial factors. To avoid this difficulty Arsenian confined his study to the effects of bilingualism within each of two natio-racial groups, an Italian and a Jewish group.

To investigate the effects of bilingualism on mental development, Arsenian used the Pintner Non-Language Test and the Spearman Visual Perception Test. His reason for using non-language tests in preference to verbal intelligence tests in either the mother tongue of the bilingual children or in English was to eliminate the influence of linguistic facility or ability of the subjects in either language on the test results. That even this precaution does not solve all problems is admitted by Arsenian, for he says: "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 and by the observations on nursery school children by Baldwin and Stecher 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 first part of Arsenian's research - that concerned with the relationship between bilingualism and age, socio-economic status, age-grade status and length of residence of parents in the United States - brought forth the following results:-

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

No statistically significant differences were found between the bilinguality scores of boys and girls in both the Italian and Jewish

groups. Hoffman (1934) had also found no sex differences among his Italian and Jewish subjects.

Bilingualism was found to be correlated with socio-economic status¹⁾ to the extent of $-.20$. This implied that the more well-to-do and socially more advanced people were relinquishing their foreign language background faster than the economically and socially less fortunate people who were adhering more tenaciously to their original language background and to the traditions and literature expressed in that language.

The correlation between bilingualism and age-grade status (or school retardation) was zero for the Jewish children and $-.20$ for the Italian group, i.e., for the Italian children, the higher the bilingual score the greater was their scholastic retardation.

The ratio of foreign language to English language background was found to decrease regularly with increase of the period of residence of both Italian and Jewish families in the United States.

It was also found that the influence of parents on the extent of bilingual status of their children was shared equally by father and mother.

In the second (and main) part of the investigation which was concerned with the relationship between bilingualism and mental development, the method of correlation and two methods of comparison between groups equated for certain factors were employed.

The correlational method showed practically no relationship between bilingual status and scores on the intelligence tests for each of

1) Measured by means of seven questions adapted from the Sims Score Card.

the groups separately, and for each age from 9 years through 14 years. The 34 product-moment correlation coefficients that were calculated ranged between $-.217$ and $.118$.

When the factor of socio-economic status was held constant by means of the partial correlation technique, the relationship between the two variables showed no essential change.

The relationship expressed by eta (correlation-ratio), between bilingualism and intelligence for the two experimental groups, while slightly higher, was statistically insignificant. The etas (corrected) ranged between $.042$ and $.143$.

In the first of the two comparative methods 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 for socio-economic status and compared in regard to intelligence and other factors.

No essential difference between the mental development of low and high bilingual children from age 9 through 14 was disclosed.

I.Q.'s. on the Pintner Non-Language Test for the low and high bilingual groups within each natio-racial classification was practically the same.

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

In the second of the two comparative methods no reliable differences in intelligence or age-grade status were found between a group of monoglot and a group of bilingual children, matched child for child on race, sex, socio-economic status, and age in months.

Arsenian's final conclusion was that the acquisition of two language systems of the bilingualist in place of one system, as is the case with the monoglot, does not have a detrimental influence on mental ability and development.

Pintner and Arsenian (1937) published separately the findings on a verbal intelligence test given to the sixth and seventh grade Jewish children used in Arsenian's original (1937) study. The Pintner Intelligence Test, Form A, consisting of eight sub-tests, namely, vocabulary, logical selection, arithmetical reasoning, best answer, number sequence, classification, opposites and analogies was used. The correlation between intelligence test scores and bilingualism (measured by the Hoffman Schedule) was $-.059$ (P.E.: 0.031). When age was partialled out, there was no change. With socio-economic status partialled out, the figure dropped to $-.029$. A study of the extreme bilingual groups by the comparative method also yielded negative results.

Darcy's review of the literature on bilingualism (1953) supports the main conclusions reached by Arsenian (1937 and 1945). She says that investigators who conclude that bilingualism has a favourable effect on the measurement of intelligence are in the minority. The general trend has been toward the conclusion that bilingualists suffer from a language handicap when measured by verbal tests of intelligence but that there is no inferiority on the part of bilingual subjects when their performance in non-language tests of intelligence is measured against that of monolingual subjects.

Although investigations into bilingualism and its effects in different parts of the world have been adequately surveyed by reviewers up to 1953, it will perhaps be useful to review longitudinally and in somewhat more detail the researches carried out in this field in one

specific region not only up to 1953 but also from that year up to the present. This will provide a more intimate view of the problems encountered in studies of bilingualism, of the often conflicting nature of the results obtained and of the unceasing efforts of researchers to improve their techniques. Such a longitudinal review of the work done in one area is made possible by the fact that Wales has been a favourite experimental ground for investigators interested in problems of bilingualism since 1922 to the present time, that is to say, from about the time that bilingualism and its effects first began to be scientifically studied.

Davies (1954) describes the general situation as follows:

"Wales consists very largely of English monoglots and Welsh bilinguals; with many of the latter it is difficult to decide which their language really is. The greatest problem here is the young child who is primarily Welsh, but who is so mixed in linguistic background as to be difficult to 'reclaim' as Welsh".

The first comparative studies of the mental development of Welsh-speaking bilingual children and monoglot English-speaking children were made by Saer (1922 and 1923). He tested about 1,400 children from 7 to 12 years of age in five rural and two urban districts of Wales. The tests were adaptations from the Binet-Simon Scale and were translated into the mother tongue for the benefit of the Welsh-speaking children. The rural monoglot group were found to be superior to the rural bilingual group by 10 points of I.Q., while the urban monoglot and bilingual groups achieved almost the same mean. In vocabulary also no substantial difference was noticed between the monoglots and the bilingualists in the urban areas, while in the rural districts a retardation of more than a year in the vocabulary level of the bilingual groups appeared.

Differences in performance between monoglots and bilingualists were thus found only in the rural areas. Saer considered that this was

due to the fact that the children in the towns (unlike the rural children) used English in their play before going to school as well as during school years and, therefore, escaped to a great extent the emotional disturbance experienced by the rural children when they found they could not meet the demands of school-life with their mother-tongue alone. At the same time he detected evidences of mental confusion in the bilingual urban children when he gave tests of dextrality and rhythm, which seemed to indicate that they, too, had suffered a mental disturbance from the too early use of a second language.

Saer also gave group intelligence tests to university students and the results showed that bilingual students who came from rural areas were inferior to monolingual students from similar areas. No such difference was found between monoglots and bilingualists from the urban areas. He concluded from this that the mental confusion due to bilingualism was of a permanent nature since it persisted in students at university level.

Arsenian (1937) criticises Saer's work on two main grounds. Firstly, the mere translation of a verbal test does not guarantee equivalence of difficulty, so that a comparison between monoglots and bilingualists could be prejudiced by this fact against the bilingualists. Secondly, it is assumed that by translating the tests into Welsh the performance of the Welsh bilingualist was thereby benefitted more than if the tests were given in English. But then not all the bilingualists could have been of the same degree of efficiency with regard to the languages involved, and as no objective measurement of the extent of bilingualism was made use of one can only hope that the averages would smooth out the differences. One cannot be certain. Besides, Saer himself found that the vocabulary of the monoglot children in English was higher than that of bilingual children either in English or in Welsh. It is obvious from this that the bilingual child under such conditions would suffer a vocabulary handicap which would

depress his performance on the verbal tests in either language. For these reasons Arsenian concludes that "the presence of the language factor in tests of intelligence tried on the bilingual child will always make the results with respect to the bilingualist's intelligence of doubtful interpretation".

He continues: "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' (Mental and Scholastic Tests) . 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 The work in the United States (also) 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".

Smith (1923) investigated the school performance of monoglot and bilingual Welsh children of ages 8 to 11 in four urban schools. The following four tests were used: (a) two free composition exercises, each of 15 minutes duration; (b) the Whipple Word Building Test; (c) a mutilated passage test consisting of two stories from each of which fifteen words were omitted; and (d) an analogies test of twelve items. When the scores of the four schools were combined, the monoglot children were found

to be superior to the bilingualists on every test. The researcher concluded: "So far from bilingualism being an 'intellectual advantage', it seems to be exactly the reverse".

Smith's tests were all verbal in character and administered in English so that Arsenian's criticisms of Saer's work in respect of the bilingualist's handicap in language would apply in this case also. Moreover, at least two of Frank's tests had low reliability quotients, .5 and .7.

A departure from the use of verbal tests alone in comparative studies of the intellectual development of monoglots and bilingualists was made by Barke (1933). The investigator administered both the Pintner Non-Language Test and the Northumberland Standardized Tests (verbal) to 697 children of ages 10 to 14 inclusive in three bilingual and two monoglot schools in a mining district in South Wales. The socio-economic status was regarded as similar in the various groups from the point of view of parental occupation, although further inquiry suggested that the home environment of the bilingual group was somewhat superior to that of the monoglots.

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

Comparison between the two groups was made on the basis of mental age. It was found that the monoglots were superior by .8 of a year of M.A. on the verbal test, while the bilingualists were .44 of a year superior on the non-language test. The inferior performance of the bilinguals on the verbal test was attributed to language difficulties, and in particular to their imperfect comprehension of the English language. It was suggested that under conditions of bilingualism non-verbal tests should be used to measure intelligence in preference to verbal tests. It will be noted that Barke's findings were similar to those generally arrived at in the United States.

A later study by Barke and Parry-Williams (1938) confirmed these results. In this investigation the Pintner Non-Language Test and the Northumberland Standardized Tests were again used and, in addition, the vocabulary level of the subjects was ascertained. The sample comprised children aged $10\frac{1}{2}$ to $11\frac{1}{2}$ years, drawn from two adjacent schools in a Welsh mining district. The findings were as follows:-

- (1) The difference between the bilingual and monoglot groups, when measured by the non-verbal mental test was negligible.
 - (2) The bilingualists were distinctly inferior to the monoglots when measured by the Northumberland Tests presented in English (their second language).
 - (3) When the two groups were measured by the verbal test given to each in its mother tongue, the superiority of the monoglot group was more marked.
 - (4) The inference was that the bilingual children were unable to do justice to themselves in either language.
 - (5) The bilingualists, neither in their mother tongue nor in their second language, had a vocabulary equal to that of the monoglots as measured by the tests of vocabulary given to them.
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- (6) This inferiority in vocabulary, when taken in conjunction with the equality of the bilingualists and the monoglots in the non-verbal intelligence test, was probably responsible in large measure for their inferiority to the monoglots in the two verbal mental tests.

Jones (1933) compared monoglot and bilingual urban children on three batteries of tests arranged in a progressive scale of verbality. At the one extreme, was non-language material represented by nine subtests which were pictorial or perceptual in content; the intermediate material consisted of four "concrete-verbal" tests in which the items were the names of concrete objects or of common attributes; at the other extreme, there was a series of "abstract-verbal" tests requiring the manipulation of abstract concepts or meanings. In addition, attainment tests of English were given. The instructions for all tests were given to each group in its mother-tongue, except for the achievement tests which were given entirely in English. Furthermore, the abstract-verbal tests were given in their original English form to both monoglot and bilingual groups. The groups were matched for age (10 years) and for socio-economic status (by parental occupation). Linguality was assessed by means of a questionnaire and teachers' reports. A comparison of mean scores for monoglot and bilingual groups revealed no statistically significant differences between them on any of the tests in the progressive scale of verbality. It was concluded that an early bilingualism need not be a handicap in either non-verbal or verbal tests of intelligence. Nor were any significant differences between the two groups found in the attainment tests of English.

James (1947) compared monoglot and bilingual groups selected by means of a modified form of Hoffman's Schedule, teachers' reports and interviews with the children. The age range of the groups was 8 to 11 years and their socio-economic backgrounds (by parental occupation) were

similar. Analyses of variance applied to the data showed that the difference between the monoglot and bilingual children in attainment in the school subjects as measured by teachers' assessments was not significant. Further, Form A of Cattell's Scale I (non-verbal) was administered in English to both groups, followed by Form B administered in Welsh to the bilingual group and in English to the monoglot group. T-tests revealed no significant difference in intelligence between the two groups on either administration of the non-verbal test.

Jones and Stewart (1951) undertook a study in which analysis of covariance was used to equate monoglot and bilingual groups on a non-verbal test in order to ascertain their relative status on a verbal test of intelligence. They pointed out four defects in previous researches into Welsh-English bilingualism, as follows: (a) The statistical significance of differences between group means was never indicated. (b) The test material was often unsuitable in validity and reliability. (c) Translation of a verbal test into Welsh does not necessarily guarantee equivalence of difficulty in the Welsh and English versions. (d) No language questionnaire was used to obtain an objective estimate of the pupils' bilingual background.

In their own study two groups of children aged $10\frac{1}{2}$ to $11\frac{1}{2}$, consisting of 326 monoglot children from a predominantly English-speaking area of Wales and 518 bilingual children from a predominantly Welsh-speaking area, both living in a predominantly rural environment, were tested with non-verbal and verbal tests of intelligence (Jenkins's Scale of Non-Verbal Mental Ability and The Cotswold Mental Ability Test, respectively). The tests were administered in English to the monoglot group, and in Welsh to the bilingual group, care having been taken to ensure that the Welsh and English versions of the tests were equivalent in difficulty.

In the raw results a highly significant difference in favour of the monoglot group was found in both the verbal and the non-verbal tests of intelligence, the finding in the case of the latter test being contrary to those of Barke (1933) and Parry-Williams (1938).

To discover whether the difference observed in favour of the monoglot group in the verbal test remained significant when the two groups were equated for the non-verbal test, an analysis of covariance was carried out. It was found that, as a result of adjusting the verbal scores to a common non-verbal basis, the difference was substantially reduced, but still remained statistically significant. It was therefore concluded that the bilingual children were significantly inferior to the monoglot children, even after full allowance had been made for the initial difference in the non-verbal intelligence test.

Jones (1952) carried out an investigation which had a somewhat different purpose. He wanted to ascertain whether the performance of Welsh-speaking (bilingual) children in a verbal intelligence test in English differed significantly from their performance in a non-verbal test administered in Welsh, and to examine any such difference in relation to their reading ability in English. His subjects were 117 children in the senior classes of five schools in quarrying districts, aged 10:2 to 12:0. The tests used were Jenkins's Scale of Non-Verbal Mental Ability, the Moray House Intelligence Test 42 (verbal) and two tests of reading, namely, Schonell's (1950) Graded Reading Vocabulary Test (oral) and the Watts-Vernon Silent Reading Test. Parental occupations, analysed according to a standard classification, were used as an estimate of socio-economic status.

In the schools used by Jones the bilingual policy of the education authority provided that formal training in the use of English as

a second language should begin at about seven years of age. Welsh was used as the main medium of teaching up to about nine years of age, but the minor language - English - was developed as a teaching medium between nine and eleven years of age until at the end of the primary stage, it occupied a place of almost equal importance with the mother tongue.

It was found that the mean I.Q. of the children on the non-verbal test was significantly greater than their mean I.Q. on the verbal test and that this difference was associated with inadequate reading ability in English. The difference between the two means tended to diminish as reading age in English increased, although the gap between them was not entirely closed even with reading ages as high as 10 or 11 years.

The main conclusion was that I.Q.'s obtained from the verbal group test in English cannot be regarded as valid assessments in the case of these Welsh-speaking children owing to their inadequate reading ability.

An interesting finding was that the correlation between the results on the non-verbal test and those on the verbal test was .836. Such a high correlation suggested that inadequate reading ability in English did not materially disturb the order of merit of I.Q. in the verbal test in comparison with that obtained in the non-verbal test. For this reason Jones held that group verbal intelligence tests in English, in spite of their disadvantages for I.Q. assessments with Welsh-speaking groups and for comparisons between groups of varying linguistic background, may still prove useful for the purpose of arranging Welsh-speaking children within the same linguistic category in a relative order of merit.

A further investigation into the influence of reading ability in English on the scores of Welsh-speaking (bilingual) children in a verbal intelligence test presented in English was undertaken by Jones (1953). Two groups of children aged 10 to 12 years were used. A language question-

naire showed that the one group consisted of monoglot English children, and the other of Welsh bilingual children who came from homes where Welsh was always spoken and whose knowledge of English as a second language had been acquired outside the home, mainly in school. They were given the same intelligence tests as in the 1952 study but only one test of reading was used, namely, Schonell's Silent Reading Test B (R. 4) (1950). The non-verbal test was administered in Welsh to the bilingual group, and in English to the monoglot group. The other two tests were given entirely in English to both groups.

No significant differences were found between the two groups in non-verbal intelligence (this result being contrary to that of Jones and Stewart (1951)) but a highly significant difference appeared in favour of the monoglot group in both the verbal intelligence test and the silent reading test. When, by covariance statistics, the two groups were equated for reading ability, the difference in verbal intelligence scores was substantially reduced, but a highly significant residue still remained. Jones attributed this residual difference to the fact that the bilingual children had not yet acquired the ability to "think in English" with an adequate degree of facility and accuracy.

This investigation, however, says Jones, afforded evidence which indicated that Welsh-speaking children are not similarly handicapped in verbal thinking which may be carried on through the medium of their mother tongue. The bilingual group, in addition to the tests already mentioned above, were given a group verbal intelligence test standardised on a representative sample of children whose linguistic background was purely Welsh. It was found that their performance on this test did not differ significantly from that on the non-verbal test of intelligence.

He summarises as follows: "It appears, therefore, that the position as regards verbal intelligence tests in English is now fairly

clear. These researches provide statistical evidence for the disadvantage which may be experienced in tests of this kind by bilingual children whose second language is English; they also indicate that such a disadvantage may arise not only from inadequate reading ability in English, but also from other factors such as the inability to 'think in English' with a sufficient degree of fluency and accuracy.

"The evidence as regards verbal intelligence tests adapted into Welsh is somewhat contradictory, although there are some indications that Welsh-speaking bilingual children are not necessarily handicapped in such tests".

On the other hand, Morgan (1957), using three non-verbal tests obtained statistically significant differences in favour of the monoglots in two tests, while the performance of the monoglots was slightly superior also on the third (the Raven Matrices (1938)). The fact that, of the tests employed, the one in which the retardation of the bilingual children was least (and non-significant) was the one test without a time limit, namely, the Raven Matrices, has led Morrison (1958) to suggest that the bilingual child, having to make a choice between two languages (and probably trying to use both on occasions), tends to be slightly slower at thinking than the monoglot, and is thus penalised on all timed tests.

A recent report on the problem of bilingualism is that of Lewis (1959). He notes that investigations of the effect of (English-Welsh) bilingualism on performance in non-verbal tests of intelligence have not yielded a consistent pattern of results. For his own study he used 372 ten-year-olds from 16 primary schools in Wales. Jenkins's Non-Verbal Scale of Mental Ability was used as a measure of intelligence. The monoglot children worked the English and the bilingual children the Welsh version of the test. Oral instructions were given in English to the

monoglots and in Welsh to the bilingualists. Linguistic background was assessed by means of a language questionnaire, the assessment being compared with teachers' ratings. Care was taken to select a homogenous group of a thoroughly Welsh background (i.e., a bilingual group) together with a corresponding English-speaking group (with a background of no appreciable "Welshness"). The groups, says Lewis, did not differ appreciably with regard to parental occupation though he admits that a more thorough analysis of the socio-economic factor might have revealed some differences. Also, the groups were not equated with regard to the urban-rural factor, there being a slightly higher proportion of Welsh-speaking bilingualists coming from a rural environment than of English-speaking monoglots.

The results showed a statistically significant difference in favour of the monoglots, corresponding to about 8 points of I.Q. Lewis suggests that this difference may be due, in part, to one or more of the following factors:-

- (a) The preponderance of rural subjects in the bilingualist group.
- (b) Differences in socio-economic status of the two groups.
- (c) The fact that the test was a timed one (cf. Morrison (1958) above).
- (d) The fact brought to the fore by Emmett (1949) that there is a "v" factor loading even in the case of non-verbal tests of intelligence since language is involved in the administration of the test and possibly also in the thinking processes of the testees.

Jones (1960) has criticised Lewis's study on just these points and the latter's reply to the criticisms (Lewis, 1960b) has not been entirely convincing. However, one definite advance over previous Welsh studies was the care with which Lewis assessed linguality in his subjects.

Reviewing the evidence on the effects of bilingualism from Welsh studies, Jones (1959) says that out of seven investigations in

which non-verbal tests of intelligence and adequate statistical criteria were used three report favourably (Jones, 1933; James, 1947; and Jones, 1953) and four unfavourably (Jones and Stewart, 1951; Jones, 1955; Jones et al., 1957; and Morgan, 1957) on the performance of bilingual children relative to monoglots. To the latter group may be added the investigation of Lewis (1959) which has been described above.

He describes two other studies carried out with non-language tests of intelligence in Wales, namely, the Bangor Survey of 1951 and the W.J.E.C. Survey of 1954.

In the Bangor Survey all children in primary and secondary schools in Caernarvonshire between the ages of 10 years and 11 years 11 months on 21st November, 1951, and numbering 2,517 in all, were given a language questionnaire similar to the Hoffman Schedule, the Jenkins Scale of Non-Verbal Mental Ability, the Jenkins Cotswold Mental Ability Test, Series I (verbal), The Schonell (1950) Silent Reading Test B (Test R4) and the Schonell (1950) Essential Mechanical Arithmetic Test, Form A. On the basis of the language questionnaire and headteachers' reports the children were subdivided into four linguistic groups, namely, Welsh, Mixed-Welsh, Mixed-English and English (the extreme groups being monoglot).

In the W.J.E.C. Survey 749 children between 10 and 11 years of age in primary schools in Aberystwyth and Bangor were tested for intelligence and educational attainment. Language background was assessed by the methods employed in the Bangor Survey of 1951. The Jenkins Scale of Non-Verbal Mental Ability (Welsh and English versions) were used.

In both investigations analyses of variance revealed highly significant overall differences between the four linguistic groups on the non-verbal test of intelligence, the tendency being for mean scores to increase as the linguistic composition of the groups became increasingly more English.

While acknowledging the accuracy of the factual data, Jones was unable to accept the interpretation that bilinguality as such was a source of disadvantage in non-verbal test situations without further investigation. He therefore subjected the 1951 Bangor Survey data to further analyses with socio-economic status as the main variable. The data of this survey was used because it was derived not from a random sample but from complete age-groups in a region in which varying linguistic and socio-economic classes were adequately represented. Parental occupation, ascertained and classified carefully according to a well-known status scheme, was used as the measure of socio-economic background. The data was broken down along three main lines, as follows:-

- (1) Chi-square tests revealed that the four linguistic groups, that is to say, Welsh, Mixed-Welsh, Mixed-English and English (which had already been found to show significant overall differences in intelligence on non-verbal tests as noted above) also varied significantly in respect of occupational status. There was a decided tendency in favour of agricultural occupations in the Welsh group, whereas, in the English and Mixed-English groups in particular the emphasis tended to be on occupations in the salaried, small employer and non-manual (i.e., "higher") categories. It appeared, therefore, that the differences in mean scores on the non-verbal intelligence test arose as much from occupational as from linguistic variations between the groups.
- (2) The schools used in the survey were next classified into three types, as follows:-
 - (a) Welsh Schools, with 80% to 100% of Welsh-speaking children.
In these schools, Welsh was the sole medium of instruction in the infants' department up to about seven years of age, English being introduced informally through occasional rhymes, jingles

and songs. In the junior department, Welsh was maintained as the main medium of teaching up to 11 years of age, but English was developed formally as a second language.

- (b) Welsh Bilingual Schools, with 30% to 80% of Welsh-speaking children. In some of these schools there was parallel or vertical classification of Welsh and English-speaking children for teaching of most subjects. In others the minor and major linguistic groups were taught together throughout the day.
- (c) English Bilingual Schools, with less than 30% of Welsh-speaking children. Some of these schools organised their work on parallel or vertical lines for all subjects, English and Welsh children being taught through their own mother tongue, except for the second language lessons. Other schools used English as the sole medium of instruction for all children, but they invariably regrouped the children according to linguistic ability for the study of Welsh.

The secondary schools were classified in the same way but the pattern of linguistic education was not as clearly defined in them as in the primary schools, owing to the increasing use of English as the medium of instruction.

According to this classification, there were in the 1951 Bangor Survey, 133 Welsh schools and 31 bilingual schools of which 16 were English Bilingual and 15 Welsh Bilingual. 87% of the Welsh schools, as compared with 25% of the bilingual schools, were situated in the rural areas.

Analyses of variance and t-tests showed that there were significant differences between the four linguistic groups in the non-verbal intelligence test in the Welsh schools, the more

"English" the composition of the group, the higher the scores. On the other hand, no such differences appeared between the linguistic groups in the bilingual schools. At the same time, chi-square tests showed highly significant differences between linguistic groups in the Welsh schools with the English and Mixed-English groups favoured, while no such significant differences between the linguistic groups appeared in the bilingual schools. This, second, analysis confirmed the conclusion of the first that the significant differences in mean scores on the non-verbal test of intelligence arose from occupational as much as from linguistic variations between groups of monoglot and bilingual children.

- (3) In the third breakdown of the data, comparisons were made between the four linguistic groups drawn only from Welsh Bilingual and English Bilingual schools. Differences in occupational class were excluded. It was found that inter-group differences in mean scores on the non-verbal intelligence test were negligible, that is to say, the various groups of monoglot and bilingual children did not differ significantly in intelligence when they were matched for socio-economic status. This analysis was crucial in the sense that, while significant inter-group differences in non-verbal scores were present when occupational differences were present (Analyses (1) and (2)), they were absent when occupational differences were eliminated (Analysis (3)). It must be noted, however, that the third analysis concerned only the bilingual schools which, as has already been pointed out, were situated mainly in the urban areas (which were linguistically mixed). The question whether or not significant differences in scores on the non-verbal intelligence test between the linguistic groups in the rural (Welsh) schools would appear, with socio-economic status held constant, does not seem to have been investigated by Jones.

In any case, the results are sufficient to invalidate the findings of previous investigators who did not carefully control the factors of socio-economic status and urban-rural background when assessing the effects of bilingualism, and the criticism holds for the bulk of Welsh studies.

Jones says: "Apart from indicating that bilingualism is not necessarily a source of intellectual disadvantage, the present survey has drawn attention to the influence of socio-economic factors in comparisons between groups of monoglot and bilingual children, and has emphasised the importance of such factors in the correct interpretation of test-results. It has also pointed to the reasonable conclusion that investigations which omit a detailed analysis of the socio-economic factor are fundamentally at fault, and that a comparison between monoglot and bilingual groups based on the results of such investigations may lead to unwarranted conclusions concerning the influence of bilingualism on intelligence. It is, indeed, highly probable that occupational differences of the kind revealed in the present analysis may largely account for the findings of previous investigators, who have reported significant differences in non-verbal intelligence in favour of monoglot groups by comparison with bilingual groups".

One other post-1945 study of the problem of bilingualism must be described as it is of some relevance to the present study. Anastasi and Cordova (1953) tested a number of Puerto Rican children in grades six to eight of a school in the Spanish Harlem area of New York City on the Cattell Culture Free Intelligence Test, Forms 2A and 2B. One of the forms was administered in Spanish (the home language) and the other in English. The over-all performance of the group fell considerably below the test norms reported by Cattell but it was found (by means of variance analysis) that the language in which the test was administered had no significant

effect upon performance. Translating the directions into Spanish did not materially improve scores. The investigators concluded that the bilingualism encountered among the Puerto Rican children was of the bifurcated variety, the children's mastery of either language being restricted and inadequate. They attributed the subnormal scores of the group to "the very low socio-economic level of the Puerto Rican children, their bilingualism which makes them deficient in both languages, their extreme lack of test sophistication, and their poor emotional adjustment to the school situation". In so far as this maladjustment itself was due to the children's severe language handicap during their initial school experiences, it was suggested that a solution of the language problem would be a necessary first step for the effective education of migrant Puerto Rican children.

(c) Literature Pertaining Mainly to the Influence of Bilingualism on Educational Attainment:

Although the literature outlined in the preceding sub-section concerned the relationship between bilingualism and mental development, there were occasional references to findings with regard to the influence of bilingualism on scholastic attainment. These will now be brought together and further additions made.

Research work undertaken in different parts of the world into the psychological aspect of bilingualism seems to have been concerned mainly with its relation to intelligence, so that there is not much evidence to show how bilingualism may affect a child's level of school achievement.

Reviewing the existing literature in this connection up to 1945, Arsenian (1945) concludes: "The bilingual's deficiency in language reflects in his school performance, especially on the elementary school

level. Studies reported from Belgium, Czechoslovakia, Canada, the Philippine Islands, Puerto Rico, and a number from this country (the United States) are almost unanimous in showing lower performance by the bilingual child. This deficiency of the bilingual is most apparent in verbal subjects, such as reading, history, and geography; and is much less apparent in non-verbal subjects such as arithmetic and science. On the high school level the differences seem very slight, and on the college level they apparently disappear".

The results of eight Welsh studies are available and these will now be briefly described.

Saer (1922 and 1923) used tests of vocabulary and composition with monoglot and bilingual children between 7 and 11 years of age. He found that the sharpest rise in the vocabulary curve occurred with unilingual children in rural districts at the age of 8 or 9 years, whereas in the case of bilingual children this was postponed until the age of 10 or 11. However, he discovered no such developmental difference in the case of urban children. The vocabulary level of monoglot children in English was higher than that of bilingual children either in Welsh or in English. With regard to composition, Saer found the work of bilingual children to be very much inferior to that of monoglot children.

Smith (1923) found that the performance of bilingual children, aged 8 to 11 years, in four urban schools was consistently inferior to that of monoglots in tests of free composition, word-filling, word-building and analogies.

James (1947), using children of the same age range as Smith, found no significant difference between monoglots and bilingualists in school subjects as measured by teachers' assessments.

Williams (1952) tested children of 9 and 11 years of age in three Welsh schools and one English school in Caernarvonshire. She concluded that, with intelligence held constant, there was not usually a significant difference between English and Welsh groups in English reading and English spelling. This finding was confined to children of average and above-average intelligence. Pupils of below-average intelligence were not compared.

Jones (1953) found a significant difference in a reading comprehension test presented in English to monoglot and bilingual groups aged 10 to 12 years in favour of the former, the children being matched for non-verbal intelligence.

Jones (1955), using the data of the 1951 Bangor Survey, compared the performance in a reading comprehension test of four groups statistically matched (by covariance technique) as regards non-verbal intelligence but differentiated linguistically into Welsh, Mixed-Welsh, Mixed-English and English categories on the combined basis of a language questionnaire and headteachers' estimates. Two age groups were tested, namely, 10:0 to 10:11 and 11:0 to 11:11. Highly significant overall differences were discovered at both age levels, the tendency being for mean scores in reading comprehension to decline as the composition of the groups became increasingly Welsh (i.e., increasingly bilingual).

Lewis (1960a) analysed the scores of 375 ten-year-olds used in the 1954 W.J.E.C. Survey in Wales to study the differences in attainment between 16 primary schools that varied in English-Welsh bilinguality. The children had worked two attainment tests of English (Schonell's Silent Reading Test B (Test R4) for comprehension and the Moray House English Test 21 (M.H.E. 21) for English usage); two attainment tests of arithmetic (Schonell's Essential Mechanical Arithmetic Test (Form A) and Schonell's

Arithmetic Test (Form A)); and one intelligence test - the Jenkins' Scale of Non-Verbal Ability. A language questionnaire, similar to Hoffman's Bilingual Schedule (Hoffman, 1934) was administered to assess the linguistic background of the subjects.

The results were as follows:-

- (1) The attainment differences between schools were considerable, though in the case of English comprehension, the overall dispersion of school means was not significant.
- (2) These attainment differences were found to be related to the corresponding differences in intelligence (this relationship being noticeably less in the case of mechanical arithmetic, however). In all the attainment tests the school means tended to increase with intelligence, but not regularly.
- (3) When the school attainments were adjusted to a common basis, as regards intelligence, by the analysis of covariance, the overall dispersion of the adjusted school means was significant in all the attainment tests. Differences in intelligence between schools did not, therefore, account fully for their attainment differences.
- (4) A linguistic background index was formulated to assess the "Welshness" of background of the school groups. Schools whose attainments in English - adjusted for intelligence - were markedly high, were observed to have low linguistic indices (i.e., low Welsh background), while schools whose adjusted attainments in English were low had high linguistic indices (i.e., high Welsh background). The tendency for high adjusted attainments to be associated with low linguistic indices and for low adjusted attainments with high linguistic indices was confirmed as being strong in both English tests, and was especially strong in English usage.

In arithmetic, on the other hand, the tendency for high adjusted attainments to be associated with low indices, and low adjusted attainments with high indices, was only slight.

- (5) Linguistic background was therefore regarded as an important factor with respect to those school differences of attainment in English which were not accounted for by intelligence. With regard to the corresponding attainment differences in arithmetic, linguistic background was of less importance, further research being regarded as necessary to decide whether the slight tendency observed was real.

The most well-known South African study which claims to be "by far the most comprehensive and thoroughgoing investigation on bilingualism hitherto conducted" is that of Malherbe (1946). The survey covered over 18,000 children in hundreds of representative schools. The author's interest in the subject was primarily practical, his main concern being to compare the levels of scholastic achievement of English- and Afrikaans-speaking pupils in unilingual and bilingual schools, with intelligence and economic environment held constant.

His main findings were as follows:-

- (a) As regards language attainment, the superiority of English- and Afrikaans-speaking pupils in their second language is considerable where they attend the bilingual school as against the unilingual school.
- (b) In their first language or mother tongue (whether English or Afrikaans), there is no loss whatsoever on the part of those attending the bilingual school.
- (c) The highest degree of bilinguism (obtained by adding each pupil's Afrikaans and English marks together) was obtained by bilingual children attending bilingual schools and the lowest by unilingual pupils attending unilingual medium schools where the medium was the same as the home language.
- (d) In the "content" subjects (arithmetic, geography, etc.) the results of the bilingual schools were consistently superior to those of unilingual schools.

- (e) Comparisons at different intelligence levels showed that children of both above average and below average intelligence do better school work all round in the bilingual than in the unilingual school. Most significant was that the greatest gain for the bilingual school was registered in the second language by the lower intelligence groups. Not only did they more than hold their own in their home language but in their second language their gain was nearly twice as big as that registered by the higher intelligence groups¹⁾.
- (f) Children from more or less bilingual homes were found to be more intelligent than children from purely unilingual homes. (The intelligence tests used were the old South African Group Test (verbal), the Beta Test (non-verbal) and the Otis Advanced (verbal)).
- (g) A special study of 5% of the pupils who were from a completely unilingual home environment but who were taught from the beginning solely through the second language (i.e., through the "wrong" medium) showed that these children suffered an initial but not very serious handicap in the content subjects. As they progressed to higher standards, the medium seemed to become of decreasing significance and had no observable adverse effect on school progress in standard six and beyond. In subjects like arithmetic, where language does not play such a big role, the handicap was smaller than in subjects like geography and history, where language plays a greater role in the acquisition of knowledge. Whatever handicap there was in the content subjects was found to be almost precisely in proportion to the relative strangeness of the language used as medium and was prac-

1) The validity of this point has been questioned by Jones (1955). He says that Malherbe failed to take account of the influence of regression in this comparison both for the total sample and for each of the two intelligence groups compared, hence this "somewhat strange conclusion".

tically non-existent where the child's knowledge of the second language approximated that of his first language.

Melherbe's report must rank as the most optimistic to date in favour of bilingualism and bilingual education. He not only found that bilingualism had no adverse effects on intellectual and scholastic development but that it actually promoted them. Such a view places him among the small minority of investigators who hold similar opinions (Darcy, 1953).

The position then, at the end of this survey of the existing literature on bilingualism, is that three of the leading authorities in this field, namely, Arsenian, Darcy, and Jones, agree that bilingual children as compared with monoglot children of the same age and environment are neither retarded nor accelerated in their mental development as indicated by performance in non-verbal tests of intelligence. They also agree that the results from verbal tests are not yet sufficiently clear-cut to permit the drawing of definite conclusions, though the weight of evidence favours the monoglots. Anastasi (1958) holds substantially the same view.

With regards to scholastic achievement, an aspect that seems to have received lesser attention from investigators than mental development, studies generally indicate lower performance by the bilingual child, especially at the elementary school level. The deficiency of the bilingualist is most apparent in verbal subjects such as reading, history and geography; and is much less marked in the non-verbal subjects such as science and arithmetic.

(3) THE PRESENT RESEARCH:

(a) The Place of the Present Research:

It has already been pointed out in the general introduction that the present research into the effects of bilingualism on the mental and scholastic status of Indian children was inspired by the practical difficulties facing the teacher of children most of whom were in the process of actively relinquishing their mother tongue in favour of one of the official languages of the country of their adoption. The development of theory or of lines of research into bilingualism, that were being followed overseas, was a secondary consideration. And yet, in the pursuit of the main aim the lesser one was equally served, for the investigator had, of necessity, to adjust his research techniques in the light of the fluctuating fortunes of past studies of bilingualism, as revealed in the survey made above of the existing literature on the subject.

Being the first research of its kind among Indians in South Africa, one could have observed caution and attempted merely a straightforward replication, in a new context, of any previous study already accepted as sound in design and interpretation, but this was not done. On the contrary, the present work differed from all known studies of the past in some important respect or other.

Firstly, it differed from all the Welsh studies cited above in the fact that the bilingual situation of Natal Indians is quite unlike the Welsh. Whereas Welsh children receive their early schooling through the medium of the mother tongue, Durban Indian pupils receive their instruction solely through the "second" language, namely, English, from the very beginning. In this respect Indian children resemble the small minority of European pupils (5%) in Malherbe's study of 1946, who were being educated through the "wrong" medium. But even this comparison is not

quite accurate, for in the case of Malherbe's subjects both the languages involved were official languages of the country, the children were au fait with the mother tongue and it was not so much a matter of their re-placing the mother tongue with a second language as one of acquiring another language in addition to the home language. In the case of Indian children, the position is that an official language (English) is actively ousting the home tongue which has no official status and which, in the great majority of cases, is very imperfectly known by the students themselves.

The bilingual situation of Indians here bears perhaps a closer resemblance to that of Arsenian's Italian and Jewish groups (1937) than to the position of the Welsh groups or of the South African European groups of Malherbe. But the sample used in the present study was richer than Arsenian's in linguistic heterogeneity. Whereas Arsenian studied homogeneous groups of Italian and Jewish children separately, there were available for the present study diverse religious-linguistic groups which were exposed to more or less the same environmental necessity of adopting a new language, a task that they were accomplishing with varying degrees of readiness. It is always possible, of course, that a massed study of heterogeneous religious-mother-tongue groups, so far from being an advantage, might introduce subtle influences that could distort the results. From first-hand experience of the groups, however, the researcher was satisfied that with all the children exposed to the same kind of social, political and educational experiences in the school, the playground and the street, there was no uncontrollable factor involved. It was felt that a study of just one or two specific religious-linguistic groups would not only not make for any significantly greater precision in the research but would exclude the wealth of comparative socio-cultural data that could be derived from an extensive study of the different segments of Durban's variegated Indian school population.

The present research also differed from Arsenian's on the point that, whereas the former held educational status constant and regarded age as a variable, the latter employed age as the constant factor and school grade as a variable. It will be noted that all the Welsh studies also made age their starting-point. There are, possibly, advantages and disadvantages in both approaches but in the Indian school situation with its wide age range in the classes due to varying ages of entrance into school, the selection of, say, only fourteen-year-olds for study, would have severely restricted the numbers that could have been obtained from the minority religious-mother tongue groups unless one were prepared to double the effort that was actually put into the research. In the interests of research economy with its maxim of "the greatest possible returns for the minimum expenditure of effort" (and money), it was decided to study the effects of bilingualism at a fixed educational level. It was felt also that some light on the problem would, in any case, be forthcoming for standards two to five from the research carried out as Project III.

A third point of difference between the present study and all known past researches was the technique used to measure degree of bilinguality. The most popular measuring instrument in the past was the questionnaire. Some questionnaires contained large numbers of questions and covered a wide range. Now, the mere length of a questionnaire is no guarantee of its effectiveness. It is possible that a few well-chosen questions could discriminate more sharply between individuals than a large number of questions seeking minute details that are possibly already included in answers to some of the other questions. With this in mind it was decided to prepare a Guttman-type cumulative scale of five or six questions selected from a larger number and possessing high discriminative power. As will be pointed out below, the instrument finally fashioned was

very satisfactory indeed from the point of view of discrimination, reproducibility and reliability.

Fourthly, the present study differed from Arsenian's in that it covered both mental and scholastic development, whereas Arsenian's investigation and most of the Welsh studies were concerned primarily with the development of intelligence alone. Malherbe's research, in contrast, centered on the effects of bilingualism on scholastic attainment, intelligence scores being of interest mainly because they were necessary for the matching of the bilingual and monoglot groups. The inclusion of the study of scholastic development under conditions of bilingualism doubled the scope of the present research relative to Arsenian's while, at the same time, losing little of the intensiveness of the latter.

In addition, an attempt was made in the present investigation to go beyond the problem of bilingualism in order to ascertain whether the amount of English actually acquired by Indian students at school, as measured by attainment tests, bore any relationship to their performance in intelligence and other scholastic tests that demanded familiarity with the language in varying degrees.

It will be noted, therefore, that the present work was not a mere replication in a different context of any study carried out either in South Africa or overseas but that it had certain novel features that might be expected to shed further light on existing knowledge in the field.

(b) The Instruments Used:

The instruments used in this project comprised a questionnaire, a verbal and a non-verbal test of intelligence, four scholastic tests and a specially constructed scale for the measurement of bilinguality.

(1) The Questionnaire:

The questionnaire (vide Annexure) was made up of four sections - personal information, school history, linguality and parental information. It had to be completed at school by the pupils under the supervision of their teachers who were given instructions on how it should be filled. Where a child's parent or parents had died he was still required to secure and furnish the required information concerning them.

(2) The Intelligence Tests:

The New South African Group Test, Forms A and B, was used. It is made up of a verbal and a non-verbal section, each consisting of three sub-tests, with norms for each section as well as combined norms. The test has not been standardised for Indian subjects, so that wherever I.Q's of Indian pupils are mentioned in this report they are based on the norms for European, English-speaking, South African subjects.

It is recognised that to assess the intelligence level of subjects of one culture through tests (and norms) that pertain to another culture is unjustified if inter-cultural or inter-racial comparisons are the main purpose of the study. This is not the primary aim of the present investigation. Inter-racial comparisons will be made at times but only for their suggestive value. The main aim will be comparisons within the Indian group of subjects themselves and for this purpose the use of tests and norms prepared for European subjects will be valid since any advantage or disadvantage accruing to the Indian group will be shared by all the subjects alike. The ideal would certainly have been to employ only those instruments that were prepared for and standardised on Indian subjects but, as pointed out in the general introduction, none was in circulation at the time of the

present research. In any case, in the main computations, greater use will be made of raw scores than of intelligence quotients with all their statistical and cultural implications.

(3) Scholastic Attainment Tests:

Four such tests were used, all issued by the National Bureau of Educational and Social Research (1951) and prepared for and standardised on South African European children, so that whatever has been said in the immediately preceding paragraph about inter-racial testing of intelligence applies also to the use of these scholastic tests in the present context.

The tests were as follows:-

- (i) The National Bureau Junior Test of Silent Reading (Vocabulary), Forms A and B: This is a test of meanings of words and consists of 50 questions to each of which a number of possible answers are provided, the student having to choose the correct one.
- (ii) The National Bureau Junior Test of Silent Reading (Paragraph Comprehension), Forms A and B: This is a test of reading comprehension consisting of 25 questions to each of which a number of possible answers are given, the subject having to choose the correct one.
- (iii) The Milne Arithmetic Test of Problem Arithmetic, Forms A and B: This is a test of 28 problems.
- (iv) The Milne Arithmetic Test of Mechanical Computation, Forms A and B: This is a companion to the problem arithmetic test and consists of 30 items.

(4) The Bilingualism Scale:

In the construction of a scale to measure bilinguality, two problems were involved, namely, the choice of a suitable method of eliciting the required information and the choice of a satisfactory statistical procedure for the treatment of such information.

With regard to statistical method, the Thurstonian (Thurstone and Chave (1929)), and the Likert (1932) techniques were considered but preference was given to the Guttman (1950) cumulative scale for reasons given in the general introduction. Scaling methods, says Peak (1953), provide a more systematic and rational procedure for studying the organisation among items than do traditional item analyses. A further advantage is that when items are scalable a rational method of weighting them is provided. As long as the weights assigned are equal or increase or decrease consistently with the scale position of the item, persons obtaining a given score will do so by answering the same items and a change in weights will not change the relative positions of scores. It is true that the Guttman technique has still to be refined both in its theoretical and practical aspects (Guilford, 1954). However, it was considered adequate enough for the purpose in hand and the Ford (1954) rapid scoring version of it was adopted.

For a start, eight questions believed to be pertinent to the pupils' bilingual status were asked and the responses to them tabulated as follows:-

TABLE III

ORIGINAL QUESTIONS TO MEASURE BILINGUALITY AND FREQUENCY OF RES-

ponses TO THEM (N = 1,052)

<u>QUESTION</u>	<u>%</u>
(1) What language(s) do you hear at home? Underline one only:	
(a) Only English	5.99
(b) More English, less Home Language	29.09
(c) English and Home Language about the same	31.56
(d) More Home Language, less English	27.66
(e) Only Home Language	5.70
	<hr/> 100.00
(2) What language(s) do you hear round your home, among your neighbours, etc.? Underline one only:	
(a) Only English	10.17
(b) More English, less Indian Languages	37.74
(c) English and Indian Languages about the same	30.61
(d) More Indian Languages, less English	18.25
(e) Only Indian Languages	3.23
	<hr/> 100.00
(3) In what language(s) do you speak to your elders - mother, father, uncle, aunt, grandmother, grand- father, etc., and they to you? Underline one only:	
(a) Only English	11.22
(b) More English, less Home Language	19.30
(c) English and Home Language about the same	22.34
(d) More Home Language, less English	26.43
(e) Only Home Language	20.71
	<hr/> 100.00
(4) In what language(s) do you speak to your brothers and sisters and they to you? Underline one only:	
(a) Only English	45.72
(b) More English, less Home Language	26.81
(c) English and Home Language about the same	15.40
(d) More Home Language, less English	9.03
(e) Only Home Language	3.04
	<hr/> 100.00
(5) In what language(s) do your three best friends speak to you and you to them? Underline one only:	
(a) Only English	84.98
(b) More English, less Home Languages	10.27
(c) English and Home Languages about the same	3.14
(d) More Home Languages, less English	1.05
(e) Only Home Languages	0.56
	<hr/> 100.00

TABLE III (Continued)

<u>QUESTION</u>	<u>%</u>
(6) Which language do your parents or guardian think is more important for you to know well? Underline one only:	
(a) English	24.43
(b) Home Language	8.94
(c) Both equally important	<u>66.63</u>
	100.00
(7) Which language can you speak, read, and write better? Underline one only:	
(a) English	78.14
(b) Home Language	1.24
(c) Equally good at both	<u>20.62</u>
	100.00
(8) Do you attend a vernacular (Home Language) school? Underline one only:	
(a) Yes	11.41
(b) No	<u>88.59</u>
	100.00

All the responses were punched on to cards and scaling was done by means of a Powers-Samas Sorter on the total sample. As suggested by Ford, the following procedure was adopted:-

- (1) The responses to Questions (1) to (7) were dichotomized into "positive" and "negative" by manipulating the "cutting" points statistically in such a way that -
 - (a) the percentage of positive responses to each question did not exceed 80% nor fell below 20%;
 - (b) there was a "gap" of not less than 5% between the positive responses to each question;
 - (c) the percentage of positive responses to each question ranged in descending order from not more than 80% for the "easiest" question to not less than 20% for the "hardest" question.

Question (8), of course, had a fixed cutting point. For Questions (5) and (8), the range 80% - 20% could not be met, hence these questions were discarded at the start of the scaling. The remaining questions were dichotomized as follows (in descending order of percentage of positive reponses):-

TABLE IV
DICHOTOMISATION POINTS OF QUESTIONS TO MEASURE BILINGUALITY AND
FREQUENCY OF POSITIVE RESPONSES TO EACH CATEGORY

<u>QUESTION</u>	<u>ALTERNATIVES</u> (SHOWING "CUTTING" POINTS)	<u>PERCENTAGE OF</u> <u>POSITIVE RES-</u> <u>PONSES</u>
(7)	(a) ----- (b) (c)	78.14
(4)	(a) ----- (b) (c) (d) (e)	72.53
(1)	(a) ----- (b) (c) (d) (e)	66.64
(3)	(a) ----- (b) (c) (d) (e)	52.85
(2)	(a) ----- (b) (c) (d) (e)	47.91
(6)	(a) ----- (b) (c)	24.43

- (2) Each of the questions was then given a weight. The weights increased in simple geometric progression from 1 for the "easiest" question to 32 for the "hardest", thus:-

<u>QUESTION</u>	<u>WEIGHT</u>
{7}	...
{4}	...
{1}	...
{3}	...
{2}	...
{6}	...
	1
	2
	4
	8
	16
	32

This would give a raw score of 0 to a pupil who answered all the questions "negatively" and a raw score of 63 to a subject who answered all the questions "positively".

- (3) The next step was to ascertain whether these six questions would form a scale. Ford has laid down the following four criteria of scalability:-
- (a) "Errors" should be randomly distributed; no non-scale score should contain over 5% of the sample population;
 - (b) Category "error" should be less than half the category frequency;
 - (c) Percentage of "error" for the entire scale should not exceed 10%, i.e., the "reproducibility coefficient" should not fall below 90%;
 - (d) For any question, "error" should not exceed 15%.

In order to determine whether these criteria would be met by a scale made up of the six questions given above, the cards were sorted and a "Run Sheet" and "Scaling Sheet" as suggested by Ford were prepared. It was found that Question (2) did not satisfy the fourth criterion of scalability posited by Ford, in that the percentage of error associated with this question exceeded 15%. The question was, therefore, dropped, leaving five questions which together formed an accept-

TABLE V - SCALING SHEET : BILINGUALISM SCALE*

Unique (Non-Scale) Score	Frequency	Extent of Error	Total Errors	Errors in Pos. Categories Questions and Weights					Errors in Neg. Categories Questions and Weights				
				Q.7 (1)	Q.4 (2)	Q.1 (4)	Q.3 (8)	Q.6 (16)	Q.7 0	Q.4 0	Q.1 0	Q.3 0	Q.6 0
(0)	71	(0)	0										
(1)	77	(0)	0										
(2)	24	(1)	24		12.0				12.0				
(3)	81	(0)	0										
(4)	17	(1)	17			17.0							
(5)	27	(1)	27			13.5				13.5			
(6)	32	(1)	32						32.0				
(7)	87	(0)	0										
(8)	6	(1)	6				6.0						
(9)	11	(1)	11				11.0						
(10)	6	(2)	12		2.0		4.0		4.0		2.0		
(11)	22	(1)	22				11.0				11.0		
(12)	9	(2)	18			4.5	4.5		4.5	4.5			
(13)	36	(1)	36							36.0			
(14)	48	(1)	48						48.0				
(15)	241	(0)	0										
(16)	3	(1)	3					3.0					
(17)	19	(1)	19					19.0					
(18)	3	(2)	6		1.5			3.0	1.5				
(19)	21	(1)	21					21.0					
(20)	0	(2)	0										
(21)	3	(2)	6			1.0		2.0		2.0		1.0	
(22)	3	(2)	6					1.5	3.0			1.5	
(23)	28	(1)	28					14.0				14.0	
(24)	0	(2)	0										
(25)	3	(2)	6				1.5	1.5		1.5	1.5		
(26)	1	(2)	2						1.0		1.0	3.0	
(27)	3	(1)	3										
(28)	1	(2)	2						1.0	1.0			
(29)	6	(1)	6							6.0			
(30)	6	(1)	6						6.0				
(31)	157	(0)	0										
Tot. Freq	1052		Computation of Error										
			Total	In Positive Categories					In Negative Categories				
Total Error			367	0	15.5	36.0	38.0	65.0	113.0	64.5	18.5	16.5	0
No. of Responses Involved			5260	822	763	701	556	257	230	289	351	496	795
Total Errors by Question				113.0	80.0	54.5	54.5	65.0	* All figures within brackets are fixed constants.				
Percent of Error			6.997	10.74	7.61	5.18	5.18	6.18					

able scale that satisfied all four criteria as shown in the scaling sheet (Table V), a model of which is given by Ford (1954, pp. 289-290).

- (4) The next step was to convert each non-scale or "unique" score to a scale score ranging from 0 to 5 by reference to a conversion table provided by Ford.

It will be observed from the scaling sheet that the four criteria for scalability laid down by Ford have been satisfied, in that -

- (1) No non-scale score contains over 5% of the sample. The nearest to this figure is the frequency of 48 against Unique Score (14), which represents 4.56% of the sample.
- (2) Errors in the positive and negative categories are all below half the category frequencies. Question (7) came nearest to violating this criterion in its negative category with 113.0 errors out of a total of 230 responses, representing 49.13%.
- (3) The reproducibility coefficient is 93.023%, obtained by subtracting the percentage of total errors (367) in relation to the total number of responses (5,260), i.e., 6.997% from 100%. The number of individuals who achieved perfect scale scores was 714 out of a sample of 1,052 (67.87%).
- (4) For no retained question does the error margin exceed 15%. Question (7) came nearest to violating this requirement with a figure of 10.74%.

The scale thus turned out to be extremely satisfactory from the point of view of internal, logical structure. In its final form it appeared as shown on page 175, with Questions (7), (4), (1), (3) and (6) re-numbered 1, 2, 3, 4 and 5, respectively.

UNIVERSITY OF NATAL
INSTITUTE FOR SOCIAL RESEARCH

BILINGUALISM SCALE

SCHOOL: _____ DATE: _____

SURNAME (in full): _____

CHRISTIAN NAME (in full): _____

STANDARD: _____ DIVISION: _____ REGISTER (SERIAL) NO.: _____

Think carefully over each of the questions asked below and underline your answers. This is not a test, there are no right and wrong answers as far as we are concerned, and no marks will be given. We are interested only in finding out which language you use most of the time. It is very important that you should give honest answers.

1. Which language can you speak, read and write better? Underline one only: (a) English. (b) Home Language. (c) Equally good at both.	
2. In what language(s) do you speak to your brothers and sisters and they to you? (If you have no brother(s) or sister(s) do not answer this question). Underline one only: (a) Only English. (b) More English, less Home Language. (c) English and Home Language about the same. (d) More Home Language, less English. (e) Only Home Language.	
3. What language(s) do you hear at home? Underline one only: (a) Only English. (b) More English, less Home Language. (c) English and Home Language about the same. (d) More Home Language, less English. (e) Only Home Language.	
4. In what language(s) do you speak to your elders - mother, father, uncle, aunt, grandmother, grandfather, etc., and they to you? Underline one only: (a) Only English. (b) More English, less Home Language. (c) English and Home Language about the same. (d) More Home Language, less English. (e) Only Home Language.	
5. Which language do your parent(s) or guardian think it more important for you to know well? (Find out from them). Underline one only: (a) English. (b) Home Language. (c) Both equally important.	

Reliability:

A scale is reliable when it will correctly produce the same results when applied to the same sample. There are three conventional methods of testing for reliability, namely, test - retest, multiple form and split-half. The first of these was adopted.

Fifty-one standard six students filled in the scale twice with an interval of a week between the test and retest. The reliability coefficient was .884. On the retest, 38 of the students returned exactly the same scale scores as on the first occasion, 6 were displaced by one rank and 7 by two ranks. In terms of the classification "low" (comprising scale scores of 5 and 4) and "high" (comprising scale scores of 3, 2, 1 and 0), a distinction that will be extensively used later, 46 pupils retained their original categories, 2 moved from "low" to "high" and 3 from "high" to "low".

Validity:

A scale is said to possess validity when it actually measures what it claims to measure. Goode and Hatt (1952) suggest four approaches to the validation of scales, namely, logical validation, jury opinion, "known groups" and independent criteria. They also add that "the best practice is to employ as many of the four techniques as is possible. In fact, the logical technique should always be employed and made explicit. It will, however, seldom be convincing alone and should be combined with at least one of the other methods". It was decided to depend on logical validation and jury opinion in the present case.

Logical validation, say Goode and Hatt, "refers to either theoretical or 'common-sense' analysis which concludes simply that, the items being what they are, the nature of the continuum cannot be other than

it is stated to be. Logical validation or 'face validity' as it is sometimes called, is almost always used because it automatically springs from the careful definition of the continuum and the selection of the items. For example, a test of 'conservatism' might contain questions about attitudes regarding property, marriage, and the political system. Responses to these questions would be judged in terms of a common-sense definition of conservatism, that is, upholding the status quo". From this point of view the very nature of the questions in the bilingualism scale constitute prima facie evidence for the validity of the scale.

Jury opinion was secured by obtaining the opinions of twelve knowledgeable Indians on the amount of English used in the home by the various Indian religious-mother-tongue sections combined into three groups as follows:-

Group I: Hindu-Gujurati, Moslem-Gujurati, Moslem-Urdu.

Group II: Christian-Tamil, Christian-Telegu.

Group III: Hindu-Telegu, Hindu-Tamil, Hindu-Hindi.

The groups were constituted as above on the basis of the writer's own experience of Indian conditions in order to make the task of the judges somewhat easier than it would have been had they been asked to rate the seven religious-mother-tongue groups singly, for the differences between the amounts of English used by some of the groups are small and hardly discernible by mere casual observation, as for instance the difference between the Hindu-Tamil and Hindu-Hindi groups (vide Tables XI and XII).

The judges themselves were selected from all the seven religious-mother-tongue groups and belonged to a variety of occupations. They included a lawyer, a doctor, four school principals, an estate agent, a social worker, a research worker, a hawker, a business owner and a

factory labourer. Their rankings were compared with the order obtained by use of the bilinguality scale. A 100% correspondence was found between the opinions of all twelve judges and the results of applying the scale to 581 boys and 310 girls (vide Tables XI and XII).

(c) The Sample:

The total sample consisted of 1,052 standard six pupils, made up of 697 boys and 355 girls from 20 Government and Government-Aided Indian Schools in Durban. The median ages of the students on the first Tuesday in June of the year of research are given below¹⁾. For purposes of comparison, the median ages of Indian, Coloured and European pupils for the whole of Natal on the same date and for the same grade are also shown (Director of Education (Natal), 1959).

TABLE VI
MEDIAN AGES (IN YEARS) OF PUPILS IN STANDARD SIX: JUNE, 1957

	The Durban Sample	Natal Indians	Natal Coloureds	Natal Europeans
Boys	16.00	15.73	14.58	13.57
Girls	15.25	15.21	14.21	13.49
All Pupils	15.73	15.57	14.38	13.53

It will be seen that in the case of both sexes the median ages of the sample exceeded those of all the other groups. By European standards the Durban Indian pupils were two years "over-age" for standard six. The reasons for this have already been given in the general introduction.

1) The Natal Education Department takes its annual statistics on the first Tuesday in June every year.

For unavoidable reasons the students had to be tested on two different occasions. They were first given a battery of four scholastic tests followed about a month later by an intelligence test. The median age of the pupils on the day of the scholastic tests was 16.03 years and on the day of the intelligence test, 16.11 years.

Standard six was selected for study as this grade represents the end of the primary school career for all Natal Indian pupils many of whom leave school at this age to seek employment. It was felt that it would be useful to assess the amount of mental and scholastic handicap (if any) that was suffered by Indian children as a result of language difficulties at this crucial educational level.

All the schools that were used followed the same syllabuses, prescribed by the Natal Education Department, and their standard six pupils wrote the same public (external) examination. School influences were more or less similar for all the pupils. The schools contained children from all the major Indian linguistic and religious groups, sitting side by side irrespective of religion, mother tongue, caste or socio-economic status. Indian schools, as Kuper (1960) points out, are "democratic" institutions in these respects. The sample may be categorised as follows:-

TABLE VII

RELIGIOUS AFFILIATION AND MOTHER TONGUE OF 1,052 STANDARD SIX BOYS AND GIRLS

Religious Group	%	Mother Tongue	%
Christian	10.36	Gujurati	16.16
		Hindi	18.44
Hindu	70.63	Tamil	45.06
		Telegu	11.03
Moslem	19.01	Urdu	8.27
		Other Indian languages	0.76
		Unspecified	0.28
Total	100.00	Total	100.00

It will be noted that the percentages both by religion and by mother tongue in the sample studied do not correspond with the figures for the whole of Durban, given in Table II. No attempt was made to select numerically proportional samples of each group for, if this were done, the numbers of pupils in some of the categories would have been too small to warrant reliable comparisons between groups. Actually, in order to ensure adequate numbers in the various categories, those schools were selected for study as would yield the greatest number of pupils belonging to the minority groups. Random sampling in the selection of schools in Durban would not only have been unnecessary for the purpose of this project but would have actually seriously hindered the search for sufficient numbers in the various religious and linguistic categories.

It was also felt that the usual method of dividing Indians into either religious or linguistic groups was not specific enough for the purposes of the present study and liable to lead to all kinds of distortions. Thus both the Christian and Hindu religious groups contain Gujurati-, Hindi-, Tamil- and Telegu-speaking people while the Moslem religious group also includes Gujurati-speaking persons, and so on. There are unmistakable differences in the way of life of a Hindu-Gujurati, a Christian-Gujurati and a Moslem-Gujurati, and similarly for the other sections. Although some use will be made of the "blanket" categories of religion and mother tongue separately, the sample will be dealt with mainly along combined religious-linguistic lines in order to ensure greater precision and meaning. The distribution within the sample would then be as follows:-

TABLE VIII

RELIGIOUS-MOTHER-TONGUE AFFILIATION OF 1,052 STANDARD SIX BOYS AND GIRLS

Group	Boys		Girls	
	No.	%	No.	%
Christian-Gujurati	1	0.14	1	0.28
-Hindi	3	0.43	3	0.85
-Tamil	47	6.74	25	7.04
-Telugu	16	2.30	11	3.10
Hindu-Gujurati	32	4.58	32	9.01
-Hindi	134	19.23	54	15.21
-Tamil	259	37.16	143	40.28
-Telugu	62	8.90	27	7.61
Moslem-Gujurati	71	10.19	33	9.30
-Memon	8	1.15	—	—
-Urdu	62	8.90	25	7.04
Unclassifiable	2	0.28	1	0.28
Total	697	100.00	355	100.00

In school these children were instructed through the medium of English, studied English as their main language and conversed with one another in English but at home the great bulk of them used both English and the mother tongue in varying degrees depending on the person with whom they were communicating - whether parent, sibling or friend. In assessing the degree of bilinguality of the students the home was, therefore, made the focus, for it is here that they are most prone to use the mother tongue¹⁾.

All the pupils answered the bilingualism questionnaire which was specially constructed for the study and the purpose of which was to ascertain the amount of English used in their homes vis a vis the mother tongue (vide page 175). The responses to the questions (pp. 169-170) were

1) Henceforth, the phrase "degree of bilinguality" will be used to denote a student's English-mother-tongue ratio.

revealing. It will be seen that while English only is used in conversing with elders 11.22% of the subjects (Question 3), the figure rises to 45.72% with siblings (Question 4) and to 84.98% with best friends (Question 5)! Another interesting feature is that while, on the one hand, 75.57% of the pupils' parents or guardians considered the mother tongue to be more important than or as equally important as English for their children (Question 6), yet, on the other hand, only 21.86% of the students stated that they could speak, read and write the home language either better than or as well as English (Question 7) and only 11.41% attended mother tongue classes (Question 8)! The figure of 75.57% must, therefore, stand either as a mere expression of loyalty on the part of Indian parents to their original culture and traditions, or it may represent a very real conviction which cannot find practical expression at present due to the fact that there is no direct state support for Indian mother tongue education.

A study of the responses to the bilingualism scale showed that there was a sufficiently wide range of linguality among the pupils to make comparative studies possible, as shown in the following table where a scale score (or rank order) of 0 indicates that the mother tongue predominates over English in the children's homes while a scale score of 5 indicates that English is dominant and the home language correspondingly subordinate, or not used at all. In the technical terminology of previous research of this type the pupils with a scale score of 0 may be described as being relatively bilingual and those with a scale score of 5 as relatively unilingual or monoglot. Again, 0 would indicate a high bilinguality score and 5 a low bilinguality score, with intermediate grades denoted by the figures 1, 2, 3 and 4.

TABLE IX
DISTRIBUTION BY SCALE SCORES OF INDIAN PUPILS IN BILINGUALITY

<u>Scale Score</u>	<u>Number of Pupils</u>	<u>%</u>	
5	174	16.54	} 48.29% (Low)
4	334	31.75	
3	180	17.11	} 51.71% (High)
2	157	14.92	
1	110	10.46	
0	97	9.22	
Totals		1,052	100.00

It will be noted that scale scores of 5 and 4 account for about one half (48.29%) of the subjects and scale scores of 3, 2, 1, and 0, for the other half (51.71%). In many of the chi-square tests to be described below the 5 and 4 scale score-groups will be combined and designated "low" (in bilinguality and, therefore, high in the use of English), while the 3, 2, 1, and 0 groups will be combined and described as "high" (in bilinguality and, therefore, low in the use of English)¹⁾. Combination of groups was necessary whenever the expected frequency in any cell of a contingency table was below 5²⁾ (Guilford, 1950; Freund, 1952). Whenever this did not occur, grouping was not resorted to, the comparisons then being made on

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- 1) It must be repeated that children who are hereafter designated in the text as being "high" in bilinguality are those who still use the mother tongue to an appreciable degree side by side with English, while those who are designated "low" in bilinguality are children who are more unilingual in the sense that they have relinquished the mother tongue to a relatively greater extent than the bilingualists, in favour of English.
- 2) Guilford (1950) says: "There are lower limits to utilizable frequencies Some authors say that a chi-square should not be computed if any theoretical frequency is less than 10. Others, more generous, would compute chi square even when a theoretical cell frequency is as low as 2. A realistic limit is 5."

the basis of the full range of scale scores. The degrees of freedom given under every chi-square table will indicate whether grouping of cells was carried out or not.

Detailed analyses were undertaken to investigate what factors were related to the varying scores of the subjects on the bilingualism scale. The variables considered to be relevant were age, religious-mother-tongue affiliation, sex, parental level of western education, parental level of mother-tongue education and socio-economic status. These will be discussed in the order given.

(a) Age:

Information on the relationship between age and degree of bilinguality was available from three analyses made in connection with other aspects of the study. In the first analysis, 480 boys made up of equal numbers from homes of low and high socio-economic status, were studied¹⁾. The product-moment coefficients of correlation²⁾ between bilingual status and age were positive and significant at the .01 level of confidence (vide p. 245). This implied that the older boys used and experienced the mother tongue at home to a greater extent than the younger boys, with English correspondingly subordinated.

-
- 1) The occupation of the father was used as the measure of socio-economic status. The procedure and the justification for it will be elaborated later in the appropriate section.
 - 2) Throughout the account of this project, r will be used to indicate the product-moment coefficient of correlation. Except where otherwise indicated, r has been derived from grouped data and corrected for errors of grouping by the use of the constants provided by Peters and Van Voorhis (1940, p. 398). In all cases also the precaution has been taken to test for linearity of regression, the following formula which is based on chi-square being applied (Guilford, 1950):-

$$\chi^2 = (N - k) \left(\frac{\eta^2 - r^2}{1 - \eta^2} \right)$$

In the above formula k stands for number of columns (or rows) and η for eta or correlation ratio.

A second, similar analysis with 272 girls belonging to homes of low and high socio-economic status in equal numbers also yielded positive correlations but the coefficients were not statistically significant at the .01 level (vide p. 245). There seems to be a double reason for this lack of significance which was present in the case of boys. Firstly, since there is no legal compulsion that Indian children should remain at school until a certain age or grade (as for Europeans), there is a tendency for girls from the most westernised homes to "survive" to the standard six level, those from more conservative (and, therefore, more bilingual) homes tending to leave school before this point is reached. Factual evidence for this will be presented later when the relationship between bilinguality scores and the level of western education of parents is examined. Secondly, it is the older rather than the younger girls who leave school before standard six is reached. Indian parents, in general, still seem to be conservative with regard to the education of older girls. The joint operation of these two factors in the case of girls would tend to reduce the magnitude of any positive correlation between age and degree of bilinguality.

The second point made above is supported by the following table which has been compiled from figures (covering the whole of Natal) presented by the Director of Education (Natal, 1959). It brings out clearly that as one proceeds from standard one to standard six the percentage of girls remaining at school relative to boys decreases steadily. It also shows that it is the older girls who tend to leave earlier, for, starting on equal terms in standard one, age differences between the sexes begin to appear and to increase steadily until, by the time the standard six level is reached, the girls are younger than the boys by a clear six months (nine months in the case of the Durban sample). Both in terms of age and family background, and, almost certainly, other factors also, Indian girls

at the standard six level are a much more select group than standard six boys.

TABLE X
SEX RATIOS AND MEDIAN AGES OF BOYS AND GIRLS IN NATAL INDIAN
PRIMARY SCHOOL STANDARDS, JUNE, 1957

<u>Standard</u>	<u>Sex Ratios (%)</u>		<u>Total</u>	<u>Median Ages (Years)</u>	
	<u>Boys</u>	<u>Girls</u>		<u>Boys</u>	<u>Girls</u>
I	53.35	46.65	100.00	9.94	9.96
II	55.15	44.85	100.00	11.26	11.13
III	57.64	42.36	100.00	12.66	12.38
IV	63.89	36.11	100.00	13.78	13.36
V	68.19	31.81	100.00	14.73	14.22
(VI	69.75	30.25	100.00	15.73	15.21
{ Durban					
{ Sample	66.25	33.75	100.00	16.00	15.25

It may be concluded that the older standard six boy is more bilingual (i.e., he has a poorer home background of English) than the younger. The tendency in the case of girls is similar though not clear-cut.

The question arises as to why age should be positively correlated with bilinguality at all. It will be shown later (in the section on the relationship between parental level of western education and the bilingual status of their children) that it is not the age of the child per se that is responsible for his lesser use of English at home but that age itself is a variable that is dependent on two positively correlated factors, namely, the amount of western education received by the parents and their socio-economic status. It will be shown that parents who are more advanced in these two respects get their children admitted into schools at an earlier age than parents who are less advanced, hence the positive association between age and bilinguality at the standard six level.

(b) Religious-Mother-Tongue Affiliation:

In the next analysis, scale scores were classified so as to ascertain whether the religious-mother-tongue affiliation of the pupils was related to their bilingual status. Boys and girls were separated for the purpose. Care was taken to match the various religious-linguistic groups within each sex for age. By a process of elimination the mean ages of the boys within each religious-mother-tongue group was fixed at 16.6 years and of the girls at 15.6 years. Standard deviations were more or less the same. 1), 2), 3), 4)

The distribution was as follows:-

TABLE XI
COMPARISON OF RELIGIOUS-MOTHER-TONGUE GROUPS IN BILINGUALITY: BOYS

Groups	S c a l e S c o r e s						N	Means
	Low		High					
	5	4	3	2	1	0		
Christian-Tamil and Christian-Telegu	23	16	-	4	-	-	43	4.349
Hindu-Telegu	12	18	12	11	5	-	58	3.362
Hindu-Tamil	36	64	42	53	27	12	234	2.970
Hindu-Hindi	12	32	22	16	14	9	105	2.857
Hindu-Gujurati	1	10	2	8	2	9	32	2.156
Moslem-Gujurati	3	7	6	8	19	7	50	1.920
Moslem-Urdu	1	6	10	11	12	19	59	1.576
Totals	88	153	94	111	79	56	581	2.814

Chi-square: 77.990

df: 6

P: <.05

- 1) The use of a Powers-Samas sorting machine made it possible to match the various groups for age with precision.
- 2) In this analysis, 161 subjects out of a total sample of 1,052 had to be discarded either in the process of precise equation or because their

(footnote continued next page)

TABLE XII

COMPARISON OF RELIGIOUS-MOTHER-TONGUE GROUPS IN BILINGUALITY: GIRLS

Groups	S c a l e S c o r e s						N	Means
	Low		High					
	5	4	3	2	1	0		
Christian-Tamil and Christian-Telegu	19	7	2	-	1	-	29	4.483
Hindu-Telegu	4	16	3	2	-	-	25	3.880
Hindu-Tamil	10	71	25	6	3	5	120	3.533
Hindu-Hindi	3	19	15	3	5	7	52	2.827
Moslem-Urdu	3	6	9	-	1	6	25	2.680
Moslem-Gujurati	1	9	5	4	4	5	28	2.429
Hindi-Gujurati	1	6	3	6	1	14	31	1.645
Totals	41	134	62	21	15	37	310	3.174

Chi-square: 48.949

df: 6

P: <.05

It will be seen that the religious-linguistic groups differ significantly among themselves in the degree to which they have relinquished

(footnote continued from previous page)

ages were not available for the day on which the bilingualism scale was completed or because home languages were not specified. Included among the rejects were also 6 Christian-Hindi, 8 Moslem-Memon and 2 Christian-Gujurati pupils as their numbers were too small for purposes of comparison.

- 3) The mean ages of the boys and girls are appreciably higher than the June medians presented in Table VI as the bilingualism scales were filled in during the month of November following.
- 4) The Christian-Tamil and Christian-Telegu groups were combined in order to have sufficient numbers for comparative purposes. In a preliminary test carried out with the two groups equated for age, the distribution of scale scores and the means were found to be almost identical in the case of both sexes.

the mother tongue and adopted English as a medium of communication within the home. In the case of both sexes the least bilingual is the Christian-Tamil-Telegu group and the most bilingual, the Gujurati and Urdu groups.

A detailed comparison of pairs of religious-mother-tongue groups employing the data given in the two immediately preceding tables was then carried out. Chi-square was used¹⁾. The following were the results (the mean scale score of each group being given within brackets):-

TABLE XIII

COMPARISON OF PAIRS OF RELIGIOUS-MOTHER-TONGUE GROUPS IN BILINGUALITY: BOYS

<u>Pairs</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Christian-Tamil and Telegu (4.349) and -			
Hindu-Telegu (3.362)	15.574	1	<.05
Hindu-Tamil (2.970)	31.534	1	<.05
Hindu-Hindi (2.857)	27.591	1	<.05
Hindu-Gujurati (2.156)	23.717	1	<.05
Moslem-Gujurati (1.920)	43.561	1	<.05
Moslem-Urdu (1.576)	59.287	1	<.05
Hindu-Telegu (3.362) and -			
Hindu-Tamil (2.970)	1.179	1	>.05
Hindu-Hindi (2.857)	1.084	1	>.05
Hindu-Gujurati (2.156)	1.852	1	>.05
Moslem-Gujurati (1.920)	10.268	1	<.05
Moslem-Urdu (1.576)	19.686	1	<.05
Hindu-Tamil (2.970) and -			
Hindu-Hindi (2.857)	0.001	1	>.05
Hindu-Gujurati (2.156)	0.502	1	>.05
Moslem-Gujurati (1.920)	8.041	1	<.05
Moslem-Urdu (1.576)	18.061	1	<.05
Hindu-Hindi (2.857) and -			
Hindu-Gujurati (2.156)	0.308	1	>.05
Moslem-Gujurati (1.920)	6.227	1	<.05
Moslem-Urdu (1.576)	14.538	1	<.05
Hindu-Gujurati (2.156) and -			
Moslem-Gujurati (1.920)	1.429	1	>.05
Moslem-Urdu (1.576)	5.283	1	<.05
Moslem-Gujurati (1.920) and -			
Moslem-Urdu (1.576)	0.813	1	>.05

1) In the tests 2 x 2 tables were used. For this purpose bi-linguality scores were grouped under the headings "low" (5, 4) and "high" (3, 2, 1, 0) as indicated already. Whenever 2 x 2 tables were used for analyses during this project, the following formula which
(footnote continued next page)

TABLE XIV

COMPARISON OF PAIRS OF RELIGIOUS-MOTHER-TONGUE GROUPS IN BILINGUALITY: GIRLS

Pairs	Chi-square	df	P
Christian-Tamil and Telegu (4.483) and -			
Hindu-Telegu (3.880)	0.374	1	>.05
Hindu-Tamil (3.533)	4.622	1	<.05
Hindu-Hindi (2.827)	15.382	1	<.05
Moslem-Urdu (2.680)	14.677	1	<.05
Moslem-Gujurati (2.429)	15.571	1	<.05
Hindu-Gujurati (1.645)	24.594	1	<.05
Hindu-Telegu (3.880) and -			
Hindu-Tamil (3.533)	0.995	1	>.05
Hindu-Hindi (2.827)	8.214	1	<.05
Moslem-Urdu (2.680)	8.210	1	<.05
Moslem-Gujurati (2.429)	7.410	1	<.05
Hindu-Gujurati (1.645)	16.047	1	<.05
Hindu-Tamil (3.533) and -			
Hindu-Hindi (2.827)	8.564	1	<.05
Moslem-Urdu (2.680)	7.433	1	<.05
Moslem-Gujurati (2.429)	8.390	1	<.05
Hindu-Gujurati (1.645)	18.755	1	<.05
Hindu-Hindi (2.827) and -			
Moslem-Urdu (2.680)	0.079	1	>.05
Moslem-Gujurati (2.429)	0.112	1	>.05
Hindu-Gujurati (1.645)	2.514	1	>.05
Moslem-Urdu (2.680) and -			
Moslem-Gujurati (2.429)	0.070	1	>.05
Hindu-Gujurati (1.645)	0.652	1	>.05
Moslem-Gujurati (2.429) and -			
Hindu-Gujurati (1.645)	0.680	1	>.05

It will be noted that of the 21 pairs of religious-mother-tongue groups compared 13 pairs in the case of boys and a like number in the case of girls showed statistically significant differences.

(footnote continued from previous page)

incorporates a correction for continuity was employed (Siegel, 1956, p. 107):

$$\chi^2 = \frac{N \left(\left| AD - BC \right| - \frac{N}{2} \right)^2}{(A+B) (C+D) (A+C) (B+D)}$$

The letters A, B, C and D refer to the four cells.

Sex:

In the next analysis sex differences in bilinguality were investigated. First, an overall comparison of scale scores was made by selecting at random from the different age strata 16 boys and 16 girls, matched exactly for age (and standard deviation), from each of the seven religious-linguistic groups, giving a total of 112 boys and 112 girls whose scores were compared. The figure of 16 was the maximum possible in view of the precise matching for age. The distribution by sex was as follows:-

TABLE XV
COMPARISON OF BOYS AND GIRLS IN BILINGUALITY

Sex	S c a l e S c o r e s						N	Means	Age (Years)
	5	4	3	2	1	0			
Girls	20	39	18	12	7	16	112	3.045	15.843
Boys	23	34	14	17	14	10	112	3.045	15.843
Totals	43	73	32	29	21	26	224	3.045	

Chi-square: 5.631

df: 5

P: < .05

It will be seen that the sexes are identical in their means and not significantly dissimilar in the distribution of scale scores.

Although no sex differences appeared in the overall analysis of scale scores, boys and girls were compared within each religious-linguistic group. For this purpose, the sexes were matched exactly for age (and standard deviation) within and between groups by random selection at each age stratum, the figure working out at 15.6 years for all groups and sub-groups. The sexes were not equalised for numbers as it was not necessary in this context.

It will be seen from the table that follows that in three of the seven comparisons where significant sex differences appear the girls are favoured. The reason for this is discussed on p. 224.

TABLE XVI
SCALE SCORES OF BOYS AND GIRLS IN BILINGUALITY WITHIN
RELIGIOUS-MOTHER-TONGUE GROUPS

<u>Christian-Tamil and Christian-Telegu</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	26	3	29	4.483	0.671	1	>.05
Boys	39	4	43	4.500			
<u>Hindu-Gujurati</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	7	24	31	1.645	0.573	1	>.05
Boys	11	21	32	2.381			
<u>Hindu-Hindi</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	22	30	52	2.827	0.015	1	>.05
Boys	44	61	105	2.990			
<u>Hindu-Tamil</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	81	39	120	3.533	18.491	1	<.05
Boys	100	134	234	3.172			
<u>Hindu-Telegu</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	20	5	25	3.880	4.711	1	<.05
Boys	30	28	58	3.542			
<u>Moslem-Gujurati</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	10	18	28	2.429	1.573	1	>.05
Boys	10	40	50	2.036			
<u>Moslem-Urdu</u>							
	<u>Low</u>	<u>High</u>	<u>N</u>	<u>Mean</u>	<u>Chi-square</u>	<u>df</u>	<u>P</u>
Girls	9	16	25	2.680	5.161	1	<.05
Boys	7	52	59	1.556			

Parental Level of Western Education

Next to be studied was the relationship between the level of western education of parents and the bilingual status of their children. By western education is meant schooling in an English-medium school. None of the parents had attended an Afrikaans-medium school. The table below indicates the level of western education attained by the parents of the students who comprised the sample:-

TABLE XVII

LEVEL OF WESTERN EDUCATION OF PARENTS OF STANDARD SIX PUPILS

<u>Educational Level</u>	<u>Fathers</u>	<u>Mothers</u>
No Education	164	568 Low: 54.46%
Up to Std. I	74	85
Up to Std. II	87 Low:	72
Up to Std. III	88 57.16%	88
Up to Std. IV	182	84
Up to Std. V	102	51
Up to Std. VI	185	69 High:
Up to Std. VII	44	7 45.54%
Up to Std. VIII	66 High:	15
Up to Std. IX	7 42.84%	1
Up to Std. X	22	3
Beyond Std. X	20	-
Totals	1,041	1,043
Unspecified	11	9

For the purpose of statistical computation, parental level of western education was divided into "low" and "high" categories. In the case of fathers, all those who had received schooling up to and including standard four were assigned to the "low" group, the remainder to the "high". In the case of mothers, those who had received no western education at all were regarded as "low" and the remainder as "high", even where their schooling had not proceeded beyond sub-standard one. The rationale on which these dividing lines were adopted was that the numbers of fathers and mothers split more evenly into halves at the points indicated above than they would have done at any other. By this method the western educ-

ational status of the parents of any student could be described in one of four possible ways, namely, father-high-mother-high (FH-MH), father-high-mother-low (FH-ML), father-low-mother-high (FL-MH), and father-low-mother-low (FL-ML). These qualitative categories have been adopted in the chi-square tests that follow.

The most striking point about Table XVII is the disparity between the western educational level of fathers and mothers. Nearly half of the mothers had never been to an English school! Taking the standard two level as the dividing line (since the total sample splits more or less evenly at this point) a chi-square test reveals a highly significant difference, thus:-

TABLE XVIII
COMPARISON OF WESTERN EDUCATIONAL LEVELS OF MOTHERS AND FATHERS

Parents	Up to Std. II	Std. III & Beyond	N
Mothers	725 (69.51%)	318 (30.49%)	1,043 (100%)
Fathers	325 (31.22%)	716 (68.78%)	1,041 (100%)
Totals	1,050	1,034	2,084
Unspecified			20

Chi-square: 304.045

df: 1

P: < .05

Conservatism in respect of western education, when it concerns girls, is a characteristic not only of the pupils' grandparents but also of their parents to-day. In Table X it was shown that the percentage of girls at school declines steadily with increasing standard until, starting on equal terms at the standard one level, the ratio in standard six is 69.75% boys to 30.25% girls. By the time the end of the high school (standard ten) is reached, the percentages of boys and girls are 85.78 and 14.22, respectively (Director of Education (Natal), 1959).

Comparisons of the levels of western education of fathers and mothers of the sample separately show the Moslem-Gujurati, the Moslem-Urdu and the Hindu-Gujurati groups to be the most conservative in respect of western education for females, for, while the fathers of these groups compare favourably with those of other religious-mother-tongue groups, the mothers are at the bottom of the scale of western education, as follows¹⁾:-

TABLE XIX
COMPARISON OF THE LEVELS OF WESTERN EDUCATION OF FATHERS
BY RELIGIOUS-MOTHER-TONGUE AFFILIATION

Groups	Western Educational Status				N	%
	Low	%	High	%		
Moslem-Gujurati	48	47.1	54	52.9	102	100.0
Christian-Tamil	35	48.6	37	51.4	72	100.0
Moslem-Urdu	46	53.5	40	46.5	86	100.0
Hindu-Gujurati	35	54.7	29	45.3	64	100.0
Christian-Telegu	15	55.6	12	44.4	27	100.0
Hindu-Tamil	243	61.1	155	38.9	398	100.0
Hindu-Telegu	59	67.0	29	33.0	88	100.0
Hindu-Hindi	124	67.0	61	33.0	185	100.0
Unclassified					30	
Totals	605		417		1,052	

Chi-square: 18.996

df: 8

P: <.05

-
- 1) Kuper (1956b) describes the situation as follows: "The extent to which (Indian) women are secluded in South Africa varies with different economic and cultural groups Muslims and Gujarati Hindus practise the most strict seclusion. Tamilians (whose women never draw their saris over their faces) have a tradition of greater freedom, and Christian Indians tend to follow the Western pattern. As in other parts of the world, it is the groups with the greatest economic security (in this case the Muslim and Gujarati Hindu trading groups) whose women tend to lead the most sheltered lives".

TABLE XX
COMPARISON OF THE LEVELS OF WESTERN EDUCATION OF MOTHERS
BY RELIGIOUS-MOTHER-TONGUE AFFILIATION

Groups	Western Educational Status				N	%
	Low	%	High	%		
Christian-Tamil	12	16.7	60	83.3	72	100.0
Christian-Telegu	12	44.4	15	55.6	27	100.0
Hindu-Tamil	182	45.8	215	54.2	397	100.0
Hindu-Telegu	45	51.7	42	48.3	87	100.0
Hindu-Hindi	121	64.4	67	35.6	188	100.0
Moslem-Urdu	58	67.4	28	32.6	86	100.0
Moslem-Gujurati	74	71.8	29	28.2	103	100.0
Hindu-Gujurati	55	85.9	9	14.1	64	100.0
Unclassified					28	
Totals	559		465		1,052	

Chi-square: 105.306

df: 8

P: <.05

It has been suggested previously that there is a tendency for Indian girls from the more westernised homes to "survive" to the standard six level while those from more conservative homes tend to leave school before this point is reached. The table below supports this statement. It shows that the parents of standard six girls are more highly educated in English (and, therefore, more "westernised") than the parents of standard six boys. In respect of western educational level of parents also the girls constitute a more highly selected group than the boys.

TABLE XXI
COMPARISON OF PARENTAL LEVELS OF WESTERN EDUCATION OF STAND-
DARD SIX BOYS AND GIRLS

Sex	Parental Level of Western Education				N
	FH-MH	FH-ML	FL-MH	FL-ML	
Girls	144 (40.68%)	60 (16.95%)	57 (16.10%)	93 (26.27%)	354 (100%)
Boys	149 (21.82%)	92 (13.47%)	122 (17.86%)	320 (46.85%)	683 (100%)
Totals	293	152	179	413	1,037
Unspecified					15

Chi-square: 55.895

df: 3

P: <.05

Before the relationship between the degree of bilinguality of the students and the level of their parents' western education could be investigated, it was necessary to clarify the association between the latter variable and the age of the pupils. It has been stated previously that although there was a significant positive correlation between age and bilingual status, it was not age in itself that was the determinant but the fact that the younger students generally came from homes where the western educational level of the parents was relatively higher and who had secured school places for their children earlier than those parents who were less well-educated in English. The tables below support the points made above.

Tables XXII and XXIII show that parents who have enjoyed a greater measure of western education send their children to school at a younger age than those who have had lesser western education.

TABLE XXII

COMPARISON OF THE AGES OF STANDARD SIX BOYS AT SCHOOL ENTRY BY
WESTERN EDUCATIONAL LEVEL OF PARENTS

Western Educational Level of Parents	Ages of Children at School Entry		N
	Below 8 Years	8 Years & Above	
FH-MH	93 (62.42%)	56 (37.58%)	149 (100%)
FH-ML	41 (44.57%)	51 (55.43%)	92 (100%)
FL-MH	49 (40.16%)	73 (59.84%)	122 (100%)
FL-ML	109 (34.06%)	211 (65.94%)	320 (100%)
Totals	292	391	683
Unspecified			14

Chi-square: 33.522

df: 3

P: <.05

TABLE XXIII
COMPARISON OF THE AGES OF STANDARD SIX GIRLS AT SCHOOL ENTRY BY
WESTERN EDUCATIONAL LEVEL OF PARENTS

Western Educational Level of Parents	Ages of Children at School Entry		N
	Below 8 Years	8 Years & Above	
FH-MH	100 (69.44%)	44 (30.56%)	144 (100%)
FH-ML	36 (60.00%)	24 (40.00%)	60 (100%)
FL-MH	30 (52.63%)	27 (47.37%)	57 (100%)
FL-ML	35 (37.63%)	58 (62.37%)	93 (100%)
Totals	201	153	354
Unspecified			1

Chi-square: 23.947

df: 3

P: <.05

Tables XXIV and XXV show that, after school entry, possible differential rates of passing grades, failing grades and school-leaving among the groups do not affect the position substantially, for children of parents who are well-educated in English are still younger than the others even at the standard six level.

TABLE XXIV
COMPARISON OF THE AGES OF BOYS ON 5TH JUNE BY WESTERN
EDUCATIONAL LEVEL OF PARENTS

Western Educational Level of Parents	Ages in Years ¹⁾		N
	Below 16	16 & Above	
FH-MH	107 (71.81%)	42 (28.19%)	149 (100%)
FH-ML	39 (42.39%)	53 (57.61%)	92 (100%)
FL-MH	64 (52.46%)	58 (47.54%)	122 (100%)
FL-ML	120 (37.50%)	200 (62.50%)	320 (100%)
Totals	330	353	683
Unspecified			14

Chi-square: 49.780

df: 3

P: < .05

1) 15.9 years represented the approximate mid-point of the age distribution of the boys on June 5th.

TABLE XXV
COMPARISON OF THE AGES OF GIRLS ON 5TH JUNE BY WESTERN
EDUCATIONAL LEVEL OF PARENTS

Western Educational Level of Parents	Ages in Years ¹⁾		N
	Below 15.5	15.5 & Above	
FH-MH	99 (68.75%)	45 (31.25%)	144 (100%)
FH-ML	33 (55.00%)	27 (45.00%)	60 (100%)
FL-MH	30 (52.63%)	27 (47.37%)	57 (100%)
FL-ML	37 (39.78%)	56 (60.22%)	93 (100%)
Totals	199	155	354
Unspecified			1

Chi-square: 19.310

df: 3

P: <.05

That age in itself has little or nothing to do with pupil bilin-
guality is brought out in the two tables below. In the case of boys, the
subjects consisted of 31 "younger" and 31 "older" pupils (the maximum pos-
sible in view of precise matching for age) from each of the four educational
categories, the 62 students in each category being in this way matched for
parental level of western education but differing in age. The dividing line
between "younger" and "older" was 15.9 years, this being the approximate
mid-point of the age distribution of boys. The mean age of the "younger"

1) 15.4 years represented the approximate mid-point of the age distribution
of the girls on 5th June.

group was 14.94 years and that of the older, 17.24 years. The comparison between the "younger" and "older" pupils was made by combining the four parental levels of education in each case.

The girls were contrasted for age but matched for parental level of western education in the same way as boys, but the numbers in their case were 19 "younger" and 19 "older" subjects in each of the four educational classes, the maximum number possible in the circumstances. The dividing line between the "younger" and "older" girls was 15.4 years which was the approximate mid-point of the age distribution of the girls. The mean of the "younger" girls worked out at 14.49 years and that of the older at 16.56 years.

TABLE XXVI
COMPARISON OF YOUNGER AND OLDER BOYS IN BILINGUALITY

Age Groups	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
Older	60	64	124	3.048
Younger	65	59	124	3.177
Totals	125	123	248	

Chi-square: 0.403

df: 1

P: > .05

TABLE XXVII
COMPARISON OF YOUNGER AND OLDER GIRLS IN BILINGUALITY

Age Groups	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
Older	43	33	76	3.158
Younger	39	37	76	3.026
Totals	82	70	152	

Chi-square: 0.238

df: 1

P: >.05

While the two preceding tables have shown that mere age has no connection with student bilinguality, the next two tables show that parental level of western education is so correlated, negatively, i.e., the higher the parental level of western education, the lower their children in bilinguality. In this analysis the pupils in the four parental educational categories were precisely matched for numbers (the maximum possible that exact matching would permit), age, and standard deviation, after which scale scores were compared. The mean age of the boys in each category was 16.275 years and of the girls, 15.720 years.

TABLE XXVIII
COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF PARENTS : BOYS

Western Educational Level of Parents	Scale Scores						N	Means
	5	4	3	2	1	0		
FH-MH	26	20	11	14	6	4	81	3.420
FH-ML	8	23	15	13	14	8	81	2.679
FL-MH	13	33	15	12	5	3	81	3.346
FL-ML	15	18	14	21	7	6	81	2.938
Totals	62	94	55	60	32	21	324	

Chi-square: 29.790

df: 15

P: < .05

TABLE XXIX
COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF PARENTS : GIRLS

Western Educational Level of Parents	Scale Scores						N	Means
	Low		High					
	5	4	3	2	1	0		
FH-MH	12	27	7	2	1	-	49	3.959
FH-ML	5	16	11	3	5	9	49	2.714
FL-MH	6	28	7	2	3	3	49	3.469
FL-ML	4	18	12	7	1	7	49	2.918
Totals	27	89	37	14	10	19	196	

Chi-square: 20.107

df: 3

P: < .05

A feature to be noted is that in the case of both boys and girls it is the western educational level of the mother and not that of the father that is associated with the degree of bilinguality of the child. There is a significant negative correlation between the mother's level of western education and the degree of bilinguality of the child, the higher her education the lower is the student in bilinguality score.

These points are supported by the four tables below where the data of the two immediately preceding tables are used. The categories FH-MH and FH-ML were grouped together and compared with the other two categories combined, namely, FL-MH and FL-ML, in order to evaluate the influence of the father. The procedure enabled the FH's to be compared with the FL's by "neutralising" the educational levels of mothers in each case (MH+ML). Similarly, in order to evaluate the influence of the mother, the categories FH-MH and FL-MH were grouped together and compared with the remaining two categories combined, namely, FH-ML and FL-ML. This enabled the MH's to be compared with the ML's by neutralising the educational levels of fathers in each case (FH+FL). The results were as follows:-

TABLE XXX
COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF FATHERS : BOYS

Western Educational Level of Father	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
FH (M Neutral)	77	85	162	3.049
FL (M Neutral)	79	83	162	3.142
Totals	156	168	324	

Chi-square: 0.409

df: 1

P: > .05

TABLE XXXI

COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF MOTHERS : BOYS

Western Educational Level of Mother	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
MH (F Neutral)	92	70	162	3.383
ML (F Neutral)	64	98	162	2.809
Totals	156	168	324	

Chi-square: 9.012

df: 1

P: < .05

TABLE XXXII

COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF FATHERS : GIRLS

Western Educational Level of Father	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
FH (M Neutral)	60	38	98	3.337
FL (M Neutral)	56	42	98	3.194
Totals	116	80	196	

Chi-square: 0.190

df: 1

P: > .05

TABLE XXXIII

COMPARISON OF STUDENT BILINGUALITY BY WESTERN EDUCATIONAL
LEVEL OF MOTHERS : GIRLS

Western Educational Level of Mother	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
MH (F Neutral)	73	25	98	3.714
ML (F Neutral)	43	55	98	2.816
Totals	116	80	196	

Chi-square: 17.762

df: 1

P: < .05

The significant influence of the Indian mother's western educational level on the degree of bilinguality of her child and the relative ineffectiveness of the father in this respect is perhaps just one aspect of the more general finding that it is the mother, and not so much the father, who determines the intellectual and cultural level of the home (Burt, 1952).

Parental Level of Mother-Tongue Education:

The relationship between pupil bilinguality and level of parental mother-tongue education was also studied. Educational level in the home language is a very difficult variable to measure precisely for many adults have learned to read and write the Indian languages from their parents and other relatives and not systematically through attendance at precisely graded mother-tongue schools. Since assessment by grades completed was out of the question, parental level of home-language education was ascertained through two broadly framed questions, Nos. 6 and 7 of Section D of the questionnaire (vide Annexure). The responses to them were as follows:-

TABLE XXXIV
LEVEL OF MOTHER-TONGUE EDUCATION OF PARENTS

Level	Fathers		Mothers	
	Number	%	Number	%
Could only speak it	337	32.34	534	51.85
Could only speak and read it	131	12.57	112	10.87
Could speak, read and write it	574	55.09	384	37.28
Totals	1,042	100.00	1,030	100.00
Unspecified	10		22	

As in the case of western educational level, a comparison of the standard of mother-tongue education achieved by the fathers and mothers

showed the fathers to be significantly superior. Indian women lag behind the men not only in western but also in home-language education.

TABLE XXXV
COMPARISON OF FATHERS' AND MOTHERS' LEVELS OF
MOTHER-TONGUE EDUCATION

Level of Mother Tongue Education	Fathers	Mothers	N
Could speak, read and write it	574 (59.92%)	384 (40.08%)	958 (100%)
Could speak and read it only	131 (53.91%)	112 (46.09%)	243 (100%)
Could speak it only	337 (38.69%)	534 (61.31%)	871 (100%)
Totals	1,042	1,030	2,072

Chi-square: 83.524

df: 2

P: < .05

For the purpose of statistical computation, parental level of mother-tongue education was also divided into "low" and "high" categories, the former comprising all those who could only speak the home language or could only speak and read it, and the latter, all those who could speak, read and write it. Such a division split the total number of fathers and mothers roughly into halves, in terms of proficiency in the mother tongue. As in the case of western educational level of fathers and mothers, this classification made it possible to describe the mother-tongue status of the parents of any student in one of four ways, namely, FH-MH, FH-ML, FL-MH, and FL-ML. In the analyses that follow the age of pupils was ignored as it has already been shown that this factor is not in itself of any moment.

It was found that in the case of both boys and girls there was a significant positive correlation between proficiency of parents in the

home language and the degree of bilinguality of their children - the higher the home language status of parents, the more bilingual the students (as indicated by the mean scale scores in the two tables below).

TABLE XXXVI
COMPARISON OF STUDENT BILINGUALITY BY PARENTAL LEVEL OF
MOTHER-TONGUE EDUCATION : BOYS

Parental Level of Mother Tongue Education	Scale Scores						N	Means
	Low		High					
	5	4	3	2	1	0		
FH-MH	23	45	30	33	26	22	179	2.665
FH-ML	23	47	34	36	30	16	186	2.726
FL-MH	11	19	5	13	3	6	57	3.070
FL-ML	58	70	39	48	33	15	263	3.103
Totals	115	181	108	130	92	59	685	
Unspecified							12	

Chi-square: 8.854

df: 3

P: < .05

TABLE XXXVII
COMPARISON OF STUDENT BILINGUALITY BY PARENTAL LEVEL OF
MOTHER-TONGUE EDUCATION : GIRLS

Parental Level of Mother Tongue Education	Scale Scores						N	Means
	Low		High					
	5	4	3	2	1	0		
FH-MH	12	44	20	13	6	17	113	2.929
FH-ML	8	29	24	6	7	17	91	2.714
FL-MH	2	24	4	2	2	1	35	3.543
FL-ML	22	51	21	6	2	3	105	3.724
Totals	44	148	69	27	17	38	344	
Unspecified							11	

Chi-square: 23.726

df: 3

P: < .05

A comparison of the educational status of the parents of the girls and boys in the home language showed that the mothers and fathers of the standard six girls were significantly superior to those of the boys. It will be remembered (from Table XXI) that the parents of the girls were also more advanced in western education.

TABLE XXXVIII
COMPARISON OF PARENTAL LEVELS OF MOTHER-TONGUE EDUCATION OF
STANDARD SIX BOYS AND GIRLS

Sex	Parental Level of Home Language Education				N
	FH-MH	FH-ML	FL-MH	FL-ML	
Girls	113 (32.85%)	91 (26.46%)	35 (10.17%)	105 (30.52%)	344 (100%)
Boys	179 (26.13%)	186 (27.15%)	57 (8.32%)	263 (38.40%)	685 (100%)
Totals	292	277	92	368	1,029

Chi-square: 8.255

df: 3

P: <.05

As was done in the case of western education, the numbers in the various categories of Tables XXXIX, XL, XLI and XLII were equalised (with retention of the maximum possible) in order to determine which was associated more strongly with the degree of bilinguality of the student - the home proficiency of the father or of the mother, with the following results:-

TABLE XXXIX

COMPARISON OF STUDENT BILINGUALITY BY MOTHER-TONGUE EDUCATIONAL
LEVEL OF FATHERS : BOYS

Level of Father in Home Language Education	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
FH (M Neutral)	43	71	114	2.693
FL (M Neutral)	58	56	114	3.097
Totals	101	127	228	

Chi-square: 3.484

df: 1

P: >.05

TABLE XL

COMPARISON OF STUDENT BILINGUALITY BY MOTHER-TONGUE EDUCATIONAL
LEVEL OF MOTHERS : BOYS

Level of Mother in Home Language Education	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
MH (F Neutral)	51	63	114	2.860
ML (F Neutral)	50	64	114	2.930
Totals	101	127	228	

Chi-square: 0.000

df: 1

P: >.05

TABLE XLI

COMPARISON OF STUDENT BILINGUALITY BY MOTHER-TONGUE EDUCATIONAL
LEVEL OF FATHERS : GIRLS

Level of Father in Home Language Education	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
FH (M Neutral)	32	38	70	2.814
FL (M Neutral)	50	20	70	3.615
Totals	82	58	140	

Chi-square: 8.507

df: 1

P: <.05

TABLE XLII
COMPARISON OF STUDENT BILINGUALITY BY MOTHER-TONGUE EDUCATIONAL
LEVEL OF MOTHERS : GIRLS

Level of Mother in Home Language Education	Scale Scores		N	Means
	Low (5, 4)	High (3, 2, 1, 0)		
MH (F Neutral)	44	26	70	3.257
ML (F Neutral)	38	32	70	3.172
Totals	92	58	140	

Chi-square: 0.656

df: 1

P: >.05

These results are not consistent as they were in the case of western educational levels. Only one association proved to be significant, namely, that between the father's educational level and the bilinguality of the girls. In the corresponding case with boys there is a similar trend (approaching significance). It seems that, on the whole, the mother-tongue attainments of fathers and mothers are of similar potency in influencing the linguality of their children with the advantage on the fathers' side. It will be remembered, that in the case of western educational levels it was the mother who was all-powerful, the father being colourless.

Socio-Economic Status:

During this project the occupation of the father was used as the index of the socio-economic status of the child's home, there being no other more refined means of assessing this factor available immediately. This procedure has often been adopted in the past (e.g., Jones, 1952 and 1959). Differences in vocational level have been found to be closely related to the complex differences in social status, so much so,

that occupation has come to be regarded as the best single indicator of social-economic level (Strang, 1951; Saunders et al, 1958). In the two instruments devised by Warner et al (1941, 1949) to measure social class in America, namely, Evaluated Participation (E.P.) and Index of Status Characteristics (I.S.C.), occupational level played a major role. Thus Anastasi (1958) says that since occupational level receives a relatively large weight in the computation of the I.S.C., besides being correlated with the other three characteristics (source of income, house type and dwelling area), it can itself provide a fair approximation of social status.

Taussig (1920) recognises five classes of workers. In ascending order of status they are: day labourers; unskilled labourers; skilled labourers; lower middle class, clerical and semi-intellectual; and well-to-do, professional and managerial. The Minnesota Scale of Paternal Occupation (Goodenough and Anderson, 1931) lists seven occupational levels and is perhaps the best known. In ascending order the occupational classes are: day labourers of all classes (including agriculture); slightly skilled trades and occupations requiring little training or ability; semi-skilled occupations, minor clerical positions, and minor business; farmers; clerical, skilled trades, and retail business; semi-professional and managerial; and professional.

Because of the peculiar employment situation of Indians (a point that will be elaborated in the next paragraph), it was decided to avoid sophisticated classifications such as those given above and to divide occupational level into two broad classes only - "high" and "low". In the high category were included the following: wholesale and retail business proprietors (small and large); doctors; lawyers; school teachers; industrial proprietors (furniture, clothing, etc.); cinema proprietors; printing press proprietors; landlords; building contractors; estate and insurance agents; taxi owners; clerks; bookkeepers; foremen; commercial

travellers; skilled workers (machinists, tailors, qualified motor mechanics, barmen, carpenters and bricklayers, motor trimmers, printers, dispensers, etc.). In the "low" category were placed all semi-skilled workers (e.g., casual painters, waiters, shoemakers, shop-assistants, odd-job men, laundry workers, etc.) and unskilled workers (e.g., municipal cleaners, caretakers, boilermen, fishermen, factory labourers, groundsmen, general labourers, hawkers, etc.).

While occupation by itself has proved to be a useful index of socio-economic status in western societies in which the full range of occupations is open to all without discrimination, one could not be certain whether it would function in the same way in the case of Durban Indians, for many avenues of employment are barred to them both at official and unofficial levels. Woods (1954), for instance, says: "Official 'white labour' policy in the Union has influenced semi-official action, which has tended towards the replacement of Indians by Europeans in any skilled or semi-skilled work and by Natives in unskilled work". The result is that Indians function within a greatly restricted employment range, artificially imposed.

To test whether occupation was a satisfactory index of socio-economic status in the case of Indians, the socio-economic status scores on the full scale prepared for Project III, of 537 randomly selected pupils out of a total of 1,693¹⁾, were compared with their fathers' occupational categories ("high" or "low"), as follows:-

1) Vide pp. 392-401.

TABLE XLIII

RELATIONSHIP BETWEEN SCORES ON FULL SOCIO-ECONOMIC STATUS SCALE AND
LEVEL OF PATERNAL OCCUPATION (DATA FROM PROJECT III)

Occupational Status	Scores on Socio-Economic Scale		N
	Low (0, 1, 2)	High (3, 4, 5)	
High	29 (22.83%)	98 (77.17%)	127 (100.00%)
Low	295 (71.95%)	115 (28.05%)	410 (100.00%)
Totals	324	213	537

Chi-square: 95.703

df: 1

P: < .05

c1): .389

Estimated r2): .550

- 1) C stands for contingency coefficient. It was obtained by the formula given by Garrett (1947, pp. 359-363):-

$$C = \sqrt{\frac{X^2}{N+X^2}}$$

Siegel (1956) has this to say about C: "..... the contingency coefficient is an extremely useful measure of association because of its wide applicability. The contingency coefficient makes no assumptions about the shape of the population of scores, it does not require underlying continuity in the variables under analysis, and it requires only nominal measurement (the least refined variety of measurement) of the variables. Because of this freedom from assumptions and requirements, C may often be used to indicate the degree of relation between two sets of scores to which none of the other measures of association is applicable" (p. 201). Further, he says: "We may test whether an observed C differs significantly from chance simply by determining whether the X^2 for the data is significant" (p. 199).

- 2) r stands for estimated product-moment coefficient of correlation, obtained indirectly from C by employing the correction procedure given by Garrett (1947, p. 363). It has been computed only because it is a more familiar statistic than C, to indicate the degree and direction of association (vide Hagood, 1941) between the two variables compared.

It is clear that in spite of the coarse classification of occupations into just two categories and the arbitrariness that (unavoidably) entered into the allocation of some of the occupations into high and low grades there does exist a significant correlation between level of occupation and socio-economic status even in the somewhat abnormal employment situation of Indians in this country. All this assumes, of course, that the scale prepared for Project III does measure socio-economic status. Evidence in support of this will be presented in the appropriate place.

Socio-economic status was distributed as follows in the sample:-

TABLE XLIV
COMPARISON OF RELIGIOUS-MOTHER-TONGUE GROUPS BY SOCIO-ECONOMIC STATUS

Groups	Socio-economic Status				N	%
	Low	%	High	%		
Hindu-Gujurati	3	4.7	61	95.3	64	100.0
Moslem-Gujurati	16	15.4	88	84.6	104	100.0
Moslem-Urdu	35	41.2	50	58.8	85	100.0
Hindu-Telegu	55	41.8	32	58.2	87	100.0
Hindu-Hindi	109	58.3	78	41.7	187	100.0
Christian-Telegu	16	59.3	11	40.7	27	100.0
Christian-Tamil	43	59.7	29	40.3	72	100.0
Hindu-Tamil	273	68.1	128	31.9	401	100.0
Unclassified					25	
Totals	550		477		1,052	

Chi-square: 168.601

df: 8

P: < .05

This table confirms the finding of Kuper, Watts and Davies (1958) that inequalities in economic status are associated with religious-mother tongue affiliation among Durban Indians.

A study of the sample in terms of socio-economic status showed that in this respect also the standard six girls were a more select group than the boys, the former coming from homes significantly higher up in the socio-economic scale, thus:-

TABLE XLV

COMPARISON OF SOCIO-ECONOMIC LEVELS OF STANDARD SIX BOYS AND GIRLS

Sex	Paternal Occupational Status		N
	Low	High	
Girls	157 (44.23%)	198 (55.77%)	355 (100.00%)
Boys	399 (57.74%)	292 (42.26%)	691 (100.00%)
Totals	556	490	1,046
Paternal Occupation Unspecified			6

Chi-square: 16.669

df: 1

P: < .05

It was shown in Tables XXIV and XXV that, in the case of both boys and girls, the students from homes where the parental level of western education was high were younger than those from homes where the educational level was low. The same tendency was observed for socio-economic status, the higher the socio-economic level of the home, the younger the student. Thus, excluding 6 students who could not be classified, the mean age on 5th June of the year of research of 490 boys and girls from homes of high socio-economic status was 15.44 years as against 16.00 years for 556 boys and girls from low status homes. The following tables make the comparison for the sexes separately:-

TABLE XLVI
COMPARISON OF THE AGES OF BOYS ON 5TH JUNE BY
SOCIO-ECONOMIC STATUS

Socio-Economic Status	Ages in Years		N
	Below 16	16 & Above	
High	167 (57.19%)	125 (42.81%)	292 (100%)
Low	170 (42.61%)	229 (57.39%)	399 (100%)
Totals	337	354	691
Paternal Occupation Unspecified			6

Chi-square: 13.778

df: 1

P: < .05

TABLE XLVII
COMPARISON OF THE AGES OF GIRLS ON 5TH JUNE BY
SOCIO-ECONOMIC STATUS

Socio-Economic Status	Ages in Years		N
	Below 15.5	15.5 & Above	
High	124 (62.63%)	74 (37.37%)	198 (100%)
Low	76 (48.41%)	81 (51.59%)	157 (100%)
Totals	200	155	355

Chi-square: 6.630

df: 1

P: < .05

That differential rates of failing and repeating grades between the two socio-economic status levels were not responsible for producing the above results is brought out in the two tables below, which indicate that children from homes of relatively higher socio-economic status actually

enter school at an earlier age than those from lower status homes (as in the case of western educational levels of parents).

TABLE XLVIII
COMPARISON OF THE AGES OF STANDARD SIX BOYS AT SCHOOL ENTRY
BY SOCIO-ECONOMIC STATUS

Socio-Economic Status	Ages in Years		N
	Below 8 Years	8 Years & Above	
High	151 (51.71%)	141 (48.29%)	292 (100.00%)
Low	149 (37.34%)	250 (62.66%)	399 (100.00%)
Totals	300	391	691
Paternal Occupation Unspecified			6

Chi-square: 13.59

df: 1

P: < .05

TABLE XLIX
COMPARISON OF THE AGES OF STANDARD SIX GIRLS AT SCHOOL ENTRY
BY SOCIO-ECONOMIC STATUS

Socio-Economic Status	Ages in Years		N
	Below 8 Years	8 Years & Above	
High	123 (62.12%)	75 (37.88%)	198 (100.00%)
Low	79 (50.33%)	78 (49.68%)	157 (100.00%)
Totals	202	153	355

Chi-square: 4.504

df: 1

P: < .05

Since both parental level of western education and socio-economic status are negatively correlated with increasing age at school entry, the indications are that the first two variables are positively correlated. This is borne out by the two tables below:-

TABLE I
COMPARISON OF PARENTAL LEVEL OF WESTERN EDUCATION BY
SOCIO-ECONOMIC STATUS : BOYS

Western Educational Level of Parents	Socio-Economic Status		N
	Low	High	
FH-MH	51 (34.22%)	98 (65.77%)	149 (100%)
FH-ML	35 (38.04%)	57 (61.96%)	92 (100%)
FL-MH	90 (73.77%)	32 (26.23%)	122 (100%)
FL-ML	217 (68.45%)	100 (31.55%)	317 (100%)
Totals	393	287	680
Unclassifiable			17

Chi-square: 75.216

df: 1

P: < .05

TABLE LI

COMPARISON OF PARENTAL LEVEL OF WESTERN EDUCATION BY
SOCIO-ECONOMIC STATUS : GIRLS

Western Educational Level of Parents	Socio-Economic Status		N
	Low	High	
FH-MH	52 (36.11%)	92 (63.89%)	144 (100%)
FH-ML	17 (28.33%)	43 (71.67%)	60 (100%)
FL-MH	37 (64.91%)	20 (35.09%)	57 (100%)
FL-ML	51 (54.84%)	42 (45.16%)	93 (100%)
Totals	157	197	354
Unclassified			1

Chi-square: 25.406

df: 3

P: < .05

The comparison between socio-economic status and bilinguality of the students (which was the main aim of this sub-section) gave the following results:-

TABLE LII

COMPARISON OF STUDENT BILINGUALITY BY SOCIO-ECONOMIC STATUS : BOYS

Socio-Economic Status	Scale Scores						N	Means
	5	4	3	2	1	0		
High	52	73	47	51	36	33	292	2.846
Low	68	108	63	79	55	26	399	2.942
Totals	120	181	110	130	91	59	691	
Paternal Occupation Unspecified							6	

Chi-square: 5.522

df: 5

P: > .05

TABLE LIII

COMPARISON OF STUDENT BILINGUALITY BY SOCIO-ECONOMIC STATUS : GIRLS

Socio-Economic Status	Scale Scores						N	Means
	5	4	3	2	1	0		
High	24	82	39	14	9	30	198	3.040
Low	29	68	31	13	8	8	157	3.465
Totals	53	150	70	27	17	38	355	

Chi-square: 11.646

df: 5

P: <.05

It will be seen that there is a significant positive correlation between degree of bilinguality and socio-economic status in the case of the girls. With the boys, the means differ in the expected direction but their difference is not significant. These results are not as clear-cut as might have been anticipated when one takes into account the significant negative correlation between parental level of western education and student bilinguality (Tables XXVIII and XXIX), on the one hand, and the significant positive correlation between the former and socio-economic status, on the other (Tables L and LI). This may be explained by the fact that religious-mother tongue affiliation which has already been shown to be strongly associated with degree of bilinguality (Tables XI and XII) tends to cut across the comparisons made in the two immediately preceding tables. With both the boys and the girls, it was the zero score cells that contributed the bulk of the chi-square values. Now, in the case of the 33 boys in the high socio-economic category, who obtained scale scores of 0, no less than 20 (or 87.88%) were either Hindu-Gujurati, Moslem-Gujurati or Moslem-Urdu, as compared with only 8 out of 26 (or 30.77%) in the low category. Similarly, in the case of the 30 girls in the high socio-economic group, the respective figures were 23 (or 76.67%) as against 8 (or 37.50%)

in the low category. Tables XI and XII show that these three religious-mother tongue groups scored the highest in bilinguality. Furthermore, analysis of the socio-economic data shows that the three groups are also at the top in this respect, 95.3% of all Hindu-Gujurati, 84.6% of all Moslem-Gujurati, and 58.8% of all Moslem-Urdu students belonging to the high category (Table XLIV). On the other hand, these three groups were found to be the lowest in respect of mothers' level of western education (which is more important than the fathers' level in determining degree of bilinguality) (Table XX). These contrasting features in the heterogeneous Durban Indian population have blurred the relationship between their socio-economic status and bilinguality.

Summary:

The main results from the investigations into factors believed to be associated with the bilinguality of the sample may be summarised as follows:-

Age:

It is not in itself connected with bilinguality in both sexes. This corresponds with the conclusion of Arsenian (1937) who found that the extent of bilingual background did not vary significantly from age to age for ages 9 to 14 in both his Italian and Jewish groups (vide p.136).

Religious-Mother-Tongue Affiliation:

This factor is significantly related to bilingual status. Each religious-mother-tongue group seems to be a distinct, miniature socio-cultural entity. The Hindu-Gujurati, Moslem-Gujurati and Moslem-Urdu groups are the most conservative, i.e., the most bilingual, while the Christian-Tamil, Christian-Telegu and, almost certainly, the Christian-Hindi, are the least bilingual.

Sex:

Sex in itself does not appear to be associated with degree of bilinguality but within the Hindu-Telegu, the Hindu-Tamil and the Moslem-Urdu groups there are significant sex differences in favour of the girls. This is explained by the fact that within these three groups the western educational level of the girls' parents is much higher than that of the boys' parents, the difference being more marked than in the case of the other groups. Sex in itself does not appear to be of any consequence in this respect.

This finding accords with that of Hoffman (1934) and Arsenian (1937) (vide pp. 134-135).

Parental Level of Western Education:

Significantly associated (negatively) with degree of bilinguality with both boys and girls, the more highly educated the parents, the less bilingual the child. Actually, it is the western educational level of the mother that is responsible for the correlation, the father being non-influential.

Parental Level of Home Language Education:

Significantly correlated (positively) with degree of bilinguality in the case of both boys and girls, the higher the education of the parents in the mother tongue, the greater the bilinguality of the child. The indications are that the father's proficiency in the home language is more important than the mother's in this respect but the evidence is not clear-cut.

In respect of the influence of parents on the bilingual status of their children, the Indian group thus differs somewhat from the Italian

and Jewish groups of Arsenian (1937). He had found that the influence of parents was shared equally by father and mother (vide p. 135).

Socio-Economic Status:

Whatever connection this variable might have with bilinguality in the Indian situation here is obscured by cultural factors (religious-mother-tongue affiliation).

Arsenian (1937) had found bilingualism to be correlated with socio-economic status to the extent of $-.20$. The more well-to-do and socially more advanced people were relinquishing their foreign language background faster than the economically and socially less fortunate people who were adhering more tenaciously to their original language background and to the traditions and literature expressed in that language (vide p. 135).

In the Durban Indian situation the contrary seems to be the case. The Hindu-Gujurati, Moslem-Gujurati and Moslem-Urdu groups which are the most conservative, i.e., the most bilingual, are also at the head of all groups in socio-economic status. They belong mainly to the "passenger" class of immigrants from India (Kuper, 1960). Because of their favoured economic status, they have not experienced the same urgency to adopt western ways of life as the other groups to whom adaptation has become almost a matter of survival. Hence, with Durban Indians, the correlation between bilinguality and socio-economic tends to be positive, whereas, Arsenian (1937) had found a negative relationship.

(F) RESULTS:

(a) Hypothesis (1)

It will be remembered that the first hypothesis of this project was that Indian pupils would score relatively lower than Europeans in intel-

ligence and scholastic tests that demanded a greater degree of familiarity with English than in intelligence and scholastic tests that did not.

(i) Scores in the Intelligence Tests:

The recently issued New South African Group Test made it possible, for the first time, to assess accurately and directly in the South African racial context, the degree of handicap caused by linguistic difficulties, since the test has separate norms for its non-verbal and verbal sections but both computed in relation to the same reference point, that is to say, the same European subjects. Thus the manual accompanying the test says: "The total (combined) score will give the best indication of the general level of a person's intelligence while the non-verbal and verbal scores will indicate if he has any specific abilities or weaknesses in the non-language or language sphere" (National Council for Social Research, 1956).

TABLE LIV

MEAN INTELLIGENCE QUOTIENTS OF INDIAN STANDARD SIX PUPILS IN THE
NEW SOUTH AFRICAN GROUP TEST BY EUROPEAN NORMS

	<u>BOYS: (N = 664¹); Mean Age = 16.36 Years)</u>		
Non-Verbal I.Q.:	82.361	(S.D.: 11.585;	S.E.: 0.450)
Verbal I.Q.:	80.291	(S.D.: 11.020;	S.E.: 0.428)
Combined I.Q.:	79.651	(S.D.: 10.770;	S.E.: 0.418)
	<u>GIRLS (N = 346²); Mean Age = 15.63 Years)</u>		
Non-Verbal I.Q.:	82.202	(S.D.: 11.390;	S.E.: 0.613)
Verbal I.Q.:	80.150	(S.D.: 11.845;	S.E.: 0.638)
Combined I.Q.:	79.428	(S.D.: 11.170;	S.E.: 0.601)
	<u>BOYS AND GIRLS: (N = 1,010; Mean Age = 16.11 Years)</u>		
Non-Verbal I.Q.:	82.317	(S.D.: 11.560;	S.E.: 0.364)
Verbal I.Q.:	80.242	(S.D.: 11.310;	S.E.: 0.356)
Combined I.Q.:	79.574	(S.D.: 10.905;	S.E.: 0.343)

-
- 1) 33 boys were absent from school on the day of the intelligence test.
2) 9 girls were absent from school on the day of the intelligence test.

It will be noted that the hypothesis stated above has been borne out in so far as it relates to scores in intelligence tests, the performance of the whole sample in the non-verbal section of the test being superior to their performance in the verbal part by 2.075 I.Q. points. The difference is significant at the .01 level, the t value being 6.963 after taking into account an obtained product-moment coefficient of correlation of .655 between the non-verbal and verbal I.Q.'s of the pupils¹⁾.

As the higher score in the non-verbal test relative to the verbal test is due to a handicap in English, **it is to be expected that as** one goes down the educational scale, that is to say, as the degree of mastery of English decreases, the discrepancy between non-verbal and verbal scores will increase, with the advantage consistently in favour of the non-verbal scores. Evidence for this comes from Project III. The table below shows the New South African Group Test Scores of the 1,693 boys used in that project, ranging from standard six to standard two. Although the subjects were a specially selected lot, since they were chosen on the basis of never having failed any grade prior to the investigation, the validity of the comparison between their non-verbal and verbal scores is not affected in any way.

1) The formula employed was that which is used to compute the significance of the difference between the means of two large correlated samples stated for example, by Garrett (1947, p. 209) as follows:-

$$\frac{M_1 - M_2}{\sqrt{\sigma_{M_1}^2 + \sigma_{M_2}^2 - 2r_{12} \sigma_{M_1} \sigma_{M_2}}}$$

TABLE LV

MEAN NON-VERBAL AND VERBAL I.Q.'S OF INDIAN PUPILS IN THE NEW SOUTH AFRICAN GROUP TEST BY SCHOOL STANDARD (DATA FROM PROJECT III)

Standard	N	Non-Verbal I.Q.	Verbal I.Q.	Difference	Test Favoured
VI	306	82.147	77.801	4.346	Non-Verbal
V	336	81.568	76.542	5.026	Non-Verbal
IV	313	80.914	74.971	5.943	Non-Verbal
III	361	83.191	75.061	8.130	Non-Verbal
II	377	84.546	75.806	8.740	Non-Verbal

Conversely, as one goes up the educational scale, that is to say, as mastery of English increases, one would expect the discrepancy between non-verbal and verbal scores to decrease and finally to disappear. There is evidence for this from tests that the researcher carried out (in connection with other investigations) with post-junior certificate and post-senior certificate (matriculation level) teacher-trainees at the Springfield Training College and with undergraduate and graduate arts and science trainees in the University of Natal during the years 1959 and 1960, the students comprising both males and females. The following were the results:-

TABLE LVI

COMPARISON OF MEAN NON-VERBAL AND VERBAL I.Q.'S OF TEACHER-TRAINEES IN THE NEW SOUTH AFRICAN GROUP TEST

Educational Level	N	Non-Verbal I.Q.	Verbal I.Q.
Post-Junior Certificate	59	90.475	88.932
Post-Senior Certificate	206	92.987	94.125
Graduate & Undergraduate	32	96.313	98.688

The figures indicate that equality between non-verbal and verbal I.Q.'s is attained at the junior-senior certificate levels, after which the advantage shifts to the verbal side.

Although Indian pupils at the standard six level are handicapped by language difficulties in a verbal test of intelligence, the extent of handicap (2.075 points of I.Q.), though statistically significant, is of hardly any practical importance in face of the fact that the non-verbal I.Q. of the students is 17.683 points, the verbal I.Q., 19.758 points, and the combined I.Q., 20.426 points below the English-speaking norms¹⁾!

It has already been mentioned that Logue (1954) found the mean I.Q. of his Indian subjects on the (old) (verbal) South African Group Test to be 87.4 as against 100 for South African European children. He attributed the difference of 12.6 points of I.Q. to the Indians' weakness in English. Two observations have to be made in this connection.

Firstly, it is suggested that the Indo-European difference of 12.6 I.Q. points discovered by Logue was an underestimation. The correct figure was probably in the region of 20 points as indicated by the New South African Group Test, for grave doubts have been cast on the accuracy of the standardisation mean of 100 established by Wilcocks (1931) for South African Europeans on the (old) South African Group Test. Pratt Yule and

1) Loevinger (1940) and Edwards (1956) make a very necessary distinction between practical and statistical significance. The latter says that it is possible, by increasing the number of cases involved, to make even a minute difference between two means attain statistical significance, for additional replications serve to decrease the degree of uncontrolled error against which the difference between the means is compared. In such a case, he goes on, although statistical significance may be attained, common sense would tell us that if the difference between the means of the two groups is so small that it requires a thousand cases to detect it, then it is not likely to be of any practical significance.

Albino (1948) applied the test to 5,720 children between the ages of 10 and 17, who were fully representative of the entire schoolgoing population of Rhodesia, and obtained a mean of 108.7. This dropped to 106.8 when the I.Q.'s of 622 dependent children in institutions, computed from their known Binet scores were included. Two years later, Pratt Yule and Albino (1950) discovered that the (old) South African Group Test also measured high in the Union of South Africa, the mean I.Q. of over 40,000 Transvaal children working out to 108. It was concluded that the original sample on which the test was standardised by Wilcocks was unrepresentative, and that possibly also, educational changes and an increase in test sophistication during the intervening 20 years had brought about an all-round rise in I.Q. Whatever the reasons for this inflation of scores, it is clear that, until it was superseded by the New South African Group Test in 1956, the older test had made a present of about 8 I.Q. points to every child tested, including Logue's Indian group. If allowance is made for this, the I.Q.'s of the Indian subjects on the Old and New South African Group Test would become almost identical.

The second point is that Logue was apparently mistaken in attributing the inferior performance of the Indian children in the old South African Group Test mainly to a handicap in English. The present research shows that at the standard six level language difficulties account for only 2.075 points of I.Q. It is true that at the standard two level (which was also the lowest standard studied by Logue) the figure rises to 8.740 points (Table LV), yet the discrepancy between the non-verbal scores of European and Indian children at this point is 15.454 points of I.Q.¹⁾, leaving a big margin still to be accounted for in terms other than weakness in English.

1) The figure is probably larger in reality for, as has already been pointed out, the groups shown in Table LV were all non-failures.

Furthermore, even in highly educated Indian groups in whom non-verbal and verbal scores attain parity (Table LVI) the mean I.Q.'s are still well below European standards, considering the high degree of selectivity of the Indian subjects.

The conclusion is clear. In the present educational, social, economic and political context, Indian subjects score consistently lower than Europeans in non-verbal intelligence tests. In verbal tests Indian inferiority is more marked; linguistic handicap accounts for their lower scores appreciably (though certainly not wholly) in the lower standards but not above the junior-senior certificate level and yet even here the inferiority of Indians persists.

It is recognised that the contents of the five immediately preceding paragraphs have, in attempting an inter-racial comparison, perhaps overstepped the self-imposed limits of the present project. However, the comparison has been made because of the leads that it offers for further research. In fact, the whole problem of Indian inferiority relative to Europeans in mental tests is taken up later for detailed study and constitutes the raison d'être for Project III.

Another feature of the mental test scores given in Table LIV is that the boys and girls have scored almost identical means. Tests of statistical significance of the sex differences yielded the non-significant t-values of 0.209, 0.184 and 0.305 for the non-verbal, verbal and combined sections, respectively.

The boys, however, scored significantly higher mean raw scores, at the .01 level in the verbal and combined scores and at the .05 level in non-verbal scores, as follows:-

TABLE LVII

COMPARISON OF THE MEAN RAW SCORES OF INDIAN STANDARD SIX BOYS AND GIRLS
IN THE NEW SOUTH AFRICAN GROUP TEST, SENIOR SERIES¹⁾

	Boys	Girls	t	P
N	661	343		
Ages in Years	16.36	15.63		
Non-Verbal Raw Scores	22.725 (S.D.: 7.077) (S.E.: 0.275)	21.586 (S.D.: 6.708) (S.E.: 0.363)	2.503	> .01 (< .05)
Verbal Raw Scores	21.853 (S.D.: 6.444) (S.E.: 0.251)	20.327 (S.D.: 6.552) (S.E.: 0.354)	3.516	< .01
Combined Raw Scores	44.700 (S.D.: 11.845) (S.E.: 0.461)	41.971 (S.D.: 11.580) (S.E.: 0.626)	3.510	< .01

Other things equal, one would normally have attributed the superiority of the boys over the girls in raw intelligence scores to the fact that the former are 0.73 year older than the latter. The difference would have been regarded as representing a difference in mental age, due to the greater chronological age of the boys.

-
- 1) The total of boys and girls in this table is 1,004, i.e., 6 short of the total given in Table LIV. The explanation is as follows: Of the 1,010 students who were tested for intelligence, 1,004, comprising 661 boys and 343 girls, worked the senior version of the New South African Group Test and 6, the intermediate version. Whenever raw scores are referred to throughout the text, they pertain to the senior level only, the 6 odd students being excluded, as raw scores at the two levels are not comparable. This separation does not apply to I.Q.'s which are comparable, whether derived from the junior, intermediate or senior versions of the Test.

Actually, however, the factor of age functions against the boys, for it will be shown later (p. 278) that in the peculiar educational set-up of Durban Indian children both raw scores in intelligence tests and intelligence quotients are negatively correlated with age to a significant degree.

In the matter of socio-economic status also the boys are at a disadvantage relative to the girls. Table XLV shows that the girls are, on an average, significantly superior to the boys in socio-economic status, and it is an established fact that children's intelligence test scores are positively correlated with this factor (vide p. 237).

For a valid comparison, boys and girls, therefore, have to be equalised for both age and socio-economic status. This was done through a balanced two-way analysis of variance in which 274 boys and 274 girls¹⁾ were matched exactly for age (and standard deviation) and for socio-economic status, the pattern of analysis being as follows^{2),3)}:-

TABLE LVIII

2 x 2 FACTORIAL DESIGN FOR THE COMPARISON OF BOYS AND GIRLS IN INTELLIGENCE

	BOYS		GIRLS	
N:	137	137	137	137
Age (in Years):	15.740	15.740	15.740	15.740
Socio-Economic Status	Low	High	Low	High

-
- 1) These were the maximum possible numbers obtainable in view of the exact matching methods adopted. At each sex-age-status stratum selection of the subjects was made at random.
 - 2) As presented, for example, by Edwards (1950), p. 209.
 - 3) In all the analyses made in this table the groups were tested for homogeneity of variance by the method described by Bartlett (1937).

The raw scores of the students were again used in the comparison, with the following results:-

TABLE LIX
ANALYSIS OF VARIANCE OF THE RAW SCORES OF INDIAN STANDARD SIX
BOYS AND GIRLS IN THE NEW SOUTH AFRICAN GROUP TEST

(a) Non-Verbal Scores

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Sex:	562.089	1	562.089	11.946	<.01
Socio-economic Status:	290.513	1	290.513	6.174	>.01 (<.05)
Sex x Socio-economic Status:	248.469	1	248.469	5.281	>.01
Within Groups:	25,597.445	544	47.054		
Totals:	26,698.516	547			

Means

Girls: 21.285 (I.Q.: 80) Boys: 23.310 (I.Q.: 83)
Low Status Group: 21.569 (I.Q.: 82) High Status Group: 23.026 (I.Q.: 83)

(b) Verbal Scores

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Sex:	780.504	1	780.504	18.969	<.01
Socio-economic Status:	331.161	1	331.161	8.048	<.01
Sex x Socio-economic Status:	44.415	1	44.415	1.079	>.01
Within Groups:	22,383.512	544	41.146		
Totals:	23,539.592	547			

Means:

Girls: 20.091 (I.Q.: 80) Boys: 22.478 (I.Q.: 83)
Low Status Group: 20.507 (I.Q.: 81) High Status Group: 22.062 (I.Q.: 83)

(c) Combined Scores

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>P</u>
Sex:	2,562.454	1	2,562.454	19.020	<.01
Socio-economic Status:	1,124.498	1	1,124.498	8.347	<.01
Sex x Socio-economic Status:	603.330	1	603.330	4.478	>.01
Within Groups:	73,290.146	544	134.724		
Totals:	77,580.428	547			

Means:

Girls: 41.489 (I.Q.: 79) Boys: 45.814 (I.Q.: 82)
Low Status Group: 42.219 (I.Q.: 79) High Status Group: 45.084 (I.Q.: 81)

This problem of sex differences in intelligence test scores will be discussed below after a study of the performances of the boys and girls in the scholastic tests.

(ii) Scores in Scholastic Tests:

The performance of the Indian pupils by standard and age in the scholastic tests relative to the performance of European pupils in the same educational grade are given below. In interpreting the table it should be held in mind that the mean age of the Indian students on the day of the scholastic tests was 16.03 years, a high figure due to the fact that only a small minority of Indian children succeed in obtaining school places at the minimum legal age of 5+ years which is normal for Europeans.

TABLE LX
MEAN RAW SCORES OF INDIAN AND EUROPEAN STANDARD SIX PUPILS
IN SCHOLASTIC TESTS

	<u>Indians</u> (N: 1,022) ¹⁾	<u>Europeans</u>	<u>Maximum</u> <u>Possible</u>	<u>Indian Performance Rela-</u> <u>tive to European Perfor-</u> <u>mance by Standard & Age</u> ²⁾
Vocabulary	19.305	27.6	50.0	Between Stds. IV and V 11.6 Years
Reading Comprehen- sion	12.322	15.7	25.0	Between Stds. IV and V 11.5 Years
Problem Arithmetic	10.373	12.5	28.0	Between Stds. IV and V 12.6 Years
Mechanical Arithmetic	11.154	12.5	30.0	Between Stds. V and VI 13.2 Years

-
- 1) 30 students were absent from school on the day of the scholastic tests.
2) The standard and age indices of the performance of the Indian pupils are based on the norms given for Europeans by the National Bureau of Educational and Social Research (1951) in the manual accompanying the scholastic tests. In computing the age indices, interpolation was resorted to.

It will be noted that the second part of Hypothesis (1), namely, that Indian pupils would score relatively lower than Europeans in scholastic tests that demanded a greater degree of familiarity with English than in scholastic tests that did not, has been borne out in that the mean subject ages of the Indian pupils (by European norms) are lower for vocabulary and reading comprehension than for problem and mechanical arithmetic. Further, Indian performance approximates European norms (both by standard and subject age) more closely in mechanical than in problem arithmetic which makes greater demands on mastery of English, thus confirming inspectorial observations in this regard (vide pp. 121-122).

Statistically significant, sex differences in favour of the boys were found in vocabulary and problem arithmetic of the .01 level of confidence and in reading comprehension at the .05 level, thus:-

TABLE LXI
COMPARISON OF THE MEAN RAW SCORES OF STANDARD SIX INDIAN
BOYS AND GIRLS IN SCHOLASTIC TESTS

	<u>Boys</u> (N: 673)	<u>Girls</u> (N: 349)	<u>t</u>	<u>P</u>
Vocabulary	19.932 (S.D.: 6.942) (S.E.: 0.268)	18.097 (S.D.: 7.104) (S.E.: 0.381)	3.938	<.01
Reading Comprehen- sion	12.503 (S.D.: 3.736) (S.E.: 0.144)	11.967 (S.D.: 4.102) (S.E.: 0.220)	2.033	>.01 (<.05)
Problem Arithmetic	10.803 (S.D.: 3.378) (S.E.: 0.130)	9.543 (S.D.: 3.360) (S.E.: 0.160)	5.676	<.01
Mechanical Arithmetic	11.151 (S.D.: 3.672) (S.E.: 0.142)	11.159 (S.D.: 3.584) (S.E.: 0.192)	0.008	>.01

As far as intelligence is concerned, the results are consistent in showing that, matched for age and socio-economic status, the boys are superior to the girls in all three sections of the New South African Group Test - non-verbal, verbal, and combined raw scores. In the European standardisation of the test only negligible differences between the sexes had appeared (National Council for Social Research, 1956).

Logue (1954) had also found a significant sex difference in favour of boys among his Indian subjects in the old South African Group Test but not in his Non-Verbal Test of Intelligence (1956). A possible defect in both of his comparisons was that the sexes were not matched carefully for socio-economic status. It has already been shown that at the standard six level at any rate Indian girls are a more highly selected group than the boys, significantly more girls than boys coming from homes of high status (Table XLV), while Table X suggests that this process of selection begins in the very earliest standards.

Now, it is the virtually unanimous finding of a very large number of investigators in different countries that there exists a significant, positive association between socio-economic status and scores in intelligence tests in the case of adults, of children and of whole communities (e.g., Eells et al., 1951; Anastasi, 1958). Table LIX of the present research also shows that there are significant socio-economic status differences in verbal and combined scores in the New South African Group Test (at the .01 level of confidence) as well as in the non-verbal scores (at the .05 level). Hence, in any comparison of the sexes in intelligence, socio-economic status must be taken into account.

The conservative outlook of the Indian community on the role of women in society (Kuper, 1960) is probably responsible for the observed sex differences in the intelligence test scores of Indian children.

Kamat (1939, 1951) while standardising the Stanford Revision of the Binet-Simon Scale for Indian children in the Bombay Presidency, also discovered fairly consistent sex differences from age 2 years to age 16 years and above favouring the boys. On the other hand, Burt (1933), in his London Revision, had found only slight differences and these had favoured the girls. Also, Anastasi (1958), surveying the literature on the subject, writes: "When no deliberate effort has been made to exclude sex differences from the (intelligence) test, there has generally been a tendency to favour girls. This follows from the fact that intelligence tests consist so largely of verbal items, on which girls are superior. In so far as the tests depend upon memory, girls have an additional advantage. Moreover, many intelligence tests are validated against school achievement, in which girls also excel, especially at the elementary school level".

It seems that these conclusions, arrived at in western cultures, do not apply to eastern cultures or to a "semi-eastern" culture such as that of Natal Indians. Kamat (1951) attributed the inferiority of his girls to cultural factors. He said: "..... it must be remembered that in Indian society the girls grow up in a different environment from that of boys. They spend most of their time in the company of their mothers and other female members of the family, the majority of whom are still illiterate, whereas boys spend more of their time with their fathers who are more literate. Further, it is still the fashion to bring up girls to be good mothers and housewives and to bring up boys for a literary career If, as Burt says, the English girls (who were found to score higher in intelligence tests than boys) being sheltered, supervised and detained at home incline more towards literary pursuits, the Indian girls, on the other hand, suffer from a comparative neglect of their literary education"¹⁾.

1) On the other hand, Lall (1944) found no sex differences when he tested
(footnote continued next page)

Such a state of affairs prevails also among Indians in Natal although the picture is rapidly changing (Kuper, 1956).

The superiority of the boys over the girls in intelligence is probably responsible also for their superiority in three of the four scholastic tests.

It is interesting to note, however, that even when the sexes are matched for socio-economic status and combined raw scores in the intelligence test the directions of the differences persist. Thus, when 128 boys of high and 128 boys of low socio-economic status were matched exactly with 128 girls of high and 128¹⁾ girls of low socio-economic status for combined raw scores in the intelligence test (as well as for standard deviation), their scholastic mean scores appeared as follows:-

TABLE LXII
MEAN SCORES OF "EQUALLY INTELLIGENT" BOYS AND GIRLS IN SCHOLASTIC TESTS

	<u>Boys</u>	<u>Girls</u>
N:	256	256
Combined Raw Score:	41.258	41.258
Vocabulary:	19.199	17.922
Reading Comprehension:	11.922	11.703
Problem Arithmetic:	10.219	9.430
Mechanical Arithmetic:	10.719	11.172

(footnote continued from previous page)

- all the eleven-year-old high school pupils in the United Provinces of Agra and Oudh (India). He used a verbal group test in Hindustani, constructed after the pattern of the Moray House tests. His sample of 1,419, however, contained 1,385 boys and only 34 girls. Explaining this disproportion, he says: "The small number of girls is due to the fact that the Government high schools for girls are very few as compared with such schools for the boys". It is obvious from this statement that conservatism with regard to female education was very marked in the area studied. The absence of sex differences between the large number of boys and the comparatively small, and probably highly selected, group of girls is, therefore, understandable in the circumstances.
- 1) These were the maximum numbers possible in view of the exact matching techniques adopted. Selection was done at random within the various class intervals.

The statistical significance of the differences were not computed as the investigation of sex differences was not the primary purpose of the present study, but the consistency of the results given in Tables LXI and LXII suggest that, apart from inferiority in intelligence, cultural factors are operating against the girls. It is unlikely that differences in the quality of tuition received by the boys and girls were responsible for the observed differences in their mean scores in the scholastic tests, for of the 20 schools used in the research, 12 were co-educational schools (and these contained the great bulk of the sample) while only 3 were purely boys' and 3 purely girls' schools. However, this point should be investigated by the future researcher.

Socio-economic status differences in scholastic performance (with intelligence controlled) were also indicated as shown below:-

TABLE LXIII
MEAN SCORES OF "EQUALLY INTELLIGENT" SOCIO-ECONOMIC STATUS GROUPS IN
SCHOLASTIC TESTS

	Low Status Group	High Status Group
N:	256 (Boys: 128) (Girls: 128)	256 (Boys: 128) (Girls: 128)
Combined Raw Score:	41.258	41.258
Vocabulary:	18.297	18.824
Reading Comprehension:	11.469	12.156
Problem Arithmetic:	9.907	9.743
Mechanical Arithmetic:	10.743	11.149

Again, the statistical significance of the differences were not computed but the results are in line with those of similar studies of European children (e.g., Schonell, 1942; Robbertse, 1948).

The observed inferiority of Indian girls in intelligence and scholastic tests requires detailed study at some future time. The problem is an important one both on scholastic and humanitarian grounds. If the folkways and mores of the Indian community are condemning half its number to an artificially imposed inferiority and blocking the full development of its potentialities, then the more quickly such customs and traditions are dispensed with, the better for the advancement of Indians¹⁾.

(b) Hypothesis (2):

It will be remembered that the second hypothesis of the present project was that since Indian pupils varied in the amount of English they used in the home vis a vis the mother tongue, those children who had a richer background of English would tend to score relatively higher in tests that demanded a high degree of familiarity with English than those children who had a poorer background. (This was also the implication of inspectorial opinions, vide pp. 119-122).

1) A similar sentiment has been expressed by an outside observer who was, until recently, Director of Education in Natal. He has said: "There is still much sex discrimination (among Indians), and your Society (Natal Indian Teachers') may feel that it has a special duty in this matter. At the turn of the century there were six boys in Indian schools for every girl. Very great progress has been made, for in the junior and middle school there are now about as many girls as boys. But not in the upper school. In the year 1957, there were in the senior secondary class in Indian schools 398 boys and 66 girls, or almost exactly six boys to one girl. Now I have said that the same and progressive South Africa of the future will need and will use all the intelligence of all its people. Believe me when I say that Heaven, for its own inscrutable reasons, has divided intelligence just as fairly between boys and girls as between Asians and Europeans. No community can afford to leave half of its top-level intelligence untrained" (McConkey, 1960).

The hypothesis was investigated by the method of partial correlation^{1),2),3)}. The question then became: What is the extent of association between the scores of Indian children in intelligence and scholastic tests and their bilingual status, other factors held constant?

(i) Test-Intelligence in Relation to Bilingualism:

Raw scores in the intelligence tests were used for correlational analyses instead of I.Q.'s in order to avoid complications that might result from applying norms derived from one culture on another. Since this procedure eliminated age (which is the basis for computing I.Q.'s), it had to be taken care of separately. This meant that five variables were involved, namely, degree of bilinguality, raw scores in the intelligence tests, age, sex, and socio-economic status. Since interest lay in the relation-

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- 1) Guilford (1950) defines a partial correlation between two things as "one that nullifies the effects of a third variable (or a number of other variables) upon both the variables being correlated" (p. 345).
 - 2) The method of partial correlation was also used by Arsenian (1937) and Pintner and Arsenian (1937) in their studies of the relationship between bilingualism, on the one hand, and mental development and school adjustment, on the other.
 - 3) In all the partial correlational analyses described in this project only those boys and girls who were not less than 14 years 0 months and not more than 17 years 11 months in age were used. The lower and upper age groups were excluded in order to ensure linearity of regression when raw scores in the intelligence (and scholastic) tests were correlated with age. It is a well-known fact that mental growth is a non-linear function, a rapid rise of the curve in the early years being followed by a levelling out in the 'teens and a gradual fall thereafter (e.g., Wechsler, 1944). Exclusion of the very young and very old students meant, in effect, the excising of the two curved ends of the regression line (in the case of the present sample). As mentioned earlier, all regression lines were tested for curvature before product-moment r 's were accepted as adequate indices of the relationships being investigated. Guilford (1950), for example, says: "The most important requirement for the legitimate use of the Pearson r is that the trend of relationship between Y and X be rectilinear, in other words, a straight-line regression". Restriction of the age range did not overly attenuate the sample. Thus, on the date of the intelligence tests, out of a total of 1,052 pupils, only 154 were eliminated on the basis of age, the remaining 30 being absent, so that 868 were available to choose from for correlational purposes. Further, on the date of the scholastic test, 147 students were excluded on the grounds of age while 42 were absent, leaving a total of 863 for correlational analyses. The accepted age limits, therefore, covered the bulk of the total sample. In the statistical tests other than correlational, e.g., chi-square, there was, of course, no need to observe these precautions and the total sample was used for analyses.

ship between the first two named, the influence of the other three factors had to be neutralised or eliminated. Age was controlled statistically by being partialled out, while the sexes were treated separately. The effects of socio-economic status were neutralised by selecting, at random, equal numbers of subjects from the low and high status levels within each sex group. The final sub-samples consisted of 480 boys and 272 girls, these being the maximum numbers possible in view of the selection procedure adopted.

The task became, therefore, one of computing first-order partial r 's between intelligence test score and degree of bilinguality, with age held constant. The results were as follows:-

TABLE LXIV
RELATIONSHIP BETWEEN THE RAW SCORES OF INDIAN STANDARD SIX BOYS IN
THE NEW SOUTH AFRICAN GROUP TEST AND THEIR DEGREE OF BILINGUALITY.

(a) Non-Verbal Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial $r^{1)}$</u>	<u>$P^{2)}$</u>
1. Intelligence	$r_{12} = -.056$	$>.01$	$r_{12.3} = -.012$	$>.01$
2. Bilinguality	$r_{13} = -.261$	$<.01$		
3. Age	$r_{23} = +.171$	$<.01$		

(b) Verbal Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial r</u>	<u>P</u>
1. Intelligence	$r_{12} = -.066$	$>.01$	$r_{12.3} = -.026$	$>.01$
2. Bilinguality	$r_{13} = -.238$	$<.01$		
3. Age	$r_{23} = +.171$	$<.01$		

(c) Combined Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial r</u>	<u>P</u>
1. Intelligence	$r_{12} = -.060$	$>.01$	$r_{12.3} = -.015$	$>.01$
2. Bilinguality	$r_{13} = -.271$	$<.01$		
3. Age	$r_{23} = +.171$	$<.01$		

Footnotes 1), 2), see next page.

TABLE LXV

RELATIONSHIP BETWEEN THE RAW SCORES OF INDIAN STANDARD SIX GIRLS IN
THE NEW SOUTH AFRICAN GROUP TEST AND THEIR DEGREE OF BILINGUALITY

(a) Non-Verbal Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial r</u>	<u>P</u>
1. Intelligence	$r_{12} = -.090$	$>.01$	$r_{12.3} = -.074$	$>.01$
2. Bilinguality	$r_{13} = -.306$	$<.01$		
3. Age	$r_{23} = +.065$	$>.01$		

(b) Verbal Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial r</u>	<u>P</u>
1. Intelligence	$r_{12} = -.052$	$>.01$	$r_{12.3} = -.030$	$>.01$
2. Bilinguality	$r_{13} = -.373$	$<.01$		
3. Age	$r_{23} = +.065$	$>.01$		

(c) Combined Scores and Bilinguality

<u>Variables</u>	<u>Zero-Order r's</u>	<u>P</u>	<u>Partial r</u>	<u>P</u>
1. Intelligence	$r_{12} = -.097$	$>.01$	$r_{12.3} = -.077$	$>.01$
2. Bilinguality	$r_{13} = -.416$	$<.01$		
3. Age	$r_{23} = +.065$	$>.01$		

Footnotes 1) and 2) - page 243.

- 1) The formula employed to compute first-order partial r 's was as follows:-

$$r_{12.3} = \frac{r_{12} - r_{13} r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}} \quad (\text{Guilford, 1950; p. 345})$$

- 2) The probability levels of all partial r 's were derived from a table given by Garrett (1947, pp. 426-428), which gives coefficients of correlation at the 5% and 1% levels of confidence for varying degrees of freedom.

The conclusion to be drawn from the two immediately preceding tables is that there is no significant connection (either positive or negative) between the non-verbal, verbal and combined raw scores of Indian standard six boys and girls and their bilingual status. The results are consistent.

There are two other features worthy of note in Tables LXIV and LXV. Firstly, there is a significant, positive correlation between bilinguality and age in the case of boys but not in the case of girls. The fact is not altered when intelligence level is held constant (non-verbal, verbal or combined raw scores). Thus, using the same figures as are given in Tables LXIV and LXV, the following results were obtained:-

TABLE LXVI
RELATIONSHIP BETWEEN DEGREE OF BILINGUALITY AND AGE OF INDIAN
STANDARD SIX BOYS AND GIRLS WITH INTELLIGENCE CONSTANT

Factor Held Constant	Boys		Girls	
	Partial r	P	Partial r	P
Non-Verbal Raw Scores	+.162	< .01	+.039	> .01
Verbal Raw Scores	+.160	< .01	+.050	> .01
Combined Raw Scores	+.161	< .01	+.028	> .01

It will be seen that the positive correlation between bilingual status and age remains consistently significant in the case of boys and consistently non-significant in the case of girls. Why this is so has already been argued earlier (vide p. 184, ff.).

The second noteworthy feature of Tables LXIV and LXV is the consistently negatively and statistically significant set of correlations between raw scores on the intelligence tests and age in the case of all three measures of mental status and in the case of both boys and girls. Nor-

mally one expects raw score increments on intelligence tests with every year of growth until the age of sixteen or so, and, therefore, positive correlation between the two variables. It is true that "overageness" in the group of students studied could be due to failures and consequent repetitions of grades on part of the less intelligent children, which could lead to negative correlations. But this is only a partial explanation, for a study of the association between intelligence and age of only those children of the total sample who had never failed a single grade in their school careers, and whose advanced age relative to their standard was due solely to their late entrance into school, also yields consistently negative correlations in terms of both raw scores and I.Q.'s, thus:-

TABLE LXVII
RELATIONSHIP BETWEEN INTELLIGENCE LEVEL AND AGE OF 732 INDIAN
STANDARD SIX NON-FAILURES (BOYS AND GIRLS)

Type of Test	Raw Scores & Age r	P	I.Q. & Age r	P
Non-Verbal	-.227	<.01	-.497	<.01
Verbal	-.201	<.01	-.593	<.01
Combined (Non-Verbal and Verbal)	-.239	<.01	-.594	<.01

This phenomenon is not of direct relevance to the present investigation but will be the centre of interest in Project III.

(ii) Scores in Scholastic Tests in Relation to Bilingualism:

The study of the relationship between the performance of the students in the scholastic tests and their bilingual status was more involved than in the case of intelligence since no less than four variables had to be controlled, namely, age, intelligence, sex, and socio-economic status.

Age and intelligence were controlled statistically by the computation of second-order partial r 's¹⁾. The sex and socio-economic difficulties were surmounted by selecting, at random, equal numbers of boys and girls in such a way that within each sex group there were equal numbers of pupils of low and high socio-economic levels. The sexes were then combined for study. The final sub-sample was constituted as follows:-

	<u>Boys</u>	<u>Girls</u>	<u>Totals</u>
High Socio-Economic Status	133	133	266
Low Socio-Economic Status	133	133	266
<hr/>			
Totals	266	266	532

The results were as follows:-

1) The formula employed was that given by Guilford (1950):-

$$r_{12.34} = \frac{r_{12.3} - r_{14.3} r_{24.3}}{\sqrt{(1 - r_{14.3}^2) (1 - r_{24.3}^2)}}$$

TABLE LXVIII

RELATIONSHIP BETWEEN THE RAW SCORES OF INDIAN STANDARD SIX BOYS
AND GIRLS IN SCHOLASTIC TESTS AND THEIR DEGREE OF BILINGUALITY

(1) Vocabulary and Bilingual Status:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Vocabulary Scores
2. Degree of Bilinguality
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = -.093$	$> .01$	$r_{12.3} = -.083$	$> .01$	$r_{12.34} = -.067$	$> .01$
$r_{13} = +.332$	$< .01$				
$r_{14} = -.205$	$< .01$	$r_{14.3} = -.152$	$< .01$		
$r_{23} = -.046$	$> .01$				
$r_{24} = +.119$	$< .01$	$r_{24.3} = +.112$	$> .01$		
$r_{34} = -.192$	$< .01$				

(b) Verbal Raw Scores and Age Constant

Variables

1. Vocabulary Scores
2. Degree of Bilinguality
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = -.093$	$> .01$	$r_{12.3} = -.052$	$> .01$	$r_{12.34} = -.047$	$> .01$
$r_{13} = +.643$	$< .01$				
$r_{14} = -.205$	$< .01$	$r_{14.3} = -.047$	$> .01$		
$r_{23} = -.083$	$> .01$				
$r_{24} = +.119$	$< .01$	$r_{24.3} = +.101$	$> .01$		
$r_{34} = -.264$	$< .01$				

(Table LXVIII continued next page)

TABLE LXVIII (Continued)

(2) Reading Comprehension and Bilingual Status:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Reading Comprehension Scores
2. Degree of Bilinguality
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.033$	$>.01$	$r_{12.3} = +.057$	$>.01$	$r_{12.34} = +.078$	$>.01$
$r_{13} = +.418$	$<.01$				
$r_{14} = -.232$	$<.01$	$r_{14.3} = -.170$	$<.01$		
$r_{23} = -.046$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.112$	$>.01$		
$r_{34} = -.192$	$<.01$				

(b) Verbal Raw Scores and Age Constant

Variables

1. Reading Comprehension Scores
2. Degree of Bilinguality
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.033$	$>.01$	$r_{12.3} = +.098$	$>.01$	$r_{12.34} = +.109$	$>.01$
$r_{13} = +.568$	$<.01$				
$r_{14} = -.232$	$<.01$	$r_{14.3} = -.103$	$>.01$		
$r_{23} = -.083$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.101$	$>.01$		
$r_{34} = -.264$	$<.01$				

(Table LXVIII continued next page)

TABLE LXVIII (Continued)

(3) Problem Arithmetic and Bilingual Status:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Problem Arithmetic Scores
2. Degree of Bilinguality
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = -.005$	$>.01$	$r_{12.3} = +.024$	$>.01$	$r_{12.34} = +.031$	$>.01$
$r_{13} = +.554$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.074$	$>.01$		
$r_{23} = -.046$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.101$	$>.01$		
$r_{34} = -.192$	$<.01$				

(b) Verbal Raw Scores and Age Constant

Variables

1. Problem Arithmetic Scores
2. Degree of Bilinguality
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = -.005$	$>.01$	$r_{12.3} = +.053$	$>.01$	$r_{12.34} = +.055$	$>.01$
$r_{13} = +.580$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.018$	$>.01$		
$r_{23} = -.083$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.101$	$>.01$		
$r_{34} = -.264$	$<.01$				

(Table LXVIII continued next page)

TABLE LXVIII (Continued)

(4) Mechanical Arithmetic and Bilingual Status:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Degree of Bilinguality
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.047$	$>.01$	$r_{12.3} = +.069$	$>.01$	$r_{12.34} = +.082$	$>.01$
$r_{13} = +.366$	$<.01$				
$r_{14} = -.171$	$<.01$	$r_{14.3} = -.111$	$>.01$		
$r_{23} = -.046$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.112$	$>.01$		
$r_{34} = -.192$	$<.01$				

(b) Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Degree of Bilinguality
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.047$	$>.01$	$r_{12.3} = +.092$	$>.01$	$r_{12.34} = +.100$	$>.01$
$r_{13} = +.433$	$<.01$				
$r_{14} = -.171$	$<.01$	$r_{14.3} = -.065$	$>.01$		
$r_{23} = -.083$	$>.01$				
$r_{24} = +.119$	$<.01$	$r_{24.3} = +.101$	$>.01$		
$r_{34} = -.264$	$<.01$				

As in the case of intelligence, the results here are also consistently unequivocal. There is no significant connection (either positive or negative) between the vocabulary, reading comprehension, problem arithmetic and mechanical arithmetic scores of Indian standard six boys and girls and their bilingual status. This conclusion holds when both non-verbal and verbal intelligence are held constant.

Hypothesis (2), therefore, which was the key problem of this project, has been consistently negatived.

A feature to be noted is that verbal intelligence is associated more closely with scholastic achievement than is non-verbal intelligence. This is illustrated in the following summary compiled by collating the relevant figures from Table LXVIII.

TABLE LXIX
COMPARISON OF COEFFICIENTS OF CORRELATION BETWEEN SCORES OF INDIAN
STANDARD SIX PUPILS IN SCHOLASTIC TESTS AND THEIR NON-VERBAL
AND VERBAL SCORES IN THE NEW SOUTH AFRICAN GROUP TEST

Subject	Zero-Order r with Non-Verbal Raw Scores	Zero-Order r with Verbal Raw Scores
Vocabulary	.332	.643
Reading Comprehension	.418	.568
Problem Arithmetic	.554	.580
Mechanical Arithmetic	.366	.433

The same tendency has been observed by other investigators, for example, by Stroud, Blommers and Lauber (1957), Hage and Stroud (1959) and Gundersen and Feldt (1960). In the Indian situation also, the verbal intelligence test is a better prognostic instrument of school success than the non-verbal test.

Hypothesis (3):

It will be remembered that the third hypothesis of this project was that, apart from their bilingual status, the level of actual mastery of English by Indian pupils, as revealed in scholastic tests (i.e., their "achieved English"), would be associated with their standard of performance in intelligence and scholastic tests that did not measure efficiency in English directly but which required varying degrees of proficiency in the language for the successful working of them.

This hypothesis assumed added importance from the fact that the bilingual status of Indian pupils appeared to have no significant relationship with intelligence and scholastic tests presented and worked in English. The question now became: "Other things equal, are the actual levels of achievement of Indian standard six pupils in the verbal test of intelligence and in the attainment tests of problem and mechanical arithmetic significantly related to their performance in scholastic tests of vocabulary and reading comprehension?"

The method of second-order partial correlation was used again to answer this question. The same sub-sample of 532 as was employed in testing Hypothesis (2) was used to study the present hypothesis also.

As an extension to the technique of partial correlation, multiple regression equations were also computed in order to give fuller statistical accounts of performance in the tests of verbal intelligence, non-verbal intelligence, problem arithmetic and mechanical arithmetic in relation, particularly, to "achieved" vocabulary and "achieved" reading comprehension, with intelligence (either verbal or non-verbal) and age represented as well.

Regression equations to summarise performance in tests have become popular ever since Burt (1921) published his famous formula, $B = .54 S + .33 I + .11 A$, to express the performance of his sample in the Binet Test (B) in terms of scholastic ability (S), "intelligence" (I) (as measured by the Burt Reasoning Test), and chronological age (A). Subsequently, Freeman (1928) also published equations to indicate performance in the Binet and Dearborn intelligence tests in terms of proficiency in the Burt Reasoning Test and scholastic status in arithmetic, reading rate and reading comprehension.

The multiple regression equations¹⁾ presented in this study are in terms of beta coefficients. These are "weights" which, in any given equation, indicate the relative importance of the variables that have gone into performance in a test. The abbreviations used in the tables are VI for verbal intelligence (raw) score, N-VI for non-verbal intelligence (raw) score, VOC. for vocabulary, RC for reading comprehension, PA for problem arithmetic, and MA for mechanical arithmetic. As an example, the equation, $VI = .5086 VOC + .3472 N-VI - .0931 A$, in Table LXX, (1) (a), may be interpreted as follows: When the variabilities (standard deviations) of the measurements involved in the equation are all equalised and scoring units made comparable, the independent "contributions" of ability in vocabulary and non-verbal intelligence, and of age, to performance in the verbal test of intelligence are in the ratio of approximately 5 : 3 : -1.

The great merit of the multiple regression equation is that it gives a concise, quantitative summary of the relative strength of the variables that enter into performance.

1) The equations were computed by the Dolittle method described by Guilford (1950, pp. 441 ff.).

(i) Test-Intelligence in Relation to Achieved English:

TABLE LXX

RELATIONSHIP BETWEEN THE SCORES OF INDIAN STANDARD SIX BOYS AND
GIRLS IN TESTS OF INTELLIGENCE AND IN TESTS OF ENGLISH

(1) Intelligence and Vocabulary:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Verbal Raw Scores
2. Vocabulary
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.643$	$<.01$	$r_{12.3} = +.582$	$<.01$	$r_{12.34} = +.570$	$<.01$
$r_{13} = +.534$	$<.01$				
$r_{14} = -.264$	$<.01$	$r_{14.3} = -.193$	$<.01$		
$r_{23} = +.332$	$<.01$				
$r_{24} = -.205$	$<.01$	$r_{24.3} = -.152$	$<.01$		
$r_{34} = -.192$	$<.01$				

Regression Equation: $VI = .5086 \text{ VOC.} + .3472 \text{ N-VI} - .0931 \text{ A.}$

(b) Verbal Raw Scores and Age Constant

Variables

1. Non-Verbal Raw Scores
2. Vocabulary
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.332$	$<.01$	$r_{12.3} = -.017$	$>.01$	$r_{12.34} = -.020$	$>.01$
$r_{13} = +.534$	$<.01$				
$r_{14} = -.192$	$<.01$	$r_{14.3} = -.062$	$>.01$		
$r_{23} = +.643$	$<.01$				
$r_{24} = -.205$	$<.01$	$r_{24.3} = -.047$	$>.01$		
$r_{34} = -.264$	$<.01$				

Regression Equation: $\text{N-VI} = -.0225 \text{ VOC.} + .5338 \text{ VI} - .0557 \text{ A.}$

TABLE LXX (Continued)

(2) Intelligence and Reading Comprehension:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Verbal Raw Scores
2. Reading Comprehension
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.568$	$<.01$	$r_{12.3} = +.448$	$<.01$	$r_{12.34} = +.429$	$<.01$
$r_{13} = +.534$	$<.01$				
$r_{14} = -.264$	$<.01$	$r_{14.3} = -.193$	$<.01$		
$r_{23} = +.418$	$<.01$				
$r_{24} = -.232$	$<.01$	$r_{24.3} = -.170$	$<.01$		
$r_{34} = -.192$	$<.01$				

Regression Equation: $VI = .3985 RC + .3473 N-VI - .1049 A.$

(b) Verbal Raw Scores and Age Constant

Variables

1. Non-Verbal Raw Scores
2. Reading Comprehension
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.418$	$<.01$	$r_{12.3} = +.165$	$<.01$	$r_{12.34} = +.160$	$<.01$
$r_{13} = +.534$	$<.01$				
$r_{14} = -.192$	$<.01$	$r_{14.3} = -.062$	$>.01$		
$r_{23} = +.568$	$<.01$				
$r_{24} = -.232$	$<.01$	$r_{24.3} = -.103$	$>.01$		
$r_{34} = -.264$	$<.01$				

Regression Equation: $N-VI = .1644 RC + .4300 VI - .0403 A.$

(ii) Arithmetic in Relation to Achieved English:

TABLE LXXI

RELATIONSHIP BETWEEN THE SCORES OF INDIAN STANDARD SIX BOYS AND GIRLS IN
TESTS OF ARITHMETIC AND IN TESTS OF ENGLISH

(1) Problem Arithmetic and Vocabulary:

(a) Non-Verbal Raw Scores and Age Constant

1. Problem Arithmetic Scores
2. Vocabulary Scores
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.466$	$<.01$	$r_{12.3} = +.358$	$<.01$	$r_{12.34} = +.352$	$<.01$
$r_{13} = +.554$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.074$	$>.01$		
$r_{23} = +.332$	$<.01$				
$r_{24} = -.205$	$<.01$	$r_{24.3} = -.152$	$<.01$		
$r_{34} = -.192$	$<.01$				

Regression Equation: $PA = .3143 \text{ VOC.} + .4464 \text{ N-VI} - .0169 \text{ A.}$

(b) Verbal Raw Scores and Age Constant

Variables

1. Problem Arithmetic Scores
2. Vocabulary Scores
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.466$	$<.01$	$r_{12.3} = +.149$	$<.01$	$r_{12.34} = +.141$	$<.01$
$r_{13} = +.580$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.018$	$>.01$		
$r_{23} = +.643$	$<.01$				
$r_{24} = -.205$	$<.01$	$r_{24.3} = -.047$	$>.01$		
$r_{34} = -.264$	$<.01$				

Regression Equation: $PA = .1581 \text{ VOC.} + .4760 \text{ VI} - .0089 \text{ A.}$

(Table LXXI continued next page)

TABLE LXXI (Continued)

(2) Problem Arithmetic and Reading Comprehension:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Problem Arithmetic Scores
2. Reading Comprehension Scores
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.510$	$<.01$	$r_{12.3} = +.367$	$<.01$	$r_{12.34} = +.360$	$<.01$
$r_{13} = +.554$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.074$	$>.01$		
$r_{23} = +.418$	$<.01$				
$r_{24} = -.232$	$<.01$	$r_{24.3} = -.170$	$<.01$		
$r_{34} = -.192$	$<.01$				

Regression Equation: $PA = .3355 RC + .4117 N-VI - .0102 A.$

(b) Verbal Raw Scores and Age Constant

Variables

1. Problem Arithmetic Scores
2. Reading Comprehension Scores
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.510$	$<.01$	$r_{12.3} = +.270$	$<.01$	$r_{12.34} = +.269$	$<.01$
$r_{13} = +.580$	$<.01$				
$r_{14} = -.167$	$<.01$	$r_{14.3} = -.018$	$>.01$		
$r_{23} = +.568$	$<.01$				
$r_{24} = -.232$	$<.01$	$r_{24.3} = -.103$	$>.01$		
$r_{34} = -.264$	$<.01$				

Regression Equation: $PA = .2695 RC + .4303 VI + .0087 A.$

(Table LXXI continued next page)

TABLE LXXI (Continued)

(3) Mechanical Arithmetic and Vocabulary:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Vocabulary Scores
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.349$	$< .01$	$r_{12.3} = +.259$	$< .01$	$r_{12.34} = +.246$	$< .01$
$r_{13} = +.366$	$< .01$				
$r_{14} = -.171$	$< .01$	$r_{14.3} = -.111$	$> .01$		
$r_{23} = +.332$	$< .01$				
$r_{24} = -.205$	$< .01$	$r_{24.3} = -.152$	$< .01$		
$r_{34} = -.192$	$< .01$				

Regression Equation: $MA = .2448 \text{ VOC.} + .2715 \text{ N-VI} - .0688 \text{ A.}$

(b) Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Vocabulary Scores
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.349$	$< .01$	$r_{12.3} = +.102$	$> .01$	$r_{12.34} = +.099$	$> .01$
$r_{13} = +.433$	$< .01$				
$r_{14} = -.171$	$< .01$	$r_{14.3} = -.065$	$> .01$		
$r_{23} = +.643$	$< .01$				
$r_{24} = -.205$	$< .01$	$r_{24.3} = -.047$	$> .01$		
$r_{34} = -.264$	$< .01$				

Regression Equation: $MA = .1170 \text{ VOC.} + .3482 \text{ VI} - .0566 \text{ A.}$

(Table LXXI continued next page)

TABLE LXXI (Continued)

(4) Mechanical Arithmetic and Reading Comprehension:

(a) Non-Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Reading Comprehension Scores
3. Non-Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.291$	$\leq .01$	$r_{12.3} = +.164$	$\leq .01$	$r_{12.34} = +.148$	$\leq .01$
$r_{13} = +.366$	$\leq .01$				
$r_{14} = -.171$	$\leq .01$	$r_{14.3} = -.111$	$> .01$		
$r_{23} = +.418$	$\leq .01$				
$r_{24} = -.232$	$\leq .01$	$r_{24.3} = -.170$	$\leq .01$		
$r_{34} = -.192$	$\leq .01$				

Regression Equation: $MA = .1524 RC + .2868 N-VI - .0806 A.$

(b) Verbal Raw Scores and Age Constant

Variables

1. Mechanical Arithmetic Scores
2. Reading Comprehension Scores
3. Verbal Raw Scores
4. Age

<u>Zero-Order r's</u>	<u>P</u>	<u>First-Order r's</u>	<u>P</u>	<u>Second-Order r</u>	<u>P</u>
$r_{12} = +.291$	$\leq .01$	$r_{12.3} = +.061$	$> .01$	$r_{12.34} = +.054$	$> .01$
$r_{13} = +.433$	$\leq .01$				
$r_{14} = -.171$	$\leq .01$	$r_{14.3} = -.065$	$> .01$		
$r_{23} = +.568$	$\leq .01$				
$r_{24} = -.232$	$\leq .01$	$r_{24.3} = -.103$	$> .01$		
$r_{34} = -.264$	$\leq .01$				

Regression Equation: $MA = .0598 RC + .3843 VI - .0556 A.$

Whereas the investigation of Hypothesis (2) showed that home background of English was not significantly related to performance in intelligence and scholastic tests, the preceding tables show that the degree of mastery of English achieved at school does play an important part.

Hypothesis (3) of this study has been consistently upheld in that, with non-verbal intelligence and age controlled, scores in the verbal test of intelligence, in the problem arithmetic test and in even the mechanical arithmetic test are significantly correlated with ability in both vocabulary and reading comprehension treated separately.

The next set of six analyses with verbal intelligence controlled was undertaken to obtain corroborative evidence to support the conclusions given above. It was found that with verbal intelligence controlled three of the results turned out to be non-significant, namely, the correlations between non-verbal intelligence and vocabulary, mechanical arithmetic and vocabulary, and mechanical arithmetic and reading comprehension. In the three cases where the correlations were significant, the coefficients were reduced in magnitude as compared with the corresponding analyses in which non-verbal raw scores were partialled out. These findings are in the expected direction and underline the important part played by achieved English in performance in intelligence and scholastic tests.

The implications of the results of the three hypotheses will now be taken up for discussion.

(G) DISCUSSION:

Hypothesis (1)

It has been found that Indian standard six pupils have scored significantly lower in the verbal section of the New South African Group Test than in the non-verbal, the difference being 2.075 points of I.Q.

In the four scholastic tests, Indian performance, relative to European performance, improved as the subjects demanded a decreasing command of English. Thus the subject ages of the sample, by European norms, increased from 11.5 years for reading comprehension and 11.6 years for vocabulary to 12.6 years for problem arithmetic and 13.2 years for mechanical arithmetic.

This was accepted as evidence that at the standard six level the performance of Indian students in both intelligence and scholastic tests is adversely affected by their handicap in English.

Hypothesis (2)

The question then arose as to whether the pupils' home background of English was a determinant of their performance in intelligence and scholastic tests. In other words, would, for example, the achievement level of the unilingual or near-unilingual Indian student who used and heard only or mainly English at home be superior to that of the bilingual Indian pupil who used and heard either the same amount of English as the mother tongue at home or even lesser? This, in fact, was the main problem of the investigation.

The findings, in the case of both intelligence and scholastic tests, were consistently negative. It appeared that the amount of English the standard six Indian child heard and used at home bore no significant relationship to his performance in intelligence and scholastic tests presented in English, the net coefficients of correlation being as follows:-

TABLE LXXII

SUMMARY OF NET COEFFICIENTS OF CORRELATION BETWEEN THE SCORES
OF INDIAN STANDARD SIX STUDENTS IN INTELLIGENCE AND
SCHOLASTIC TESTS AND THEIR DEGREE OF BILINGUALITY

I N T E L L I G E N C E				
Variables Correlated	Boys	P	Girls	P
Non-Verbal Raw Scores & Bilinguality	-.012	>.01	-.074	>.01
Verbal Raw Scores & Bilinguality	-.026	>.01	-.030	>.01
Combined Raw Scores & Bilinguality	-.015	>.01	-.077	>.01
S C H O O L S U B J E C T S				
Variables Correlated	Boys and Girls			
	Non-Verbal Raw Scores Constant		Verbal Raw Scores Constant	
Vocabulary & Bilinguality	-.067	>.01	-.047	>.01
Reading Comprehension & Bilinguality	+.078	>.01	+.109	>.01
Problem Arithmetic & Bilinguality	+.031	>.01	+.055	>.01
Mechanical Arithmetic & Bilinguality	+.082	>.01	+.100	>.01

It will be appropriate at this stage to link the conclusions of Hypothesis (2) with the results of researches that have been described earlier in the report.

The fact that the Indian sample scored lower in the verbal test of intelligence than in the non-verbal, confirms the conclusions of Arsenian (1945) (p.132¹), Jones (1953) (p.147), Darcy (1953) (p.137) and Anastasi (1958) (p.161) that bilingual children suffer a handicap in verbal tests relative to performance in non-verbal tests, though the difference amounted to only 2 points.

1) The page references pertain to the present report.

The observation of Arsenian (1945) (p.133) that the disadvantage of bilingualists tends to disappear with increase in educational attainment was also borne out in that verbal and non-verbal I.Q.'s were found to attain parity at the junior - senior certificate levels.

In scholastic attainments also, the pattern of results resembled that of previous investigators (vide, pp.155-161). The scores of the bilingual Indian subjects, when compared with those of monoglot English-speaking Europeans became relatively worse and worse as the tests demanded more and more familiarity with English, the order being, mechanical arithmetic, problem arithmetic, reading comprehension and vocabulary.

Although the handicap of the Indian students was clearly brought out by the tests administered, it was found that their varying degrees of bilinguality or home experience of English bore no relationship to their performance either in the intelligence or in the scholastic tests. Such a finding was anticipated in the case of the non-verbal intelligence test (cf. Arsenian, 1937) and in the mechanical and problem arithmetic tests (cf. Lewis, 1960a) but unexpected in the case of the verbal intelligence test and the tests of vocabulary and reading comprehension.

It is true that in a similar study, and using the same correlational method, Pintner and Arsenian (1937) (p.137) had also found no significant association between scores in a verbal test of intelligence and bilinguality among their Jewish subjects. The researchers had concluded that Jewish bilingual children of the sixth and seventh grades, born in the United States, had acquired the English language sufficiently well not to be handicapped in a group verbal intelligence test. They had conceded, however, that results might be different with other groups whose mastery of English was weaker.

Although the results are similar, one cannot apply the conclusion of Pintner and Arsenian to the data of the present study for, whereas the Jewish subjects attained the general American mean in the verbal intelligence test, the Indian subjects not only scored significantly lower in the verbal than in the corresponding non-verbal test but also considerably below the European norms. One would have thought that in these circumstances some relationship would have existed between verbal intelligence scores and degree of bilinguality.

Commonsense would indicate that an individual's familiarity with a language must necessarily influence his performance in a verbal test demanding knowledge of that language. And one would expect that a person's degree of mastery of a language will be influenced by the extent to which he hears and speaks that language in his environment. Hence one would reasonably expect that the extent to which an individual hears and speaks the language in his environment in general and in his home in particular would influence his performance in a test presented in that language and demanding some mastery of it.

However, no such relationship between test performance and bilinguality was found in this investigation. Following up the argument of the preceding paragraph, one must conclude, therefore, either that the standard of English in the Indian home is, generally, not high enough to influence the language of children favourably¹⁾ or that, at the standard six level, the English spoken and learnt at school functioned as a great equaliser and cancelled out home influence or that both factors operated.

1) It should be remembered that the bilingual scale used in this study was designed to measure the amount, rather than the quality of English used in the Indian home.

Indian bilingualism, as mentioned previously, is of the bifurcated type¹⁾, a term used by Anastasi and Cordova (1953) in their study of Puerto Rican children to indicate that the individual is proficient in neither of the two languages concerned. Anastasi (1953) says: "When a child speaks one language at home and another at school, his mastery of both languages may be retarded as a result If we consider the acquisition of vocabulary as an example, it is apparent that, when a child speaks a different language at home and at school, he will learn a somewhat different set of words in the two situations and his vocabulary in each language will thereby be curtailed What the child needs is to learn to express himself in at least one language in all types of situations. It is not the interference of the two languages, so much as the restriction in the learning of one or both to limited areas, that produces a handicap". Considerations such as these have led the present writer to suggest in the general introduction of this report that in the South African context English (or Afrikaans) should be made the first language of Indians as speedily as possible.

It is the experience of the author of this report that the standard of English in Indian homes in Durban is generally low and provides little or no incentive to children to aspire to heights of linguistic excellence. Very often the English used by elders in the home is crude and elemental. Literal translations of the mother tongue into English are common, resulting in (often amusing) distortions of idiom. Even in those Indian homes where the members speak little else but English the range of vocabulary, idiomatic usage and refined manipulation of expression are, on an average, at a much lower level than in an average English-speaking

1) The evidence is that the average Indian standard six child is more proficient in English than in the mother tongue (vide p.170, Questions (7) and (8)).

European family. The English language is in the process of being acquired by Indians and, although great progress is being made, ungrammatical forms, poor pronunciation and weak diction are still the general rule. The Indian home has not yet reached a stage where it could decisively influence the English of the child for the better. For this reason perhaps the standard six Indian pupils' experience of English at home has not been found to correlate significantly with their performance in intelligence and scholastic tests. It is probable that in many an Indian home the English spoken by the standard six student is superior to the language used by other members of the family. This leads to a discussion of the final hypothesis.

Hypothesis (3)

While the standard six Indian pupil's degree of bilinguality was found to be non-influential in determining his scores in intelligence and scholastic tests, it was discovered that his actual level of school achievement in English vocabulary and comprehension, as measured by formal tests of these skills, did play a significant part in performance. In other words, the school proved to be more potent than the home in this respect.

In the Indian situation, therefore, one may conclude that, at the standard six level, it is not the degree of the child's bilinguality (i.e., his English-mother-tongue ratio) that influences performance in intelligence and scholastic tests but the extent of his mastery of English achieved at school as revealed in attainment tests. The difference of two points between the non-verbal and verbal I.Q.'s of the subjects must be attributed to their general weakness in English rather than to the fact of their individual variations in bilinguality.

The question of whether or not the scores of Indian children in a verbal scale of intelligence are adversely affected by individual varia-

tions in bilinguality at educational levels below standard six could well become the subject of a future inquiry.

It is possible that the substantial differences between the non-verbal and verbal I.Q.'s discovered in the Welsh studies of Barke (1933), Barke and Parry (1938), Jones (1952) and Jones (1953) resulted from the fact that young children, ranging in age from 10 to 14 years, were used and that, in the present research, the difference between non-verbal and verbal test scores was small because very much older subjects from a higher school grade were tested. In other words, it is possible that by the time the standard six stage is reached Indian students have overcome linguistic handicaps to a degree that does not result in serious impairment of their performance in verbal mental tests.

Another factor that may also account for the relatively small difference of two points between the non-verbal and verbal intelligence scores in the Indian study, as compared with the Welsh studies, is that the two bilingual situations are dissimilar. As pointed out previously, the general educational practice in the Welsh schools that were used for research was that the main medium of instruction up to the age of about nine was Welsh but that English, in which formal instruction was commenced at about seven years of age, was developed as a teaching medium between nine and eleven years of age so that by the end of the primary stage, it occupied a place of almost equal importance with the mother tongue. Indian children in Durban, on the other hand, receive all their instruction in English from the moment of school entry, the home tongue being given no recognition whatsoever in the educational system. While there is a deliberate effort to preserve Welsh as a regional language in Britain, the Indian languages in South Africa are waning by default and neither the Indian

people¹⁾ nor the governmental authorities seem to be unduly perturbed about the matter. In these circumstances one would not expect uniform results in the Welsh and Indian situations.

The moral of the foregoing for research seems to be that, whereas investigations using non-verbal tests of intelligence are likely to produce similar results in different bilingual situations in different countries, this may not be the case when verbal tests are employed. Even seemingly minor differences in the bilingual set-up of different groups of subjects may produce divergent results as to the influence of bilinguality on verbal test scores. This probably explains the degree of unanimity reached when workers have used non-verbal mental tests as against the disagreements that still characterise results obtained through the medium of verbal tests. Unless the bilingualism in two situations is alike in terms of all the relevant developmental factors that are usually associated with it - historical, political, social and educational - uniform results will not be easy to come by.

The findings of the present research shift the responsibility from the home to the school. In the existing Indian situation in Durban, the school is far more important than the home in fostering mastery of the English language. Hence English should be regarded as the most important subject in the Indian primary school curriculum and every teacher, no matter what his speciality, should be a teacher of English. The development of a rich vocabulary and the cultivation of the ability to comprehend material read or heard are two aspects of English that should receive special emphasis.

1) This is the general position. There are, however, certain Indian cultural and religious organisations that are struggling to preserve and propagate the various Indian languages.

The question that immediately arises here is whether the schools can do very much more than what they are already doing in the matter of inculcating skill in the use and comprehension of English. Is it possible, in other words, to teach more English and that more effectively than is being done at the moment in Indian standard six classes to students who can fare no better, on an average, than a non-verbal I.Q. of 82.317? Can one pour more than a pint into a pint container? The question is difficult to answer at this stage. With the data available one can only suggest that Indian primary schools could at least make an attempt to close the gap between verbal and non-verbal mental test scores, that is present at the standard six level and increases as one goes down the educational scale (Table LV). The question posed in this paragraph is of fundamental importance and will be taken up again in the account of Project III.

In order to clear the ground for a new shift in the discussion, the conclusions up to this point may be summarised as follows:-

- (a) Indian standard six students are handicapped in a verbal test of intelligence presented in English by their relative weakness in that language, but not to the extent suggested, for example, by Logue (1954).
- (b) They are also at a disadvantage in scholastic tests presented in English, the greater the demand of a subject for a good knowledge of the language, the worse their performance.
- (c) The varying home backgrounds of the students in English (i.e., their degree of bilinguality) has no relationship to the goodness of their performance in both intelligence and scholastic tests. The Indian child who uses and hears only English at home is not necessarily a better student in an English-medium school than a child who uses and hears mainly the mother tongue at home. The school, therefore, is a

great equaliser in the sense that, by the time the standard six level is attained, Indian children who come from homes where little English is spoken overcome, under the influence of school learning, any initial disadvantage they might have suffered.

- (d) The actual level of achievement of Indian standard six students in vocabulary and reading comprehension is significantly related to the level of their performance in intelligence and arithmetic tests. Special attention to these two linguistic skills should result in some improvement in performance in intelligence and arithmetic tests and probably in other school subjects as well.

With these conclusions the research proper comes to a close. Yet the data gathered during its progress have brought to light more formidable and more serious problems than the original question of the effects of bilingualism, namely, the low standard of achievement of the Indian students in both intelligence and scholastic tests relative to Europeans.

At this point it will be necessary to go beyond the self-imposed limits of the present study into the controversial field of inter-racial differences in intelligence and scholastic test performance. This will be attempted with all the caution that the experiences of past investigators enjoin.

It is true that by establishing that Indian children suffer a disadvantage in a verbal test of intelligence relative to their performance in a non-verbal test, the present research has confirmed the conclusions of expert observers in the field such as Arsenian (1937), Darcy (1953), Anastasi (1958), and Jones (1959). But these investigators have, at the same time, made it clear that the mental development of bilingual children is not basically impaired in any way by the fact of their having to use two languages simultaneously since, in non-verbal and performance tests, such

children achieve the general population mean. This was certainly not the case with the Indian subjects of the present study for they were retarded by 19.758 I.Q. points in the verbal test and by 17.683 points in the non-verbal test by European norms. It seems that the discrepancy of 17.683 I.Q. points derives from a source other than language disabilities.

Performance in the scholastic tests is not, of course, of such great interest as performance in the intelligence tests, for ability in the former is primarily a function of intellectual capacity. Intelligence is primary, scholastic attainment, secondary. In the present study, for instance, as soon as it became apparent that degree of bilinguality did not in any way influence scores in both non-verbal and verbal tests of intelligence, it became almost certain that it would not affect scores in the scholastic tests either. Nevertheless, the results of the achievement tests constituted a very important supplement to the results obtained from the administration of the intelligence tests.

Evidence has already been advanced that the Indian child's weakness in English is reflected in his scores in scholastic tests also. But when it is remembered that the median chronological age of the Indian children was 16.03 years as against subject ages of 11.6, 11.5, 12.6 and 13.2 years in vocabulary, reading comprehension, problem arithmetic and mechanical arithmetic, respectively, one is constrained, as in the case of the intelligence tests, to look beyond mere weakness in English for an explanation of the startling degree of educational retardation of Indian standard six students.

The wide discrepancies between the mental and scholastic performances of Indian and European pupils in favour of the latter cannot be attributed solely or even largely to cultural differences, to the fact that cultural bias in the contents of the tests favoured the Europeans. It has

already been pointed out that Indian and European standard six pupils follow the same or similar school syllabuses in the subjects tested, use the same or similar text-books, and write the same public examinations. In fact, in Natal, the Indian school is a powerful agent of anglicisation or westernisation and functions in the direction of breaking down socio-cultural differences between Indians and Europeans. Lazarus (1960), President of the Natal Indian Teachers' Society, has recently stated: "..... the thinking and outlook of the Indian people (in South Africa) is very Western - in fact, life in the average middle-class home is no different to that in a comparable European home". A careful examination of the intelligence tests used reveals that there are only a few items in the verbal test that may be construed as being "foreign" to the culture of South African Indians. There are certainly a number of items that are relatively further removed from the daily experience of the Indian child than from the experience of the average European child but this is a matter of socio-economic, rather than cultural, differences. Furthermore, Indo-European differences are just as marked in the scholastic tests which contain the type of problems that Indian students are quite familiar with in their classrooms, so that it would be far-fetched to ascribe Indian inferiority on these tests also to cultural differences alone or mainly. The wiser course, therefore, would be to examine other possible causative factors before invoking cultural divergence to account for the observed discrepancies between Indian and European test scores.

One such factor is certainly socio-economic status. It has been mentioned previously that investigators are unanimous that socio-economic status is a significant determinant of performance in both intelligence and scholastic tests. In the present research, it has already been shown that status differences in intelligence occur even within the Indian group in spite of its restricted socio-economic status range (Table LVIII). It will

be demonstrated below that these differences are also reflected in the scholastic performance of Indian standard six students.

Now, it is common cause that South African Europeans, as a group, live on a very much higher socio-economic level than South African Indians, considered as a community. In Durban itself, analysis of the 1951 Census data by Kuper et al (1958) has yielded the following comparative figures of income:-

TABLE LXXIII
MEAN AND PER CAPITA INCOME BY RACE; DURBAN, 1951

Race	Mean Income £ per Annum	Per Capita Income £ per Annum
European	552.06	282.74
Coloured	201.20	64.34
Indian ¹⁾	182.85	40.02
Natives (Estimate)	87.	45.

Of these figures, the authors state: "European mean income (£552.06) is between 2-3 times as high as Indian and Coloured. The disparity between per capita incomes is more marked, since Coloureds and Indians have higher dependency rates. The per capita income of Indians (£40.02) is particularly low, less than two-thirds that of the Coloureds, though the difference between the mean incomes is only some 10%. The average income of Natives is lowest of all (though their per capita income is higher than that of the Indians) There can be little doubt that Natives

1) Includes a small Chinese-speaking group of 73 persons.

have more money to spend, per head of population in Durban, than the great majority of Indians".

The enormous gap between Europeans and Indians in economic status will certainly be related to the test-differences observed among the pupils. The question is: "To what extent does the lower socio-economic standing of Indian children depress their scores in intelligence and scholastic tests relative to Europeans?" The data of the present research cannot provide an answer, nor is there any existing information on the matter. The question must, therefore, be left unanswered.

A third hypothesis to account for the low level of Indian performance is educational deprivation. Some information on this possibility is available with the data of the present study. It has been pointed out that the median age of the Indian standard six sample at the time of the scholastic test (September, 1957) was 16.03 years and at the time of the intelligence test (October, 1957), 16.11 years. Now, at the age of 16.00 years, the average Natal European student just completes his standard eight course¹⁾. The position is substantially the same for the average South African European pupil²⁾. In other words, the Indian standard six child is retarded in grade placement according to age by just over two years, relative to the average European child.

How will this educational retardation affect the scores of Indian standard six students relative to European norms in the senior series of the New South African Group Test? The answer is that Indians would show

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- 1) This statement is based on the age and standard table for June, 1957, given by the Director of Education, Natal (1959).
 - 2) This statement is based on the age and standard table for June, 1957, for the whole of the Union given in the Official Yearbook of the Union, No. 29, 1956-57. The figures for 1955 are the most recent ones available, but the median ages of pupils are almost constant from year to year.

off badly since they will be compared with the performance of European pupils most of whom would be beyond them in educational level. The senior series of the New South African Group Test was standardised on European subjects ranging from 13 years 0 months to 18 years 11 months, all of whom were in some educational institution or other, no school-leavers being involved. Thus Elder (1957) says: "From the age of 14 years increasing numbers of (European) children forsake the provincial schools for other educational institutions or to enter employment. It would not have been possible to draw testees from all walks of life, so it was decided to make the sample representative of persons in educational institutions only. The standardisation samples for the Senior Test may not truly represent the (European) population of all persons aged 14-18". The institutions used, apart from the regular schools, were commercial high schools, technical colleges, reformatories, normal colleges, nursing colleges, agricultural colleges, etc.

To take the extreme case, the sixteen-year-old in standard six cannot be expected to compare to advantage with the sixteen-year-old in the university in an intelligence test even with other relevant factors such as linguistic matters and socio-economic status equalised. One would expect further education to favour performance in an intelligence test in two ways - firstly, by providing the subject with the knowledge, skills and experiences that go into the successful working of such tests, and secondly, by providing him with a stimulating environment in which mental development can reach the height of its potential. As far as skills and knowledges are concerned, it is obvious that the verbal section of the New South African Group Test relies heavily upon schooling. Even the non-verbal section involves school knowledge, directly as in the case of the number series sub-test, and indirectly in requiring the use of concepts which it is the business of the school to develop.

The hunch that educational deprivation was responsible for the inferior showing of the Indian subjects was given statistical reinforcement by the persistently negative and significant correlations between test scores and age. Thus, for the 974 pupils present at school for both the scholastic and intelligence tests and who worked the senior series of the New South African Group Test, the figures were as follows¹⁾:-

TABLE LXXIV
ZERO-ORDER COEFFICIENTS OF CORRELATION BETWEEN TEST SCORES AND
AGE OF INDIAN STANDARD SIX PUPILS

Variables Correlated	r	P
Non-Verbal Raw Scores and Age	-.273	< .01
Verbal Raw Scores and Age	-.261	< .01
Combined Raw Scores and Age	-.249	< .01
Vocabulary and Age	-.226	< .01
Reading Comprehension and Age	-.255	< .01
Problem Arithmetic and Age	-.219	< .01
Mechanical Arithmetic and Age	-.235	< .01

There was, of course, the possibility that these negative correlations were due to the fact that the sample of 1,052 contained 281 pupils who had failed grades at some time in their school careers up to

1) Since the total sample was used for this analysis, no age restrictions were observed in order to retain linearity of regression lines as was done previously and no tests for linearity were carried out. This applies to Table LXXV also. If any relationship in these two tables was actually curvilinear, the correlation ratio, η , would have given a better (higher) index of the association than the product-moment r . But it was not deemed necessary to undertake the additional labour of computing η 's from the scattergrams since the r 's were already found to be significant at the .01 level. As Garrett (1947, p. 367) points out, the coefficient of correlation (r) is a limiting value (at the lower level) of the more general coefficient, η (η), just as a straight-line relationship is a limiting case of curvilinear relationship. If the regression is linear, η will equal r ; if it is non-linear, η will be greater than r .

the time of testing. Of these, 239 had failed once, 36 twice and 6 thrice. These would be the duller children and they would be older than they would otherwise have been by the number of years they had had to repeat grades. It was decided to eliminate these 281 failures and to ascertain whether the negative correlations between test scores and age persisted in the case of the remaining 771 non-failures. The age range among the non-failures would not be simply a result of their having entered school at different ages. The results were as follows:-

TABLE LXXV¹⁾

COEFFICIENTS OF CORRELATION BETWEEN TEST SCORES AND AGE OF NON-FAILURES

Variables Correlated with Age	N	r	P
Non-Verbal I.Q.	738 ²⁾	-.497	<.01
Verbal I.Q.	738	-.593	<.01
Combined I.Q.	738	-.594	<.01
Non-Verbal Raw Scores	732 ³⁾	-.227	<.01
Verbal Raw Scores	732	-.201	<.01
Combined Raw Scores	732	-.239	<.01
Vocabulary	750 ⁴⁾	-.179	<.01
Reading Comprehension	750	-.241	<.01
Problem Arithmetic	750	-.176	<.01
Mechanical Arithmetic	750	-.229	<.01

-
- 1) Part of the data from this table has already been given in Table LXVII.
 - 2) Of the 771 non-failures, 33 had to be excluded as they were absent from school on the day of the intelligence test (though not on the day of the scholastic test).
 - 3) Of the 771 non-failures, 33 had to be excluded as they were absent from school on the day of the intelligence test. A further 6 were excluded as, being under the age of 13, they worked the intermediate form of the intelligence test so that their raw scores (though not I.Q.'s) could not be compared with the raw scores of the others, all of whom worked the senior form.
 - 4) Of the 771 non-failures, 21 had to be excluded as they were absent from school on the day of the scholastic test (though not on the day of the intelligence test).

It will be noted that all three sets of scores, namely, I.Q.'s, raw scores in the intelligence tests and scores in the attainment tests, yield negative correlations with age. Age, in other words, delayed entrance into school, seemed to exercise a depressing influence on all test scores.

In terms of actual scores, these negative correlations would imply that the younger standard six Indian children would achieve higher test scores than the older. One would, for instance, expect the thirteen-year-olds (i.e., those of normal age for standard six and who suffered no educational deprivation as a result of delayed entrance into school) to approximate¹⁾ the intelligence and scholastic test scores of thirteen-year-old European children (most of whom will be in standard six, others a grade or two above and below) more closely than the older Indian children. With increasing age, one would expect a progressively increasing gap between Indian and European scores, for while the Indian pupils would remain fixated educationally at the standard six level, European norms would be based progressively on increasing increments of education. This point is borne out consistently and clearly in the tables that follow.

1) Perfect congruence of scores will still not be expected, for the Indians, as a whole, will still be at a disadvantage in the use of English, in socio-economic status and in the quality and quantity of school facilities available to them. Against this would be the possibility that Indian standard six students are a more highly selected group than their European counterparts since education is not compulsory for the former and large numbers leave school before that grade is reached. Those who leave school early are, on the whole, lower in socio-economic status than those who remain, as will be shown in Project III.

TABLE LXXVI

MEAN COMBINED¹⁾ I.Q.'S OF INDIAN STANDARD SIX NON-FAILURES BY AGE

Age (Means in Brackets)	High S-E S. N = 365	Low S-E S. N = 368	All Indian Pupils N = 738 ²⁾	European English- Speaking Norms	Difference
Below 14 (13.40)	34 96.56	19 94.89	53 95.96	100	4.04
14 plus (14.50)	84 89.56	42 86.05	126 88.39	100	11.61
15 plus (15.40)	97 82.98	95 81.32	193 82.16	100	17.84
16 plus (16.40)	75 80.40	126 77.16	202 78.41	100	21.59
17 plus (17.40)	45 75.00	65 72.54	111 73.53	100	26.47
18 & over (18.50)	13 74.69	38 71.21	53 72.28	100	27.72
(15.93) I.Q. Range	348 84.00 21.87	385 78.66 23.68	738 81.18 23.68	100 0	18.82

It will be seen, firstly, that for each of the high and low socio-economic status groups and for the sample as a whole there is a consistent decline in I.Q. with increasing age. Secondly, the table shows very large ranges in I.Q. between the youngest and oldest pupils, 21.87

-
- 1) The groups were not compared for I.Q.'s obtained on the non-verbal and verbal intelligence tests separately as this was not regarded as necessary at this stage.
 - 2) Five pupils whose fathers' occupations were unknown were excluded from the socio-economic classifications. For this reason the sum of 348 pupils in the column marked "High S-E S." and 385 in the column marked "Low S-E S." falls 5 short of the total of 738 pupils shown in the column marked "All Indian Pupils".

points in the case of the high socio-economic status group, 23.68 in the case of the low and 23.68 for the total sample. Thirdly, it will be noted that the youngest group whose mean age of 13.40 years approximates the European standard six median of 13.78 years (in October, 1957) has nearly the same mean I.Q. (95.96) as Europeans. Fourthly, it will be seen that there is a difference of 2.69 I.Q. points between the means of the mean I.Q.'s of the high and low socio-economic status groups in favour of the former¹⁾.

Now this difference of 2 - 3 I.Q. points between Indian children from homes of high and low socio-economic status is low when compared with the figures obtained by researchers in western societies. Anastasi (1958), for instance, reviewing the literature on the subject, says: "In general, there seems to be a difference of about 20 points between the mean I.Q.'s of the children of professional men and those of the children of unskilled labourers". It could have happened that the classification of Indian occupations into just two broad categories of "high" and "low" smothered the differences between the highest and lowest occupational ranks. To test this, an analysis was made of the figures obtained by McNemar (1942) and given in Table 22, p. 517, of Anastasi, A: Differential psychology (1958). This table gives, among other data, the I.Q.'s of children of fathers who belong to seven different occupational strata in descending order of status. The mean I.Q.'s of the fifteen- to eighteen-year-old children of the top five occupational groups (corresponding roughly to the Indian "high") were combined and averaged. The same procedure was followed with the two bottom groups (corresponding roughly to the Indian "low"). The "high" occupational

1) The figure of 2.69 was derived by obtaining the difference between the means of the high and low status groups at each age level and computing the mean of the differences between the means. This procedure was resorted to as the numbers of subjects in the various groups were unequal.

groups comprised the following: professional; semi-professional and managerial; clerical, skilled trades and retail business; rural owners; and semi-skilled, minor clerical and minor business. The "low" occupational groups comprised the following: slightly skilled; and day labourers (urban and rural). The mean I.Q. of the children of the "high" group worked out at 108.7 as against 96.9 for the "low" group, giving a difference of about 12 points of I.Q. It would seem, therefore, that it is the restricted range of occupational (and, therefore, economic) opportunities for Indians that is responsible for their relatively small range in children's I.Q.'s by fathers' occupation, rather than the artifact of classification into just two socio-economic groups.

Substantially the same results as appear in Table LXXVI occur when the combined non-verbal and verbal raw scores on the intelligence test are used in the comparison, thus:-

TABLE LXXVII

MEAN COMBINED RAW SCORES OF INDIAN STANDARD SIX NON-FAILURES IN THE
NEW SOUTH AFRICAN GROUP TEST (SENIOR SERIES) BY AGE

Age (Means in Brackets)	High S-E S. N = 344	Low S-E S. N = 383	All Indian Pupils N = 732 ¹⁾	European English- Speaking Norms	Difference
Below 14 (13.50)	30 51.17	17 49.35	47 50.51	56.00	<u>5.49</u>
14 plus (14.50)	84 50.51	42 46.40	126 49.14	64.00	<u>14.86</u>
15 plus (15.50)	97 46.38	95 44.53	193 45.45	70.00	<u>24.55</u>
16 plus (16.40)	75 46.87	126 42.75	202 44.33	74.00	<u>29.67</u>
17 plus (17.40)	45 42.78	65 40.23	111 41.28	77.00	<u>35.72</u>
18 & Over (18.50)	13 43.54	38 40.55	53 41.62	78.00	<u>36.38</u>
(15.96)	344 47.33	383 43.24	732 45.19	72.00	<u>26.81</u>

For footnote 1) see next page.

The consistent decrease in I.Q. as well as in raw scores on the intelligence test is accompanied by a similar phenomenon on the four scholastic tests as shown below:-

TABLE LXXVIII
MEAN SCORES OF INDIAN STANDARD SIX NON-FAILURES BY AGE GROUPS
IN SCHOLASTIC TESTS¹⁾

Age (Means in Brackets)	N	Vocabulary	Reading Comprehension	Problem Arithmetic	Mechanical Arithmetic
Below 14 (13.40)	65	22.46 (29.40)	14.44 (16.00)	12.01 (11.30)	13.15 (10.90)
14 plus (14.52)	130	21.35 (34.10)	13.93 (17.40)	11.50 (12.80)	11.73 (12.80)
15 plus (15.44)	204	19.34 (37.60)	12.56 (18.60)	10.70 (14.10)	11.47 (14.40)
16 plus (16.44)	197	19.46	12.03	10.78 (14.90)	11.36 (15.40)
17 plus (17.41)	104	18.48	11.88	10.19 (15.10)	9.90 (15.60)
18 & Over (18.58)	50	17.62	12.02	9.54	10.02
(15.85)	750	19.76	12.69	10.83	11.32

The four preceding tables show the following abnormal features:-
Table LXXV: The coefficients of correlation are all negative. Normally one would have expected:-

Footnote 1) from page 282 -

- Five pupils whose fathers' occupations were unknown were excluded from the socio-economic classifications. For this reason the sum of 344 pupils in the column marked "High S-E S." and 383 in the column marked "Low S-E S." falls 5 short of the total of 732 pupils shown in the column marked "All Indian Pupils".
- 1) Wherever available in the relevant manuals, the European means for each age group are given within brackets, for comparative purposes.

- (a) correlation coefficients of zero between intelligence quotients and age;
- (b) positive, significant correlations between raw scores on the intelligence tests and age; and
- (c) positive, significant correlations between scores on the four scholastic tests and age.

Table LXXVI: The last column shows, in terms of actual scores, that the older the Indian child the greater his inferiority in I.Q. as compared with his European counterpart. The difference ranges from 4.04 I.Q. points in the case of the youngest group in the Table to 27.72 in the case of the oldest. Socio-economic status does seem to play a part in determining the magnitude of the differences between Indian and European but the influence of the age factor seems to be overwhelming.

Table LXXVII. In a way this table is more revealing than Table LXXVI. While one may argue, with justification, that the use of intelligence quotients drawn up for European children, who enjoy an age-grade advantage, heavily loads the dice against older Indian children when compared with younger Indian children, this table shows that even in terms of "mental age" as represented by raw scores on the (combined) intelligence test younger Indian children are superior to older Indian children at the standard six level, the range between the youngest and the oldest groups being 8.89 points for the total sample. Normally one would expect a rise in raw scores on intelligence tests with rise in chronological age; in fact, this is one of the bases on which intelligence tests are constructed. The (European) norms of the New South African Group Test show a rise in raw scores with rise in chronological age up to the age of 18 years 11 months. With the Indian children who constituted the present sample, there is a decrease in raw scores with increase in age. A corollary of this phenomenon is that the gap between the Indian sample and Europeans becomes

wider with every additional year, ranging from 5.49 points for the youngest age group in the table to 36.38 for the oldest. Again, socio-economic status does not seem to be as crucial a factor as age.

Table LXXVIII: This table merely reflects, in terms of scholastic performance, the conclusions already derived from Tables LXXV, LXXVI, and LXXVII, namely, that the younger the Indian standard six pupil the higher his score and the more closely does he approach European norms. It will be noted that in the case of problem and mechanical arithmetic the means of the youngest Indian group actually exceed those of the European group of the same age.

Age, therefore, in other words, age at school entry, seems to be the crucial factor in determining the performance of Indian standard six pupils in intelligence and, therefore, in scholastic tests. The main hypothesis of this study was that the English language background of the pupils was an important determining factor in performance. It appears, however, that this factor operates to a negligible extent and is cast into a minor role by the age factor. The great gaps between Indian and European scores on intelligence and scholastic tests shown in Tables LXXVI and LXXVIII seem to be in very large measure a function of age and to a lesser extent a function of other factors such as language handicaps, socio-economic status, and the like. The scores of Indian standard six children who are of the same or nearly the same age as European standard six pupils are fairly close on both intelligence and scholastic tests.

However, the design of the present project was not originally aimed at investigating the influence of "over-eagerness" relative to school grade on performance in intelligence and scholastic tests. It was concerned with the effects of Indian bilingualism. That delayed entry into school and consequent "overageness for grade" did have deleterious effects on mental and scholastic development started out as a mere hunch at the beginning

of the present series of researches. The data on bilingualism, however, has given statistical strength to the hypothesis without providing conclusive answers. To seek such answers is the purpose of the final project which is described in the next section.

(H) ABSTRACT:

The purpose of this project was to investigate the relationship between bilingualism in Indian standard six students and their efficiency in English, on the one hand, and their performance in intelligence and scholastic tests, on the other.

The following three working hypotheses were formulated:-

- (1) Indian pupils would score relatively lower than English-speaking Europeans in intelligence and scholastic tests that demanded a greater degree of familiarity with English than in intelligence and scholastic tests that did not require such a high standard of English.
- (2) Since Indian pupils varied in the amount of English they used in the home vis a vis the mother tongue (i.e., in bilinguality), those children who had a richer background of English would tend to score relatively higher in tests that demanded a high degree of acquaintance with English than those children with a poorer background.
- (3) Apart from the influence of the home, the varying levels of actual individual achievement of Indian children in scholastic tests of English (i.e., their "achieved" English) would, to some extent, be related to their performance in intelligence and scholastic tests which required knowledge of English.

The sample consisted of 697 boys and 355 girls from 20 Government and Government-Aided Indian schools in Durban.

A bilingualism scale revealed that degree of bilinguality was associated basically with the religious - mother tongue affiliation of the pupils, with the level of western education of their parents (negatively), and with the level of mother-tongue education of their parents (positively).

Hypothesis (1) was consistently borne out. The Indian subjects scored significantly lower in the verbal section of the New South African Group Test than in its non-verbal section, by English-speaking European norms. The gap increased consistently as one went down to standards below six but closed at levels above standard six.

In the scholastic tests also the Indian students scored lower in vocabulary and reading comprehension by English-speaking European standards than in problem and mechanical arithmetic, subjects which involved English less directly.

Hypothesis (2) was consistently negatived. With age and socio-economic status neutralised, there appeared no significant correlation between either non-verbal, verbal or combined intelligence test scores and degree of bilingualism in both sexes. Similarly, with age, socio-economic status and sex neutralised, no significant correlation was discovered between scores in all the four scholastic tests used and degree of bilinguality.

The conclusion was that though the Indian standard six pupils were retarded in English by English-speaking European standards (as indicated in the testing of Hypothesis (1)), their degree of bilingualism had little or nothing to do with such retardation.

Hypothesis (3) was confirmed. Ability in vocabulary and in reading comprehension was found to be significantly associated with goodness of performance in intelligence and scholastic tests, suggesting that schools

would do well to pay special attention to the development of a good vocabulary and skill in reading comprehension.

It was suggested that the reason for the grossly inferior showing of the Indian pupils by European standards in both the intelligence and scholastic tests must be sought in directions other than bilinguality. Figures were quoted to suggest that the key to the problem probably lay in the school-entrance age of the pupils. A full-scale investigation of this possibility forms the subject of the next project.

A noteworthy feature of this project was that many items of incidental information of a social, cultural, educational and psychological nature came to light, that were as thought-provoking as the original problem undertaken, if not more so. Some of these certainly merit detailed study in the future. Examples of such findings are:-

- (1) The girls of the sample appeared to be a more highly selected group than the boys. They were younger in age, higher in socio-economic status, and their parents were more advanced in education both by western and eastern standards than the parents of the boys.
- (2) Matched for age and socio-economic status, significant sex differences appeared in the non-verbal, verbal and combined intelligence test scores, in favour of the boys. In the scholastic tests also, the sex differences that proved to be significant favoured the boys.
- (3) The most conservative Indian groups in respect of the adoption of English as the home language and in the provision of western education for their females were the Hindu-Gujurati, the Moslem-Gujurati and the Moslem-Urdu. These three were also the highest in socio-economic status. The most "progressive" were the Christian groups.

- (4) In spite of the restricted occupational range among Durban Indians, socio-economic status differences were reflected in both intelligence and scholastic test scores.
- (5) Performance in all the four scholastic tests was more highly correlated with scores in the verbal section of the New South African Group Test than in its non-verbal section, indicating that the former is a superior instrument of educational prognosis in the Indian situation than the latter.

ANNEXURE:

Q U E S T I O N N A I R E

Please get the help of your Teacher and Parents in filling this questionnaire. IT IS VERY IMPORTANT THAT WHAT YOU WRITE SHOULD BE CORRECT.

Complete the questionnaire first of all in pencil. When you are satisfied that it has been properly filled, use ink.

(A) PERSONAL INFORMATION

- (1) Name of School:
- (2) Surname(s) as in School Register in full:
.....
- (3) Christian name(s) as in School Register in full:
.....
- (4) Standard: Division:
- (5) Boy or Girl?
- (6) School Register No:
- (7) Admission Register No:
- (8) Correct date and year of birth:
- (9) Home address in full:
.....
.....
- (10) Religion? (Hindu, Moslem, Christian, Parsee, etc):
- (11) To which language group do you belong? (Do not put down English or Afrikaans even if you talk only these languages at home, but write down Tamil, Hindi, Telegu, Urdu, Gujurati, etc):
.....

(B) SCHOOL HISTORY

(Do not count "private schools" in your answers)

(1) In which Government or Government-Aided School did you first start schooling?

(2) In which class or Standard were you put when you first started in a Government or Government-Aided School?

(3) Have you had any "double promotions" since you started school?

Underline: YES NO

(4) If you have had "double promotions", how many times?

(5) Have you ever failed and spent more than one year in any class or Standard?

Underline: YES NO

(6) If you have failed, how many times in all?

(7) Fill in the table below working carefully backwards year by year, starting with the year 1957 and filling next to it the name of your present school and the Standard you are in. (If you have failed at any time, remember that the Class or Standard in which you failed will appear more than once in the last column. If you have had a double promotion at any time, a Standard will be missing in the last column. Fill the table in pencil first, then use ink if you are satisfied with it and your teacher has checked it):-

<u>Year</u>	<u>Name of School</u>	<u>Standard or Class</u>
1957		
1956		
1955		
1954		
1953		
1952		
1951		
1950		
1949		
1948		
1947		
1946		
1945		
1944		
1943		

- (8) With the help of the Table above, write down the year in which you entered a Government or Government-Aided School for the first time. (Get your answer checked by your teacher):
-
- (9) How old were you when you entered a Government or Government-Aided School for the first time? Give your age in completed years, leaving out the extra months. (Check with your parents and teacher):
-
- (10) If you entered a Government or Government-Aided School for the first time at the age of six years or more, what was the reason for the delay? (Ask your parents):
-
-
-

(C) LINGUALITY

- (1) What language(s) do you hear at home?
Underline one only:

- (a) Only English.
- (b) More English, less Home Language.
- (c) English and Home Language about the same.
- (d) More Home Language, less English.
- (e) Only Home Language.

- (2) What language(s) do you hear round your home, among your neighbours, etc?
Underline one only:

- (a) Only English.
- (b) More English, less Home Language.
- (c) English and Home Language about the same.
- (d) More Home Language, less English.
- (e) Only Home Language.

- (3) In what language(s) do you speak to your elders - mother, father, uncle, aunt, grandmother, grandfather, etc., and they to you?
Underline one only:

- (a) Only English.
- (b) More English, less Home Language.
- (c) English and Home Language about the same.
- (d) More Home Language, less English.
- (e) Only Home Language.

- (4) In what language(s) do you speak to your brothers and sisters and they to you? (If you have no brother(s) or sister(s), do not answer this question).
Underline one only:

- (a) Only English.
- (b) More English, less Home Language.
- (c) English and Home Language about the same.
- (d) More Home Language, less English.
- (e) Only Home Language.

- (5) In what language(s) do your three best friends speak to you?
Underline one only:

- (a) Only English.
- (b) More English, less Home Language.
- (c) English and Home Language about the same.
- (d) More Home Language, less English.
- (e) Only Home Language.

- (6) Which language do your parent(s) or guardian think it more important for you to know well?
Underline one only:

- (a) English.
- (b) Home Language.
- (c) Both equally important.

(7) Which language can you speak, read and write better?
Underline one only:

- (a) English.
- (b) Home Language.
- (c) Equally good at both.

(8) Do you attend a Vernacular (Home Language) school?
Underline: YES NO

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(D) PARENTAL INFORMATION

- (1) What work does Father do? If he is unemployed or dead, state what work your father last did. (Give details - for example, if he is in business, say whether he is the owner of the business or whether he works for someone else, what kind of business it is, etc. If he works in a factory, say whether he is the owner of it or an employee and describe exactly what work he does, e.g. labourer, machinist, foreman, clerk, etc. From what you write we should be able to learn exactly what work Father does):
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- (2) Did Father (your own) attend an "English" school?

Underline: YES NO

- (3) If so, what standard did Father pass?

- (4) Did Mother (your own) attend an "English" school?

Underline: YES NO

- (5) If so, what standard did Mother pass?

- (6) How much education has Father (your own) had in the Home Language?
Underline one only:

- (a) Can speak, but cannot read and write Home Language.
- (b) Can speak and read, but cannot write Home Language.
- (c) Can speak, read and write the Home Language.

- (7) How much education has Mother (your own) had in the Home Language?
Underline one only:

- (a) Can speak, but cannot read and write Home Language.
- (b) Can speak and read, but cannot write Home Language.
- (c) Can speak, read and write the Home Language.

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