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The comparative MMPI performance of compound and coordinate French-English bilingual students.

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THE COMPARATIVE MMPI PERFORMANCE OF COMPOUND AND COORDINATE FRENCH-ENGLISH BILINGUAL STUDENTS.

by

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B. A.: Susquehanna University, 1965

A Dissertation

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Theoretical and anecdotal material have indicated that a bilingual's personality may change when he changes language of usage. This area of investigation, crucial to clinical psychologists, has received scanty empirical attention.

Only two researchers, Gignac (1970) and Glatt (1969) attempted to evaluate the effects of bilingualism on personality assessment with objective inventories. Glatt found that Ss received different scores on the French than on the English versions of the MMPI and that these differences led to different clinical interpretations of the resulting profiles. Gignac found that such differences were not present when using a Canadian-French rather than a Parisian-French MMPI and with a considerable improved research design. He also examined the effects of the two types of bilingualism, compound (unified semantic system) and coordinate (separate but parallel semantic systems), and found that they had no effect on the results (contrary to past theoretical writings).

It was the purpose of the present study to investigate the assessment of the personality characteristics of bilinguals by using an objective personality inventory and to evaluate the effects on such a procedure of having two types of bilinguals identified: compound and coordinate. The effects of five additional factors were also analyzed: cultural background, linguistic background, age of second language learning,
degree of bilingualism in the home, and relative proficiency.

Methodology

The Ss were 17 university and 71 high school students who were fluent in both English and French and who used both languages daily. Each S was administered three instruments: the standard booklet forms of the MMPI in English and in Canadian-French (Chevrier's 1961 translation, a version used clinically throughout French-speaking Canada), and a background questionnaire. The latter elicited information about the Ss' cultural and linguistic background.

All Ss were first administered the background questionnaire and then half the English MMPI, half the French. The MMPI in the other language was taken two weeks later. The MMPIs were administered and scored according to standard instructions and the raw scale scores were used for analysis. Ss were grouped into various categories on each of the factors. A two-part statistical analysis was carried out by computer. First, a series of two-way analyses of variance were performed. One factor was always language; the second was each of the variables. Separate analyses were carried out on each of the 13 scales each time. Second, product-moment correlations and t tests were performed across all Ss and then for each group of Ss within each of the six factors.

Results

1. It was hypothesized that the Ss would obtain generally higher scores on the French version. This was true for all scales except S1, but differences were significant only for F and Hs. Clinically significant differences were not observed even on these two scales. Correlations ranged from .41 to .81 (\bar{X} = .63). These correlations were significantly
lower than previous test-retest correlations using the English version with similar Ss and time interval. Thus the first hypothesis was partially confirmed.

2. It was hypothesized that compound bilinguals would obtain more similar pairs of MMPI scores on each scale than would coordinate bilinguals. This hypothesis was not confirmed. This finding substantiated that of Gignac (1970).

3. None of the five additional factors were found to have a significant effect on the results. Those few statistically significant differences which did occur were scattered throughout, were in no consistent directions, and were felt to be coincidental. None of the 78 interaction effects were significant.

Discussion and Conclusions

1. The partial confirmation of the first hypothesis indicated a need for further studies in bilingualism as well as a validity study of Chevrier's (1961) French MMPI. An item analysis of the present data may pinpoint specific items which differ in meanings on the two versions.

2. The lack of effect of type of bilingualism may be due to a confusion in the literature as to how to delineate the categories, in addition to a past tendency to have confused origin with definition in theories concerning this distinction.

3. That the remaining variables had little effect on the outcome may have been due to the homogeneity of social class backgrounds across Ss (resulting in similar value systems) and/or because of a lack of effect once a high level of proficiency in each language is reached.
4. The effects of bilingualism on personality have been both oversimplified and overcomplicated in the past. Empirical studies have been lacking and further theorizing must await further studies in this tremendously complex field of investigation.
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TABLE OF CONTENTS

Page

ABSTRACT ............................................................... iii

ACKNOWLEDGEMENTS .................................................... vii

LIST OF TABLES ......................................................... x

CHAPTER

1. ORIENTATION AND BACKGROUND ........................................ 1

   Definition and Incidence of Bilingualism .................................. 3
   Pertinent Research .................................................. 8
   (a) Linguistic Research on Bilingualism .................................. 8
   (b) Educational Research on Bilingualism ................................ 12
   (c) Research on Bilingualism and Personality .................................. 16
   Bilingualism and the MMPI .............................................. 29
   Summary of the Literature on Bilingualism .................................. 32

2. STATEMENT OF THE PROBLEM .......................................... 34

   Experimental Hypotheses .............................................. 37

3. METHOD .............................................................. 42

   Subjects ........................................................... 42
   Instruments ......................................................... 45
   Procedures ......................................................... 49
   Statistical Analysis ................................................ 50

4. RESULTS ............................................................. 52

   Hypothesis 1 ....................................................... 52
   Hypothesis 2 ....................................................... 54
   Hypothesis 3A ...................................................... 57
   Hypothesis 3B ...................................................... 60
   Hypothesis 3C ...................................................... 63
   Hypothesis 3D ...................................................... 65
   Hypothesis 3E ...................................................... 68

viii
LIST OF TABLES

TABLES

1. Bilingual Subjects (N = 88) by Sex with Their Mean Age and Education .................................................. 44

2. Cultural and Linguistic Backgrounds of the Bilingual Subjects ................................................................. 46

3. Bilingual Subjects Categorized by Degree of Bilingualism in the Home (According to Hoffman Test Scores) .......... 47

4. Comparison of the Mean Raw Scores on the French and English MMPIs and Difference Scores, ts, and rs Between Them for All Subjects .............................................. 53

5. Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Compound and Coordinate Subjects ........................................ 55

6. Summary of Results of Analysis of Variance for Type of Bilingualism ......................................................... 56

7. Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for English Background, French Background and Bicultural Subjects ............. 58

8. Summary of Results of Analysis of Variance for Cultural Background .......................................................... 59

9. Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Subjects from English Language, French Language, and Bilingual Backgrounds .................................................. 61

10. Summary of Results of Analysis of Variance for Linguistic Background ......................................................... 62

11. Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Pre-School, Childhood, and Adolescent/Adult Learners of the Second Language .............................................. 64

12. Summary of Results of Analysis of Variance for Age of Second Language Learning ........................................ 66
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Subjects with Low, Same, and High Degrees of Bilingualism in the Home Background</td>
<td>67</td>
</tr>
<tr>
<td>14</td>
<td>Summary of Results of Analysis of Variance for Degree of Bilingual Background</td>
<td>69</td>
</tr>
<tr>
<td>15</td>
<td>Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Subjects Superior in English, Superior in French, and Equal in Relative Proficiency</td>
<td>70</td>
</tr>
<tr>
<td>16</td>
<td>Summary of Results of Analysis of Variance for Relative Proficiencies.</td>
<td>72</td>
</tr>
<tr>
<td>17</td>
<td>Comparison of the Present English-French Correlations with Previous Test-Retest Correlations.</td>
<td>75</td>
</tr>
</tbody>
</table>
CHAPTER 1
ORIENTATION AND BACKGROUND

As clinical psychologists our main tool of work is language, generally the language in which we and, we assume, our clients are most fluent. In a bilingual country this assumption may not be correct. In Canada, English is only one of two or more languages spoken by many individuals and is clearly the minority language in some areas (Royal Commission, 1969). Yet this is often ignored and individuals are tested in English (or possibly French) without considering the influence which knowing or preferring another language might have on the client's personality. The basic hypothesis underlying the present study is that we cannot undertake the assessment and/or treatment of bilingual individuals without knowing whether part of the personality has been lost or changed when only one of the languages is used in the professional situation.

The primary purpose, therefore, is to evaluate the relationship between bilingualism and personality, to determine whether the bilingual's personality changes when he shifts the language he uses, and to evaluate some of the variables which might affect these relationships.

The origin of language is unknown, but it is likely to have been after homo sapiens had begun living in somewhat organized societies (Arsenian, 1937). Its importance, however, is certainly unquestionable. Human existence is welded to language. No normal person is without this faculty and no other species is known to possess it. Once acquired, language becomes a
constant companion to all human behavior. It is the possession of the individual, yet at the same time it is the bond which establishes societies. (Lotz, 1961, p. 2).

Language seems to fulfill various major functions. First, it is the means by which ideas and cultures are transmitted. "Language is ... in a peculiar sense, both part and symbol of a culture, reflecting its essence in such a way that another language cannot serve as a substitute" (Bossard, 1945, p. 700). Secondly, it is the means by which each human being can communicate with his fellows. "Through words, men communicate with each other in short-cut form, eliminating with a few syllables the need for a hundred separate actions" (Sherif & Sherif, 1956, p. 449). Finally, it has been theorized that language, or more specifically subvocal language, may in fact be what we call thinking. Words tend to function "as clear-cut, organized, and enduring anchorages for the individual's perceiving, judging, and other aspects of his experience and behavior" (Sherif & Sherif, 1956, p. 483).

All of these functions are certainly important as considerations for clinical psychologists in as much as it is through language that the games which are called social situations are handled (Reusch, 1953) and it is the basis of all psychological therapies, regardless of theoretical orientation (Reusch, 1959).

The number of languages being used throughout the world during the present era has been estimated at as little as fifteen hundred (Arsenian, 1937) to as many as three or four thousand (Lotz, 1961; Whatmough, 1957). Historically, "through immigration, colonization, and annexation of territory, groups of people speaking different languages have been thrown together in daily contact and communication"
More recently this contact process has been speeded up by the various wars, the "rapidly increasing political, cultural, and commercial relations among countries," and by the shrinkage of the Earth due to the jet age (Jensen, 1962, p. 132). This means that more and more people are becoming conversant with two or more languages. "Partly as a result of its obvious relation to communicative difficulties and educational problems in large modern societies, the effects of bilingualism have come to be the subject for much debate" (Diebold, 1968, p. 218f).

Definition and Incidence of Bilingualism

Previous studies have proposed a number of definitions for the term 'bilingualism'. Haugen (1950) first defined it as referring to a person who could produce meaningful utterances in more than one language; later he modified this so as to refer to all people with a number of language skills but who are not monolingual (1956). O'Doherty (1958) distinguished between bilingualism and pseudo-bilingualism; the latter included those individuals who master one language and then acquire some knowledge or partial mastery of another, the second not being an automatic medium of social intercourse. Mackey (1962) defined bilingualism as "the alternate use of two or more languages by the same individual" (p. 52) and then (1966) substituted the word 'habitual' for the word 'alternate'. Yamamoto's (1964) definition is similar to both of Mackey's definitions, but with a separation between bifurcation (each language restricted to certain social situations) and bilingual parallelism (each language used indiscriminantly). Arsenian (1937), however, pointed
out that "bilingualism is not a simple concept and its form and appearance everywhere are not uniform. There are many types of bilingualism" (p. 46). For this reason it is felt that any research in this area must of necessity generate its own operational definition depending on its purpose and scope. For the purpose of the following discussions, Haugen's late definition will be used.

"With the exception of Portugal, Iceland, and a couple of principalities, no country in Europe is free of national or language minorities and, therefore, of the problems of bilingualism in one form or another" (Arsenian, 1937, p. 145). Today, even these exceptions are not true. In Asia and Africa the problem is present wherever immigration and colonization took place (South Africa, India, Pakistan, Japan, etc.). In North America, as in Europe, the problem is widespread.

In the United States, bilingualism is common in the large metropolitan areas, certain rural areas in the Middle West, the southwestern states, and Hawaii (Jensen, 1962). Studies have indicated that from one to two thirds of the families in the eastern industrial states converse in more than one language (Arsenian, 1937; Bovet, 1953; Stjne, 1939; and Wessel, 1931). Jordan, (1921ab) found that in the Minneapolis-St. Paul area "the persistence of the foreign language is more stubborn and widespread than has been suspected" (1921a, p. 36). Lynn (1945) estimated that there were over one and a half million Spanish-speaking individuals in the southwestern states by 1940 and Tireman and Hughes (1948) set this figure as being upwards of two million. Hawaii has large minorities of its population speaking various Asian languages, as well as English, Spanish, and Portuguese (Coale & Smith, 1938). Bain (1942) estimated that fully one quarter of all American school children are bilingual.
In Canada, the problem is even more crucial. One need only to pick up a newspaper to realize the significance of the problem and its present effects on the political and cultural structure of the country as a whole. Most Canadians tend to think of the French-English dichotomy as being limited to Quebec without realizing the extent to which the rest of the country is affected. The Royal Commission on Bilingualism and Biculturalism (1969) designated both Ontario and New Brunswick as officially bilingual provinces in addition to Quebec. Areas where 10% or more of the population are French-speaking can be found in every province except British Columbia. Although it is this dichotomy which is currently receiving the attention of the press and public, large segments of the country are fluent in other languages (such as the German-speaking residents of the Prairie provinces and the speakers of Cantonese and other Chinese dialects in Montreal, Toronto, and Vancouver).

To paraphrase Jensen (1962), it would indeed appear that the melting pot of North America possesses many bilinguals and potential bilinguals.

One of the most important aspects of learning a second language is the ability to keep it apart from the first and to use it in the appropriate situation. It is therefore not enough to learn the items of the foreign language; each one must also be tagged as belonging to that language so that it will not be drawn upon when one is speaking a different language. (Haugen, 1967, p. 78f).

Psycholinguists originally stated this mechanism in terms of decoding and encoding processes (Osgood, 1954) and have distinguished two types of bilingualism: compound and coordinate. In the first situation, the two languages constitute a single coding system (a single semantic system); in the second, the coding systems are separate though parallel (separate semantic systems).
Diebold (1968) defined compound bilingualism as being when the words in each language have equivalent meanings and coordinate bilingualism as being when there may not be true equivalents from one language to the other. He pointed out the need to ascertain the type of bilingualism held by subjects:

much of the research seems to suggest that coordinate bilinguals ... having learned and then using their languages in separated contexts, have a correspondingly greater functional separation of their two linguistic systems as well as greater functional separation of the cognitive processes and other language-mediated behavior which relate to differential encoding of experience specific to one or the other language. Conversely, the compound bilingual seems to exhibit a greater merging of these systems and processes. (p. 230).

From this it would seem that the type of bilingualism involved may greatly affect the performance of bilinguals on personality inventories. Haugen (1956) mentioned several possible means of assessing a bilingual to determine to which type he belongs. Ervin and Osgood (1954) advanced the idea that the two types would result if the two languages are learned at the same time and in the same context, or at different times and in different contexts. Lambert, Havelka, and Crosby (1968) found that the distinction could be made by simply eliciting the context in which the languages were learned. A coordinate bilingual is defined as being when

one language was learned exclusively in the home and the other exclusively outside the home, when one parent consistently used one language and the other a different language, or when one language was acquired in a particular national or cultural
setting distinct from that in which the second was acquired. (p. 240.)

A compound bilingual is defined by means of exclusion: he is a non-coordinate. In other words, he has acquired his languages in a fused acquisition context.

Diebold (1966) and, later, Jakobovits (1967) have proposed models to portray how the acquisition contexts could produce different structures and cognitive organizations. Empirical studies have not always validated such models, however, and there is some confusion as to just what effects on functioning the dichotomy actually has. While Jakobovits and Lambert (1961), Lambert, Havelka, and Crosby (1968), and Segalowitz and Lambert (1969) have demonstrated the validity of the models, a series of studies by Alton (1960) failed to demonstrate the predicted functional results. In the only study on this subject from clinical psychology, Gignac (1970) likewise could not confirm his prediction that coordinates would show greater discrepancies between languages than would compounds.

The source of the difficulty may lie in a fundamental error in defining the terms. Both the terms have been consistently defined by origins, not by functions, although there is an implication that the functions are there as well. By its nature, a definition cannot be historical; hence no one can agree on how to define the terms. The present study will use only an operational definition of the terms: a coordinate bilingual is one who has acquired his languages in different cultural contexts; a compound is one who has acquired both his languages in the same cultural context.
Pertinent Research

Is this phenomenon of bilingualism a curse or a blessing? Or is it neither? The question has captured the attention of government officials, school administrators, teachers, educational psychologists, psychologists, anthropologists, sociologists, political scientists, linguists, speech correctionists, and personnel studying child development. (Jensen, 1962, p. 133.)

Research on bilingualism has centered around three major areas:
(a) A great deal of the research has been concerned with the areas of linguistics and speech development (Haugen, 1956; Weinreich, 1953).
(b) Educators have been concerned with whether bilingualism handicaps children in their educational endeavors. (c) Of more recent concern has been the possible effects of bilingualism on the personality of the individual.

(a) Linguistic Research on Bilingualism

The question which linguists have been attempting to examine is whether speaking more than one language affects the verbal production of the individual in each. Results have generally found that certain speech patterns will be carried over from one language to the other ("linguistic borrowing") with the result that neither will be spoken as well as could be (Gumperez, 1962; Haugen, 1950). Other authors have investigated a related problem: linguistic interference. Mackey (1962) conceptualized the difference as being a vacillation in the use of foreign features rather than of consistent alien usage. These authors (e.g., Burling, 1959; Goldstein, 1948; Haugen, 1956; Mackey, 1962; Osgood, 1954; Vogt, 1954; and Weinreich, 1953) concluded that most bilinguals are not able to keep the two or more languages sufficiently separated to avoid at least some interference being present. Lynn (1945), in a comprehensive
study of the English spoken by Spanish-Americans in Arizona, found the consistent presence of certain types of errors: shortening of vowels; incorrect stressing of syllables; variations in voicing, aspiration, and tension; and insufficient transition between sounds. She concluded that each of these errors could be directly attributable to the subjects having first learned Spanish.

Other linguists (Christopherson, 1948; Nelson, 1956) have found a high correlation between improper speech rhythm and the speaking of more than one language. They ascribed this to the bilingual's search for the proper response pattern in the language being used at a given time, a search not usually necessary when the same language is being spoken by monolinguals. Duncan (1947), however, raised the possibility that this might be an effect of sociological factors and of the family tensions which arise between Americanized subjects and their foreign-born parents.

There is little agreement among linguists as to the effects of bilingualism on overall speech development. Arsenian (1945), Beckey (1942), Keston and Jimenez (1954), Saer (1922), Smith (1939), and Yamamoto (1964) agreed that bilinguals are unable to attain a level of language mastery in either language equal to that of monolinguals, if for no other reason than linguistic interference. Jensen (1962) summarized the findings of some forty publications as follows:

The bilingual will tend to use fewer different words. He will develop a confused, mixed vocabulary ... [and] will use shorter sentences, more incomplete sentences, fewer compound and complex sentences, fewer interrogative, and more exclamatory sentences. Confused structural patterns, unusual word order, the errors in agreement, and dependency will result. The bilingual child will make many errors in the
use of verbs and tense, connectives, prepositions, nouns, pronouns, and articles. He will make faulty use of negatives, will fail to inflect words, will use too many interjections, and will employ too much redundancy. He will misuse idiomatic expressions, will make faulty choice of synonyms, and will frequently fall into the trap of literal translation. The almost inevitable carry-over of some phonetic, grammatical, or lexical elements means that both languages will suffer when judged by the highest standards. Furthermore, the bilingual child will develop an excessive reliance on non-verbal, gross gesturing. (p. 135.)

While the bulk of the research seems to favor the theory that bilingualism has ill effects on speech development, the contention of a number of authors is that there are no ill effects and there may even be some advantages. Their claims cannot be dismissed lightly. Leopold (1939) and Ronjat (1913) made longitudinal studies of the bilingual speech development of their own children and agreed that there were no detrimental effects. Samuels, Reynolds, and Lambert (1968) found that a school program designed to teach a second language to first and second grade children was quite successful and that the children had no difficulty in assimilating a second language. Arsenian (1945), Carrow (1957), Manuel (1935), Tan (1947), and Pintner (1932) agreed that any initial difficulties which the bilingual might experience seem to disappear by about age thirteen. Several authors (Anastasi & de Jesus, 1953; Raubicheck, 1934; Smith, 1933; Stark, 1940; Totten, 1960; and Weinreich, 1953) contend that the learning of a second language will tend to increase the length and maturity of the sentences and lead to larger vocabulary levels.

"Studying a second language will aid a person to strengthen his original tongue, to become more sensitive to nuances, to manipulate languages more effectively, and to learn additional languages more easily" (Jensen, 1962,
The relationship between bilingualism and stuttering may shed some light on these discrepancies. Several authors (Blanton & Blanton, 1919; Hahn & Hahn, 1956; Raubicheck, 1934; Smith, 1933; and Travis, Johnson, & Shover, 1937) have suggested the possibility of a correlation between bilingualism and stuttering because of the bilingual's search for appropriate response patterns. Only Travis and his associates (1937) examined this question empirically. In their survey of nearly 500 school children in East Chicago, Indiana, they found that there was a higher incidence of stuttering among bilinguals (2.8%) than among monolinguals (1.8%). Of relevance, however, are two of their conclusions:

We cannot be certain that this difference is due solely to the factor of bilingualism. It may be due to the economic insecurity and emotional instability found in many foreign homes ..., or it may be due merely to a confusion which arises from being placed in a totally strange and new environment....

That there is a difference between the bilinguals and the English speaking subjects may be no more significant than the fact that the difference is really quite small. It is not to be overlooked that 97.2 per cent of the bilinguals do not stutter. (p. 189.)

This raises two arguments: (a) it is the sociocultural factors which lead to differences, not bilingualism per se; and (b) the disadvantages inherent in bilingualism are not really significant, except in a limited statistical sense. Further research may conclude that the advantages do in fact outweigh the disadvantages. One cannot help but wonder whether many monolinguals would not appear handicapped in their linguistic skills when compared with the same high standards which were being used to compare the skills of bilinguals (Jensen, 1962). For now it appears that the questions must remain unanswered.
(b) Educational Research on Bilingualism

A number of authors (Arsenian, 1945; Christopherson, 1948; Delmet, 1930; Haugen, 1956; Johnson, 1938; Lewis, 1960; Nelson, 1956; O'Doherty, 1958; Smith, 1939; and Wallace, 1956) have claimed that bilingualism leads to educational retardation. Reading and studying in general are handicapped, as may be certain abilities in specific subject areas, especially spelling and the humanities. There is "at the very least ... an extra obstacle in the learning process for a foreign-language-speaking child" (Mitchell, 1937, p. 36).

Other studies, however, would seem to indicate that such handicaps do not exist. Carrow (1957) concluded that bilingualism had no ill effects on oral reading rate and Marshall and Phillips (1942), Smith (1942), and Spoorl (1944) concluded that it had no ill effects on the academic performance of college students. It appears, therefore, that bilingualism may have a differential effect depending on the age of the student: while it may be a handicap at the elementary school level, it is not a handicap at the high school and university levels. Bossard (1945) and Mackey (1962) pointed out that educators have not been as concerned with the problem as they should be and Abraham (1955, 1956, 1957) continuously urged that bilinguals be classified as "exceptional children" and receive special training and educational assistance.

There has been little research into bilingualism's effects on those cognitive behaviors which are correlated with linguistic behavior (Diebold, 1968). Recent research on bilingualism and verbal recall (Lambert, Ignatow, & Krauthamer, 1968; Young & Navor, 1968) indicated there is no influence, either positive or negative, regardless of whether the material to be
recalled was bilingual or monolingual.

While teachers of language have been more interested in the effects of intelligence on language learning, the educational psychologists have explored the effect of language learning on intelligence. Unfortunately, the conclusions are somewhat contradictory, due to the difference in terminology and purposes of various investigators. (Haugen, 1956, p. 80.)

Examination of the effects of bilingualism on intelligence began in the 1920s (Garretson, 1928; Saer, 1922, 1923; Smith, 1923; and Yoshioko, 1929). The results of these and other early studies indicated that bilingual children scored significantly lower than monolingual children on verbal and sometimes nonverbal tests of intelligence (Darcy, 1953; Jensen, 1962; and Peal & Lambert, 1962). Later studies on Welsh children (Eichorn & Jones, 1952; Jones & Stewart, 1951) indicated that the notion of inferiority of bilingual children was present even later.

On the other hand, Weinreich (1953) concluded that the "majority of experimenters deny the allegedly evil effects of bilingualism on mental development" (p. 117). Arsenian (1937), after extensive testing of Puerto Rican children in New York City, concluded that bilingualism had no ill effects on the development of mental abilities. Other researchers (notably Hill, 1936; Kolasa, 1954, Pintner & Arsenian, 1937, and Spoorl, 1944) completely agreed with these findings, and with the findings of an earlier study (Jones, 1933) which found that bilinguals do not suffer on a number of tests ranging from concrete nonverbal to highly abstract verbal. Stark (1940) found that bilinguals were superior to monolinguals, but the lack of adequate controls does not allow this study to bear much weight.

Pintner (1923) and Pintner and Keller (1922) found that bilingual school children were inferior to monolinguals on verbal tests of intelligence, but that there was no difference on nonverbal tests. Their findings
have been confirmed by a number of researchers using a wide variety of
subjects (Altus, 1953; Barke, 1933; Barke & Parry-Williams, 1938; Darcy,
1946, 1952; Garth, 1928; James, 1947; Jamieson & Sandiford, 1928; and
Wang, 1926). Anastasi and Cordova (1953) concluded that the differences on
the verbal tests depended on how the languages were learned, and Darcy
(1953) mentioned that while bilinguals do not suffer on nonverbal tests
of intelligence, they are being penalized on verbal tests when they are
used.

Haugen (1956) pointed out that the types of bilinguals being tested
have had an additional handicap:

The bilinguals tested have nearly always been of a
particular kind, which we may refer here to as 'home-
school' bilinguals. Most of them are children living
in a non-English-speaking environment ... whose first
encounter with English is in the school at the age of
six or seven. After a few years of this dualism, in
which English is largely limited to their external
contacts, they are tested in English and of course
fall below the norms of children who have spoken
English since infancy. (p. 82.)

Studies by Klineberg (1941) and Sanchez (1932, 1934a) pointed out
that social conditions can affect the development of mental abilities to
an even greater extent than bilingualism. Diebold (1968), Jones (1960),
and Lewis (1959) have pointed out the lack of sociological controls in
previous comparisons of bilinguals and monolinguals (with bilinguals coming
from lower socioeconomic environments the majority of time) and the effects
which this lack has had in leading to negative findings.

Other reasons for the negative findings have been postulated.
Haugen (1956) mentioned that many of these earlier studies were done in
an atmosphere which was generally hostile to all foreign groups. Lewis
(1959) mentioned that the alleged inferiority on nonverbal tests may be
due to the test constructors' inability to eliminate all verbal factors from their tests. Hill (1936) and Sporel (1944) pointed to the lack of controls for knowledge of English in earlier studies. Johnson (1953) felt that testing intelligence in English is probably not valid when the subjects are deficient in the assimilation of the culture of which English is reflective. Sanchez (1943b) found that Spanish-American children did not know an average of 114 words used in the administration of the Stanford-Binet in English. Finally, Mitchell (1937) tested similar children in both Spanish and English and found that they averaged 13.32 points higher when tested in Spanish.

Peal and Lambert (1962) concluded that "it becomes apparent that it is necessary to control certain variables in this type of study before conclusions can be drawn" (p. 5). They then tested French-English bilingual children, carefully matching them with monolinguals in each language on socioeconomic and cultural background and with the same level of vocabulary. Each bilingual was also tested for relative usage and fluency in each language. Their results indicated that the bilinguals did as well or better than the monolinguals on all of the tests, both verbal and non-verbal.

The picture that emerges of the French-English bilingual in Montreal is that of a youngster whose wider experiences in two cultures have given him advantages which a monolingual does not enjoy. Intellectually his experiences with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, and a more diversified set of mental abilities, in the sense that the patterns of abilities developed by bilinguals were more heterogenous. (p. 20.)

Macnamara (1964) criticized the study on several points, implying that the bilingual subjects had to have been brighter because they were
able to handle two languages fluently. Amisfeld and Lambert (1969) pointed out that the criterion used was a balanced measure between languages and that it was possible for a subject to have been considered bilingual because he was equally slow in both languages rather than equally fast. Also, the two groups were equated for their skill in French (the languages of their schooling and of the tests) and in their past performance. They finally concluded that "it will take better sets of data and arguments than those presented so far...to convince us that bilingual persons are in any sense inferior" (p. 127). It appears that Peal and Lambert's (1962) study must stand as the last word to date. Improved methodology and a better understanding of the concepts involved would seem to have negated the early case for the inferiority of bilinguals. Regardless of whether they are basically inferior, superior, or relatively the same as monolinguals in their ability to learn, a strong case has been made by previous researchers for the need of educators to treat bilinguals differently from monolinguals, and that they require certain attention which the monolinguals do not. Only in this way can their possible special advantages be used to their fullest, thereby overcoming whatever handicaps may in fact be present.

c) Research on Bilingualism and Personality

"It has repeatedly been urged that bilingualism is a crucial factor in the personality structure of an individual and his emotional adjustment to his surroundings" (Haugen, 1956, p. 84). This claim is ably summarized by Weinreich (1953, pp. 119-121) as well as others. A survey of the literature revealed three questions which needed to be asked with respect to bilingualism's effects on personality.
1. What is the extent of the sociological influences affecting bilinguals which might not affect monolinguals?

There is a great deal of evidence to support the notion that empirical differences between bilinguals and monolinguals on various measures were due to uncontrolled socioeconomic and/or cultural factors. As mentioned above, differences in rhythm (Duncan, 1947), stuttering (Travis, Johnson, & Shover, 1937), and cognitive abilities (Diebold, 1968; Klineberg, 1941; Jones, 1960; Lewis, 1959; and Sanchez, 1932, 1934a) have been attributed to social factors rather than to the speaking of more than one language. Three sociological variables have been identified which will influence the personality characteristics of the bilinguals: the status of the 'foreign' language, the status of the bilingual himself, and the presence of family discord.

With regard to the status of the foreign language, Bossard (1945) found that many of his bilingual informants reported the attaching of stereotyped labels to them depending on the non-English language which they spoke. This stereotyping was especially the case when they spoke one of the so-called immigrant languages. He suggested the importance of linguistic identification with status. Immigrant languages do not enjoy social prestige and the growing bilingual child is placed in conflict between the narrower environment in which his "mother-tongue" is accepted and the wider environment in which it is not. The second language may then be forced upon him by the dominant group due to social pressure and to the pressures of social prestige (Haugen, 1956), though the child may then meet this threat with a resurgence of language loyalty (Weinreich, 1953). Nevertheless, a stigma of inferiority may be placed on the childhood language by the dominant social group. This may then
lead to negative associations among the more sensitive speakers of the minority language (Levy, 1933; Raubicheck, 1934). The decision as to whether or not there should be resistance to the encroachment of the new language can be quite an emotional one, especially when acculturation is as rapid as it is in North America (Linton, 1943).

Several authors have empirically demonstrated the presence of stereotypes which are attached to various minority languages. Botha (1968) found that, as a result of the higher social status of Frenchmen in Lebanon, French as a second language had a greater influence on the personality of native Lebanese than did English as a second language. Arsenian (1945) found that the effect on children of learning two languages simultaneously depended on the presence or absence of a relative superiority in social status of one of the languages. Amisfeld and Lambert (1964) had French-Canadian children listen to tape recordings of children's voices in both French and English, the same children recording the passages in both languages. They asked the young subjects questions about their opinions of French people and English people prior to hearing the voices. They then asked the children to rate the personalities of the children on the tapes on each of fifteen traits. The ratings assigned the voices paralleled quite closely the stereotyped opinions held concerning the French and the English generally.

Two further illustrations point out the different social status which can be attached to even the same language when it occurs in two different cultural milieus. Spanish is widely used in both Mexico and the southwestern part of the United States. Among the Mexican Indians it is held in high regard since the Spanish-speakers are of a generally
higher socioeconomic status; in the United States the opposite is true. Pike (1945) related an incident in which a Mexican Indian returned to his small village after visiting a nearby Spanish-speaking town. He pretended to speak Spanish to his non-Spanish-speaking fellows and thereby gained great prestige in their eyes. Tuck (1945), on the other hand, reported that the greatest source of conflict and irritation present in a southwestern United States community was the speaking of Spanish rather than English in public, since English was the higher of the two in terms of local socioeconomic status.

The hostile attitudes which are directed at non-dominant languages are often merely displacements of "deeper racial, religious, political, or social antagonisms" (Jensen, 1962, p. 361). Soffietti (1955) pointed out that such hostile attitudes are often due to a conflict of biculturalism (of which bilingualism represents one part). The status of the language which is a minority in all or part of a bilingual's environment is reacted to as being an outward manifestation of a minority culture.

With regard to the status of the bilingual himself, differences in intelligence between bilinguals and monolinguals all but disappeared when the two groups of subjects were equated or when the bilinguals used were of a higher socioeconomic class (Ervin, 1964; Fishman, 1952; and Peal & Lambert, 1962). In nearly all of the earlier studies of the cognitive abilities of bilinguals, the subjects were of lower socioeconomic status than the so-called comparable monolinguals (Diebold, 1968). It would seem readily apparent that such factors must be controlled before research into the personality characteristics of bilinguals can even begin to approach the status of definitive research.
With regard to family discord and the bilingual, Jensen (1962) concluded that the parents, and especially the mother, tend to lose the ability to communicate with the offspring. This leads to their losing the respect and even the obedience of the children; they in turn may lose the ability to enjoy their children. Spoerl (1944) concluded that the major source of differences separating bilinguals from monolinguals with regard to personality characteristics was the significantly higher incidence of family discord in the bilingual group.

Bossard (1945) found that all seventeen of his bilingual case histories made reference in some detail to familial discord due to the acquisition and use of English:

Where the acquisition of the new language is hailed as a new educational experience, in which all members are sharing, there is a far less possibility of tension. Where, on the other hand, the parents forbid, discourage, or frown upon the children's efforts, the results are quite different... Under the most fortunate circumstances, the bilingual situation appears to involve a nervous strain, a certain added effort to shift gears, as it were, from one linguistic level to another. (pp. 701f.)

His subjects reported that as children they began to sense they were different from their parents and they reached a state of objective appraisal of them. They felt hostility toward their parents because the latter were often unwilling to keep pace in English (especially the mothers). The children developed feelings of rejecting the parents as well as rejecting the parental language. On the other hand, the parents and grandparents (who most strongly identify with the native language) cannot understand the children's rejection of the "mother-tongue." A real barrier to family communication can be the result when the children fail to respond to questions put to them by the parents in the native language or even
when they do respond but in English. It is unlikely that a child undergoing such strong family turmoil would not be affected by it. This is especially true when, at the same time, he is being subjected to pressures from other parts of his environment due to his being from a minority group and, often, also due to his being from a lower socioeconomic group.

In summary, the status of the language and of the bilingual himself, as well as family discord which he might have to face, would all seem to cause possible personality conflicts within the bilingual. Because of a lack of adequate controls in most of the previous studies, there is little empirical evidence to show how much these factors have influenced our present knowledge about the psychology of bilingualism. There is little doubt that these factors will have to be more fully explored or at least taken into account in future studies.

2. Do bilinguals differ from monolinguals in their basic personality characteristics?

Does the person who is able to speak more than one language have personality characteristics different from monolinguals because of their special ability? The literature revealed a variety of opinions ranging from there being harmful to there being positive effects and including several writers who felt that there were no effects whatsoever.

The opinion was expressed that bilinguals are clearly different from monolinguals with regard to various personality characteristics. Spoerl (1944) found that the reasons given by bilinguals for dropping out of university were not the same as those given by monolinguals. Of the former, 27% gave "personal maladjustment" as their reason as opposed to none of the latter. Bossard (1945) claimed that several differences existed even after social aspects were accounted for. Lambert and Moore (1966)
found that both American and Canadian French-English bilinguals incorporated subtle features of both languages. On a test of semantic stereotypy, the bilinguals occupied a position between the various monolingual groups.

While the above three studies indicated the existence of differences, they were neutral with regard to the direction of the effects of these differences. Other writers, however, felt that there are various harmful effects due to speaking two languages. "A second language, especially when acquired in infancy or childhood, is believed by some to interfere with the proper integration of personality and in extreme cases to lead to emotional and moral disorganization!" (Haugen, 1956, p. 84).

The bilingual child may develop serious emotional instability and social maladjustment. His frustrations arising from his ineffectiveness as a communicator may be very damaging to him, particularly if he is a weak personality to begin with. Losing his self-confidence and sense of security, he may develop extreme introversion and shyness or he may become very aggressive and antisocial. He may become schizophrenic .... (Jensen, 1962, p. 136.)

Christopherson (1948) takes the extreme view, pointing out that most bilinguals feel a "pull in opposite directions which threatens the unity of their personality," and which often leads to schizophrenia (p. 9). Because each language is learned and usually employed with different persons and contexts, the use of each language may be associated with shifts in a large variety of behaviors. This might make it appear as though bilinguals actually do have a split personality because of the extra dimension of potential variation not available to monolinguals (Ervin, 1964). Yamamoto (1964) felt that bilinguals suffer from a higher rate of emotional maladjustment and mental disease. He blames it, however, on the language handicap and resulting impairment of social skill which in turn leads to increased tension and anxiety. Bossard's (1945) informants
revealed a number of defenses they felt they had to institute in order to avoid the harmful effects of bilingualism. Finally, Smith (1931) found numerous incidents of stuttering among childhood bilinguals; she failed, however, to show that there was a causal relationship involved. It must be added that in most of the research males were found to be more affected than females (Jensen, 1962).

"A number of scholars assert that whatever maladjustment is present is likely caused not by bilingualism but by immature emotional constitutions, excessive family tensions, or by sociological considerations... (Jensen, 1962, p. 360).

Both Jensen (1962) and Weinreich (1953) point to evidence which disproves "the alleged detrimental effects of bilingualism on emotional life" (Weinreich, 1953, p. 121) and "even assert that it might actually create a better adjusted individual" (Jensen, 1962, p. 360). Diebold (1968) argued against the theory that bilinguals are predisposed to schizophrenia, pointing out that very few incidents are not directly attributable to the sociocultural environment. Instead, he argued that the presence of such a second language leads to a rather formidable defense against just such a break with reality. Jensen (1962) concluded that the ability to communicate with a wider variety of people leads to a lessened tendency for children to become introverted. Johnson (1951) found that the tendency toward prejudice was negatively correlated with the degree of bilingualism. Leopold (1939, Vol. III) admitted to the possible conflicts which might be faced only by a bilingual, but felt that this in fact leads to their having stronger personalities less likely to be affected by later setbacks.

Other authors seem convinced that speaking a second language has no
special effect on one’s personality characteristics. Weinreich (1956) pointed to evidence which tends to disprove the presence of harmful effects on the emotionality of bilinguals while Jensen (1962) asserted that any emotional difficulties present are likely to have been caused by sociological considerations. English-Yiddish bilingual children in New York City were found to have no emotional handicaps (Pintner & Arsenian, 1937) and to engage in the same recreational activities as comparable monolinguals (Fishman, 1952). Arsenian (1945) found no emotional or social difficulties among various types of bilingual children as long as the social prestige factor of the language involved was taken into account.

3. Do bilinguals change their personality characteristics when they change their language usage?

The third question is whether an individual actually changes his personality at the same time that he changes languages. Information on this question comes from linguistic theory, self-reports, and empirical observations.

The first of the sources, linguistic theory, is derived mainly from the work of Benjamin Whorf (1940a, 1940b, 1941b, 1950, 1952) and Edward Sapir (1929, 1932, 1933). They analyzed the influence of language on the perception of reality. Psychologists have typically not been concerned with the uniqueness of language but, rather, with the relationship between language and behavior, regardless of the language in question (Fishman, 1960). Whorf and Sapir, however, stressed the point that language is not simply a means of communicating about some object which exists independently of language; language is the means by which man structures and organizes objects in certain characteristic ways. "We see and hear and otherwise
experience very largely because the language habits of our community pre-
dispose certain choices of interpretation" (Sayir, as quoted in Hoijer,
1954, p. 92). The implications of this concept are obviously considerable
since it would imply that bilinguals, by definition, must partake of
two different modes of interpreting their experience. Osgood (1963)
concluded that after two decades of work Whorf and Sapir felt "that
the language one uses, through the lexical and grammatical categories
it sets up, somehow influences how one perceives the world around him,
how one thinks, and even one's natural philosophy" (p. 296).

Whorf has been criticized as being overly involved in playing
games with words and with cataloguing Indian languages and odd grammatical
constructions, while his followers have sometimes been criticized for
"pseudoserious" attempts at linking, for example, "the musicalness of
Italians to the light, melodious nature of the Italian language, or the
stodginess of Germans to the heavy, lugubrious quality of the German
language" (Fishman, 1960, p. 333). There has also been criticism of the
relationship in the lack of proof that language causes philosophy rather
than the other way around (Lee, 1944).

Some research does exist which related grammatical as well as lexical
structure to personality. Hoijer (1951) correlated the verb system of
the Navahos (in which there is no clean separation between actors, actions,
and objects of the action) with the tendency of that culture to be passive
and fateful, and with their belief in a mythology in which individuals
adjust to an already given universe. Glenn (1959) noted that the adjective
most commonly precedes the noun in English while the noun precedes the
adjective in French. He interpreted this as indicating an inductiveness
among English-speakers and a deductiveness among French-speakers. Fishman
mentioned several other examples along these lines, although he concluded that few people have really sought to ascertain the proper nature of the relationship which might exist.

There has often been a tendency to reject this line of study as being of little or no consequence within the framework of modern European languages since, with the exception of Glenn's (1959) study, most research has been carried out with Indian or Oriental languages (Fishman, 1960). Diebold (1968), however, pointed out an example of lexical differentiation between German and English which often leads to difficulty for bilinguals and which may be related to well-established differences in the personality characteristics of the two cultures. While it is true that there is a scarcity of research in this area, Fishman (1960) concluded that no one seriously suggests that such differences known to exist would have no effect on the thoughts, values, and actions of the speakers of each language.

"No one is in a better position to give first-hand information about bilingualism than the bilingual himself" (Haugen, 1956, p. 69). The few introspective reports currently available would seem to indicate that there is a change in personality when there is a shift in languages. Lowie (1945) recounted his experiences after immigrating from Austria and attempting to develop both his native German and his acquired English into adequate and creative instruments of communication. "The popular impression that a man alters his personality when speaking another tongue is far from ill-grounded. When I speak German to Germans I automatically shift my orientation as a social being" (p. 258). Green (1941) recounted his failure to translate his own book from French to English and having to write an entirely new book to make the same point: "it was as if,
writing in English, I had become another person" (p. 402). Bossard's (1945) informants also related the difficulties encountered by bilinguals switching languages, especially when there was a cultural difference attached to each of the languages. Weinreich (1953), in his summation of the then available literature, indicated that bilinguals will testify to the necessity of a personality adjustment when a second language is learned.

While evidence from empirical observations also indicated that bilinguals will change personality when shifting languages, by their nature these studies must be interpreted as leading only to tentative conclusions. Three studies originated from a psychoanalytic viewpoint. The first was that of Velikovsky (1934) who noted that the second language can enter deep enough into the personality structure to become the language of dreams and to produce bilingual puns. The second, that of Goldstein (1948), found that cured aphasics may recover the use of the acquired language without recovering any of the native tongue. He does not, however, give clear reasons for this phenomenon and the possibility of it being the result of recency of learning or of being used the majority of time cannot be ruled out. In the third study, Buxbaum (1949) analyzed the expression of hidden hostilities through aberrant linguistic behaviors and discussed the possible roles of a second language in the formation of the ego and superego. She reported that in some cases it was a relief to the patient to be able to relate painful experiences in a language other than the one used at the time they occurred. These patients reported their experiences seemed less real and personal when they could be expressed in a second language.

Studies from different viewpoints also indicated the occurrence of a personality shift. Bossard (1945) concluded that the true bilingual
(one who fluently speaks and actively participates in two languages) experiences two different cultures. Titone (1969) concluded that the personality of the learner of a second language "is gradually reorganized and reshaped through an intimate, deep and prolonged contact ... with the forms and contents of the foreign language" (p. 307). In short, as he learns a second language he learns a second self.

When word associations of people in various languages have been examined (Esper, 1918; Rosenzweig, 1957, 1961, 1964), widespread differences were found. For example, Rosenzweig (1961) examined the primary association responses of American, French, German, and Italian subjects and found less than 25% were the same across as many as three of the languages. Based on these studies, Lambert and Moore (1966) administered the Kent-Rosanoff standard word association lists in both French and English to bilinguals and found that the semantic patterns of the associations changed when the language of report changed.

Edgerton and Kanno (1971) examined the views of mental illness of Los Angeles Mexican-Americans who were bilingual (as were the interviewers). Differences on a number of points occurred between subjects who took the interview in Spanish and those who took it in English. However, the effect may be more related to the cultural background rather than language of interview since those who preferred Spanish were closely allied with rural Mexican backgrounds and those who chose English with middle-class Anglo-American society.

All of the above studies would at least imply that shifting languages involves changing personality characteristics, but the evidence is somewhat inferential. Only two studies attempted to directly test this hypothesis. Ervin (1955, 1964) administered the TAT in both English and French to
native French living in Washington, D.C. Nine predictions derived from studies of child-rearing and values on the two countries (France and the United States) were made regarding expected content differences in the two languages. Of these, three were statistically validated (meaning that the content of the stories did shift with the language change for the same individual at two different sessions). She pointed out four possible reasons for the results, none of which were necessarily more appropriate, and admitted that the subjective nature of the rating instrument may have constituted a fifth, and perhaps most influential, reason. There is no evidence as to whether her having limited her approach to analyzing just nine variables covered up shifts existent in other areas of these subjects' personalities.

In the second of the two studies, Botha (1968) administered the Dennis' Uses Test to one hundred Arab-French and one hundred Arab-English bilinguals, each subject taking the test only once (with half of it in each language). The Arab-French bilinguals differed from each other depending on the language they used; the Arab-English bilinguals did not differ. All of the subjects were of similar background and had equal fluency in their particular two languages. Botha explained the differences found in the French-Arab bilinguals as being related to the high respect given to the French as compared with the English, to its being taught at an earlier age, and to the greater familiarity the subjects had with the French culture.

**Bilingualism and the MMPI**

The Minnesota Multiphasic Personality Inventory (MMPI) has been translated into fifteen languages (Dahlstrom & Welsh, 1960). Large scale
restandardizations have been done on the Italian (Nencini, Banissoni, & Rosen, 1957), French (Perse, 1958), and German (Spreen & Spreen, 1963; Spreen & Sundberg, 1962) versions. Little research has been done, however, on the MMPI and bilingualism. Only two studies, those of Glatt (1969) and Gignac (1970), investigated the effects of bilingualism on the assessment of personality by an objective personality inventory.

Glatt (1969) administered pairs of MMPIs to Spanish-, French-, and German-English bilinguals in order to ascertain the validity of each of the translated versions. He found relatively small differences between the scores on the Spanish-English and German-English pairs. On the French-English pairs, however, widespread differences were found to exist. Experienced clinical psychologists rated these pairs of protocols and separated many of the pairs into different clinical categories. Glatt concluded that the Spanish and German versions could be used clinically when feasible but felt that the French version demanded further investigation before it could be used with the same confidence. His results are suspect, however, because of several methodological problems. Besides being small in number, his subjects were homogenous in nature, being primarily females in their early twenties who were attending the same university. On the other hand, their knowledge of French was totally uncontrolled. Some subjects continued to use French daily and some had very little contact with the language, although it was their first-learned. There were no indications as to whether the differences were primarily from subjects fluent in both languages or those who were considerably more proficient in one or the other. The test-retest interval was also uncontrolled, ranging from 0-70 days. It may have been that the resulting
differences were only among the subjects who took the test two months apart. In this case, differences would not have been unexpected. Finally, there were no controls for socioeconomic and cultural differences among the subjects nor were these even described.

Gignac (1970) attempted to replicate Glatt's findings but with the inclusion of several methodological improvements. Because he used Canadian French-English bilinguals, he administered Chevrier's (1961) French translation, rather than Perse's (1958). His subjects were more likely to be using both languages daily, although nearly all used English the majority of the time. They were controlled for intelligence and there were some attempts to narrow the sociocultural differences. All of his subjects were known to be relatively fluent in both languages, regardless of their relative daily usage. Finally, he controlled for test-retest interval and order of presentation. His results indicated that there were far fewer differences in the scores on the two versions and none that could be considered clinically significant. This discrepancy from Glatt's (1969) result may be due to the difference in versions used (if Chevrier's (1961) version is a more valid translation) or because Glatt's subjects were no longer a part of the culture for which Perse's (1958) translation was aimed.

Gignac (1970) did take one large methodological step past Glatt (1969) in that he separated his subjects into compound and coordinate bilinguals. He hypothesized that the coordinate bilinguals would record more discrepant pairs of scores than would the compound bilinguals. His results were, however, in the opposite direction: what few differences that did exist between the two groups were in the direction of less
discrepancy for coordinates, rather than more. He concluded that

the unpredictable 'compound-coordinate' results
may again be a function of the artifacts of the
translation and the type of sample. It is evident
... that coordinate subjects were 'more bilingual'
than the compound group and as a result displayed
fewer significant differences. As was stated
previously, the majority of the sample was of the
compound system and these were individuals who
were speaking English more frequently than French.

By now, it is clearly apparent that a similar
study should be conducted with another French-
English sample, one which could be extracted from
a population of both systems speaking French and
English with equal fluency. (p. 45.)

Summary of the Literature on Bilingualism

1. A number of definitions for the term "bilingualism" have been
proposed.

2. Researchers agree that linguistic borrowing and/or linguistic
interference leads to bilinguals' having less efficiency in each of their
languages. The bulk of the research favors the theory that bilingualism
has ill effects on overall speech development, though some authors claimed
the opposite. It may be that the disadvantages disappear by adolescence.
Relevant studies have not been controlled for socioeconomic and cultural
factors.

3. Early studies on bilingualism's effects on intelligence indicated
that it had ill effects; later studies disproved this theory (as long as
social and linguistic ability factors were held constant). Peal and
Lambert's (1962) study, the best-controlled study of its kind, unequivocally
indicated that bilingualism had no effect whatsoever on mental development.

4. With regard to bilingualism's effect on personality, three areas
of investigation were reviewed. (a) Three possible sociological variables
which could influence the personality of bilinguals have been identified:
the status of the 'foreign' language, the personal status of the bilingual himself, and the presence of family discord due to the clashing of the old and the new languages. Strong cases could be made for the possible presence of all three factors in previous research which made no allowance for their presence. It was felt that sociological factors would have to be more closely examined and controlled in future research on bilingualism.

(b) Research on bilingualism's effects on an individual's basic personality characteristics produced a number of opinions but little agreement. While some authors felt that it made no difference, a majority were of the opinion that it did make a difference; the latter group could not agree on what these differences were nor even as to whether they were a help or a hindrance.

(c) The question of whether a change in the personality of the bilingual accompanied his shifting languages has probably generated the least amount of research. Theorists, bilingual self-reports, and psychoanalytic studies have indicated that this change may indeed exist. Two empirical studies also reached this same conclusion.

5. Following from the last two questions, Glatt (1969) and Gignac (1970) attempted to ascertain bilingualism's effects on personality assessment with objective inventories. Their results were contradictory and both studies suffered from methodological faults. In addition, Gignac examined the possible differential effects of the two major types of bilingualism: compound and coordinate. His findings contradicted his hypothesis (namely, that compound bilinguals would exhibit less discrepancies between pairs of scores than would coordinates).
CHAPTER 2

STATEMENT OF THE PROBLEM

In reviewing the research which has been done on bilingualism, the major emphasis in the past has been on its effects on linguistic and cognitive development. In some cases, answers to questions have already been found; for the most part, however, the results of past efforts have led to more unanswered questions and to the need for additional research. Far less work has been done in the area of bilingualism's effects on personality characteristics. Researchers have not been able to agree on whether there are effects, let alone what these effects might be. Any prior work in this area which seemed to lead to tentative conclusions usually were found unacceptable methodologically.

Only two studies investigated the effects of bilingualism on objective personality inventories and their results were contradictory. Only one included in the analysis the important variable of type of bilingualism; the results of this analysis did not concur with past research.

The literature review has revealed several questions which seem to need asking: (a) will proficient bilinguals perform the same on two versions of the same objective personality inventory? (b) will coordinate bilinguals tend to have different performances and compound similar performances? (c) should (a) and/or (b) be affirmed, what are some of the factors which may have led to this finding?

It is the purpose of the present study, therefore, to investigate
the assessment of the personality characteristics of bilinguals by using an objective personality inventory and to evaluate the effects on such a procedure of having two types of bilinguals identified: compound and coordinate. In this study, compound bilinguals will be defined as those subjects whose two languages constitute a single coding or semantic system; coordinate bilinguals will be defined as those subjects whose two languages constitute separate but parallel coding or semantic systems. In the first case, it is assumed that the words in each language will have equivalent meanings; in the second, it is assumed that the words may not have equivalent meanings. Following the lead of Lambert, Havelka, and Crosby (1968), the delineation will be made by ascertaining the context in which each of the languages was learned (cf. p. 5, above).

In addition, incorporated into the design will be an analysis of several additional variables which have not been controlled in previous studies:

(a) Linguistic Background: the language(s) used in the home in which the subjects grew up;

(b) Cultural Background: the dominant culture in the area and home of the subjects' childhoods (English, French, or bicultural);

(c) Age of Second Language Learning: the period of life in which the subjects' learned their second language;

(d) Degree of Bilingual Background: a measure of the amount of use of more than one language in the home background of the subjects; and

(e) Relative Proficiency: the relative fluency which each subject has between the two languages.

As was true of the Gignac (1970) study, and because of its special relevance to clinical psychology and psycholinguistic research in Canada, all of the
bilingual subjects will be fluent in French and English, the two official languages of Canada.

The basic design of the study, in order to elicit as much relevant information as possible, will be both factorial and correlational in nature, with repeated measures on each subject. This will allow for an analysis of the possible differences between the two versions for all subjects and for the various groupings of subjects. In the analysis, the dependent variable will remain the same: raw scores on the two versions of the MMPI. The independent variables will be the type of bilingualism plus each of the five additional variables.

It is felt that the present study represents a substantial improvement over not only the Glatt (1969) study, but over the Gignac (1970) study as well. Unlike either study, the effects of cultural and linguistic backgrounds, and, more importantly, relative fluency in each language, will be carefully evaluated. This is in addition to the dividing of subjects according to their type of coding or semantic system (compound or coordinate). This will allow for more accurate definitions of "bilingual" than have been used before.

The problem which this present study is evaluating is significant for clinical psychology. With bilingualism becoming a rapidly increasing phenomenon (Arsenian, 1937; Jensen, 1962), more and more of the clients whom psychologists see for assessment and therapeutic purposes will be conversant in two or more languages. This is especially true in an officially bilingual country such as Canada. It is time that the effects of the additional languages be known. As clinical psychologists, we can no longer afford to take the chance that we are working with half the person
when we are working with a bilingual.

In addition, of course, the present study is designed to add to our currently minimal knowledge of the effects of bilingualism on personality, of the effects of switching languages on personality, and of the effects of various types of bilingualism on both issues. Thus this study is of practical importance to clinical psychologists and of theoretical importance to personality theorists and psycholinguists alike.

**Experimental Hypotheses**

The empirical studies of Botha (1968) and Ervin (1955, 1964) initially indicated that the bilingual will exhibit different personality characteristics depending on the language which he uses. Glatt (1969) found that French-English bilinguals obtained significantly higher raw scores on Perse's (1958) Parisian-French version than on the English version of the MMPI. Gignac (1970) found that his subjects scored higher on Chevrier's (1961) Canadian-French version than on the English version of the MMPI, although to a far less degree. From these findings, the following initial hypothesis was derived:

1. French-English bilinguals who are administered the MMPI in English and in Canadian-French will obtain higher scores on the French version.

The work done by such authors as Diebold (1968), Lambert, Havelka, and Crosby (1968), and Osgood (1954) provided strong evidence that whether an individual changes in personality characteristics upon shifting languages depends on the type of bilingual he is. They assumed that a coordinate bilingual (one who does not make words in each language equivalent to each other) would be far more likely to change than a compound bilingual (one who does make the words equivalent). Assuming the validity of the dis-
tinction in the first place, their assumption naturally follows. Although Gignac (1970) did not find this to be true, his results can be at least partially discounted because of methodological problems. Hence, the hypothesis which follows:

2. Compound bilinguals will obtain pairs of scores on the English and the Canadian-French versions of the MMPI which will have less differences and higher correlations than will coordinate bilinguals.

The following hypotheses (3A, 3B, 3C, 3D, and 3E) relate to the additional factors which are being incorporated in this study for the first time. In some cases, the direction which the hypothesized differences will take could not be predicted from the literature.

Subjects' cultural background have nearly always been ignored in previous research; yet

The social groups to which an individual belongs may vary in number or size, and his own adherence to them will change over time. In any given bilingual situation, however, it will be of great importance to determine the correlation between social and linguistic groups. The importance of distinguishing linguistic from social groupings has recently been emphasized by Soffietti (1955), who recently proposed the term bicultural for those who participate in more than one social group. Interference between cultural patterns is just as possible as between linguistic patterns, with resulting 'cultural accents.' He attributes most of the so-called 'bilingual problems' to biculturalism rather than bilingualism. (Haugen, 1956, p. 91.)

Lambert, Havelka, and Crosby (1968) found the relationship between bilingualism and biculturalism to be crucial in determining how an individual reacts to cognitive stimuli and whether he has a unified semantic system. Therefore, it is hypothesized that

3A. Both the raw MMPI scores of the subjects and
the magnitude of their difference scores will vary depending on whether they came from a unicultural (French or English) or a multicultural (English and French) background.

Related to both the compound-coordinate distinction and the problem of relative fluency is the linguistic background of the subject’s area of childhood and adolescence. A subject who grew up in an area which was dominated by one of the two languages will be more likely to be a compound bilingual and to have more difficulty in answering the MMPI in his non-native language than would a subject who grew up in an area in which both languages were used to nearly the same degree (e.g., Montreal or Ottawa for the present languages). Hence, the following hypothesis will be examined (the predicted direction stemming from an assumption that the similarities due to being compound will be stronger):

3B. The pairs of MMPI scores of subjects from bilingual backgrounds will show less similarities than the pairs of scores of subjects from a unilingual background.

The age at which the second language was learned is a variable ignored by previous researchers, although the aptitudes, opportunities, and motivations for learning a second language will differ between childhood and adulthood. Haugen (1956) delineates between infant, childhood, and adolescent/adult bilingualism. "Infant bilingualism means essentially the simultaneous learning of two languages" (p. 72). There is evidence that the problem of linguistic interference is especially prominent in this type. Childhood bilingualism refers to the establishment of a second language during the early school years, after the first has been learned in the family. "There is a general opinion throughout the literature that this is a favorable period, because the second language will not compete directly with the first and the learner has not yet
lost his mental plasticity” (Haugen, 1956, p. 73). Adolescent and adult bilingualism is characterized on the content rather than the formal aspects of the language. Haugen’s discussion certainly implied that the effects of learning two languages will differ depending on the age at which the second is learned. It would be expected that those who learn both languages earlier would more likely be coordinate bilinguals and those who learn it later in life would more likely be compound bilinguals. Hence:

3C. The magnitude of the difference between pairs of French and English MMPI scores will vary depending on whether the subjects learned their second language during the pre-school, elementary, or adolescent/adult stages of their lives. The difference scores will be larger for those subjects who learned their second language in the pre-school stage and smaller for those who learned it in adolescence or later.

In the review of the pertinent research it was noted that several factors which might influence the personality characteristics of the bilingual (but not of the monolingual) depended on whether there was a language conflict between the home and the social environment. Although Bossard (1945) clearly stated this, previous studies have not taken it into account. The following hypothesis is related to this issue:

3D. There will be variations both in raw scores and in the difference scores depending on whether the subjects came from homes which had a degree of bilingualism or little or no bilingualism.

"In any study involving the verbal behavior of bilinguals, it can be expected that one of the most important variables will be relative dominance, or the relative response-strengths of the two sign-systems" (Ervin, 1955, p. 108). In other words, does the bilingual subject use both of his languages with equal proficiency or is he more fluent in one
than in the other? Also involved, of course, is the absolute proficiency (can he communicate at some level of fluency in each language?). A number of reviewers (Arsenian, 1937; Haugen, 1956; and Jensen, 1962) mentioned that this concept has often not been taken into account even though there was no doubt as to the presence of a great deal of variance between subjects. Since it requires a sixth-grade level reading skill and vocabulary, the use of the MMPI will act as insurance that all subjects will have a reasonably high level of proficiency in both languages. The following hypothesis will be used as a basis for examining the effects of relative proficiency:

3E. Subjects who are equal in their proficiency in the two languages will have less differences between their two scores than will subjects who are more proficient in one or the other language.
CHAPTER 3

METHOD

Subjects

In order to limit somewhat any possible effects of intelligence, it was originally decided to use college students and faculty as subjects. For the most part, this did not prove feasible.

Letters of contact were sent to departments of French (or Romance Languages) and Psychology at several Ontario universities known or thought to have large numbers of bilingual students (including the Universities of Ottawa, Toronto, and Western Ontario, and Laurentian, Queen's, and York Universities. Contacts were also made with the University of New Brunswick, L'Universite de Moncton, and two Quebec universities. These contacts led to very little cooperation. Replies indicated that either it was felt an insufficient number of fluent bilinguals were available or that the university's administration was unwilling to allow an outsider to do research on bilingualism and biculturalism due to the current controversy surrounding these topics. A survey of nearby American universities also led to little cooperation. In these cases the reasons given were that there were few potential subjects and those that existed were mostly uniform in background.

Arrangements were finally made with two institutions: Wayne State University's (Detroit, Michigan) Department of French, and Glendon College of York University (Toronto, Ontario). However few students volunteered.
to go through the lengthy testing sessions without financial remuneration and a total of only 17 valid protocols were obtained through these sources.

Contact was then made with the administration of L'Ecole Secondaire Etienne Brûle in North York, Ontario. This public high school is the only one in Metropolitan Toronto in which all instruction and communication is in French. It is an elite public school specializing in college preparatory courses and over 90% of its graduates eventually go on to higher education. Its students are varied in background; about one-third come from Quebec and the Maritimes (from families who had recently moved to the Toronto area), one-third from North York and Toronto and of English background (who have learned French primarily in the school system), and the remaining third from various other backgrounds. With the cooperation of the school administration and the North York Board of Education, a total of 107 students were freed to participate in this study. Because of incomplete or otherwise invalid protocols, 71 of these subjects were included in the final analysis. These were added to the eight Glendon and nine Wayne State volunteers for a total of 88 subjects.

Table 1 presents the number of subjects of each sex and their mean age and mean education in number of years. It can be seen that the subjects averaged approximately nineteen years of age and had just over thirteen years of schooling. There were little discrepancies between the means for each sex.

In categorizing each subject according to which type of bilingual they were, it was found that 49 subjects were compound bilinguals with a unified semantic system and 39 were coordinate bilinguals with two semantic systems. This categorization was performed according to the
Table 1
Bilingual Subjects (N=88) by Sex with
Their Mean Age and Education

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>Mean Age</th>
<th>Mean Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>21</td>
<td>18.67</td>
<td>14.06</td>
</tr>
<tr>
<td>Female</td>
<td>67</td>
<td>19.08</td>
<td>12.85</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>18.98</td>
<td>13.14</td>
</tr>
</tbody>
</table>
following operational definition: a compound bilingual is a bilingual
who has acquired both languages within the same cultural context (e.g.,
one language at home, the other at school); a coordinage bilingual has
learned each language in a different cultural context (e.g., learning
French in Quebec City and English in Toronto).

Table 2 presents the breakdown of subjects according to their cultural
and linguistic backgrounds (primarily English, primarily French, and
bicultural/bilingual). It should be noted that some of the subjects
came from backgrounds which were neither French nor English. Data from
these subjects were omitted from the analysis of these background factors.

Table 3 presents the breakdown of the subjects according to the
degree of bilingualism present in their home background as ascertained
by their modified Hoffman scores (see below). It was found that 33 subjects
learned both languages during their pre-school years, 29 during elementary
years, and the remaining 26 during adolescence or adulthood.

Instruments

Each subject was administered three measuring instruments: the two
versions of the MMPI and the Background Questionnaire. The Minnesota
Multiphasic Personality Inventory is a reliable and valid instrument
(Hathaway & McKinley, 1967) which has already been used in countless
studies involving inter- and intra-cultural studies (Dahlstrom & Welsh,
1960; Spreen, 1961; and Taft, 1957).

The two versions used were the standard English booklet form with
accompanying answer sheets; and the French translation of Chevrier (1961)
as published by the Psychological Research Institute of Montreal, Canada.
The versions are identical in every respect, including the instructions
Table 2
Cultural and Linguistic Backgrounds of the Bilingual Subjects

<table>
<thead>
<tr>
<th>Type</th>
<th>Cultural Background</th>
<th>Linguistic Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>32</td>
<td>21</td>
</tr>
<tr>
<td>French</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>English and French</td>
<td>29</td>
<td>37</td>
</tr>
<tr>
<td>Neither</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>88</td>
</tr>
</tbody>
</table>
Table 3

Bilingual Subjects Categorized by Degree of Bilingualism in the Home (According to Hoffman Test Scores)

<table>
<thead>
<tr>
<th>Scores</th>
<th>Category</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-41; 121+</td>
<td>Little</td>
<td>29</td>
</tr>
<tr>
<td>41-60; 101-120</td>
<td>Some</td>
<td>33</td>
</tr>
<tr>
<td>61-100</td>
<td>High</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>88</td>
</tr>
</tbody>
</table>

on the front, the order of items, and the answer sheet.

In addition, each subject was administered a questionnaire in English designed to assess various facets of his linguistic and cultural background, including his type of bilingualism (see Appendix A). The type of bilingualism was evaluated by examining the subjects' answers to the questions of how and when he learned his second language. Subjects' answers to two multiple-choice type questions gave their cultural and linguistic background directly.

In order to ascertain the degree of bilingualism in the home, fourteen questions, a slightly modified version of the Hoffman Schedule of Linguistic Background (Hoffman, 1934), were asked. The modifications were included to facilitate scoring regardless of the native language (the original was designed for use only with an English-speaking population) and to make it more suitable for an older population (the original was designed for use with elementary school children). The questions asked whether any language other than English was used in the home or during various activities by different family members. Answers were scored on a scale from zero (never) to four (always), giving a range of possible scores of 0-142. Scores at either extreme indicated that only one language was used (English if the score was low, French if high); scores in the middle indicated two or more languages were used with equal frequency.

A number of techniques for measuring relative proficiency have previously been used (Cooper, 1968; Cooper & Greenfield, 1968; Diebold, 1968; Edelman, Cooper, & Fishman, 1968; Fishman, 1968, 1969; Haugen, 1950, 1956; G. B. Johnson, 1953; Lambert, 1955; Mackey, 1962, 1965, 1966; and Weinreich, 1953, 1957) but all were time-consuming and none seemed superior.
In the Background Questionnaire, the subjects were asked to rate themselves according to their relative proficiency in the two languages on four language skills. Each answer was scored from one (much better in English) to seven (much better in French) and the subjects' relative proficiency was evaluated by simply summing the four scores.

Procedures

Two sets of procedures were used, one for the university subjects and one for the high school students. Procedural differences were relatively minor, however, and would not affect the analysis of data.

Because of timetable variations, the university subjects were given all materials at one time and individually. English instructions accompanied the material and no subjects reported any difficulty in following them. All were instructed to take the Background Questionnaire first. Half were then told to take the English MMPI next and to complete it in one sitting. Two weeks later they were to take the French version under the same conditions and in the same place. The remaining half followed the same procedure but reversed the order of the MMPIs.

The high school students were given the tests in a group situation. They also took the Background Questionnaire first and then one of the MMPIs immediately thereafter. The second version was given two weeks later. Again, half took the English version first, half the French. A bilingual member of the school's staff gave these subjects their instructions, first in one language and then in the other.

All subjects were instructed that dictionaries in either language were allowed. This was in accord with the standard instructions for administering the MMPI in a clinical situation.
In no case was a name attached to the materials. All sets of test protocols were given a code number before reaching the subjects and no other identification was used. Confidentiality was thoroughly protected and neither the primary researcher nor his assistants could identify the results of a given subject. For this reason, students did not receive a feedback of their results.

**Statistical Analysis**

Test protocols were scored according to standard instructions and the raw scale scores were used for analysis. Subjects were then placed into various groups on each of six factors:

1. Linguistic background: English, French, both;
2. Cultural background: English, French, both;
3. Age of second language learning: infancy, childhood, adolescence/adulthood;
4. Type of bilingualism: compound, coordinate;
5. Hoffman scores: mostly English, mostly French, bilingual background; and

Analysis of the data was divided into two parts. In the first, a series of two-way analyses of variance was performed. One factor in each set was the test language; the second was each of the six variables mentioned above in turn. Separate analyses were performed on each of the thirteen scales for each factor. Although the cell ns were unequal, the design was balanced since they were proportional in all cases.

The second part of the analysis of the data consisted of Pearson product-moment correlations which were first performed across all subjects.
and then for each group of Ss within each of the six factors. A Student-\( t \) was performed for all correlated data.

In attempting to analyze the results, the primary concern would be with the assessment of individual differences and similarities. Therefore, the necessity for using correlational analysis. On the other hand, correlational methods do not yield information about absolute differences between the means (since devotional scores are used while the means are set at zero). Hence, a need for \( t \) tests and for analysis of variance. It was felt that this two-step analysis was necessary since the analysis of variance would be able to indicate whether any of the variables affected the mean scores across all relevant subjects but would not indicate whether sufficient agreement existed between each pair of scores on each scale to warrant an assumption of validity for the testing procedures under examination. In other words, widely divergent scores could be found between each subject's pairs of scores but without there being wide mean differences.

All of the statistical analysis was performed by the IBM Series 760 computer at the University of Windsor. The analysis of variance program used was the local computer centre's version of the Belanova program (this program was able to handle the unequal cell Ns and the repeated measures factor); the \( t \) and correlation program was also locally written.
CHAPTER 4

RESULTS

The results will be presented according to their relevance to each of the experimental hypotheses and in the same order.

Hypothesis 1: French-English bilinguals who are administered the MMPI in English and in French will obtain higher scores on the French version.

Table 4 presents the mean raw scores for all subjects on each scale for both versions of the MMPI. The difference score, Student's $t$, and Pearson $r$ are also presented. On the $E$ scale, the English mean was 8.125 while the French mean was 10.443. This difference was significant at the .01 level ($t = 3.125$, $df = 174$). On the $Hs$ scale the English mean was 6.614, the French mean was 7.909. This difference was significant at the .05 level ($t = 2.10$, $df = 1.74$). No other scales had a significant difference between means. However, it should be noted that 12 of the 13 scores had higher means for the French version than for the English.

Since chance alone would dictate that six scales should be higher in one version and seven in the other, it would appear that this trend toward higher French scores is in itself significant ($\chi^2 = 9.70$, $df = 1$, $p < .01$).

The correlations between English and French scores ranged from .41 on $Hy$ to .81 on $Si$. The mean correlation (as found by the use of $z^2$ transformations) was .63. The test of homogeneity of the obtained
Table 4

Comparison of the Mean Raw Scores on the French and English MMPIs and Difference Scores, t's, and r's Between Them for All Subjects

<table>
<thead>
<tr>
<th>Scales</th>
<th>French</th>
<th>English</th>
<th>d</th>
<th>t^a</th>
<th>r^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4.625</td>
<td>3.966</td>
<td>0.659</td>
<td>1.81</td>
<td>.52</td>
</tr>
<tr>
<td>F</td>
<td>10.443</td>
<td>8.125</td>
<td>2.318</td>
<td>3.25**</td>
<td>.56</td>
</tr>
<tr>
<td>K</td>
<td>13.034</td>
<td>12.216</td>
<td>0.818</td>
<td>1.11</td>
<td>.72</td>
</tr>
<tr>
<td>Hs</td>
<td>7.909</td>
<td>6.614</td>
<td>1.295</td>
<td>2.10**</td>
<td>.61</td>
</tr>
<tr>
<td>D</td>
<td>21.523</td>
<td>21.341</td>
<td>0.182</td>
<td>0.23</td>
<td>.73</td>
</tr>
<tr>
<td>Hy</td>
<td>20.318</td>
<td>20.136</td>
<td>0.182</td>
<td>0.26</td>
<td>.73</td>
</tr>
<tr>
<td>Pd</td>
<td>18.455</td>
<td>17.693</td>
<td>0.762</td>
<td>0.99</td>
<td>.65</td>
</tr>
<tr>
<td>Mf</td>
<td>33.989</td>
<td>33.761</td>
<td>0.228</td>
<td>0.20</td>
<td>.63</td>
</tr>
<tr>
<td>Pa</td>
<td>11.409</td>
<td>10.909</td>
<td>0.500</td>
<td>0.85</td>
<td>.46</td>
</tr>
<tr>
<td>Pt</td>
<td>17.795</td>
<td>17.102</td>
<td>0.693</td>
<td>0.46</td>
<td>.48</td>
</tr>
<tr>
<td>Sc</td>
<td>20.500</td>
<td>19.591</td>
<td>0.909</td>
<td>0.55</td>
<td>.74</td>
</tr>
<tr>
<td>Ma</td>
<td>19.841</td>
<td>19.318</td>
<td>0.523</td>
<td>0.69</td>
<td>.70</td>
</tr>
<tr>
<td>Si</td>
<td>30.352</td>
<td>31.148</td>
<td>-0.796</td>
<td>-0.56</td>
<td>.81</td>
</tr>
</tbody>
</table>

\[t^a_{df} = 174.\]

\[r^b All correlation significantly above zero (p = .001).\]

\[* p < .05\]

\[** p < .01\]

\[*** p < .001\]
correlations (Edwards, 1965) indicated they were not from the same population ($X^2 = 44.590; df = 12; p < .001$); i.e., some scales correlated significantly higher than others. Scales Hy, Pa, and Pt had correlations below .50 while K, D, Sc, Ma, and Si were above .70. All of the correlations were found to be significantly above zero (at the .95 level of confidence).

Hypothesis 1 would seem to have been only partially confirmed. Only two of the thirteen scales had significantly different means, and these differences were not of a large magnitude. However, all but one of the scales did have larger means for the French version, including the two scales with significant differences.

Hypothesis 2: Compound bilinguals will obtain pairs of scores on the MMPIs which will have less differences and higher correlations than will coordinate bilinguals.

Table 5 presents the mean raw scores for each scale on both the English and the French MMPIs for the compound and the coordinate bilinguals. It also presents the difference score, $t$, and $r$ for each scale. Table 6 summarizes the results of the analysis of variance performed on each scale for this factor.

Only three of the $t$s were of significant value. The French version mean scores were higher for the compound subjects on scales $L$ ($t = 2.147$, $df = 96, p < .05$) and $F$ ($t = 2.273$, $df = 96, p < .05$), and for the coordinate subjects on scale $F$ ($t = 2.37$, $df = 76, p < .05$). That the mean scores apparently did not differ greatly because of being one or the other type of bilingual was further shown by an examination of the pairs of $t$s for each scale. This revealed that seven of the coordinates'
Table 5

Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Compound and Coordinate Subjects

<table>
<thead>
<tr>
<th>Scales</th>
<th>Compound (N = 49)</th>
<th>Coordinate (N = 39)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>French</td>
<td>English</td>
</tr>
<tr>
<td>L</td>
<td>5.06</td>
<td>3.92</td>
</tr>
<tr>
<td>F</td>
<td>9.92</td>
<td>7.65</td>
</tr>
<tr>
<td>K</td>
<td>13.59</td>
<td>12.55</td>
</tr>
<tr>
<td>Rs</td>
<td>7.43</td>
<td>6.31</td>
</tr>
<tr>
<td>D</td>
<td>21.47</td>
<td>21.08</td>
</tr>
<tr>
<td>Hy</td>
<td>20.24</td>
<td>19.92</td>
</tr>
<tr>
<td>Pd</td>
<td>17.86</td>
<td>16.63</td>
</tr>
<tr>
<td>Pf</td>
<td>33.73</td>
<td>34.98</td>
</tr>
<tr>
<td>Pa</td>
<td>11.14</td>
<td>10.57</td>
</tr>
<tr>
<td>Pt</td>
<td>16.00</td>
<td>16.80</td>
</tr>
<tr>
<td>Sc</td>
<td>20.08</td>
<td>19.35</td>
</tr>
<tr>
<td>Ma</td>
<td>19.20</td>
<td>19.35</td>
</tr>
<tr>
<td>Si</td>
<td>30.57</td>
<td>31.35</td>
</tr>
</tbody>
</table>

^a_{df} = 96.

^b_{df} = 76.

\*p = .05.

^cAll correlations significantly above zero (p = .05).
Table 6

Summary of Results of Analysis of Variance for Type of Bilingualism

<table>
<thead>
<tr>
<th>Scales</th>
<th>Language</th>
<th>System</th>
<th>L x S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS</td>
<td>F</td>
<td>MS</td>
</tr>
<tr>
<td></td>
<td>19.113</td>
<td>3.320</td>
<td>8.351</td>
</tr>
<tr>
<td>L</td>
<td>236.453</td>
<td>10.602</td>
<td>54.923</td>
</tr>
<tr>
<td>F</td>
<td>39.455</td>
<td>1.236</td>
<td>44.070</td>
</tr>
<tr>
<td>K</td>
<td>73.840</td>
<td>4.401</td>
<td>34.329</td>
</tr>
<tr>
<td>Hz</td>
<td>1.455</td>
<td>0.052</td>
<td>5.403</td>
</tr>
<tr>
<td>D</td>
<td>1.455</td>
<td>0.067</td>
<td>4.690</td>
</tr>
<tr>
<td>Hy</td>
<td>25.501</td>
<td>1.010</td>
<td>151.956</td>
</tr>
<tr>
<td>Pd</td>
<td>2.273</td>
<td>0.038</td>
<td>51.404</td>
</tr>
<tr>
<td>Mf</td>
<td>11.000</td>
<td>0.720</td>
<td>20.161</td>
</tr>
<tr>
<td>Pa</td>
<td>21.442</td>
<td>0.218</td>
<td>24.252</td>
</tr>
<tr>
<td>Pt</td>
<td>36.364</td>
<td>0.304</td>
<td>20.441</td>
</tr>
<tr>
<td>Sc</td>
<td>12.023</td>
<td>0.481</td>
<td>9.676</td>
</tr>
</tbody>
</table>

Note -- df for all subjects = 1/172.

*P = .05.

**P = .01.
were the larger of the two and six were not, a result which would be predicted by the theory of chance.

The analyses of variance indicated that the type of bilingual involved had a significant effect only on the scores of Pd. In this case the French scores were higher for the coordinate bilinguals ($F = 6.019, df = 1/172, p = < .05$). None of the interaction effects were significant.

All of the correlation coefficients were significantly above zero ($p = < .05$). Only the pairs of correlations for scale Pt differed significantly (the compound bilinguals had a correlation of .70, the coordinates had a correlation of .36; $z = 2.197, p = < .05$).

These results overwhelmingly indicate a failure to confirm Hypothesis 2. Distinguishing between compound and coordinate bilinguals had no effect on their MMPI scores.

**Hypothesis 3A:** Both the raw MMPI scores of the subjects and the magnitude of their difference scores will vary depending on whether they came from a unicultural (French or English) or a multicultural (English and French) background.

Table 7 presents the English and French mean raw scores, differences, ts, and rs for the subjects according to their cultural background: predominantly English, predominantly French, or bilingual (French and English combined). Table 8 summarizes the results of the analyses of variance performed on each scale for this factor.

Only three significant $t$ tests resulted and these were on scales F and Hs where they would be expected from the analysis of Hypothesis 1. The analyses of variance indicated that the cultural background did have a significant effect on three scales: Hs ($F = 4.775$), D ($F = 3.217$), and
Table 7

Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for English Background, French Background and Bicultural Subjects

<table>
<thead>
<tr>
<th>Scales</th>
<th>English (N = 32)</th>
<th>French (N = 22)</th>
<th>Bicultural (n = 29)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fr.</td>
<td>Eng.</td>
<td>d</td>
</tr>
<tr>
<td>L</td>
<td>5.06</td>
<td>4.16</td>
<td>0.90</td>
</tr>
<tr>
<td>P</td>
<td>10.12</td>
<td>7.25</td>
<td>2.87</td>
</tr>
<tr>
<td>K</td>
<td>14.03</td>
<td>12.94</td>
<td>1.01</td>
</tr>
<tr>
<td>Rs</td>
<td>7.41</td>
<td>5.38</td>
<td>2.03</td>
</tr>
<tr>
<td>D</td>
<td>21.19</td>
<td>19.94</td>
<td>1.25</td>
</tr>
<tr>
<td>Hy</td>
<td>21.03</td>
<td>19.34</td>
<td>1.69</td>
</tr>
<tr>
<td>Pd</td>
<td>17.88</td>
<td>16.16</td>
<td>1.72</td>
</tr>
<tr>
<td>Pf</td>
<td>34.22</td>
<td>35.19</td>
<td>-0.97</td>
</tr>
<tr>
<td>Pt</td>
<td>11.25</td>
<td>10.81</td>
<td>0.44</td>
</tr>
<tr>
<td>Sc</td>
<td>18.97</td>
<td>16.78</td>
<td>2.19</td>
</tr>
<tr>
<td>Ma</td>
<td>18.84</td>
<td>19.03</td>
<td>-0.25</td>
</tr>
<tr>
<td>St</td>
<td>19.44</td>
<td>19.00</td>
<td>0.44</td>
</tr>
</tbody>
</table>

<sup>a</sup> df = 62<br><sup>b</sup> df = 42<br><sup>c</sup> df = 46<br><sup>d</sup> p = > .05<br><sup>+</sup> p = < .05
Table 8
Summary of Results of Analysis of Variance for Cultural Background

<table>
<thead>
<tr>
<th>Scales</th>
<th>Language</th>
<th>Cult. background</th>
<th>L x CB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS</td>
<td>F&lt;sup&gt;a&lt;/sup&gt;</td>
<td>MS</td>
</tr>
<tr>
<td>L</td>
<td>20.265</td>
<td>3.494</td>
<td>11.779</td>
</tr>
<tr>
<td>F</td>
<td>226.720</td>
<td>10.112&lt;sup&gt;**&lt;/sup&gt;</td>
<td>42.409</td>
</tr>
<tr>
<td>K</td>
<td>33.885</td>
<td>1.467</td>
<td>54.688</td>
</tr>
<tr>
<td>Hs</td>
<td>65.156</td>
<td>4.033&lt;sup&gt;**&lt;/sup&gt;</td>
<td>77.152</td>
</tr>
<tr>
<td>D</td>
<td>3.765</td>
<td>0.137</td>
<td>88.458</td>
</tr>
<tr>
<td>Hy</td>
<td>0.602</td>
<td>0.028</td>
<td>28.992</td>
</tr>
<tr>
<td>Pd</td>
<td>27.855</td>
<td>1.091</td>
<td>96.976</td>
</tr>
<tr>
<td>Hf</td>
<td>2.410</td>
<td>0.040</td>
<td>76.308</td>
</tr>
<tr>
<td>Pa</td>
<td>10.627</td>
<td>0.701</td>
<td>33.238</td>
</tr>
<tr>
<td>Pt</td>
<td>25.452</td>
<td>0.257</td>
<td>46.799</td>
</tr>
<tr>
<td>Sc</td>
<td>30.367</td>
<td>0.253</td>
<td>175.724</td>
</tr>
<tr>
<td>Ma</td>
<td>15.060</td>
<td>0.613</td>
<td>52.469</td>
</tr>
<tr>
<td>Si</td>
<td>21.687</td>
<td>0.244</td>
<td>98.631</td>
</tr>
</tbody>
</table>

<sup>a</sup> df = 1/160
<sup>b</sup> df = 2/160
<sup>*</sup> P = < 0.05
<sup>**</sup> P = < 0.01
\[ Pd \ (F = 3.779) \]. In all three cases, the subjects with English cultural backgrounds scored lowest, followed by the French-background and then the bilingual subjects. There were no significant interactions between cultural background and language of usage.

Two of the correlation coefficients failed to achieve significance at the .05 level: \( r = .18 \) for English-background subjects and \( r = .27 \) for French-background subjects. Only in the first case was the coefficient significantly lower than the other two for that scale \( (X^2 = 14.405, df = 2, p < .01) \). The test for homogeneity indicated that the coefficients for all other scales had nonsignificant differences.

These results indicate that Hypothesis 3A was not confirmed. The cultural background of the subjects seemed to have had no effect on their HMPI scores.

**Hypothesis 3B:** The pairs of HMPI scores of subjects from bilingual backgrounds will show less similarities than the pairs of scores of subjects from a unilingual background.

Table 9 presents the means, differences, \( ts \), and \( rs \) for the subjects grouped according to their linguistic background: predominantly English, predominantly French, and bilingual. Table 10 summarizes the results of the analysis of variance for this factor. Only the \( F \) scale for English background subjects had a significant difference, with the French score being higher \( (t = 2.167, df = 40, p < .05) \). However, the analysis of variance indicated the linguistic background made a difference \( (p < .05) \) on four scales: \( L \ (F = 3.261) \), \( K \ (F = 4.084) \), \( Pd \ (F = 4.530) \), and \( Sc \ (F = 3.290) \). On the first two, the English background subjects had the highest scores; on the second two, this was reversed. There was
Table 9
Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English NMPIs for Subjects from English Language, French Language, and Bilingual Backgrounds

<table>
<thead>
<tr>
<th>Scales</th>
<th>English (N = 21)</th>
<th>French (N = 26)</th>
<th>Bilingual (N = 37)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fr.</td>
<td>Eng.</td>
<td>d</td>
</tr>
<tr>
<td>L</td>
<td>5.76</td>
<td>4.14</td>
<td>1.62</td>
</tr>
<tr>
<td>F</td>
<td>10.00</td>
<td>6.43</td>
<td>3.57</td>
</tr>
<tr>
<td>K</td>
<td>14.86</td>
<td>13.76</td>
<td>1.10</td>
</tr>
<tr>
<td>Rs</td>
<td>7.48</td>
<td>5.14</td>
<td>2.34</td>
</tr>
<tr>
<td>D</td>
<td>21.48</td>
<td>20.10</td>
<td>1.38</td>
</tr>
<tr>
<td>Hy</td>
<td>21.76</td>
<td>19.48</td>
<td>2.28</td>
</tr>
<tr>
<td>Pd</td>
<td>16.24</td>
<td>15.86</td>
<td>0.38</td>
</tr>
<tr>
<td>Nf</td>
<td>34.19</td>
<td>15.19</td>
<td>-1.00</td>
</tr>
<tr>
<td>Pa</td>
<td>11.57</td>
<td>10.71</td>
<td>0.86</td>
</tr>
<tr>
<td>Pt</td>
<td>19.76</td>
<td>15.71</td>
<td>4.05</td>
</tr>
<tr>
<td>SC</td>
<td>17.86</td>
<td>16.10</td>
<td>1.76</td>
</tr>
<tr>
<td>Ma</td>
<td>18.52</td>
<td>18.62</td>
<td>-0.10</td>
</tr>
<tr>
<td>St</td>
<td>29.95</td>
<td>30.90</td>
<td>-0.95</td>
</tr>
</tbody>
</table>

a df = 40
b df = 50
c df = 72
d p > .05
e df = .01
f p < .05
Table 10

Summary of Results of Analysis of Variance for Linguistic Background

<table>
<thead>
<tr>
<th>Scales</th>
<th>Language MS</th>
<th>F^a</th>
<th>Ling. background MS</th>
<th>F^b</th>
<th>L x LB MS</th>
<th>F^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>224.022</td>
<td>9.930*</td>
<td>35.339</td>
<td>1.566</td>
<td>13.548</td>
<td>0.601</td>
</tr>
<tr>
<td>K</td>
<td>30.006</td>
<td>1.335</td>
<td>91.763</td>
<td>4.084*</td>
<td>6.230</td>
<td>0.277</td>
</tr>
<tr>
<td>Hs</td>
<td>61.928</td>
<td>3.764</td>
<td>42.875</td>
<td>2.606</td>
<td>11.917</td>
<td>0.724</td>
</tr>
<tr>
<td>D</td>
<td>1.929</td>
<td>0.069</td>
<td>58.685</td>
<td>2.105*</td>
<td>13.964</td>
<td>0.501</td>
</tr>
<tr>
<td>Hy</td>
<td>0.000</td>
<td>0.000</td>
<td>6.995</td>
<td>0.321</td>
<td>49.582</td>
<td>2.279</td>
</tr>
<tr>
<td>Pd</td>
<td>23.625</td>
<td>0.908</td>
<td>117.882</td>
<td>4.530*</td>
<td>19.545</td>
<td>0.751</td>
</tr>
<tr>
<td>Hf</td>
<td>1.167</td>
<td>0.019</td>
<td>33.003</td>
<td>0.541</td>
<td>13.489</td>
<td>0.221</td>
</tr>
<tr>
<td>Pa</td>
<td>7.714</td>
<td>0.489</td>
<td>8.737</td>
<td>0.554</td>
<td>11.872</td>
<td>0.753</td>
</tr>
<tr>
<td>Pt</td>
<td>22.881</td>
<td>0.232</td>
<td>59.350</td>
<td>0.602</td>
<td>81.123</td>
<td>0.823</td>
</tr>
<tr>
<td>Sc</td>
<td>27.523</td>
<td>0.233</td>
<td>389.138</td>
<td>3.290*</td>
<td>16.413</td>
<td>0.139</td>
</tr>
<tr>
<td>Ma</td>
<td>12.054</td>
<td>0.480</td>
<td>54.756</td>
<td>2.178</td>
<td>3.682</td>
<td>0.147</td>
</tr>
<tr>
<td>Si</td>
<td>30.006</td>
<td>0.337</td>
<td>36.764</td>
<td>0.412</td>
<td>16.895</td>
<td>0.190</td>
</tr>
</tbody>
</table>

\[ a_{df} = 1/162 \]
\[ b_{df} = 2.162 \]
\[ *p < .05 \]
\[ **p < .01 \]
no significant interactions between linguistic backgrounds and language
being used.

Four correlations were not significantly above zero at the .95 level
of confidence: \( H_v (r = .29) \), \( P_a (r = .01) \), and \( P_t (r = .07) \) for the
English background subjects and \( H_v (r = .26) \) for the French background
subjects. \( P_a \) and \( P_t \) had sets of correlations which differed signifi-
cantly \( (x^2 = 10.014, df = 2, p = .001; x^2 = 17.707, df = 2, p = .01) \)
as did \( H_v \) \( (x^2 = 6.742, df = 2, p = .05) \). In all three cases, the
subjects with bilingual backgrounds had the pairs of scores most
similar to each other. Since this was the only factor throughout the
study where one group of subjects had considerably higher correlations
than the other groups, the mean correlation coefficients were calculated
for each group using the method of \( z \) transformations. The resulting
mean correlations (.553, .622, and .725 for English, French, and bilingual
respectively) were not significant \( (x^2 = 3.771, df = 2) \).

Although a slight trend did exist in the direction of bilingual
background subjects having more similar scores, this was opposite to the
hypothesis' prediction. The results failed to confirm Hypothesis 3B.

Hypothesis 3C: The magnitude of the difference between pairs of
French and English MMPI scores will vary depending on whether the subjects
learned their second language during the pre-school, elementary, or
adolescent/adult stages of their lives. The difference scores will be
larger for those subjects who learned their second language in the pre-
school stage and smallest for those subjects who learned it in adolescence
or later.

Table II presents the means, differences, \( t_s \), and \( r_s \) for each scale
with the subjects grouped according to whether they learned their second
Table 11
Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Pre-School, Childhood, and Adolescent/Adult Learners of the Second Language.
language before schooling, during elementary school years, or in adolescence/adulthood. Table 12 summarizes the analysis of variance on each scale for this factor.

Only F for pre-school learners had a significant difference between the means with French scores being higher (t = 3.268, df = 64, p < .01). However, the age of second language learning did have a significant effect on the scores of the following six scales (df = 2/168): L (F = 3.784, p = .05), K (F = 6.004, p = < .05), Hy (F = 6.742, p = < .05), hf (F = 14.940, p = < .01), Sc (F = 8.468, p = < .01), and Si (F = 4.136, p = < .05). The importance of these results is minimized by the fact that each group of subjects had the highest pairs of scores on two of the six scales. It is further minimized by the fact that none of the interaction effects were significant.

Two of the correlation coefficients were not significantly above zero (p = < .05): Pt for pre-school learners (r = .24, df = 32) and Hy for adolescent/adult learners (r = .18, df = 24). Only in the case of the former did the low correlation differ from the other two correlations for the same scale (X² = 11.043, df = 2, p = < .01).

Though the age of second language learning did have an effect on the scores on six of the thirteen scales, the results would seem more coincidental than anything else. Hence it must be assumed that this factor did not generally influence the results and Hypothesis 3C was not confirmed.

**Hypothesis 3D:** There will be variations both in raw scores and in the difference scores depending on whether the subjects came from homes which had a degree of bilingualism or little or no bilingualism.

Table 13 presents the relevant data for each of the three categories.
### Table 12
Summary of Results of Analysis of Variance for Age of Second Language Learning

<table>
<thead>
<tr>
<th>Scales</th>
<th>Language</th>
<th>Age</th>
<th>L x A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS</td>
<td>F&lt;sup&gt;a&lt;/sup&gt;</td>
<td>MS</td>
</tr>
<tr>
<td>L</td>
<td>18.672</td>
<td>3.249</td>
<td>21.478</td>
</tr>
<tr>
<td>F</td>
<td>236.832</td>
<td>10.624&lt;sup&gt;***&lt;/sup&gt;</td>
<td>32.902</td>
</tr>
<tr>
<td>K</td>
<td>26.575</td>
<td>1.166</td>
<td>136.846</td>
</tr>
<tr>
<td>Hs</td>
<td>68.281</td>
<td>4.026&lt;sup&gt;*&lt;/sup&gt;</td>
<td>27.503</td>
</tr>
<tr>
<td>D</td>
<td>1.471</td>
<td>0.054</td>
<td>56.755</td>
</tr>
<tr>
<td>N</td>
<td>0.466</td>
<td>0.023</td>
<td>137.108</td>
</tr>
<tr>
<td>Pd</td>
<td>27.362</td>
<td>1.027</td>
<td>1.960</td>
</tr>
<tr>
<td>Mf</td>
<td>1.862</td>
<td>0.036</td>
<td>781.490</td>
</tr>
<tr>
<td>Pa</td>
<td>10.138</td>
<td>0.654</td>
<td>14.242</td>
</tr>
<tr>
<td>Pt</td>
<td>22.092</td>
<td>0.222</td>
<td>109.394</td>
</tr>
<tr>
<td>Sc</td>
<td>34.075</td>
<td>0.309</td>
<td>932.345</td>
</tr>
<tr>
<td>Ma</td>
<td>11.638</td>
<td>0.464</td>
<td>9.408</td>
</tr>
<tr>
<td>Sl</td>
<td>25.034</td>
<td>0.288</td>
<td>363.525</td>
</tr>
</tbody>
</table>

<sup>a</sup> df = 1/168

<sup>b</sup> df = 2/168

<sup>*</sup>P = <.05

<sup>***</sup>P = <.01
Table 13
Comparison of Mean Raw Scores, Difference Scores, $t$s, and $r$s Between the French and English MMPIs for Subjects with Low, Same, and High Degrees of Bilingualism in the Home Background

<table>
<thead>
<tr>
<th>Scales</th>
<th>Fr.</th>
<th>Eng.</th>
<th>$d$</th>
<th>$t$</th>
<th>$r$</th>
<th>Fr.</th>
<th>Eng.</th>
<th>$d$</th>
<th>$t$</th>
<th>$r$</th>
<th>Fr.</th>
<th>Eng.</th>
<th>$d$</th>
<th>$t$</th>
<th>$r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>5.22</td>
<td>4.44</td>
<td>0.78</td>
<td>1.03</td>
<td>.67</td>
<td>4.12</td>
<td>3.79</td>
<td>0.33</td>
<td>0.57</td>
<td>.54</td>
<td>4.67</td>
<td>3.70</td>
<td>0.97</td>
<td>1.72</td>
<td>.20</td>
</tr>
<tr>
<td>F</td>
<td>9.59</td>
<td>7.37</td>
<td>2.22</td>
<td>2.04*</td>
<td>.63</td>
<td>10.47</td>
<td>8.18</td>
<td>2.29</td>
<td>1.77</td>
<td>.46</td>
<td>11.26</td>
<td>8.81</td>
<td>2.45</td>
<td>1.94</td>
<td>.68</td>
</tr>
<tr>
<td>K</td>
<td>13.36</td>
<td>13.26</td>
<td>0.30</td>
<td>0.19</td>
<td>.78</td>
<td>13.00</td>
<td>12.00</td>
<td>1.00</td>
<td>0.98</td>
<td>.73</td>
<td>12.56</td>
<td>11.44</td>
<td>1.12</td>
<td>0.87</td>
<td>.63</td>
</tr>
<tr>
<td>Hs</td>
<td>6.89</td>
<td>6.70</td>
<td>0.19</td>
<td>0.16</td>
<td>.56</td>
<td>7.82</td>
<td>6.44</td>
<td>1.38</td>
<td>1.52</td>
<td>.65</td>
<td>9.04</td>
<td>6.74</td>
<td>2.30</td>
<td>1.92</td>
<td>.69</td>
</tr>
<tr>
<td>D</td>
<td>22.15</td>
<td>22.19</td>
<td>-0.04</td>
<td>-0.02</td>
<td>.77</td>
<td>20.79</td>
<td>20.97</td>
<td>-0.18</td>
<td>-0.15</td>
<td>.62</td>
<td>21.81</td>
<td>20.96</td>
<td>0.85</td>
<td>0.56</td>
<td>.82</td>
</tr>
<tr>
<td>Hy</td>
<td>20.74</td>
<td>20.89</td>
<td>-0.15</td>
<td>-0.13</td>
<td>.41</td>
<td>20.15</td>
<td>20.38</td>
<td>-0.23</td>
<td>-0.22</td>
<td>.43</td>
<td>20.11</td>
<td>19.07</td>
<td>1.04</td>
<td>0.72</td>
<td>.40</td>
</tr>
<tr>
<td>Pd</td>
<td>16.89</td>
<td>17.07</td>
<td>-0.18</td>
<td>-0.14</td>
<td>.41</td>
<td>19.35</td>
<td>18.38</td>
<td>0.97</td>
<td>0.83</td>
<td>.80</td>
<td>18.89</td>
<td>17.44</td>
<td>1.45</td>
<td>0.96</td>
<td>.69</td>
</tr>
<tr>
<td>Mf</td>
<td>36.00</td>
<td>36.30</td>
<td>-0.30</td>
<td>-0.16</td>
<td>.54</td>
<td>33.65</td>
<td>32.76</td>
<td>0.89</td>
<td>0.47</td>
<td>.71</td>
<td>32.41</td>
<td>32.48</td>
<td>-0.07</td>
<td>-0.03</td>
<td>.58</td>
</tr>
<tr>
<td>Pa</td>
<td>11.52</td>
<td>11.11</td>
<td>0.41</td>
<td>0.39</td>
<td>.29*</td>
<td>11.09</td>
<td>10.94</td>
<td>0.15</td>
<td>0.15</td>
<td>.31</td>
<td>11.70</td>
<td>10.67</td>
<td>1.03</td>
<td>0.95</td>
<td>.82</td>
</tr>
<tr>
<td>Pt</td>
<td>16.07</td>
<td>16.19</td>
<td>-0.12</td>
<td>-0.05</td>
<td>.72</td>
<td>18.97</td>
<td>17.68</td>
<td>1.29</td>
<td>0.43</td>
<td>.24*</td>
<td>18.04</td>
<td>17.30</td>
<td>0.74</td>
<td>0.35</td>
<td>.89</td>
</tr>
<tr>
<td>Sc</td>
<td>18.33</td>
<td>17.67</td>
<td>0.66</td>
<td>0.27</td>
<td>.85</td>
<td>20.62</td>
<td>19.68</td>
<td>0.94</td>
<td>0.39</td>
<td>.75</td>
<td>22.52</td>
<td>21.41</td>
<td>1.11</td>
<td>0.31</td>
<td>.69</td>
</tr>
<tr>
<td>Ma</td>
<td>18.48</td>
<td>18.41</td>
<td>0.07</td>
<td>0.06</td>
<td>.72</td>
<td>20.32</td>
<td>19.62</td>
<td>0.70</td>
<td>0.65</td>
<td>.62</td>
<td>20.59</td>
<td>19.85</td>
<td>0.74</td>
<td>0.47</td>
<td>.76</td>
</tr>
<tr>
<td>St</td>
<td>31.78</td>
<td>32.85</td>
<td>-1.07</td>
<td>-0.37</td>
<td>.91</td>
<td>27.62</td>
<td>28.71</td>
<td>-1.09</td>
<td>-0.53</td>
<td>.70</td>
<td>32.37</td>
<td>32.52</td>
<td>-0.15</td>
<td>-0.06</td>
<td>.78</td>
</tr>
</tbody>
</table>

$^a_{df} = 52$ 
$^{b}_{df} = 66$ 
$^{c}_{p} = > .05$
$^{*}_{p} = < .05$
of this factor: subjects with little, with some, and with a high degree of bilingualism in their home background. This was as ascertained by the results of the Hoffman questions. Table 14 summarizes the results of the analysis of variance on each scale for this factor.

With the usual exception of F (with a higher French mean for "Low" subjects: \( L = 2.040, df = 27, p = < .05 \), no pairs of means differed significantly. The analysis of variance revealed this factor to have had an effect on the resulting means of two scales. On \( Mf \), low subjects scored significantly higher on both versions than subjects in the other two groups (\( F = 3.565, df = 2/170, p = < .05 \); on \( Si \), medium subjects scored significantly lower than the other subjects (\( F = 4.285, df = 2/170, p = < .05 \). No interaction effects were significant.

Each of the three subject groups had a correlation coefficient not significantly above zero (\( p = < .95 \)): \( Pa \) for low subjects (\( r = .29 \)), \( Pt \) for medium subjects (\( r = .24 \)), and \( L \) for high subjects (\( r = .20 \)). In the first case, a low correlation was also found for the medium subjects and these differed significantly from the third \( r \) (\( X^2 = 11.954, df = 2, p = < .01 \); in the second case, the low correlation differed significantly from the other two (\( X^2 = 18.773, df = 2; p < .01 \); in the third case, the low correlation was not significantly different from the other two accompanying coefficients. That the three each resulted from the scores of different subgroups indicates a lack of any trend with regard to the effects of this factor. Therefore, Hypothesis 3E was not confirmed.

**Hypothesis 3E:** Subjects who are equal in their proficiency in the two languages will have less differences between their two scores than will subjects who are more proficient in one or the other language.

Table 15 presents the relative data for the subjects as grouped
Table 14
Summary of Results of Analysis of Variance for Degree of Bilingual Background

<table>
<thead>
<tr>
<th>Scales</th>
<th>Language</th>
<th>Degree</th>
<th>L x D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS</td>
<td>F^a</td>
<td>MS</td>
</tr>
<tr>
<td>L</td>
<td>19.113</td>
<td>3.302</td>
<td>12.060</td>
</tr>
<tr>
<td>F</td>
<td>236.453</td>
<td>10.508**</td>
<td>32.753</td>
</tr>
<tr>
<td>K</td>
<td>29.455</td>
<td>1.226</td>
<td>27.606</td>
</tr>
<tr>
<td>Hs</td>
<td>73.840</td>
<td>4.393*</td>
<td>17.038</td>
</tr>
<tr>
<td>P</td>
<td>1.455</td>
<td>0.052</td>
<td>24.895</td>
</tr>
<tr>
<td>Hy</td>
<td>1.455</td>
<td>0.068</td>
<td>20.244</td>
</tr>
<tr>
<td>Pd</td>
<td>25.506</td>
<td>0.990</td>
<td>53.875</td>
</tr>
<tr>
<td>Mf</td>
<td>2.273</td>
<td>0.039</td>
<td>209.992</td>
</tr>
<tr>
<td>Pa</td>
<td>11.000</td>
<td>0.708</td>
<td>1.382</td>
</tr>
<tr>
<td>Pt</td>
<td>21.142</td>
<td>0.213</td>
<td>74.282</td>
</tr>
<tr>
<td>Sc</td>
<td>36.364</td>
<td>0.306</td>
<td>212.590</td>
</tr>
<tr>
<td>Ha</td>
<td>12.023</td>
<td>0.482</td>
<td>51.139</td>
</tr>
<tr>
<td>Si</td>
<td>27.841</td>
<td>0.321</td>
<td>71.398</td>
</tr>
</tbody>
</table>

^a^ df = 1/170
^b^ df = 2/170

^*^ p < .05

^**^ p < .01
Table 15

Comparison of Mean Raw Scores, Difference Scores, ts, and rs Between the French and English MMPIs for Subjects Superior in English, Superior in French, and Equal in Relative Proficiency

<table>
<thead>
<tr>
<th>Scales</th>
<th>Fr.</th>
<th>Eng.</th>
<th>d</th>
<th>t</th>
<th>r</th>
<th>Fr.</th>
<th>Eng.</th>
<th>d</th>
<th>t</th>
<th>r</th>
<th>Fr.</th>
<th>Eng.</th>
<th>d</th>
<th>t</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4.45</td>
<td>3.93</td>
<td>0.52</td>
<td>0.75</td>
<td>.61</td>
<td>5.42</td>
<td>3.87</td>
<td>1.55</td>
<td>2.55*</td>
<td>.45</td>
<td>3.93</td>
<td>4.11</td>
<td>-0.18</td>
<td>-0.31</td>
<td>.61</td>
</tr>
<tr>
<td>F</td>
<td>10.59</td>
<td>8.38</td>
<td>2.21</td>
<td>1.61</td>
<td>.54</td>
<td>10.97</td>
<td>7.77</td>
<td>3.20</td>
<td>2.56*</td>
<td>.60</td>
<td>9.71</td>
<td>8.25</td>
<td>1.46</td>
<td>1.35</td>
<td>.61</td>
</tr>
<tr>
<td>K</td>
<td>12.69</td>
<td>12.93</td>
<td>-0.24</td>
<td>-0.16</td>
<td>.76</td>
<td>14.56</td>
<td>13.00</td>
<td>1.58</td>
<td>1.28</td>
<td>.78</td>
<td>11.68</td>
<td>10.61</td>
<td>1.07</td>
<td>1.10</td>
<td>.50</td>
</tr>
<tr>
<td>Hs</td>
<td>8.10</td>
<td>6.31</td>
<td>1.79</td>
<td>1.46</td>
<td>.73</td>
<td>7.90</td>
<td>5.60</td>
<td>2.22</td>
<td>2.17*</td>
<td>.67</td>
<td>7.71</td>
<td>7.96</td>
<td>-0.25</td>
<td>-0.27</td>
<td>.44</td>
</tr>
<tr>
<td>D</td>
<td>22.07</td>
<td>21.72</td>
<td>0.35</td>
<td>0.24</td>
<td>.78</td>
<td>21.35</td>
<td>20.26</td>
<td>1.09</td>
<td>0.83</td>
<td>.72</td>
<td>21.14</td>
<td>22.14</td>
<td>-1.00</td>
<td>-0.72</td>
<td>.73</td>
</tr>
<tr>
<td>Hy</td>
<td>20.69</td>
<td>20.07</td>
<td>0.62</td>
<td>0.47</td>
<td>.51</td>
<td>21.10</td>
<td>19.52</td>
<td>1.58</td>
<td>1.44</td>
<td>.39</td>
<td>19.07</td>
<td>20.89</td>
<td>-1.82</td>
<td>-1.51</td>
<td>.42</td>
</tr>
<tr>
<td>Pd</td>
<td>18.59</td>
<td>17.55</td>
<td>1.04</td>
<td>0.70</td>
<td>.71</td>
<td>19.13</td>
<td>17.48</td>
<td>1.65</td>
<td>1.26</td>
<td>.74</td>
<td>17.57</td>
<td>18.07</td>
<td>-0.50</td>
<td>-0.41</td>
<td>.47</td>
</tr>
<tr>
<td>MF</td>
<td>33.62</td>
<td>34.90</td>
<td>-1.28</td>
<td>-0.59</td>
<td>.86</td>
<td>33.13</td>
<td>32.16</td>
<td>0.97</td>
<td>0.50</td>
<td>.09d</td>
<td>35.32</td>
<td>34.36</td>
<td>0.96</td>
<td>0.48</td>
<td>.77</td>
</tr>
<tr>
<td>Pa</td>
<td>11.69</td>
<td>11.07</td>
<td>0.62</td>
<td>0.52</td>
<td>.44</td>
<td>11.26</td>
<td>10.55</td>
<td>0.71</td>
<td>0.73</td>
<td>.44</td>
<td>11.29</td>
<td>11.14</td>
<td>0.15</td>
<td>0.16</td>
<td>.53</td>
</tr>
<tr>
<td>Pt</td>
<td>20.31</td>
<td>17.24</td>
<td>3.07</td>
<td>0.88</td>
<td>.26d</td>
<td>17.10</td>
<td>17.39</td>
<td>-0.29</td>
<td>-0.13</td>
<td>.82</td>
<td>15.96</td>
<td>16.64</td>
<td>-0.68</td>
<td>-0.39</td>
<td>.74</td>
</tr>
<tr>
<td>Sc</td>
<td>21.62</td>
<td>21.97</td>
<td>-0.35</td>
<td>-0.01</td>
<td>.73</td>
<td>20.45</td>
<td>17.84</td>
<td>2.61</td>
<td>1.01</td>
<td>.76</td>
<td>19.39</td>
<td>19.07</td>
<td>0.32</td>
<td>0.14</td>
<td>.80</td>
</tr>
<tr>
<td>Ma</td>
<td>19.79</td>
<td>19.48</td>
<td>0.31</td>
<td>0.22</td>
<td>.70</td>
<td>19.55</td>
<td>18.42</td>
<td>1.13</td>
<td>0.83</td>
<td>.71</td>
<td>20.21</td>
<td>20.14</td>
<td>0.07</td>
<td>0.06</td>
<td>.71</td>
</tr>
<tr>
<td>Si</td>
<td>30.89</td>
<td>32.62</td>
<td>-1.73</td>
<td>-0.65</td>
<td>.87</td>
<td>30.03</td>
<td>30.00</td>
<td>0.03</td>
<td>0.01</td>
<td>.86</td>
<td>30.14</td>
<td>30.89</td>
<td>-0.75</td>
<td>-0.30</td>
<td>.70</td>
</tr>
</tbody>
</table>

a df = 56
b df = 60
c df = 54

P = > .05
P = < .05
according to their relative proficiency in the two languages: better in
English, equal in proficiency, and better in French. Table 16 summarizes
the results of the analysis of variance on each scale for this factor.

The pairs of means differed significantly three times when the subjects
were categorized according to this factor and all three were for the
subjects with equal proficiency (L: $t = 2.549$, $df = 60$, $p = .05$; F:
$L = 2.555$, $df = 60$, $p = .05$; and Hs: $t = 2.167$, $df = 60$, $p = .05$).

It should be noted that these results were for those subjects who would
not have had trouble with one or the other language and it, therefore,
further confirms the findings presented in Table A. Again, however,
none of the interaction effects were significant. Only one scale was
affected by the groupings for this factor. In this case, K was lower for
those subjects who were superior in French and highest for the subjects
with equal proficiency ($F = 4.547$, $df = 2/170$, $p = .05$).

Two correlations failed to be significantly above zero ($p = .95$):
Pit for English-superior subjects ($r = .26$) and Mf for equal proficiency,
subjects ($r = .29$). In both cases they differed significantly from the
other two coefficients with which they were associated ($X^2 = 14.324$,
$df = 2$, $p = .01$; $X^2 = 11.545$, $df = 2$, $p = .01$). No other series of
correlations were significant.

The relative proficiency which the subjects had in the two languages
did not affect their MMPI performance and Hypothesis 3E was not confirmed.
Table 16

Summary of Results of Analysis of Variance for Relative Proficiencies

<table>
<thead>
<tr>
<th>Scales</th>
<th>MS</th>
<th>F&lt;sup&gt;a&lt;/sup&gt;</th>
<th>MS</th>
<th>F&lt;sup&gt;b&lt;/sup&gt;</th>
<th>MS</th>
<th>F&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>236.453</td>
<td>10.411*</td>
<td>3.931</td>
<td>0.173</td>
<td>11.132</td>
<td>0.490</td>
</tr>
<tr>
<td>K</td>
<td>29.455</td>
<td>1.280</td>
<td>104.602</td>
<td>4.547*</td>
<td>13.094</td>
<td>0.569</td>
</tr>
<tr>
<td>Hs</td>
<td>73.840</td>
<td>4.442*</td>
<td>16.316</td>
<td>0.977</td>
<td>25.222</td>
<td>1.510</td>
</tr>
<tr>
<td>D</td>
<td>1.455</td>
<td>0.052</td>
<td>19.634</td>
<td>0.699</td>
<td>16.457</td>
<td>0.586</td>
</tr>
<tr>
<td>Hy</td>
<td>1.455</td>
<td>0.068</td>
<td>2.547</td>
<td>0.120</td>
<td>44.652</td>
<td>2.095</td>
</tr>
<tr>
<td>Pd</td>
<td>25.506</td>
<td>0.971</td>
<td>3.462</td>
<td>0.132</td>
<td>17.732</td>
<td>0.675</td>
</tr>
<tr>
<td>Mf</td>
<td>2.273</td>
<td>0.038</td>
<td>77.191</td>
<td>1.281</td>
<td>24.432</td>
<td>0.406</td>
</tr>
<tr>
<td>Pa</td>
<td>11.000</td>
<td>0.709</td>
<td>3.521</td>
<td>0.227</td>
<td>1.839</td>
<td>0.056</td>
</tr>
<tr>
<td>Pt</td>
<td>21.142</td>
<td>0.215</td>
<td>89.122</td>
<td>0.906</td>
<td>61.590</td>
<td>0.626</td>
</tr>
<tr>
<td>Sc</td>
<td>36.364</td>
<td>0.305</td>
<td>132.222</td>
<td>1.107</td>
<td>36.315</td>
<td>0.304</td>
</tr>
<tr>
<td>Ha</td>
<td>12.023</td>
<td>0.476</td>
<td>21.146</td>
<td>0.837</td>
<td>4.602</td>
<td>0.182</td>
</tr>
<tr>
<td>Si</td>
<td>27.841</td>
<td>0.308</td>
<td>47.707</td>
<td>0.528</td>
<td>11.577</td>
<td>0.128</td>
</tr>
</tbody>
</table>

<sup>a</sup>df = 1/170

<sup>b</sup>df = 2/170

*P = <.05

**P = <.01
CHAPTER 5

DISCUSSION

The present study compared the effects of compound and coordinate bilingualism on English and Canadian-French MMPI performances. In addition, the effects of cultural and linguistic background, age of second language learning, degree of bilingualism in the home, and relative proficiency on MMPI performances were also evaluated.

The review of past research generated a total of seven hypotheses. Of the two major hypotheses, the first, which predicted that scores on the French MMPI would be higher for all subjects, was at least partially confirmed; the second, which predicted that compound subjects would have more similar pairs of scores than would coordinate subjects, was not confirmed. Hypotheses concerning the effects of linguistic and cultural backgrounds, age of second language learning, degree of home bilingualism, and relative proficiency were not confirmed.

The results of both Glatt's (1969) and Gignac's (1970) studies had indicated a strong tendency for the scores on the French version to be consistently and significantly higher; thus the first hypothesis predicted the same results. The results were at best only partially supportive of Hypothesis 1.

Two scales, F and Hs, did have significantly higher scores for the French version throughout the analysis: Since subjects with equal proficiency in both languages exhibited greater differences than any other
subjects and since no interaction effects were significant, it seems most likely that the two versions of these scales are not equivalent. While the differences are not of obviously large magnitude, there could be some clinical importance attached to this finding, especially in the case of the F scale. A raw score above 15 on the English version of this scale is sufficient to raise questions about the validity of that particular test administration. Does the observed difference between the English and French means necessitate accepting as valid a French profile with an F as high as 17 or 18?

While the initial hypothesis would seem to have been unconfirmed, two other features of the results modify this initial rejection. First, of the 11 scales with nonsignificant results, 10 had higher means for the French version. This trend was in itself highly significant.

Second, the correlations between the scores on the two versions were considerably lower than those obtained by previous researchers using only the English version. Table 17 compares the present correlations with those obtained by three previous test-retest situations using similar subjects and time intervals (Cottle, 1950; MacDonald, 1952; Windle, 1955). The .70 correlation for Ha was the only one which was not significantly lower than at least one of the test-retest figures (although it must be noted that none of the other studies reported figures for Si). The correlations for Hy (.41) and Pt (.48) were lower than all three of the test-retest correlations and several of the scales had correlations lower than two of the three.

These features certainly indicate the necessity for further studies in this area before the two versions can be considered clinically inter-
Table 17
Comparison of the Present English-French Correlations with Previous Test-Retest Correlations

<table>
<thead>
<tr>
<th>Scales</th>
<th>Present(^a)</th>
<th>Windle(^b)</th>
<th>Cottle(^c)</th>
<th>MacDonald(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>.52</td>
<td>.79(**)</td>
<td>.46</td>
<td>.62</td>
</tr>
<tr>
<td>F</td>
<td>.56</td>
<td>.62</td>
<td>.75(*)</td>
<td>.71(*)</td>
</tr>
<tr>
<td>K</td>
<td>.72</td>
<td>.92(***)</td>
<td>.76</td>
<td>.72</td>
</tr>
<tr>
<td>Hs</td>
<td>.61</td>
<td>.73</td>
<td>.81(**)</td>
<td>.59</td>
</tr>
<tr>
<td>D</td>
<td>.73</td>
<td>.84(*)</td>
<td>.66</td>
<td>.77</td>
</tr>
<tr>
<td>Hy</td>
<td>.41</td>
<td>.71(**)</td>
<td>.72(***)</td>
<td>.61(*)</td>
</tr>
<tr>
<td>Pd</td>
<td>.65</td>
<td>.84(**)</td>
<td>.81(*)</td>
<td>.63</td>
</tr>
<tr>
<td>Hf</td>
<td>.63</td>
<td>.79(*)</td>
<td>.79</td>
<td>.88(***)</td>
</tr>
<tr>
<td>Pa</td>
<td>.46</td>
<td>.81(***)</td>
<td>.56</td>
<td>.51</td>
</tr>
<tr>
<td>Pt</td>
<td>.48</td>
<td>.92(***)</td>
<td>.90(***)</td>
<td>.79(***)</td>
</tr>
<tr>
<td>Sc</td>
<td>.74</td>
<td>.82</td>
<td>.86(*)</td>
<td>.82</td>
</tr>
<tr>
<td>Ma</td>
<td>.70</td>
<td>.79</td>
<td>.76</td>
<td>.75</td>
</tr>
<tr>
<td>Sj</td>
<td>.81</td>
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</tr>
</tbody>
</table>

\(^a\)\(N = 88\)  \(^b\)\(N = 55\)  \(^c\)\(N = 100\)  \(^d\)\(N = 117\)

\(\*\)differs from present correlation with \(p \leq .05\)

\(\*\*\)differs from present correlation with \(p \leq .01\)

\(\*\*\*\)differs from present correlation with \(p \leq .001\)
changeable. At the least, a full-scale normative study should be performed on a French-Canadian sample if this version is going to continue to be used clinically. To continue to interpret it as if it were comparable to the English version can no longer be considered clinically valid.

There may be several reasons for the difference in results between this and the two previous studies. Glatt's (1969) study used Perse's (1958) French translation, not Chevrier's (1961). The former was aimed only at a European-French, not a Canadian-French population, and therefore was somewhat different. It may be that the validities of the two versions are simply not the same. In addition, Glatt's subjects were far more homogenous in background (being mostly English-background college coeds in their early twenties) and far less homogenous in linguistic abilities (especially in French), and neither of these factors were controlled.

Finally, he used a test-retest interval which ranged from 0-77 days, but did not examine whether this had an appreciable effect on the results.

Although Gignac (1970) used the same French MMPI as this study, his population differed by being almost exclusively individuals who used English throughout their daily lives with the exception of part of their academic program. It was felt that even some of the native French speakers may, because of disuse, have had trouble interpreting the French version.

In addition, he analysed the obtained T scores, rather than raw scores, and this could have distorted the data somewhat. These scores do not include very high or very low scores and to convert them to Ts meant the assumption had to be made that the pattern of conversion on each scale remained consistent at either extreme, an assumption not previously verified by empirical study. Also, these scores do not correlate perfectly with the
raw scores. A difference of one raw score on a given scale may mean a
difference of one, two, or three T scores. Finally, he also did not
present any data on the cultural background of his subjects (an important
source of differences if a presently middle-class professor at an English-
speaking university had had a lower-class upbringing with French as the
sole language of communication).

Two possible reasons which could explain the differences between
answers on each of the two versions cannot be accepted at this time. The
first would be that differences observed were simply an artifact of the
subjects' inability to translate each of the languages equally as well.
The analysis of the results clearly pointed out, however, that the differ-
ences were most noticeable in those subjects who were equally fluent in
the two languages. The second would be that the differences were simply
a result of artifacts caused by faulty translation. While there was
nothing inherent in the results to counterindicate this possibility, the
literature review quite definitely indicated that differences in personality
characteristics due to language shifts have been reported through anecdotal
material as well as in limited empirical studies. At present, an item
analysis of the answers to both versions of the F and Hs scales is under
way. It is hoped that this will indicate more specifically the source
of bias in these scores. It is probably that only a few of the items are
contributing to the difference since many of the items are also scored on
other scales and the other scales did not show the same degree of difference.

The Compound-Coordinate Dichotomy

Osgood (1954) originally posited two types of bilingualism which
have come to be called compound and coordinate. Several later writers
(including Diebold, 1966, 1968; Haugen, 1956; Jakobovits, 1967; and Lambert, Havelka, & Crosby, 1968) have pointed out in some detail the effects of being one or the other type. Compound bilinguals are supposed to make only literal translations from one language to the other. Each word in one language will have its equivalent in the other language. Coordinates, on the other hand, completely separate their two languages. Words in one language do not have equivalents in the other.

It was assumed that a coordinate bilingual would have to change his personality if he changed his language of usage. Diebold (1968) pointed out that the dual language systems would lead to a functional separation of the cognitive processes and other language-mediated behavior. He suggested that experiences would be encoded differently in each of the languages.

In the only attempt to verify these assumptions, Gignac (1970) had found that they were not tenable. His results indicated that the distinction had very little effect on his subjects' MMPI performances. What differences that did exist were in the direction opposite to predictions. Because of the methodological faults in Gignac's study, the present study was designed to more fully evaluate the effects of this dichotomy by controlling for a number of other factors previously ignored by the relevant research.

It was hypothesized that coordinates would exhibit less similarities in their scores on the two versions than would compounds. The results disproved this hypothesis entirely. This factor simply had no effect on the overall result. This study, in combination with Gignac's, seems to strongly suggest a further look at this hypothetical construct is in order.

At first it would seem that the literature was quite plain in
explaining the meanings of the two categories. However, a closer look reveals some confusion as to how to best separate bilinguals into the two categories. Haugen (1956) mentioned several possible means of assessing the type, including making a simple split between school-learning and non-school-learning. Lambert, Kavelka, and Crosby (1968) mentioned several other delineations, some of which would occur very rarely (such as when each parent speaks a different language exclusively). In a private communication to an associate, Lambert recently mentioned that any individual who has not learned the second language before age six would have to be a compound bilingual; this would directly contradict some of his earlier writing. It would seem that a number of schemas do exist but without evidence to suggest one or the other is more accurate.

Before an accurate assessment of the effects which the compound-coordinate dichotomy may have can be made, linguists need to restate the definitions in terms which do not depend on history but on description or function. Further empirical study is needed in this area. Such a study would compare the scores of compounds and coordinates with the subjects assigned to the two groups according to each of the various schemas previously mentioned in the literature.

It may be that the dichotomy, if it has any meaning at all, is valid only for research in linguistics. In other words, it has no effect on an individual's personality, only on his actual use of words and syntax. On the other hand, it is difficult to simply ignore the illustrations which the previously mentioned authors have given to point out the meaningfulness of the dichotomy to changes in personality. It may be that, in fact, the problem is far more complicated than had previously been suggested.
Other Factors

The review of the literature had suggested five other factors (linguistic and cultural backgrounds, age of second language learning, degree of home bilingualism, and relative proficiency) which could possibly have had effects on the MMPI performances. None of the five relevant hypotheses were confirmed, however.

The cultural effects on personality have been studied and emphasized hundreds of times and there was no reason to assume there would be different results from this particular group. The differences which did occur indicated that the subjects from English backgrounds were less concerned with their physical well-being, had less depressive overtones to their thinking, and tended to be less radical in their feelings and attitudes. This apparently lower level of anxiety may have been due to their being tested in a cultural situation which was more like their background than their French-background counterparts (many of whom may still have been undergoing cultural shock).

Similarities between the cultural groups remained more prevalent than differences, however. It is likely that the large majority of subjects grew up in rather similar middle- and upper-class backgrounds and this was sufficient to assure the prevalence of similarities, even though a French or an English flavor may also have been present. The homogeneity is further emphasized by the fact that nearly all of the subjects came from Canada or the United States, or had at least been here for a number of years. Unfortunately, because of the relatively small number of subjects involved in this study, a further breakdown of backgrounds was not possible. It is hoped that further data can be collected to shed further light on this factor. For the present, it appears that Soffietti's (1955) contention
that it is biculturalism rather than bilingualism which will more greatly affect personality will have to remain neither proven nor disproven.

The lack of significance for the linguistic background may have been due to its becoming less and less important as the fluency of the individuals increases in their non-native language. It may also be that the factor lessens when colloquial language is used as little as possible. Whatever the reason, for these subjects this hypothesis was totally rejected.

As mentioned above, subjects who learned both languages early in life would have been expected to have less similarities in their pairs of scores because of their usually being coordinate bilinguals. However, the results did not give any support to this hypothesis. Also related to the compound-coordinate theory was the expectation that those subjects from homes with a high degree of bilingualism would have had a fused acquisitionnal context; this would make them compound bilinguals and they should have more similar pairs of scores. This hypothesis was also rejected. It may be that the cultural homogeneity of the subjects had an influence in dampening possible effects from this factor. An individual whose parents spoke more than one language at home would likely have a cultural milieu different from those from unilingual homes. Immigrant families, for example, tend to use their native language at home, regardless of their ability in their new tongue. A bilingual atmosphere is more readily associated with a middle- or upper-class background. Hence, the cultural homogeneity of the subjects would have dampened the effects.

Finally, it was felt essential to analyze the effects of relative proficiency in the two languages. It was hypothesized that knowing both languages equally as well would eliminate the portrayal of the subject's
personality more accurately in one language than in the other and, therefore, produce more similar scores. Not only was this hypothesis rejected, it was found that subjects with equal proficiency differed significantly on three scales in their pairs of scores. This result would seem to point strongly to the existence of a real difference in the two versions on these scales if on no other. There is another possible explanation for the remarkable sameness of the scores of subjects with unequal proficiency. Subjects may, when encountering difficulty with a particular item in their less-proficient language, attempt to remember the item as they previously read and answered it in their more familiar language. Those with equal proficiency will simply treat each pair of items as different items on each version. Even though this factor did not yield significant differences and did not interact with the language factor, its results were in fact crucial to the interpretation of the overall results. It has often not been an integral part of previous research but would certainly seem to be necessary to obtain an accurate estimation of results in this area.

Of the seven hypotheses tested by this study, none were found to be tenable according to the results, although the first hypothesis was partially verified. The type of bilingualism, compound or coordinate, was found to be of no effect whatsoever, a verification of the findings of Gignac (1970). Despite previous research and opinions, none of the five additional factors had any effect either. A total of 78 interaction effects were tested. None were significant.

One result which remained constant throughout the study was the significantly higher scores of scales F and Hs on the French version.
This accounted for most of the significant differences which were found in the statistical analysis. Since a lack of equivalence in the two versions is indicated, a forthcoming item analysis may pinpoint more directly the source of conflict.

Several reasons may be postulated for the overall results. One is the relative homogeneity of the subjects with respect to their cultural backgrounds. If this did, in fact, minimize the differences, it means that the criticism of the literature with respect to a general lack of control for cultural background when discussing observed differences is valid. The young age of many of the subjects may also have added some discrepancy from the expected results. Finally, as will be examined in another later study, some confusion existed as to which would be the best means of categorizing the subjects with regard to the compound and coordinate types.

Clinically speaking, the lowered correlation coefficients, as well as the differences between the means, would indicate the need for some caution in interpreting the results of French-language MMPIs. A full normative study is required before clinical accuracy can be successfully approached. At this point, the Canadian-French version cannot be used in the clinical setting with nearly the same degree of confidence as the English version.

Theoretically speaking, it would seem that a number of writers in the past have been guilty of either oversimplifying or overcomplicating the effects of bilingualism on personality. Some writers have simply assumed the presence of hypothetical constructs and then used them as the basis for theoretical discussion as if their presence had already been verified. Other writers have assumed the presence of many factors which
are stated as being part of the whole picture but which, from the results
of this study, may in fact be "red herrings." Empirical studies have
been and continue to be sorely lacking in this general area (especially
research with adequate designs) and further theorizing should await the
empirical verification of some of the previous literature. While the
lack of statistically significant results in this study would seem to
shed no light on the subject, it does in fact point out the tremendous/
complexity of the area and the need for far more work than has previously
been realized.

The topic of bilingualism is currently of great concern to Canada
as can be witnessed by the voluminous reports and briefs submitted to the
Royal Commission on Bilingualism and Biculturalism (1969) as well as by
that body's final four volume report. It can only be hoped that the
empirical void surrounding the topic will be filled in before rhetoric
alone becomes the sole basis on which decisions are made.
CHAPTER 6
SUMMARY

Introduction

Researchers agree that the incidence of bilingualism has been rapidly spreading throughout the world and that its resulting problems are on the increase.

Studies of its linguistic effects have led to some agreement as to there being ill effects on overall speech development. Early studies indicating its ill effects on intellectual and educational development are no longer considered valid because of their lack of adequate controls for socioeconomic and cultural variables.

With regard to bilingualism's effects on personality, three areas of investigation were reviewed: (a) sociological implications; (b) effects on personality characteristics; and (c) possible changes in personality when there is a change in the language of usage. Although it is of great importance in the practice of clinical psychology, the last area of investigation has received the least attention from empiricists. There are both theoretical and anecdotal material to indicate that personality characteristics do change when the language changes, but only tentative support exists from the very few empirical investigations.

Only two researchers, Glatt (1969) and Gignac (1970), have attempted to evaluate the effects of bilingualism on personality assessment with objective inventories. Glatt found that subjects received significantly
different scores on the French than on the English versions of the MMPI and that these differences were sufficient to allow for different clinical interpretations of the profiles. His study, however, was found to suffer from serious methodological deficiencies.

Gignac (1970) found that subjects' scores on the two versions did not differ significantly nor clinically, but he used a Canadian-French rather than Parisian-French version, although generally his methodology was considerably improved. He also examined the effects of the two types of bilingualism, compound (possessed of a unified semantic system) and coordinate (possessed of separate but parallel semantic systems), and found that they had no effect on the results. This was contrary to past theoretical writings, although empirical studies also had led to contradictory results in the past.

Purpose

It was the purpose of the present study to investigate the assessment of the personality characteristics of bilinguals by using an objective personality inventory and to evaluate the effects on such a procedure of having two types of bilinguals identified: compound and coordinate. In addition, incorporated into the design, in an attempt to overcome past methodological faults, were analyses of five additional factors: cultural background, linguistic background, age of second language learning, degree of bilingualism in the home, and relative proficiency. It was felt that the inclusion of these variables allowed for more accurate a definition of bilingual than had been used before.

Methodology

Subjects: The subject population consisted of 17 university students
and 71 high school students. All were fluent in both English and French, although their linguistic and cultural backgrounds were varied. They had a mean age of just under 19 years and had a mean of over 13 years of schooling.

**Instruments:** Each subject was administered three instruments: the standard booklet forms of the MMPI in English and in Canadian-French (as translated by Chevrier in 1961), and a background questionnaire. The latter was designed to elicit information about the subjects' cultural and linguistic background. The type of bilingualism was evaluated by examining the subject's answers to the questions of how and when he learned his second language. Part of the questionnaire was based on the Hoffman Schedule of Linguistic Background and part was a self-rating scale of relative proficiency.

**Procedures:** All subjects were administered the background questionnaire first. Half then took the English MMPI, half the French. Two weeks later, each subject took the MMPI in the second language. Because of scheduling difficulties, the university students took the tests individually; the high school students took them in a group setting. The MMPI protocols were scored according to standard instructions and the 13 standard validity and clinical scales' scores were used for analysis. Subjects were then grouped into various categories on each of the factors. A two-part statistical analysis was then carried out by computer. First, a series of two-way analyses of variance was performed. One factor was always test language; the second was each of the variables. Because of computer program limitations, separate analyses were performed for each of the 13 scales. Secondly, product-moment correlations and t-tests were
performed across all subjects and then for each group of subjects within each of the six factors.

Results

1. Because of the results of earlier studies, it was initially hypothesized that the bilinguals would obtain generally higher scores on the French than on the English MMPI. This was found to be the case for 12 of the 13 scales (Si being the lone exception). However, only for F and Hs did these differences reach statistical significance at the .05 level. In neither case were the differences sufficient to be of great concern clinically. The correlations ranged from as low as .41 on Hy to as high as .81 on Si. The mean correlation was .63 (as found by the use of z transformations). When compared with three prior studies of the test-retest correlations for the English MMPI with similar subjects and time intervals, the correlations for these subjects were considerably lower. These results would seem to indicate only a partial confirmation of this hypothesis.

2. Because of past theoretical writings it was hypothesized that the compound bilinguals would obtain more similar pairs of MMPI scores on each scale than would coordinate bilinguals. The results indicated that, in fact, the type of bilingualism had no effect on the results and this hypothesis was completely rejected. Although not in line with past theoretical work, these results did agree with the only other empirical investigation of the compound-coordinate dichotomy.

3. Each of the five additional factors (linguistic background, cultural background, age of second language learning, degree of home bilingualism, and relative fluency) were statistically analyzed for their
effects on the results of the tests for the two major hypotheses. Few significant effects were found and there were few major effects on the correlational data. Those differences which did appear were in no consistent directions and were felt to have been the result of coincidence. None of the 78 interaction effects were of significance.

Discussion and Conclusions

1. The partial confirmation of the first hypothesis did indicate quite clearly the need for further studies in the area of bilingualism and assessment of the validity of Chevrier's (1961) French WMI. An item analysis would seem to be needed to pinpoint those test items whose translated versions may not be of the same meaning as the original English statements. A full-scale normative study of the Chevrier version would also seem called for if it is going to be used clinically.

2. The lack of effect for the type of bilingualism might be partially explained by the confusion which exists in the literature as to which of several different and sometimes contradictory methods should be used to delineate those subjects in each category. There seems to have been a tendency on the part of linguists to confuse origin with definition. At this point, not even tentative conclusions can be reached without further study on the part of linguists themselves. It may be that the type of bilingualism has an effect only on the mechanics of acquisition, not on the personality of the acquirer.

3. Several reasons were given for why the remaining variables did not affect the previous results. In part, it may have been a product of the homogeneity of social class backgrounds which the subjects had. This would have resulted in similar value systems. In addition, it may
be that the variables no longer have an effect on language usage once fluency in both languages is reached.

4. It would seem that a number of writers in the past have been guilty of either oversimplifying or overcomplicating the effects of bilingualism on personality. Empirical studies continue to be lacking in the area of bilingualism's effects on personality and on personality assessment. Further theorizing should await verification of some of the previous assumptions. Despite the lack of statistically significant results, the present study would seem to have indicated the tremendous complexity of this area and the need for far more work than had previously been realized.
APPENDIX A

Sample Background Questionnaire
BACKGROUND QUESTIONNAIRE

NAME __________________________    UNIVERSITY __________________________

AGE    MALE    FEMALE    UNDERGRADUATE    GRADUATE    FACULTY __________________________

PLACE OF BIRTH __________________________

FATHER'S BIRTHPLACE __________________________    MOTHER'S BIRTHPLACE __________________________

LANGUAGES USED IN PARENT'S HOME (If more than one, give percentage of time each was used) __________________________

LANGUAGES YOU UNDERSTAND __________________________

LANGUAGES YOUR FATHER UNDERSTANDS __________________________

LANGUAGES YOUR MOTHER UNDERSTANDS __________________________

Answer questions 1 - 13 by circling the appropriate number according to the following:

Never = 0    Sometimes = 1    Often = 2    Mostly = 3    Always = 4

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

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

<table>
<thead>
<tr>
<th></th>
<th># 1</th>
<th># 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Father</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>(b) Mother</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>(c) Grandfather(s)</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>(d) Grandmother(s)</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>(e) Brothers/Sisters</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>(f) Other relatives</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
</tbody>
</table>

3. Did your Father speak to the following in any language other than English?

(a) Mother 0 1 2 3 4

(b) Brothers/Sisters 0 1 2 3 4

4. Did your Mother speak to the following in any language other than English?

(a) Father 0 1 2 3 4

(b) Brothers/Sisters 0 1 2 3 4
5. Did your Brothers/Sisters speak to the following in any language other than English?
   (a) Father
   (b) Mother

6. Did the following read any newspaper in a language other than English?
   (a) Father
   (b) Mother
   (c) Yourself

7. Did the following read any books in a language other than English?
   (a) Father
   (b) Mother
   (c) Yourself

8. Did the following write any letters in a language other than English?
   (a) Father
   (b) Mother
   (c) Yourself

9. Were letters written in a language other than English received in your home?

10. Did the following attend lectures in a language other than English?
    (a) Father
    (b) Mother
    (c) Yourself

11. Did the following attend movies or plays in a language other than English?
    (a) Father
    (b) Mother
    (c) Yourself

12. Were radio or television programs given in a language other than English listened to or watched in your parent's home?
    0 1 2 3 4

13. Do you do your thinking in any language other than English?
    0 1 2 3 4 If so what language?
14. Were there any books in a language other than English in your parent's home?  
   None  Some  Many  Most  All

15. At what age did you begin to learn your second (and subsequent) language?  

16. Under what circumstances did you acquire your second language?  

17. The culture I grew up in was:  
   ______ Entirely English  
   ______ Entirely French  
   ______ English and French combined  
   ______ English combined with  
   ______ French combined with.  
   ______ Neither English nor French, but  

18. I translate easily from French to English: True False

19. I translate easily from English to French: True False  
   (If your answer to either was False, please explain your difficulties below)

20. Rate your ability to speak French as compared with English:  
   ______ very much better  
   ______ much better  
   ______ better  
   ______ the same  
   ______ very much worse  
   ______ much worse  
   ______ not as well
21. Rate your ability to understand French as compared with English:

- very much better
- much better
- better
- the same
- very much worse
- much worse
- not as well

22. Rate your ability to read French as compared with English:

- very much better
- much better
- better
- the same
- very much worse
- much worse
- not as well

23. Rate your ability to write French as compared with English:

- very much better
- much better
- better
- the same
- very much worse
- much worse
- not as well

24. In what places do you primarily use English?


25. In what places do you primarily use French?


REFERENCES
REFERENCES


Bovet, P. Bilingualism and education. New Era In Home and School, 1933, 14, 161-163.
Burling, R. Language development of a Garo and English speaking child. World, 1959, 15, 45-68.


Darcy, N. T. The effect of bilingualism upon the measurement of the intelligence of children of preschool age. Journal of Educational Psychology, 1946, 37, 21-44.


Duncan, H. H. Personality adjustment techniques in voice therapy. *Journal of Speech and Hearing Disorders, 1947, 12, 161-167.*


Glenn, E. S. Untitled paper given at the annual convention of the American Psychological Association, Cincinnati, 1959.

Green, J. An experiment in English. Harper's, 1941, 183, 397-405.


Haugen, E. The analysis of linguistic borrowing. Language, 1950, 26, 210-231.


Hoijer, H. Cultural implications of some Navaho linguistic categories. Language, 1951, 27, 11-120.

Hoijer, H. (Ed.) Language in culture: Proceedings of a conference on the interrelations of language and other aspects of culture. Menasha,


Jones, W. R. A critical study of bilingualism and nonverbal intelligence. 
*British Journal of Educational Psychology, 1960, 30, 71-76.*

*British Journal of Psychology (Statistical Section), 1951, 4, 3-8.*

Jordan, R. H. Nationality and school progress. Bloomington, Illinois: 
1921. (a)

Jordan, R. H. Retention of foreign language in the home. *Journal of 
Educational Research, 1921, 3, 35-42.* (b)

Keston, M. J., & Jimenez, C. A study of the performance on English and 
Spanish editions of the Stanford-Binet Intelligence Test by Spanish-

Klineberg, O. Mental testing of racial and national groups. As cited 
in Haugen, 1956.

Kolasa, B. J. The relationship between bilingualism and performance on 
a linguistic type intelligence test. *Dissertation Abstracts, 1954, 
14, 2396.*

Lambert, W. E. Measurement of linguistic dominance of bilinguals. *Journal 

Lambert, W. E., & Anisfeld, E. A note on the relationship of bilingualism 
and intelligence. *Canadian Journal of Behavioral Science, 1969, 
1, 196.*


MacDonald, G. L. A study of the shortened group and individual forms of the MMPI. *Journal of Clinical Psychology*, 1952, 8, 309-311.


Pintner, R., & Keller, R. Intelligence tests of foreign children. *Journal of Educational Psychology*, 1922, 13, 214-222.


Sanchez, G. I. The implications of a basal vocabulary to the measurement of the abilities of bilingual children. Journal of Social Psychology, 1934, 5, 395-402. (b)


Smith, M. E. The effect of bilingual background on college aptitude scores and grade point ratios earned by students at the University of Hawaii. *Journal of Educational Psychology*, 1942, 33, 356-364.


Spoerl, D. T. The academic and verbal adjustment of college age bilingual students. *Journal of Genetic Psychology*, 1944, 64, 139-157.


Whorf, B. L. *Linguistics as an exact science.* Technology Review, 1940, 43, 3-8. (a)

Whorf, B. L. *Science and linguistics.* Technology Review, 1940, 42, 229-248. (b)

Whorf, B. L. *Languages and logic.* Technology Review, 1941, 43, 250-255. (a)

Whorf, B. L. The relation of habitual thought and behavior to language. In L. Spier (Ed.), *Language, culture, and personality.* Menasha, Wisconsin: Sapir Memorial Publication Fund, 1941, (b)


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