BILINGUALISM:
AN ASSET OR LIABILITY ON THE
COGNITION OF SIX TO NINE YEAR-OLD
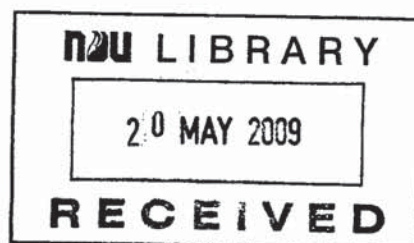LEBANESE CHILDREN?

A Thesis
Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in English

by

Lina Antoine Rahme

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Fall, 2008

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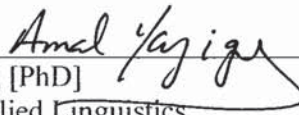

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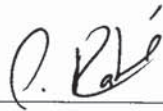First Reader: _____
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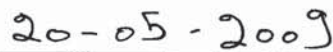   Dr Amal Malek, [Doctorate]
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Bilingualism:
An Asset or Liability on the
Cognition of Six to Nine Year-Old
Lebanese Children?

Abstract

This study compares the performance of six to nine-year old Arabic-English bilingual children from Lebanese private schools to that of their monolingual peers in the English language in the areas of semantic development, awareness of the arbitrary nature of word-referent relationship, divergent thinking, knowledge of grammatical structures, and analogical reasoning. The purpose is to find out whether the bilinguals have been positively affected by their bilingualism. The exercises are taken from researchers who conducted their studies after 1960 and believe that bilingualism results in cognitive advantages as opposed to those before that period who conclude that bilingualism negatively affects cognition. Twenty eight bilinguals and thirteen monolinguals are chosen. The results show that bilinguals in Grades 1 and 2 outperform their peers in most of the areas tested, but the bilinguals of Grade 3 perform poorly while their monolingual peers achieve very good results. The conclusions reached are that as monolinguals mature, they become more proficient in their English language and demonstrate cognitive advantages while bilinguals do that at a younger age. The third grade bilinguals are confused and exhibit disadvantages. The recommendation is to implement two additions to the curriculum of Grade 3 and to have the third grade bilingual teachers and parents monitor their learning to ensure firstly proper acquisition of vocabulary words in both languages and secondly a near native proficiency in both languages in order to receive cognitive advantages.

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Introduction

Bilingualism has been the subject of research for the past century. Researchers have been especially interested in studying its effects on the intelligence of humans to prove whether or not it has negative effects. Historically, anti-bilingualism advice predominated. Baker (2006) and Wei (2007) quote a professor at Cambridge University in 1890 who shows the negative viewpoint by saying:

> If it were possible for a child to live in two languages at once equally well, so much the worse. His intellectual and spiritual growth would not thereby be doubled, but halved. Unity of mind and character would have great difficulty in asserting itself in such circumstance (p.143; p.16).

Lebanon is a country which follows both bilingual and multilingual education. The educational curriculum states "the principle of teaching two foreign languages was established: The first starting at the beginning of schooling, and the second starting in the seventh grade" (Lebanese Curriculum and its Objectives, 1997, p.146). The first foreign language could either be English or French. The Lebanese researcher has been an Arabic-English bilingual since entering kindergarten and is interested in studying some cognitive effects of bilingualism on Lebanese Arabic-English bilingual children. This interest led to conducting research in the area of bilingualism and its cognitive effects and receiving interesting results which range from negative, such as the experiment conducted by Haugen in 1956, to positive, such as the study done by Peal and Lambert in 1962 (cited in Baker, 2006, p.143). Another reason for conducting this study is the knowledge that many middle class parents in the Lebanese society teach their children a foreign language alongside their native language, Arabic, in its Lebanese

variant. Thus lies the importance of a comparative study that takes into consideration the cognitive abilities of monolingual children on the one hand and bilinguals on the other.

Purpose

The purpose of this study is to compare the performance of six to nine-year old bilingual children from private schools in Lebanon to that of six to nine-year old monolingual children from the same schools in the areas of semantic development, analogical reasoning, divergent thinking, control over linguistic processes, and awareness of the arbitrary nature of word-referent relationship. Based on the comparison, the study finds out whether the bilingual children have been positively affected by their bilingualism, that is whether they are at a higher stage in the semantic developmental area, are better at analogical reasoning, are better divergent thinkers, have more control over linguistic processes, and are more aware of the arbitrary nature of word-referent relationship. The majority of the studies, conducted from the year 1962 till recently, which are explained in the review of literature, show that bilingualism improves the above-mentioned aspects of cognitive abilities in children of different ages.

Hypothesis

The research is based on testing the following hypotheses.

Six to nine year old balanced bilingual children from private schools

- reach a semantic development stage two to three years earlier than their monolingual peers.
- comprehend the arbitrary nature of word-referent relationship and that words are just symbols as opposed to their monolingual peers.

- get higher scores on divergent thinking skill exercises than their monolingual peers.

- identify grammatical sentences as opposed to their monolingual peers.

- get higher scores on analogical reasoning skill exercises than their monolingual peers.

Type of Research

The research is a comparative study that replicates the studies of leading researchers such as, Ianco-Worrall (1972), Ben-Zeev (1977), Baker (2006), Bialystock (1985), and Diaz (1985) in the field of bilingualism and its cognitive effects on children. The results received from the monolingual children are compared to the results of the bilingual children across the four schools that are chosen, and differences and/or similarities are studied and analyzed. There is also reference to the results of the original studies.

Division of Chapters

Chapter One includes a general introduction about bilingualism in Lebanon, the purpose of the thesis, the hypothesis, and the type of research.

Chapter Two includes general information about bilingualism. It starts by stating the categories followed by the types of acquisition. After that, the degrees of bilingualism are discussed followed by a distinction between additive and subtractive bilingualism. The item before last is the three different ways a language is encoded in people's brains. The last item is the definition of bilingualism.

Chapter Three includes the review of literature. It is divided into two main parts. The first part talks about the early studies, from the early nineteenth century till the 1960s, which, in general, show negative effects of bilingualism on the

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cognition of bilingual children. The second part talks about the later studies, from the 1960s till recently, which show positive effects of bilingualism on the cognition of bilingual children and from which the researcher has taken or adapted exercises for the current study.

Chapter Four is the methodology chapter. It includes detailed information about the subjects in this current study, the procedure taken to conduct the study and the exercises given to the subjects.

Chapter Five reports on all the results received from the study and presents the analysis of those results.

Chapter Six is the last chapter, and it includes the conclusions reached, the implications and the limitations of this research on the cognitive advantages of bilingual children in the Lebanese society.

Areas in Bilingualism

The current study deals with the effects of bilingualism on the cognition of bilingual Lebanese children. Before going into the details of this study, it is necessary to provide an explanation and overview of some areas of bilingualism, which are needed to ensure understanding and comprehension of the study. Therefore, this chapter discusses the categories of bilingualism, the types of acquisition, the degrees of bilingualism, a distinction between additive and subtractive bilingualism, the three different ways a language is encoded in people's brains, and the definition of bilingualism.

To begin with, Colin Baker and Sylvia Prys Jones (1998) have categorized bilingualism into five major types: balanced, dominant, semilingual, prestigious, and multilingual. The first type, which is balanced bilingualism, describes a person who has near-native proficiency in both languages (p.1). Butler and Hakuta (2004) define it as "those bilinguals who have equally high proficiencies in both languages" (p.119). The second, dominant bilingualism, is when a person is much more proficient in one of the languages and uses it more frequently (Children and Bilingualism, 2007). Semilingualism, the third type of bilingualism, is a negative label for a person who has a low level of competence and a small vocabulary in both languages (Andersson & Cunningham-Andersson, 2004, p.108; Edwards, 2004, p.10). As for the fourth type, prestigious bilingualism, it refers to a person who is competent in or uses two high status languages. The last type, multilingualism, is for a person who uses three or more languages (Baker & Jones, 1998, p.1). In the present study, the bilingual children who have been chosen are balanced bilinguals based on the teachers' evaluation and grades.

There is a number of possible routes involved in children's bilingual acquisition. One instance is that children may acquire two languages simultaneously. Alternatively, they may acquire one of the languages before the other. Romaine (1995) cites several researchers' opinions concerning bilingual acquisition. In the first case, Swain (1972) has labeled the acquisition as "bilingualism as a first language" and Meisel (1990), another researcher, as "two first languages" or "bilingual first language acquisition". The third, McLaughlin (1978), states that the acquisition of more than one language up to the age of three should be considered simultaneous. Other researchers Romaine cites are Padilla and Lindholm (1984) who disagree with McLaughlin's concept by saying one should speak of simultaneous acquisition of two languages only when the child has been exposed to the two languages from birth (p.181).

This is the case with a child being exposed to two languages since birth or at a very young age, but there are other children who are monolingual and then for certain circumstances, such as emigration, learn a second language. These children and their parents learn the second language in a "natural" way since they do not receive formal instruction. In cases such as these, Romaine (1995) believes that the problems the migrant families face in trying to preserve their first language are similar to those of families trying to bring up their children bilingually (p.182).

Raising bilingual children is not an easy matter, and some are afraid of negatively affecting their children. There are several guide books for parents who want to raise bilingual children. Ronjat's studies in 1913, cited in Edwards (2004), are the earliest systematic studies of childhood bilingualism. He is the one who introduced the 'one person-one language' principle (defined in the following paragraph) which is thought to be the most effective method for bringing up a child

bilingually in a home where the parents have different mother tongues (p.12). There are also other methods for bringing up bilingual children. Following Harding and Riley, Romaine (1995) classifies the types of early childhood bilingual acquisition into five categories depending on several factors such as: The native language of the parents, the language of the community at large, and the parents' strategy of speaking to the child. Romaine adds a sixth type, "mixing", which she has come up with (p.183).

The first type of early childhood bilingual acquisition, one person-one language, is when the parents have different native languages with each having a certain degree of competence in the other's language. The parents each speak their own language to the child since birth and the language of one of the parents is the dominant language of the community (Andersson & Cunninghan-Andersson, 2004, p.31). Type 2, non-dominant home language/one language-one environment, is when the parents have different native languages, but they both speak the non-dominant language to the child who is fully exposed to the dominant language when outside the home. The native language of one of the parents is the dominant language of the community. Colin Baker (2006) categorizes this type as "home language is different from outside the home" (p.102). Type 3, non-dominant home language without community support, is when the parents share the same native language and speak it to the child, and the dominant language is not that of the parents. Type 4, double non-dominant home language without community support, is when the parents have different native languages, and they each speak their own language to the child from birth. The dominant language is different from either of the parents' languages. Type 5, non-native parents, is when the parents share the same native language, but one of them always addresses the child in a language

which is not his/her native language. The dominant language is the same as that of the parents. Type 6, mixed languages, is when the parents are bilingual, and they code switch and mix languages. Sectors of the community may also be bilingual (Romaine, 1995, p.183). In the current study, the children fall either under type 1, type 5, or type 6. For instance, a type 1 child might have one of the parents a native Lebanese and the other a native English-speaking one. Each of the parents uses his / her mother-tongue while addressing the child. A type 5 child has two Lebanese parents who both have Lebanese Arabic as their native-tongue. However, one of the parents always uses English while talking to the child. And a type 6 child has Lebanese bilingual parents who use both languages interchangeably while speaking to the child.

The bilingual's skill may not be the same at all levels for both languages. The linguistic levels involved are phonological, grammatical, lexical, semantic, stylistic, and graphic. An example of difference on the phonological level would be the Polish novelist Joseph Conrad. He has an excellent command of the written English language but speaks it with a very strong Polish accent. This is the case because he has learned English only for the purpose of reading and writing it. Concerning the semantic level, bilinguals may be able to express themselves better in one language than the other especially in certain topics or contexts. For example, a language used informally at home is not used to talk about schooling topics if another language is used at school (Romaine, 1995, p.13). The researcher in this study has asked the Arabic and English school teachers to select children who have a similar level of skills in both languages.

Another important factor in bilingualism is the distinction between additive and subtractive bilingualism. Edwards (2004) believes the former occurs in

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circumstances where the learning of another language represents an expansion of the linguistic repertoire (p.10). A classic example is found in the bilingualism of aristocracies and social elites because it is considered natural or ordinary for an educated person to learn a second language at no cost to the first (Baker, 2006, p.4; Butler & Hakuta, 2004, p.118). As for subtractive bilingualism, Edwards and Baker believe it occurs when the politics of a country favors the replacement of the home language by the majority language, such as the replacement of Spanish by English in the US (2004, p.11; 2006, p.4).

In Lebanon, bilingualism falls into the first category, that of additive bilingualism. In the Lebanese schools, which all follow bilingual education, classical Arabic is considered very important and is taught in primary and intermediate classes as an independent subject. Seven or eight hours a week are designated for it. Simultaneously, English or French is learnt (Lebanese Curriculum and Its Objectives, 1997). As mentioned in Chapter One, education in Lebanon depends highly on the knowledge of at least two different languages, but schools do not teach their students a foreign language at the expense of their native one. Therefore, the bilingual sample in the study is one which has additive bilingualism.

When children learn a second language, the concepts of this language are encoded in their brains so they can become proficient in its use. There are three different ways people can become proficient in two languages: coordinate, compound, and sub-coordinate. Williams and Snipper (1990) provide talk about the first two: compound and coordinate (p.39), and Romaine (1995) adds the third one: sub-coordinate (p.79). They believe that these ways of becoming bilingual are due to the differences in the ways the languages had been learned.

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The coordinate bilinguals learn their native language first and then are introduced to a second language. These two languages are learnt in two completely separate environments; the words are kept separate and not linked in any manner each having its own specific meaning; the two linguistic codes are organized separately into two sets of meaning units (cited in Butler & Hakuta, 2004, p.116). Williams and Snipper (1990) give an example of a 5 year-old Japanese girl, Uguisu, whose parents moved her to the USA for two years. Initially, she had no knowledge whatsoever of the English language, and her parents communicated with her by only using their native tongue, Japanese. She eventually learnt English from her friends in kindergarten and became proficient in it (p.39). Romaine (1995) also gives an example of a person whose native tongue is English and then learned French at school. The settings in learning the languages were two different ones, and that was the reason for having different conceptual systems developed and maintained for the two languages. The example of the word "book" is provided. In this case, the French term "livre" would have its own meaning unit and the English word "book" its own meaning unit (p.79).

On the other hand, in compound bilingualism, the person learns the two languages in the same context, and therefore, there is a fused representation of the languages in the brain. There are two sets of linguistic codes stored in one meaning unit. The languages can either be used interchangeably or separately by different people in different situations (cited in Butler & Hakuta, 2004, p.116). Williams and Snipper (1990) provide the results of the study Leopold (1939-1949) conducted on his own daughter. Since she was a child, she and her father would only communicate in German, while she and her mother would only communicate in English. The girl eventually kept both languages totally separate till her teenage

years (p.39). Romaine (1995) gives the example of a child who acquired both French and German in his home. The child would have a common meaning, or one meaning unit, for the words "buch" and "livre" which both mean "book". So, one single concept which is "book" would have two different verbal labels attached to it since both words are tied to the same mental representation (p.79). Here, the distinction between coordinate and compound bilingualism is that in the former, the languages are independent, whereas in the latter, they are interdependent.

Sub-coordinate, which is a sub-type of coordinate bilingualism, is when bilinguals interpret words of their weaker language through the words of the stronger language. The dominant language acts as a filter for the other. In this case, there are two sets of linguistic codes but one meaning unit (Butler & Hakuta, 2004, p.118). Romaine (1995) gives the example of an English/Urdu bilingual whose weak language is English. The English word "book" will evoke the Urdu word "kitab" (p.79).

To sum up the ways of becoming bilingual, according to Weinreich (1953) cited in Butler and Hakuta (2004), the compound bilingual has one set of meanings and two linguistic systems tied to them. The coordinate bilingual has two sets of meanings and two linguistic systems tied to it. The sub-coordinate bilingual, according to Romaine (1995) has a primary set of meanings established through the first language and another linguistic system attached to it (p.79). The children in the current study fall either under compound or coordinate bilingualism and not sub-coordinate because they have been identified by their teachers as balanced bilinguals.

It is very difficult to find one clear-cut definition of bilingualism because of its complex nature. It is not at all just about two languages (May, Hill, &

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Tiakiwai, 2004, p.10). Is it the ability to speak two different languages, read them, write them, understand them, speak one and understand the other, or write one and be fluent in the other? There are a lot of combinations one could make in defining bilingualism; linguists have had different explanations and definitions which have varied across time.

Bloomfield (1933), cited in Edwards (2004), believes that it is the native-like control of two languages, where one perfectly learned language is added to the native one (p.8). On the other hand, Haugen (1953), also cited in Edwards (2004), observes that bilingualism begins when the speaker of one language can produce complete meaningful utterances in the other language (p.8). As for Diebold (1964), who is cited in Reyes (2007), bilingualism is "incipient bilingualism", which is minimum knowledge in one language and being bilingual to some degree (p.1). MacNamara's (1967) view, cited in Reyes (2007) as well, is similar to Diebold's in that even the minimal acquisition of one of the language skills, be it listening, speaking, reading, or writing makes a person bilingual (p.1). Williams and Snipper (1990) provide a broad definition, which is "a person's ability to process two languages" (p.33). Bilinguals, according to Meisel (1990), are "individuals who acquired their two languages in early childhood, that is, who were exposed to both languages from early on, before age 3" (cited in Wei, 2007, p.336).

Because specificity is crucial for the validity of the study, the researcher has chosen a definition that is most suitable and applicable to the Lebanese society and the nature of the study. It is stated by Gleason and Ratner (1993), "bilingualism is the ability to communicate effectively verbally and in written form in two languages, the native one and another frequently used, with a certain amount of ease in all usual situations" (p.392).

The study of cognitive effects on bilingual children is a new field of research in the Lebanese community. The purpose of this study is to take a small sample of the Lebanese community's children and observe whether bilingualism positively affects some of their cognitive abilities. Several variables are controlled to ensure valid and reliable results such as age, social economic status, and proficiency in the English and Arabic language. The exercises given to the children are adapted or taken from experiments done by researchers in the field of bilingualism.

The following chapter discusses the studies made on the effects of bilingualism on the cognition of children from the early 20th century till our current times. The information is presented in chronological order and shows the development of research and the changing of results from negative to positive.

Review of Literature

This chapter discusses the major studies that have been conducted on the effect of bilingualism on cognitive abilities of humans from the early twentieth century till the early twenty-first century. The first part of the chapter deals with the earlier studies up to the 1960s. During that period, most of the studies show that bilingualism is a real liability because it negatively affects people's cognitive abilities. It is important to state how those studies are conducted to show that some of the negative results received are due to the lack of control of important variables. As for the second part of the chapter, it discusses the major studies done from the 1960s onward. Contrary to the earlier studies, most of those new ones state that bilingualism positively affects cognitive abilities of humans. In the current study, some of the exercises are adapted and other exercises are taken as is from six of the studies discussed in the second part.

The widespread belief from the early 20th century till the middle of the 20th century, around 1960, is that bilingualism has negative detrimental effects on the cognitive and intellectual growth of human beings (Wei, 2007, p.16). Lee (1996, p.502) and Baker (2006, p.144) talk about the early studies that examine cognitive development in bilinguals. The latter refers to the mentioned period as "The Period of Detrimental Effects" (2006, p.144).

Lee (1996) mentions the social concerns of the US at the beginning of the 20th century when a lot of immigrants arrive there (p.501). They score very poorly on IQ tests and do not seem to be able to fit in the American society and adapt to the lifestyle (Haugen, 1956). Naturally, psychologists offer explanations. Two theories are presented. The first, provided by hereditarians, explains that these immigrants descend from races of low intelligence and are therefore not intelligent by nature.

They do not consider bilingualism a factor affecting IQ results. On the other hand, the environmentalists or the empiricists believe that bilingualism confuses the mind and negatively affects cognitive growth and therefore results in such low scores on IQ tests (cited in Lee, 1996, p. 501).

In 1917, twenty-five out of thirty adult Jews are found to be "feeble-minded" according to Goddard (1910, cited in Romaine, 1995) who had translated a test into English and said that the lack of vocabulary found in those subjects is due to lack of intelligence (p.107). This theory is challenged, in later years, by Gould and Hakuta. Hakuta (1989, in Hakuta and Garcia) talks about those immigrants to the US in the early 1900s. He sees bilingualism as a sign of immigration. He believes that the IQ tests are administered under traumatic circumstances and result in poor scores. Another reason for the poor results is that the language of the test, English, is not understood (p.374). Gould (1981, cited in Romaine 1995) shares the same view that IQ tests are administered to prevent immigration to the US because immigrants who do not perform well are not allowed into the country (p. 108).

After World War I, many IQ tests are administered. According to A. J. Snow, Brigham (1923), a hereditarian, in his book *A Study of American Intelligence,* tries to link the poor performance of two million draftees to a lesser intelligence resulting from racial origin. He believes intelligence to be hereditary and not modifiable. He does not believe it is a disadvantage if the subjects do not know the language of the test. Brigham's thesis is that "the average intelligence of our immigrants is declining" (p.304), and to him, this is due to two factors. The first factor, in his own words, is "the immigration to the US of the Alpine and Mediterranean races has increased, while that of the Nordic races has materially decreased" (p.304). The second factor is "the representatives of the Alpine and

Mediterranean races in our immigration are undoubtedly inferior to the representatives of the Nordic race" (p.304). After conducting his study, Goodenough (1926, cited in Edwards, 2004), who is also a hereditarian, claims that language handicap is the cause of low IQ and not a result of it because he finds that the more English is used at home, the higher the IQ scores (p.16). Francis Walker's similar views to Goodenough are apparent when he states "these immigrants are beaten men from beaten races, representing the worst failures in the struggle for existence…. Europe is allowing its slums and its most stagnant reservoirs of degraded peasantry to be drained off upon our soil" (cited in Hakuta &Garcia, 1989, p.375).

Baker (2006) mentions Saer, who in 1923 conducts a study to conclude that bilinguals are behind monolinguals in verbal IQ. Saer's study includes 1400 subjects who are seven to fourteen year old monolingual and bilingual children. The result is a ten-point difference in IQ to the advantage of monolinguals in the rural areas of Wales (p.145). Saer's explanation is that bilinguals are mentally confused. In 1924, Saer furthers the research to university students and concludes that monolinguals are superior to bilinguals. From that conclusion, he reconfirms the results he received the year before and states that there is a permanence in mental ability shown through IQ test results because it persists in university students (p.144).

Several researchers during this period offer negative results and effects of bilingualism. Barke and Perry Williams (1938), for example, claim that bilinguals have weaker verbal abilities than monolinguals (cited in Lee, 1996, p. 501). Madorah Smith (1939, cited in Hakuta, Ferdman, & Diaz, 1987) believes, after studying the free speech utterances of Hawaiian preschool children who have a wide

variety of language backgrounds, that children should learn the L2 after pre-school years. Her bilingual sample shows inferiority to monolinguals; therefore, she concludes that "an important factor in the retardation in speech found in the preschool population is the attempt to make use of two languages" (p.289). Ten years later, in 1949, Madorah Smith conducts a research that attempts to measure both vocabularies of thirty English-Chinese bilingual children. Her results show that, in either language, the children have below average-sized vocabularies for children of their age. The negative results she receives are consistent with the research she had done a decade earlier (p.309).

Harris (cited in Lee, 1996), in 1948, talks about bilinguals having lower standards on written composition and more grammatical errors than monolinguals. As for Carrow, in 1957, who is also cited in Lee (1996), he claims that bilinguals have deficient articulation and deficiencies in their development of non-verbal abilities, such as mathematic competency (p. 501).

Anastasi and Cordova (1953), after studying Puerto-Rican children in New York, find that monolingual children are up to 3 years ahead of bilingual children in skills relating to verbal and non-verbal intelligence. From the IQ tests done, they conclude that the languages of the tests make no difference at all; the subjects perform poorly on the tests (p.13).

Other studies conducted during the first half of the century take into consideration the negative performance on verbal IQ tests, and therefore the result researchers, such as Darcy (1953), come up with is that bilinguals are inferior to monolinguals in almost all aspects of language (cited in Macnamara, 1967, p. 58). Macnamara (1967) also claims that there are deficiencies in the verbal abilities of

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bilinguals, and that proficiency in a second language necessitates the loss of proficiency in the first language (p. 61).

One of the exceptions is Malherbe in 1946, cited in Romaine (1995), who believes that bilinguals are superior to monolinguals. He studies 18,000 students in South Africa; some are in monolingual schools and others in bilingual ones. In the monolingual schools, English is considered a subject, and Afrikaans is the main language of instruction. In the bilingual schools, the primary instructions are given in the first language, and then both languages are used. After comparing students' achievements both scholastically and linguistically, the bilinguals are clearly superior to the monolinguals (p.110).

During the same time, besides Malherbe, some researchers argue that children get mental advantages from their exposure to two languages. Werner Leopold (1939-1949) studies Hildegard, his oldest daughter over a period of seven years. He speaks to her in German; her mother speaks to her in English, and she grows up in an English-speaking environment (cited in Wei, 2007, p.303). Leopold notices his daughter's mental development is improving due to her exposure to two languages. He explains his observation by noting that bilinguals focus on content of language instead of form because they have to differentiate between two different words for the same referent and therefore learn the symbolism of words very early (cited in Hakuta et.al., 1987, p.292; cited in Lee, 1996, p. 502).

Cummins (1983) finds a way to explain the contradictory findings of Leopold and Macnamara. He suggests they exist because of the different socioeconomic backgrounds the subjects come from; therefore, he argues that the studies, one showing deficiencies in verbal abilities of bilinguals and the other proposing improvement in mental development, are unreliable (p.119).

Another problem with the early studies is that the degree of bilingualism is not assessed. Researchers determine the degree in unscientific ways. For example, Brunner (1929) assesses it according to the place of birth of the children's parents (cited in Lee, 1996, p.502); Hakuta (1989) claims that psychologists rely on the children's last name. The subjects may not have been bilingual at all, and the methods cannot be considered valid since the subjects can be monolingual or barely able to speak the language of the tests they are given (Hakuta & Garcia, 1989, p.374).

To conclude the early studies of bilingualism and intelligence, they show contradictory results because of each researcher's definition of bilingualism and the way the studies are conducted (cited in Hakuta, et.al, 1987, p.287). The negative effects of bilingualism on cognitive development as regarded by researchers in the first researches are summed up by George Thompson (1952), as cited in Hakuta and Garcia (1989):

> There can be no doubt that the child reared in a bilingual environment is handicapped in his language growth. One can debate the issue as to whether speech facility in two languages is worth the consequent retardation in the common language of the realm (p.375).

Nearly all of the previous part discusses negative effects of bilingualism on the cognitive abilities of humans. After a long period of people believing that bilingualism is a real threat to cognitive abilities and sometimes leads to retardation in speech and thinking, some researchers start to refute this opinion and present new and fresh theories stating that bilingualism has, contrary to everyone's belief, positive effects on cognitive abilities. The following part explains how and why this happens.

In the 1960s, bilingualism becomes an asset to political power in Canada. Bilingualism is valued only if it takes the shape of "double monolingualism", that is being proficient in the two languages simultaneously (cited in Heller, 2002, p.48). Therefore, bilingual education is adopted, and subsequently middle-class parents become worried about the negative effects of bilingualism on their children's cognition.

Several studies are conducted, but the most influential is that of Lambert and Peal in 1962 (cited in Myers-Scotton, 2006, p.340; cited in Williams and Snipper, 1990, p.65). The advantage they have over the previous studies is that they take into consideration three very important variables that have been earlier neglected. First, they choose to compare 10-year-old bilingual and monolingual children who come from the same French school system in Montreal and who have the same social background, middle class. Second, they only include children who are equally proficient in both English and French and drop children who are identified as "pseudo-bilinguals", not proficient in both languages. Thus, the new idea of "balanced bilinguals" is introduced by them. Third, they do not just rely on cognitive abilities that the concept of IQ is based on but go beyond them and look at a wider perspective such as thinking styles and strategies (cited in Baker, 2006, p.148). Three tests are used, the modified version of the Lavoie-Larendau Group Test of General Intelligence, the Raven's Colored Progressive Matrices, and subtests of the Thurstone and Thurstone Primary Mental Abilities Test (cited in Lee, 1996, p. 503). Peal and Lambert control several factors such as sex, age, and socio-economic status. They also go the extra mile and evaluate the children's proficiency in the language through self-evaluation and vocabulary and association tests. The results are in favor of bilingualism because the bilinguals score much

higher than the monolinguals in both verbal and non-verbal intelligences. The conclusion reached is that the monolinguals are outperformed by their bilingual peers because the latter possess better mental flexibility and strong concept formation skills (cited in Myers-Scotton, 2006, p.340). Therefore, based on the results, the researchers challenge half a century of studies and present totally new results by claiming that bilingualism has positive effects on cognitive abilities (cited in Mackey, 1969, p.225). Romaine (1995) presents their conclusion:

> Intellectually, the bilingual's experience 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, ... It is not possible to state from the present study whether the more intelligent child became bilingual or whether bilingualism aided his intellectual development, but there is no question about the fact that he is superior intellectually. In contrast, the monolingual appears to have a more unitary structure of intelligence, which he must use for all types of intellectual tasks (p.112).

Although Peal and Lambert (1962) take into consideration variables that are not examined in the earlier studies, some researchers are still not ready to fully accept the results. Macnamara (1966) argues that the sampling of the bilingual subjects may have been biased (cited in Mackey, 1969, p.226) for three reasons; first, the children who score above a certain level on the English version of the Peabody Picture Vocabulary Test are chosen. Second, the monolingual sample is in a lower grade and is receiving less formal instruction, and third, the monolinguals' Raven scores are positively skewed, while being negatively skewed for the bilinguals. Macnamara (1966) also says it is possible that the balanced bilinguals they chose as subjects are children who are more intelligent and have a natural tendency to

learning languages. Therefore, their findings are definitely advantageous to bilingualism (cited in Romaine, 1995, p.115).

Lee (1996) believes there is no doubt that Peal and Lambert (1962) have brought new perspective to the effect of bilingualism on intelligence and have made other researchers take that into consideration (p. 504).

On the other hand, a lot of researchers support the findings of Lambert and Peal. For example, Ianco-Worrall (1972, p.1392) studies thirty Afrikaans/English bilingual children versus monolingual ones in South Africa. The children's ages range from four to nine; the two groups are matched based on IQ, sex, age, school grade, and social class (Ianco-Worrall, 1972, p.1393). Anita Ianco-Worrall concludes that the bilinguals are able to analyze language as an abstract system earlier than their peers. Her conclusion results from tasks she gives the children.

The first task in the experiment is based on Leopold's observations that point to a faster rate of development in specific areas of cognitive functioning such as earlier separation of word sound from word meaning by bilingual children (Ianco-Worrall, 1972, p.1391). The task is a semantic and phonetic preference test. It consists of eight verbally presented, one syllable sets of words. She gives it in two languages to the bilinguals, Afrikaans and English, but the words are not the same. Each set of words consists of three words where one is the standard and the other two are the choice words. The first choice word is related phonetically to the standard one, and the second choice word is related semantically to it. Ianco-Worrall conducts the test as such and tells the child, "I have three words: *cap, can, and hat*. Which is more like *cap, can* or *hat*" (1972, p.1394)? With the seven-year old subjects, there is no difference in the response. Both groups answer "hat" indicating semantic preference or meaning preference. However, with the four to

six-year olds, the bilinguals tend to respond to word meaning while the monolinguals, by choosing "can", tend to respond to the sound of the word, indicating phonetic preference (Ianco-Worrall, 1972, p.1397). She concludes from the results that bilinguals reach a stage in semantic development two to three years earlier than their monolingual peers (Ianco-Worrall, 1972, p.1398).

Another task in Ianco-Worrall's experiment is based on Vygotsky's (1962) notion that bilingualism leads to the earlier realization of the arbitrary nature of name-object relationship (cited in Ianco-Worrall, 1972, p.1391). The task is an exercise with three parts. The first part is when the student is asked for an explanation of six names: dog, cow, chair, jam, book, and water; e.g., "Why is a dog called 'dog'" (Ianco-Worrall, 1972, p.1394)? The second part involves asking the student whether the names can be interchanged: "Suppose you were making up names for things, could you then call a cow 'dog' and a dog 'cow'" (Ianco-Worrall, 1972, p.1394)? The majority of the bilingual children answer yes, while a very small part of the monolinguals does. Part three is an interchange of names in play. Ianco-Worrall tells the student, "Let us play a game. Let us call a dog 'cow'." Then, she asks two questions: "Does this 'cow' have horns?" and "Does this 'cow' give milk?" Besides this pair of words, two other pairs are interchanged: 'chair' is called 'jam' and 'book' is called 'water'. The questions are: "Can you eat this 'jam'?", "Can you sit on this 'jam'?", "Can you drink this 'water'?" and "Can you read this 'water'? There is no difference between bilinguals and monolinguals across all the age levels (Ianco-Worrall, 1972, p.1398). Ianco-Worrall's (1972) conclusion from all the experiment, and not just the last part, is that bilingual children understand the arbitrary relation between words and the names people give

objects earlier than monolinguals. She believes that monolinguals are bound by words, but bilinguals feel and know language to be arbitrary (p.1399).

In Cummins's study (1978), which is very similar to Ianco-Worrall's, three questions of the type "suppose someone was making up names for things, could he then call the sun "the moon" and the moon "the sun"? are asked. The other two items are "cat-dog" and "book-chair" (Cummins & Mulcahy, 1978, p.1240). Unlike Worrall's study, a yes/no answer is insufficient. Justifications are needed, and the only ones judged correct are those that recognize the arbitrary nature of word referent relationships and those that argue that the only reason someone cannot change the names is that everyone will be confused. The subjects of the study are 72 children attending a Ukrainian-English bilingual program in Edmonton, Canada. The control group speaks no Ukrainian at home and is judged by teachers not to be very fluent in Ukrainian, and the experimental group has extensive training in Ukrainian at home and is judged by teachers to be very fluent in the language. No difference is found between the groups in awareness of the arbitrary nature of word-referent relationships (Cummins & Mulcahy, 1978, p.1239).

The conclusion Ianco-Warrall reaches is challenged by the researcher Aronsson in 1981 who believes that monolinguals deal with lexical arbitrariness in a different form, stylistic. Children have to distinguish between "guy" and "boy", two synonyms in English. Aronsson believes that this is similar to bilinguals knowing the word "boy" in English and its parallel "pojke" in Swedish (cited in Romaine, 1995, p.113).

In 1973, one year after Ianco-Worrall conducts her study, Scott's argument is that bilinguals possess better divergent thinking skills because they perform better on such tasks than monolinguals. His argument is that convergent thinking is tested

in IQ tests and requires the person to reach one answer as opposed to divergent thinking, which requires several answers to an open-ended question. Also, since divergent thinking is believed to promote creative thinking, bilinguals are considered better than monolinguals at tasks that require creative thinking (cited in Romaine, 1995, p.113).

According to Baker (2006), research findings also show that bilinguals are superior to monolinguals on divergent thinking tests (p.153). Out of twenty-four studies conducted, according to Ricciardelli (1992), twenty studies show the superiority of performance in bilinguals (p.303). Divergent thinking can be tested by asking questions like, "How many uses can you think of for a brick?", or "How many interesting or unusual uses can you think of for tin cans?" So, the person has to think of as many answers as possible that come to mind. In response to the brick question, a divergent thinker comes up with normal uses for a brick but also with very unusual ones such as "for blocking up a rabbit hole, for propping up a wobbly table, as a foot wiper". However, a convergent thinker only provides very obvious answers (Baker, 2006, p.152).

As for creative thinking, which is the term more frequently used than divergent thinking in the United States, figural tests are administered which provide a sheet with forty squares or circles, and the person is asked to "draw pictures using these individual circles or squares, and subsequently place a label underneath" (Baker, 2006, p.153). Baker believes that bilingualism enhances creative thinking because the ownership of two languages means having two different labels for one thing. Therefore, a person has a wider variety of associations. Baker provides a simple example. The word "school" in English means "ysgol" in Welsh; this word

also means "ladder", so this provides the bilingual with added associations, that is, the idea of a school as a ladder (2006, p. 153).

The study made by Carringer in 1974 yields the same results: bilinguals are better creative thinkers. The bilingual group only includes balanced bilinguals. Carringer (1974) attributes flexibility to the fact that bilinguals have two terms for one referent. He has to "cope continually with the negative transfer effects caused by interlingual interference, and thus develops more cognitive flexibility in his efforts to overcome this interference" (p. 502). His subjects are 15 year-old English/Spanish bilinguals (Carringer, 1974, p.500).

Peal and Lambert (1962, cited in Myers-Scotton, 2006), after conducting their study, claim that bilinguals show more mental flexibility (p.340). Also, according to Liedtke and Nelson in 1968, since bilinguals are exposed to a more complex environment and a much more complex social interaction than monolinguals, they are better at concept formation, which is a major part of intellectual development (cited in Lee, 1996, p. 505).

Genesee, Tucker, and Lambert (1975, p.1013) believe that it is possible for bilingual children to become less de-centered because of their exposure to two languages. They come to this conclusion after testing English speaking children who receive most of their education in French due to immersion programs and find that they are much more sensitive to the needs of their blindfolded audience than monolinguals. The children are asked to explain a game of board and dice to two listeners, one of them blindfolded. The bilingual group takes into consideration the needs of the blindfolded person much more than the monolingual group does (Genesee, Tucker, & Lambert, 1975, p.1012). Baker (2006) states that this is what researchers refer to as "communicative sensitivity" (p.161).

Another experiment that shows bilingual children's sensitivity is conducted by Genesee (2006). An experimenter plays with and observes six two to two and a half year-old English-French bilingual children on three occasions. The experimenter uses mixed utterances fifteen percent of the time during the first meeting, forty percent during the second meeting, and fifteen percent again during the last meeting. The six children mix more during the second meeting than the first, and four of them reduce the mixing during the last meeting. The results clearly show that these bilingual children are sensitive to the needs of others since they are monitoring the language choice of their interlocutor (p.59).

Another reason bilinguals have such flexible minds is because they have to associate two different semantic meanings for one word in a language but not in the other. The example of the word "school", which has been earlier used, explains the issue. The word for "school" in Welsh also means "ladder", but it just means "school" in English. This is beneficial for the bilingual child since the same association of the two words in English means that school is a ladder for success and opportunities in life (cited in Romaine, 1995, p.115). According to Li Wei (2007), because bilinguals are able to extend the range of meanings, associations and images, they think more flexibly and creatively (p.21).

The "processing of words and the development of a concept of a word" (Bialystock, 1984) are tested. The results Bialystock gets are that bilinguals have a better understanding of the idea of a word than monolinguals. To get those results, Bialystock (1984) asks the children to count the number of words found in sentences, therefore testing the children's awareness of what a word is. Around the age of 7, children develop the ability to know that words add up to form a sentence and are entities of their own outside a sentence and have meanings of their own.

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According to Bialystock, the bilinguals count the words in sentences better than their monolingual peers because "they were more clear about the criteria that determined the identity of words, and they were more capable of attending to the units of speech they considered relevant" (1984). All these tasks require selective attention, and the ability to make use of it allows the use of "language for advanced and specialized purposes such as literacy" (cited in Romaine, 1995, p.114).

Cited in Baker (2006), Bialystock (1987), after conducting her studies, says that bilingual children are superior to monolingual ones on measures of "cognitive control of linguistic processes" (p.157). Three studies are conducted; each involves around 120 children aged 5 to 9. In each of the studies, similar experiments are given. The children are given sentences of different natures: some are meaningful and grammatical, such as "Why is the dog barking so loudly?" Some are meaningful but ungrammatical. For example, "Why the dog is barking so loudly?" A third category of sentences is silly but grammatical, like "Why is the cat barking so loudly?" The last type of sentences is silly and at the same time ungrammatical: "Why the cat is barking so loudly?" Once they are given the sentences, the children are asked to find the grammatical sentences with total disregard to meaning. This tests the "level of analysis of a child's linguistic knowledge." Across all the ages being tested, bilinguals judge the grammaticality of the sentences much more accurately than their monolingual peers (cited in Baker, 2006, p.157).

Bialystock, in 2001, states that being able to step back and analyze language form requires what is called "metalinguistic knowledge" (cited in Myers-Scotton, 2006, p.339). This knowledge aids children in learning at school and being literate. She believes that children with this knowledge do understand that when change in word order takes place, the meaning of the sentence changes. They also know that

change in verb form means a change in the time the event takes place (cited in Myers-Scotton, 2006, p.339). Myers-Scotton (2006) defines metalinguistic knowledge as "knowledge about the abstract character of language-knowledge beyond how to produce certain utterances" (p.339). An example of metalinguistic task is translation. Malakoff (1992, cited in Romaine, 1995) says that children of minority groups provide translation for their less proficient parents in the native tongue of the country and even at a very young age show a low rate of errors (p.115).

One of the earliest studies done on metalinguistic awareness is by Ben-Zeev in 1977. While investigating metalinguistic awareness, she finds that bilingual Hebrew-English children outperform monolinguals (Hebrew and English) on "symbol substitution" tasks. The test is called the Symbol Substitution Test (p.1012). The goal is to show that the children understand that words are only symbols. The test consists of a seven-item task where the children are required to substitute one meaningful word for another within a fixed sentence frame. The first two items are as such: "You know that in English this is named airplane (the experimenter shows a toy airplane). In this game, its name is 'turtle'…Can the 'turtle' fly? How does the 'turtle' fly? The children's answer to the first question should be "yes" and to the second question "with its wings" (Ben-Zeev, 1977, p.1012). For the rest of the items, the children should violate selectional rules of the language. For example, "in this game, the way we say 'I' is to say 'macaroni'. So how do we say 'I am warm?' The correct answer is "Macaroni am warm." To give the correct answer, the child must resist the mutual interference of the substituted item and the sentence frame. In the test, the last item is the most complex one because it requires the child to substitute a major part of speech for a minor one,

such as a verb for a preposition: the word 'clean' must be substituted for the word 'into' in "The doll is going clean the house" (Ben-Zeev, 1977, p.1012). The bilinguals perform considerably better than their monolingual peers not only with regard to meaning, but also with regard to sentence construction (p. 1015). These tasks show how aware children are of the features of language and how much control they have over their production of correct and grammatical sentences.

Two other studies show enhanced metalinguistic awareness for bilinguals and examine it. The first is conducted by Cummins and Mulcahy (1978), who finds that bilinguals are able to better analyze contradictory statements than their monolingual peers such as, Irish-English and Ukrainian-English bilingual children. The second, by Galambos (1982), shows that El Salvadoran bilinguals, who are proficient in both English and Spanish, have a stronger hold on the syntactic structures of both languages especially when judging whether sentences are grammatically correct or incorrect (cited in Lee, 1996, p. 505).

Many other cognitive advantages are found to exist in bilinguals. Besides the positive effect bilingualism has on metalinguistic awareness, it also has a positive effect on concept formation. Bain's findings (1974), alongside Liedtke and Nelson's (1968), show the superiority of bilinguals on such tasks. For example, Bain studies the discovery of rules needed to solve linear numerical problems, including capacities for classification and rule generalization (cited in Lee, 1996, p.506).

Diaz, in 1985, discovers that the more proficient bilinguals are in both languages, the stronger their analogical reasoning is. The idea of whether bilingualism is a result of higher intelligence or vice versa is very clear to him. He strongly believes it is bilingualism that is positively affecting intelligence (cited in

Baker, 2006, p.149). He discovers this when he gives 5 to 7 year-old children

sentences to complete such as (cited in Lee, 1996, p. 506):

The princess is beautiful, the monster is _____

 Snow is ice, rain is _____

However, some cognitive disadvantages are also found in some bilinguals.

Tsushima and Hogan's study in 1975 shows that ten to eleven year-old Japanese-

English bilinguals score lower than monolinguals on measures of verbal ability

(cited in Lee, 1996, p.506). Also, while Ben-Zeev's study in 1977 shows a lot of

positive effects, it also shows delay of Hebrew-English bilingual children in

vocabulary and grammatical structures (Ben-Zeev, 1977, p.1015).

Researchers, such as Hakuta, try to point out that it is basically impossible to

compare bilinguals to monolinguals since there is no true random sampling.

Another criticism they make is the issue of causality which they say has not been

regarded. Is bilingualism improving cognitive development or are the more

intellectually gifted children becoming higher-proficient bilinguals?

Because of all the criticisms that are made on the studies of bilingualism and

intelligence, researchers start to test it on bilinguals only, taking into consideration

how each degree of bilingualism may be related to the cognitive abilities. Duncan

and DeAvila conduct a study of such kind in 1979 on Hispanic children, and they

group them in 5 categories according to their proficiency in English and Spanish.

The group with the highest proficiency scores the highest on all measures of

cognitive ability (cited in Lee, 1996, p. 508).

The results received, which show that the highest scorers are the ones with

the highest proficiency in both languages, are suspect since Duncan and DeAvila do

not control IQ, so to overcome this, some researchers such as Hakuta and Diaz

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(1985), Diaz and Padilla (1985), and Diaz (1985) use multiple regression techniques (cited in Hakuta et.al., 1987, p.294). They measure the effect of bilingualism on cognitive abilities by first analyzing first-language proficiency, age and socioeconomic status and then analyzing second-language proficiency (cited in Hakuta et.al, 1987, p.295).

Referring to Duncan and DeAvila's results, the relationship between L2 proficiency and cognitive abilities is obvious. The highest scorers on cognitive tasks are the highest proficient bilinguals, and the next three categories (partial bilinguals, limited bilinguals, and monolinguals) show no significant difference in performance (cited in Lee, 1996, pp. 508-509). Those results support the threshold hypothesis of Cummins and Mulcahy (1978), Duncan and DeAvila (1979), Kessler and Quinn (1982), and many others in which they state that children need to have reached a certain level of proficiency in L1 and L2 for cognitive advantages to occur. They believe that L1 proficiency should be present to avoid cognitive deficits associated with bilingualism and L2 proficiency to get cognitive advantages. If children are proficient in their L1 and L2, they are at a cognitive advantage when compared to monolinguals (cited in Baker, 2006, p.171; cited in Lee, 1996, p. 508-509).

Hakuta (1985, in Lee 1996) talks about a study of low socio-economic status Hispanic children enrolled in a bilingual program. Those who have high proficiency in L1 and L2 perform better in metalinguistic awareness tasks and nonverbal intelligence. Hakuta (1986) reports that as for other studies that use multiple regression techniques, a positive link between L2 proficiency and enhanced cognitive skills is found (cited in Lee, 1996, p.508).

Lee and Romaine mention that Diaz and Hakuta (1985) also make further research on the threshold hypothesis. Their subjects are 300 Puerto Rican children who are enrolled in a bilingual education program but are much more proficient in Spanish than in English. They are kindergarten students and first graders who differ in L2 proficiency. The results do not support their hypothesis which is that "bilingualism should affect verbal flexibility as reflected in metalinguistic skills, which should then be generalized to non-verbal ability" (cited in Romaine, 1995, p. 117; cited in Lee, 1996, p.509). That is due to the children not being balanced bilinguals. They continue their study of the children and assume that as their English gets better, the results will match with their assumptions, but that is not possible in the US because as the children become proficient enough in English, they are placed in monolingual English classes and therefore not allowed to develop their bilingualism (cited in Romaine, 1995, p. 117).

Garcia (1985) criticizes Cummins' theory by saying that the selection of the Canadian children in his study is biased since most of them are from a high socio-economic status and are rewarded for learning an L2, and they are high achieving children. So Garcia argues that it is very possible that individual differences in intellectual functioning along with support or non-support in the social context of acquisition are variables responsible for the differences in bilingual and monolingual cognitive performances (cited in Lee, 1996, p.509).

In later years, Lina Ricciardelli (1992) tests the threshold hypothesis by conducting a study that examines the relationship of bilingualism to cognitive development. The study compares the performance of monolinguals to that of bilinguals on metalinguistic awareness, creativity measures, measures of nonverbal abilities, and a measure of reading achievement. The results she receives are

consistent with the threshold hypothesis in that the highly proficient subjects in both English and Italian exhibit an overall superiority in the cognitive measures. The bilinguals who are highly proficient in only one of their languages do not have bilingual superiority but perform better than bilinguals who are not proficient in both their languages. These least proficient bilinguals perform similarly to the least proficient monolinguals (p.313). Ricciardelli (1992) also concludes that the negative results received in previous studies, such as Darcy's (1953), are the result of the bilinguals being proficient in only one of their languages and being tested in their weaker language. She reaches this conclusion because one of the groups of bilinguals, who are proficient in Italian but weak in English, are tested in their weaker language, English, and perform more poorly than the bilinguals who are not proficient in both languages (p.313).

In other projects such as the ones done by Lambert and Tucker (1972), the results show equal intelligence for monolinguals and bilinguals. No difference in intelligence is found even after years of testing and retesting (cited in Romaine, 1995, p.116). Barik and Swain (1976) conduct a longitudinal study on the IQ of balanced bilingual children enrolled in a French immersion program and children enrolled in a regular English program in Canada. The more proficient the bilinguals are in French, which is their second language, the higher they score every time the tests are given during the whole five-year period (p.260). The year-by-year results do not show any differences in IQ between the two groups, but the analysis shows that over the 5-year period, the immersion group has a higher IQ measure. This supports Cummins's threshold hypothesis since the children are considered to be moving toward bilingualism, that is, they are becoming more proficient in the second language (p.259).

Bain and Yu (1980) ask parents of newborn children to volunteer in a study and try to control the longitudinal variable. At the beginning of the study, the children are between six and eight months. Thirty couples choose to raise their children to become bilinguals, while sixty choose to make them monolinguals. The first variety of cognitive tests is administered at the age of twenty-two to twenty-four months: the monolinguals and bilinguals show no difference, but when other tests are given at forty-six to forty-eight months, the bilinguals outperform the monolinguals. After the results, Bain and Yu state their belief in the positive aspect of bilingualism (cited in Romaine, 1995, p.116).

The relationship between bilingualism and the social context of acquisition is a very important one. Children who come from rich social backgrounds receive a lot of attention from their parents and are placed in an educational setting where the two languages can be learnt equally. On the other hand, children of migrant workers do not have that advantage and are only exposed to their parents' native language. This leads to their not being proficient in both languages. Therefore, as concluded earlier, studies on bilingualism should be done on children who have equal proficiency in two languages (Romaine, 1995, p.115). That is the reason behind Romaine's (1995) belief that there is ground for criticism in Bain and Yu's study because even though they choose their subjects from the same socioeconomic background, the results are bound to be favorable for bilingualism because all the parents are middle to upper class. Such homes promote bilingualism and provide a very comfortable and rich environment for the child to become proficient in both languages. Also, parents who volunteer are all very well educated as well as very much interested in making their children bilingual. So, it is argued that the conditions in which the study takes place are very favorable to bilingualism.

According to MacNab (1979), the same applies to a study done on Canadian children in an immersion program versus one in a normal program. The fact that parents choose to place their children in an immersion program is already an asset for bilingualism (cited in Romaine, 1995, p.115).

Lee (1996) talks about Diaz's (1985) belief that the focus of research is always the outcome of the relationship of bilingualism to cognitive development, and it is time to propose theories to explain the positive relationship. Bilinguals are able to see language form as well as function and they know that the attributes of an object do not transfer to the word itself. They are able to name an object any nonsense name and know that it still refers to the same object. By having two words for the same referent, bilinguals not only increase their knowledge of L1 and L2 but also become more flexible cognitively. This makes them think of language as a symbolic system (p.510). Diaz and Padilla's (1985) study shows that bilinguals are also able to code switch very easily, that is switch from one language to the other very quickly, but they rule out the possibility that the positive effects of bilingualism on problem solving might come about because of switching. The subjects of their study are 54 bilingual preschoolers from Texas. Their private speech is assessed during their performance on cognitive tasks such as block design, classification, and sequencing of story cards. Diaz and Padilla (1985) find that bilinguals who have higher levels of competence in L1 and L2 perform better on cognitive skills because their proficiency in language allows them to guide their inner thinking.

Bilinguals use cognitive strategies in making sense of their language environment. Cited in Lee (1996), according to Segalowitz (1977), being proficient in two languages enhances people's "mental calculus" and makes them better

manipulators of symbols and able to alternate between linguistic rules (p.511). According to Bialystok and Ryan (1985), bilingualism is linked to cognitive control in information processing, and Genesee (1981) says that bilinguals have a cognitive ability to analyze underlying conceptual characteristics in information processing (cited in Lee, 1996, p.511).

The socio-cultural context is very important because as Bruner (1966) argues, once children are in the symbolic stage, the cultural environment plays a very important role for mental growth and development (cited in Lee, 1996, p.512). Fishman (1965) believes that the question is not whether there is a relationship between intelligence and bilingualism but in which socio-pedagogical context which kind of relation exists (p.228).

Long and Padilla (1970), in Lee 1996, find that children whose L1 is respected and used in their homes perform much better than children whose L1 is disregarded and replaced by L2. Also, Dube and Herbert (1975, cited in Lee (1996), find that when the L1 is used and valued in the classroom, school performance and linguistic proficiency in L1 and L2 improves. When examining bilingualism's effect on cognitive development, researchers should know whether the parents, the school, or the society believes in bilingual education and understands its value and importance (p.513).

In conclusion, from the early 19th century to the 1960s, the dominant belief is that bilinguals are inferior to monolinguals on cognitive abilities. Studies are conducted, and the majority of the results confirm the belief that bilingualism negatively affects cognitive abilities. The most influential studies are made by Saer (1923), who concludes that bilinguals are mentally confused and at a disadvantage in thinking compared to monolinguals. His conclusions result from two

experiments, one conducted on 7 to 14 year-old children and another on university students. Later on, in the 1960s, other researchers conduct experiments that show cognitive advantages of bilingualism. The researchers, Peal and Lambert (1962), are the first to conduct experiments while taking into consideration and controlling important variables in the research such as age, sex, IQ, and socioeconomic status. Their results challenge half a century of studies and show that bilinguals have more mental flexibility than monolinguals.

From that point onwards, researchers control those variables and find several cognitive advantages of bilingualism. Ianco-Worrall (1972) finds that bilinguals are able to analyze language as an abstract system earlier than their monolingual peers. Genesee, Tucker, and Lambert (1975) believe that bilingual children may become less de-centered than monolingual children. Bain (1974) and Liedtke and Nelson (1968) find a positive effect of bilingualism on concept formation. Carringer (1974), Ricciardelli (1992), and Baker (2006) find that bilinguals are better divergent thinkers than monolinguals. Bialystock (1987) shows that bilinguals are superior to monolinguals in measures of cognitive control of linguistic processes. Ben-Zeev (1977), Malakoff (1992), and Bialystock (1984) believe that bilinguals have better metalinguistic awareness than monolinguals.

Duncan and DeAvila (1979) conduct an important study where bilinguals are compared to one another. Bilinguals of different proficiencies are compared, and the results are that proficiency in the first language should be present to avoid negative effects associated with bilingualism. This idea develops into the "threshold hypothesis" which states that the more proficient the bilinguals are in both languages, the more apparent the cognitive effects will be. Also, Diaz in 1985 conducts a study which shows that proficient bilinguals have stronger analogical reasoning abilities.

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When looking at the results of all these studies, one question comes to mind: Do Arabic-English Lebanese bilingual children have some of the cognitive advantages described in so many of the studies conducted on bilingualism and its effect on cognitive abilities?

Method

This chapter explains the method the researcher follows in conducting the study. It presents the steps the researcher takes from the first stages of the experiment till the last.

Subjects

The participants in the study are first, second, and third grade children from the American Community School, Eastwood College, the Evangelical School for Girls and Boys in Louaize, and Sagesse High School. The children are of mixed gender. The monolinguals are a group of 13 children whose first language is English. Some of them are Lebanese and the others are foreigners. If they have picked up some Arabic utterances from their friends, they are not considered bilingual according to the definition being followed in this study. What is important is for them to have all communication in English at home with family and relatives and at school with their friends. These children are exposed to two or three Special Arabic hours per week at school, but none of them is capable of conducting a simple conversation in Arabic. The researcher asks them a few questions in Arabic, and they are all unable to answer and fall silent. Some of the questions are "How are you?", "What did you do yesterday after school?", and "How old are you?" The other group is made up of 28 bilingual children. Both groups are chosen after following several steps which are explained in the procedure part.

Originality of the Study

The researcher has chosen six different exercises from the studies of five leaders in the field of bilingualism and incorporated them within this one study. Such a study of bilingual children has not been done in the Lebanese community.

From these six exercises, the researcher is able to test five different areas in the children's cognitive abilities as opposed to just testing one area.

Procedure

Subject Sampling

The researcher's first step is to go to the schools and collect information (presented in the following paragraphs) about the children before choosing who is to participate in the study. The researcher first checks the socioeconomic status of the children. The four private schools that are chosen, American Community School, Eastwood College, the Evangelical School for Girls and Boys in Louaize, and Sagesse High School have children with similar socioeconomic backgrounds, which is middle to high. The four schools have very similar tuition fees, and they are therefore expected to have children from very similar socioeconomic backgrounds. The children who are chosen have educated parents.

The second step is to check the subjects' language proficiency and fluency. Therefore, information from the teacher is needed. The English teacher is first asked if the child is an expert user, a very good user, a good user, a competent user, a modest user, a limited user, an extremely limited user, an intermittent user, or a non-user of the English language (Baker, 2006, p. 30). Each of these measurements has descriptive statements so the teacher can place the child in the appropriate description slot (see Appendix A for complete proofs). Then the teacher is asked whether the child is shy or not. Does the child frequently participate in class? Does the child answer confidently when asked a question (see Appendix B for complete proofs)? This distinction among children helps to make the researcher's study more valid because a characteristic trait such as shyness can hinder oral fluency, performance, and expression which are needed for answering the oral questions.

The same is done with the Arabic teacher. When this is finished, the English and Arabic grades of the children are referred to in order to check whether the teachers' evaluation is applicable to the grades which are representative of the children's abilities and skills.

The third step is to narrow down the number of the children and work with the ones who are placed in the description slot in both English and Arabic as very good, good, and competent users of the language. That is the case for bilinguals; for the monolinguals, English is the language considered. These children are chosen so as to avoid working with the weak ones and the excellent ones, the two extremes. The bilinguals are asked questions involving their use of Arabic and English such as: which language or languages they use with their mother, father, siblings, relatives, neighbors, and friends to determine whether there is a preference in language use (see Appendix C for complete proofs). The monolinguals are also asked to check their knowledge, competence, and fluency in the Arabic language, if there is any.

Finally, the subjects are chosen. The ones chosen are not afraid to speak up or communicate with adults since the research exercises are oral, and they have little preference between Arabic and English because that means they are the closest to being balanced bilinguals. The bilingual and monolingual children who are finally chosen all have very similar general and language averages. Six monolinguals from Grade 1, four from Grade 2, and three from Grade 3 are chosen to form the monolingual group. Ten bilinguals from Grade 1, ten from Grade 2, and eight from Grade 3 are chosen to form the bilingual group.

Steps of the Study

The next step is to send the parents a letter from the researcher and the school to ask for permission to interview the children. When permission is granted, the researcher sits with each of the children and chats with them at the beginning to make them feel relaxed. The researcher asks about the age of the child, his/her interests, his/her friends and other ice-breaking questions. This also serves the goal of checking for fluency in both languages for the bilinguals and to make sure that the monolingual sample is incapable of conversing using Arabic. The researcher explains that the exercises to be given are in no way related to the child and his/her grades at school. It is understood that the child is helping the researcher with a project she has at university and that the help being offered is much appreciated.

The researcher then gives the exercises that have been chosen for the research. The subjects are given the following six exercises. Each of these exercises is taken from the study of a leading researcher in the field of bilingual studies. Some of the exercises are taken from the original study and applied as they are in this study, while other exercises from the original studies are adapted and used in this study following the concept of the experiment. This happens when the original study provides parts of the experiment and not the experiment as a whole. The following section gives a detailed explanation of every exercise.

Exercises of the Study

The first exercise is taken from Ianco-Worrall's study in 1972 (p. 1391). It is to check whether bilinguals reach a semantic development stage earlier than monolinguals of the same age. The researcher gives the subjects two words "hat" and "can", and asks them which word is more similar to the word "cap" (see Appendix D for complete proofs). If the answer is "can", the subjects show

phonetic preference, and if the answer is "hat", they show semantic preference. The latter shows a more developed semantic stage. The original study does not provide the seven other sets of words that are used, so the researcher makes up seven sets following the same concept as the first set. It is as such: there is a basic word; the first choice word has the same first syllable, and the second choice word has the same meaning. All the words are one-syllable words.

As for the second exercise, it is also taken from Ianco-Worrall (1972) and James Cummins's study (1978) and used as it is. It tests the subjests' knowledge of arbitrary relation of words and whether they know that words are just symbols. There are three parts to it. The first part is as such: "Why is a dog called dog?" The same question is asked for cow, chair, jam, book, and water. The first part is used as an introduction to the exercise, just to get the children to think of the objects and animals that the words represent. As for the second part, the researcher uses the same words to ask the children "Can you call a cow dog and a dog cow?" Two other questions using the remaining words are asked. Another three sets of questions are also asked: "Suppose you were making up names for things, then could you call a cow 'dog' and a dog 'cow'? A yes/no answer is insufficient. Justifications are needed, and the only ones judged correct are those that recognize the arbitrary nature of word-referent relationships along with those that argue that the only reason someone cannot change the names is that everyone will be confused. The third and last part of the exercise includes a game where the researcher replaces one word for another and asks the children questions. The goal is also to check whether the children understand that words are only symbols (see Appendix E for complete proofs).

The third exercise is used as it is from Ben-Zeev's study in 1977. It involves "symbol substitution" tasks. The test is called the Symbol Substitution Test. It serves the same purpose as Exercise Two. It is to test that the children understand that words are only symbols. An example of this is substituting the word "turtle" for the word "airplane" and asking the child to answer questions about the "airplane" while being called "turtle". Another task within this exercise is telling children that the word "macaroni" is to be substituted with the word "I", and then asking them to use the word in a sentence which means "I am warm". These tasks show how aware children are of the features of language and how much control they have over their production of correct and grammatical sentences (see Appendix F for complete proofs).

The fourth exercise tests divergent thinking and is taken from Baker as is (2006, p.152). The researcher tests divergent thinking by asking questions like, "How many uses can you think of for a brick?", or "How many interesting or unusual uses can you think of for tin cans?" So, the child is given credit only when he/she provides at least three unusual uses. If usual uses are given, the student receives no credit (see Appendix G for complete proofs).

As for the fifth exercise, it is taken as it is from Bialystock's study (cited in Baker, 2006, p.157). It measures cognitive control of linguistic processes. The children are given sentences of different natures: some are meaningful and grammatical, such as "Why is the dog barking so loudly?" Some are meaningful but ungrammatical. For example, "Why the dog is barking so loudly?" A third category of sentences is silly but grammatical, like "Why is the cat barking so loudly?" The last type of sentences is silly and at the same time ungrammatical: "Why the cat is barking so loudly?" Once they are given the sentences, the children are asked to find

the grammatical sentences with total disregard to meaning. This tests the level of analysis of a child's linguistic knowledge (see Appendix H for complete proofs).

The last exercise is adapted from the study of Diaz in 1985. It tests analogical reasoning. The children are given sentences to complete. The first two sentences are the same as those in the study, but the last two are made up by the researcher and follow the same concept (see Appendix I for complete proofs). The first two sentences are the following:

The princess is beautiful, the monster is _____

Snow is ice, rain is _____

After the exercises are given, the results of the monolingual subjects are compared to their bilingual peers' results. The purpose is to see whether bilinguals outperform the monolinguals in the tasks that are given. There is also reference to the results of the original studies.

Before conducting the study on the bilingual and monolingual children chosen from the four different schools, the researcher decides to first conduct a pilot study to try out the exercises on a different group of children. This is done in order to make sure that all the exercises are understood by the children in the real study and to make any minor changes, if necessary, to the wording of the questions, the presentation of the exercises, or to the examples or words given in the exercises. The following is the pilot study; the changes made to two of the exercises are included.

The pilot study is conducted at St. Joseph School with four first grade children and one second grade child.

The researcher received the children; she greeted them all the same way, by introducing herself and giving them a kiss on the cheek. She explained that she had a project at university and that they were helping her with it by answering her questions. The researcher also made it very clear that what she was doing had absolutely nothing to do with their school or school grades. This eliminated any fear they had and made them comfortable. Before starting, the researcher explained that she had six exercises, and every time one exercise was finished, she would tell them "… to go".

Exercise 1

In this exercise, none of the subjects hesitated. They answered quickly and sometimes they would answer when still in the first part of the question. Therefore, no changes were implemented.

The following are the results.

Names	cap	Mat	doll	hit	Take	cheer	shop	great
Gr1 A	can	map	dog	hip	tape			
Gr1 B	can	rug	toy	beat	tape	cheek	show	
Gr1 C	can	map	dog	hip	tape	cheek	show	gray
Gr1 D	hat	mat	toy	beat	tape	cheek	store	gray
Gr2 A	can	map	dog	hip	tape	cheek	show	gray

The blank spaces mean the researcher did not ask them.

Exercise 2

When the children were asked the questions, discomfort showed on their faces, and the researcher felt that they had no idea what to say. For those who answered, except for the second grader who communicates in English with her family, they took their time. Some even needed more than 20 seconds to answer.

Because of that, for this part, in the real study, the children will be given five to ten seconds to answer. If they answer after that, their reply will not be documented.

The results:

Names	Dog	Cow	chair	Jam	Book	water
Gr1 A	no answer	no answer	no answer	no answer	no answer	no answer
Gr1 B	no answer	because he have milk	bec. the bec. the baby he don't sit	bec. he play outside	bec. it is not in the bag	bec. from the beach
Gr1 C	no answer	because he don't have	because he don't have	no answer	because we don't have	if we put cold water we want to be cold
Gr1 D	because he is his name is dow	because the cow is his name is cow	because the chair his name is chair	because jam is his name	because his name is book	because water his name is water
Gr2 A	I never know	I don't know about animals' names	I told you I don't know about why they are named	I have no idea	I have no idea	Let me think about that one, because of waterfall

Part 2:

The results of the first three questions:

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When asked whether they could interchange the names of objects, all the answers were consistent. The children looked puzzled when asked the question, but none of them hesitated for a second and directly answered "No". The question was clear.

Names	dog/cow	jam/chair	book/water
Gr1 A	No	No	No
Gr1 B	No	No	No
Gr1 C	No	No	No
Gr1 D	No	No	No
Gr2 A	No	Never	No

The first four children, who are all 1st graders, directly said no and offered explanations, while the 2nd grader, who is a native speaker of English, said yes for the 3 situations without any hesitation and thought a bit when asked 'why'.

The results of the next three questions, with the 'why':

Names	dog/cow	jam/chair	book/water
Gr1 A	No because the dog is not a cow	No (no explanation)	No (no explanation)
Gr1 B	No because the dog his name is dog and the cow his name is cow	No because jam his name is jam and chair his name is chair	No because the book it is book and the cup it is cup
Gr1 C	No because the dog is small and the cow is big	No because the chair we sit on it and the jam we eat it	No because we drink the water and we read the book
Gr1 D	No because the cow his name is cow and the dog his name is dog	No because the jam is jam and the chair is chair	No because the water his name is water and the book his name is book
Gr2 A	Yes because then I would be making up a name	Ok let me think because I like to say switching names with jam	Ok because some books are called water

Part 3:

There was no hesitation in answering.

The results are as follows:

Names	dog/cow	chair/jam	book/water
Gr1 A	yes/yes	yes/no	yes/no
Gr1 B	yes/yes	no/no (then yes)	yes /no
Gr1 C	no/no	no/no	no/no
Gr1 D	yes/yes	yes/no	yes/no
Gr2 A	ok/no	no I can't eat a chair/ no I cant sit on jam	ok/why not

Exercise 3

There was no hesitation in answering.

The results are:

Names	Plane/turtle	'I' is 'macaroni'	'into' is 'clean'
Gr1 A	no/he cannot fly	I explained/no answer	The doll go to the house
Gr1 B	no/ like this (she showed me)	no answer	Clean
Gr1 C	No/the turtle fly with (silence)	I am warm (so I explained) macaroni I	to the house
Gr1 D	No/ He cannot fly	I am warm	The dog he want to go to the house clean
Gr2 A	Why not like Ninja Turtles/good question it don't have any wings	Macaroni is warm	The clean doll is going into the house

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Exercise 4

Because the children had difficulties knowing what 'brick' and 'tin can' are, for this exercise, in the real study, the researcher will get the picture of a brick and a real tin can to show the children.

The results are:

Names	Brick	tin can
Gr1 A	No answer	I explained a bit/no answer
Gr1 B	for a house/to make a big castle/to make the wall	a fish
Gr1 C	For house/for farm door	For (silence) make the (silence)
Gr1 D	For not to broke the thing, to someone he want broke it, he not can broke it	For eating thing and for I don't know
Gr2 A	A house, making a book, Jesus wrote a word on a book, for house	Swing, a bus(that will be funny), a chair

Exercise 5

The results:

Names	sentence 1	sentence 2	sentence 3	sentence 4
Gr1 A	No	No	No	no
Gr1 B	No	Yes	yes	no
Gr1 C	no/yes	Yes	No	no
Gr1 D	yes	No	Yes	no
Gr2 A	Yes	same thing	I don't understand. It makes no sense. If a cat could bark, it would be a miracle	no sense

Two of the children asked what grammatical meant, and the researcher explained; when it sounds right. For example 'you is happy' is not grammatical.

Exercise 6

The results:

Names	sentence 1	sentence 2	sentence 3	sentence 4
Gr1 A	not beautiful	Water	Sun	not cold
Gr1 B	not beautiful	not ice	sun the light	not cold
Gr1 C	not beautiful	Snow	Sun	hot
Gr1 D	bad	not cold	Sun	hot
Gr2 A	ugly	Water	Light	hot

They all liked this exercise and smiled when giving their answers.

Reporting and Analysis of Results

The first part of the chapter reports the results received from the six exercises. Each exercise is dealt with separately. Within every exercise, the reporting starts with the answers of the first graders and then moves on to the answers of the second graders and ends with those of the third graders. The second part is the analysis.

Exercise 1

Exercise 1 is given to test the children's semantic development level and to see whether bilinguals reach the semantic development stage 2 to 3 years earlier than their monolingual peers. This is done by giving the children eight sets of words. One example is saying the two words "hat" and "can" and asking the children which word is more similar to the word "cap". If the answer is "can", the subjects show phonetic preference, and if the answer is "hat", they show semantic preference. The latter shows a more developed semantic stage (see Appendix D for complete proofs). The following are the results.

3 out of the 6 monolinguals in Grade 1 show phonetic preference for they choose the word that is phonetically similar to the standard word in the 8 one-syllable sets of words. As for semantic preference, only 1 child gives semantic answers to all the sets of words. The other children provide mixed answers. One of the children gives half of the answers semantic and the other half phonetic. She shows strong position bias because for the first six sets of words, she chooses the option that comes directly after the standard word. As for the last two, she chooses the second option word by picking semantic preference for the one before last (store) and phonetic preference for the last one (gray). In Ianco-Worrall's experiment, the children whose answers are mixed are taken into consideration only

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if one of the preferences is given 66% of the time. If not, their answers are disqualified. Therefore, they are placed in the neither category because they show no consistency in their answers. On the other hand, another monolingual does not show position bias but is placed in the neither category because she chooses 3 semantic answers and 5 phonetic ones, which means she shows phonetic preference 62.5% of the time.

As for the first-grade bilinguals, 2 out of 10 show phonetic preference. Only 1 bilingual shows semantic preference. 7 out of 10 give mixed answers. 4 children provide 7 out of 8 phonetic answers; that is 87.5% phonetic answers, so they are placed in the phonetic category. One child provides 7 out of 8 semantic answers and is placed in the semantic category. The last 2 provide 3 out of 8 semantic answers. They are placed in the neither category because they show preference 62.5% of the time. Therefore, for the Grade 1 bilinguals, as shown in Table 1.1, 6 out of 10 are in the phonetic category, 2 are in the semantic category, and 2 are in the neither category.

Table 1.1

Grade 1 Semantic Development Stage

Age	Group	Number	Semantic	Phonetic	Neither
6-7	Monolinguals	6	1	3	2
6-7	Bilinguals	10	2	6	2

In Grade 2, out of 4 monolinguals, no one is completely consistent and chooses either semantic or phonetic answers. They all have mixed answers. Two choose 1 semantic answer and 7 phonetic ones. They are placed in the phonetic category; that is, half of the monolinguals for phonetic answers. Only 2 of the third

monolingual's answers are semantic, and that places him in the phonetic category as well. The last monolingual has 6 semantic answers which place him in the semantic category.

Out of 10 bilinguals in Grade 2, 6 provide consistent answers. Three are in the phonetic category, and the other three are in the semantic category. Four children give mixed answers. Two of them provide 1 semantic answer and are placed in the phonetic category. One of the bilinguals gives 2 phonetic answers and is placed in the semantic category. The last bilingual is placed in the neither category for answering half semantic and half phonetic. These results are stated in the following table, Table 1.2.

Table 1.2

Grade 2 Semantic Development Stage

Age	Group	Number	Semantic	Phonetic	Neither
7-8	Monolinguals	4	1	3	0
7-8	Bilinguals	10	4	5	1

Out of the 3 monolinguals in Grade 3, one shows phonetic preference, and the other two show semantic preference. No monolingual falls in the neither category as shown in Table 1.3. As for the bilinguals, 4 out of 8 show phonetic preference, and none shows purely semantic preference. One bilingual gives 1 semantic answer and is therefore placed in the phonetic category. Another gives 2 semantic answers and is also placed in the phonetic category. The third gives 1 phonetic answer and goes to the semantic category, and the last bilingual gives 3 semantic answers, and is placed in the neither category.

Table 1.3

Grade 3 Semantic Development Stage

Age	Group	Number	Semantic	Phonetic	Neither
8-9	Monolinguals	3	2	1	0
8-9	Bilinguals	8	1	6	1

The following, Table 1.4, is a table with the results of Grades 1, 2 and 3 grouped together.

Table 1.4

Summary Table of Semantic Development Stage

Age	Group	No of Sts	Semantic	Phonetic	Neither
6-9	Monolinguals	13	4	7	2
6-9	Bilinguals	28	7	17	4

In brief, when the results of the three grades are grouped together, the following are the numbers received. For the monolingual group, 4 out of 13 go for semantic preference, 7 for phonetic preference and 2 are inconsistent. As for the bilinguals, 7 out of 28 go for semantic preference, 17 for phonetic preference, and 4 are inconsistent.

Exercise 2

It tests the subjects' knowledge of arbitrary relation of words and whether they know that words are just symbols. There are three parts to it (see Appendix E for complete proofs).

Part 1

The first part is as such: "Why is a dog called dog?" The same question is asked for cow, chair, jam, book, and water. It is used as an introduction to the exercise, just to get the children to think of the objects and animals that the words represent.

The answers fall under 3 categories: ignorance, attributes, and abstract justification. One more category is used, the disqualified, when no apparent pattern exists in the child's answers. These are similar to the categories Ianco-Worrall groups her subjects into.

In Grade 1, 1 out of 6 monolinguals fall under the category of ignorance (the answers are all "I don't know"). Another monolingual gives the same answer for the first two questions but the remaining 4 answers fall under the attributes category. The answers are as such: "a chair is called a chair because we can sit on it." Since more than half of the answers are consistent, the student is placed in the attributes category. One monolingual is very confused and keeps asking questions such as "what do you mean? I am confused." She only answers two times and is therefore placed in the "disqualified" category. Two other monolinguals give attributes for the objects across all their answers. The last monolingual gives abstract justification for five of her answers (she explains that God creates things the way they are). The answers fall into the abstract justification.

As for the bilinguals, no answers fall into the ignorance category as shown in Table 2.1. The answers of 4 bilinguals are mixed; 2 children remain silent for two of the questions (cow/jam and cow/dog), 2 remain silent for "cow", but their other answers all fall under the attributes category. So, they are placed in that

category. The remaining 6 bilinguals give answers that fall under the attributes category.

Table 2.1

Grade 1 Explaining Names of Things

Age	Group	No of Sts	Ignorance	Attributes	Abstract	Disqualified
6-7	Monolinguals	6	1	3	1	1
6-7	Bilinguals	10	0	10	0	0

Out of the four monolinguals in Grade 2, 1 does not answer at all. Another monolingual answers "I don't know" and therefore both fall under the category "ignorance". The third monolingual is very confused and does not seem to comprehend the question and tries to give an answer to "chair, book, and water", but he answers with no confidence at all. This shows lack of understanding of the question and is placed in the "disqualified" category. The last monolingual's answers fall under the attributes category as shown in Table 2.2.

Three bilinguals show ignorance by answering "I don't know". Two bilinguals reply "I don't know" for two of the questions (chair/water and dog/cow) but give attributes to the rest of the objects, and therefore are placed under the attributes category. Three other bilinguals give attributes to all the objects and are placed in the attributes category. One of the last 2 bilinguals replies that God creates names for objects and is placed in the abstract category, and the other answers for 2 of the questions that people create the names and for the other answers gives attributes. The last bilingual is placed in the attributes category because the majority of her answers belong there.

Table 2.2

Grade 2 Explaining Names of Things

Age	Group	No of Sts	Ignorance	Attributes	Abstract	Disqualified
7-8	Monolinguals	4	2	1	0	1
7-8	Bilinguals	10	3	6	1	0

In Grade 3, one monolingual falls under the ignorance category. Another monolingual gives attributes to all the objects and is placed in the attributes category. The third monolingual answers "I don't know" for dog and jam, but for the other 4 objects, he either says that God has named them or that people who invented them have named them. He is placed in the abstract category.

Only 1 bilingual responds to the last object "water" and gives it an attribute, but for the previous 5 questions, he does not answer and is placed in the ignorance category. Another bilingual gives attributes to half the objects and is placed in the attributes category. Two bilinguals give attributes to 4 of the objects and are placed in the attributes category. One gives attributes to 5 objects and is also placed in the attributes category. Two other bilinguals give attributes to all the objects. The last bilingual replies that people decide to name objects and is placed in the abstract category. All these results are stated in the following table, Table 2.3.

Table 2.3

Grade 3 Explaining Names of Things

Age	Group	No of Sts	Ignorance	Attributes	Abstract	Disqualified
8-9	Monolinguals	3	1	1	1	0
8-9	Bilinguals	8	1	6	1	0

The following is a summary table that groups the answers of all the children from Grades 1 to 3.

Table 2.4

Summary Table, Explaining Names of Things

Age	Group	No of Sts	Ignorance	Attributes	Abstract	Disqualified
6-9	Monolinguals	13	4	5	2	2
6-9	Bilinguals	28	4	22	2	0

Part 2

In this part, the researcher uses the same words to ask the children "Can you call a cow dog and a dog cow?" Two other questions using the remaining words are asked. Another three sets of questions are also asked: "Suppose you were making up names for things, then could you call a cow 'dog' and a dog 'cow'? A yes/no answer is insufficient. Justifications are needed, and the only ones judged correct are those that recognize the arbitrary nature of word referent relationships along with those that argue that the only reason someone cannot change the names is that everyone will be confused. The answers of the first three questions are joined with the answers of the last three questions. The combined response classifies the student into one of four categories: no-no, no-yes, yes-yes, and yes-no. Only students who are consistent in the type of combined response they offer across the three pairs of words are classified. The students who show inconsistency in their responses are classified in the "inconsistent" category.

In Grade 1, 5 out of the 6 monolinguals answer no-no; only one monolingual shows inconsistency in the answers of the first 3 questions. He is placed in the inconsistent category. Out of the 10 bilinguals, 5 answer no-no. One bilingual

answers yes-yes. Another answers no-yes. The other three bilinguals answer inconsistently. The results of Grade 1 children are stated in Table 2.5.

Table 2.5

Grade 1, Interchanging of Names

Age	Group	No of sts	No-no	No-yes	Yes-yes	Yes-no	Inconsistent
6-7	Mono	6	5	0	0	0	1
6-7	Bi	10	5	1	1	0	3

In Grade 2, out of 4 monolinguals, 3 answer no-no. The last monolingual answers no-yes. 3 out of 10 bilinguals answer no-no. 4 other bilinguals answer no-yes. The eighth bilingual answers yes-yes. The last 2 bilinguals answer inconsistently. Table 2.6 displays the results.

Table 2.6

Grade 2, Interchanging of Names

Age	Group	No of sts	No-no	No-yes	Yes-yes	Yes-no	Inconsistent
7-8	Mono	4	3	1	0	0	0
7-8	Bi	10	3	4	1	0	2

Out of 3 monolinguals in Grade 3, as seen in Table 2.7, two answer no-yes. The last monolingual's answers are inconsistent. As for the bilinguals, two answer no-no. Three answer no-yes. The last three have inconsistent answers.

Table 2.7

Grade 3, Interchanging of Names

Age	Group	No of sts	No-no	No-yes	Yes-yes	Yes-no	Inconsistent
8-9	Mono	3	0	2	0	0	1
8-9	Bi	8	2	3	0	0	3

The following is a summary table of all the children's responses on whether the names of things can be interchanged.

Table 2.8

Summary Table, Interchanging of Names

Age	Group	No of sts	No-no	No-yes	Yes-yes	Yes-no	Inconsistent
6-9	Mono	13	8	3	0	0	2
6-9	Bi	28	10	8	2	0	8

Part 3

The third and last part of the exercise includes a game where the researcher replaces one word for another and asks the children questions. The words are the same ones used in parts 1 and 2 of the exercise. "dog" is replaced by "cow", "chair" is replaced by "jam", and "book" is replaced by "water". One example of the questions asked is "Does this cow have horns?". The goal is also to check whether the children understand that words are only symbols.

Out of six monolinguals in Grade 1, only one answers correctly. Three monolinguals give incorrect answers to all the questions. The last two give mixed

answers, where the answers to only 1 pair are correct. One of the children answers correctly to book /water and another to dog/cow.

As for the bilinguals, two out of ten answer correctly. Table 2.9 shows that four bilinguals give incorrect answers across the 3 pairs of questions. For example, one of the girls answers "yes" to the questions: Does this "cow" give milk? and Does this "cow" have horns? The last 4 bilinguals give mixed answers. One child answers the questions of chair/jam (Can you eat this "jam"? and Can you sit on this "jam"?) and book/water (Can you drink this "water"? and Can you read this "water"?) correctly. Another answers the questions of dog/cow and book/water correctly. The third gives correct answers to dog/cow and chair/jam. As for the last, he answers the questions of one pair correctly: chair/jam.

Table 2.9

Grade 1, Attributes of Objects

Age	Group	No of Sts	Correct	Wrong	Mixed 2	Mixed 1
6-7	Mono	6	1	3	0	2
6-7	Bi	10	2	4	3	1

Table 2.10 shows that one monolingual out of four in Grade 2 answers correctly. Another answers incorrectly. The last two give incorrect answers to one pair: chair/jam and dog/cow respectively. Of the ten bilinguals, two answer correctly. Four bilinguals answer incorrectly. Two give incorrect answers to one pair: dog/cow. One answers correctly to one pair: dog/cow, and the last bilingual answers questions incorrectly to another pair.

Table 2.10

Grade 2, Attributes of Objects

Age	Group	No of Sts	Correct	Wrong	Mixed 2	Mixed 1
7-8	Mono	4	1	1	2	0
7-8	Bi	10	2	4	3	1

The three monolinguals in Grade 3 answer correctly as shown in Table 2.11. Three bilinguals out of eight answer correctly. Only one bilingual answers incorrectly. The remaining four have mixed answers. Two of them give correct answers to 1 pair: dog/cow. The last two get 1 pair wrong: dog/cow.

Table 2.11

Grade 3, Attributes of Objects

Age	Group	No of Sts	Correct	Wrong	Mixed 2	Mixed 1
8-9	Mono	3	3	0	0	0
8-9	Bi	8	3	1	2	2

Table 2.12 is a summary table of all the children's answers about the attributes of an object.

Table 2.12

Summary table, Attributes of Objects

Age	Group	No of Sts	Correct	Wrong	Mixed 2	Mixed 1
6-9	Mono	13	5	4	2	2
6-9	Bi	28	7	9	8	4

Exercise 3

The exercise is divided into 2 parts, the part which requires understanding that words are only symbols (where an airplane is called "turtle") and the part which requires violation of grammatical rules (see Appendix F for complete proofs).

For the first part, 2 out of 6 monolinguals in Grade 1 understand that an airplane is still an airplane even when it is called "turtle". 3 out of 10 bilinguals have that same understanding. Table 3.1 shows the results.

Table 3.1

Grade 1, Words as symbols

Age	Group	No of Sts	Show understanding	Do not show understanding
6-7	Monolinguals	6	2	4
6-7	Bilinguals	10	3	7

In Grade 2, 3 monolinguals show understanding of symbol substitution. 6 bilinguals show that as well. The results are clearly shown in Table 3.2.

Table 3.2

Grade 2, Words as symbols

Age	Group	No of Sts	Show understanding	Do not show understanding
7-8	Monolinguals	4	3	1
7-8	Bilinguals	10	6	4

Table 3.3 states that in Grade 3, the 3 monolinguals show understanding and 4 bilinguals do that too.

Table 3.3

Grade 3, Words as Symbols

Age	Group	No of Sts	Show understanding	Do not show understanding
8-9	Monolinguals	3	3	0
8-9	Bilinguals	8	4	4

The following is a summary table of the responses of the children from Grades 1 to 3.

Table 3.4

Summary table, Words as symbols

Age	Group	No of Sts	Show understanding	Do not show understanding
6-9	Monolinguals	13	8	5
6-9	Bilinguals	28	13	15

As for the second part, Table 3.5 shows that in Grade 1, 5 monolinguals and 9 bilinguals get both questions wrong. Only 1 monolingual gets the "macaroni" question correct but not the complex one "into". There is also only one bilingual to get the "macaroni" question correct.

Table 3.5

Grade 1, Violation of grammatical rules

Age	Group	No of Sts	Violate grammatical rules	Do not violate grammatical rules	Do not violate the rules of the more complex item	Violate the rules of the more complex item
6-7	Monolinguals	6	0	5	1	0
6-7	Bilinguals	10	0	9	1	0

In Grade 2, only 1 monolingual and 1 bilingual give correct answers to both questions. 2 monolinguals give wrong answers as well as 5 bilinguals. Only one monolingual gets "macaroni" correct. The same goes for two bilinguals. As for the last 2 bilinguals, they both answer the more complex question "into" correctly and give wrong answers to "macaroni". Table 3.6 shows the results of Grade 2.

Table 3.6

Grade 2, Violation of grammatical rules

	Group	No of Sts	Violate grammatical rules	Do not violate grammatical rules	Do not violate the rules of the more complex item	Violate the rules of the more complex item
7-8	Monolinguals	4	1	2	1	0
7-8	Bilinguals	10	1	5	2	2

Only one monolingual in Grade 3 answers correctly, and the other two monolinguals give one correct answer, that of "macaroni". No bilinguals at all give correct answers to both questions. Five of the bilinguals give incorrect answers to both. The remaining three bilinguals give correct answers to "macaroni" only and not to "into". Table 3.7 shows the results.

Table 3.7

Grade 3, Violation of grammatical rules

Age	Group	No of Sts	Violate grammatical rules	Do not violate grammatical rules	Do not violate the rules of the more complex item	Violate the rules of the more complex item
8-9	Monolinguals	3	1	0	2	0
8-9	Bilinguals	8	0	5	3	0

Table 3.8 is a summary table of all the children's responses.

Table 3.8

Summary table, Violation of grammatical rules

Age	Group	No of Sts	Violate grammatical rules	Do not violate grammatical rules	Do not violate the rules of the more complex item	Violate the rules of the more complex item
6-9	Monolinguals	13	2	7	4	0
6-9	Bilinguals	28	1	19	6	2

Exercise 4

In this exercise, the researcher tests divergent thinking by asking questions like, "How many uses can you think of for a brick?", or "How many interesting or unusual uses can you think of for tin cans?" So, the child is given credit only when he/she provides at least three unusual uses. If usual uses are given, the student receives no credit (see Appendix G for complete proofs).

As apparent in Table 4.1, in Grade 1, two monolinguals out of ten provide creative answers for both, "tin can" and "brick", while only 1 bilingual does that. There is only one monolingual who gives creative answers for "tin can", and four bilinguals answer creatively to that as well. The remaining three monolinguals and five bilinguals give no creative answers.

Table 4.1

Grade 1, Creative thinking

Age	Group	No. of sts	Creative	Semi creative	Not creative
6-7	Monolinguals	6	2	1	3
6-7	bilinguals	10	1	4	5

In Grade 2, one monolingual and four bilinguals provide creative answers for "tin can" and "brick". Two monolinguals and six bilinguals give creative answers for "tin can". Only one monolingual does not give any creative answers. Table 4.2 states the results.

Table 4.2

Grade 2, Creative thinking

Age	Group	No. of sts	Creative	Semi creative	Not creative
7-8	Monolinguals	4	1	2	1
7-8	Bilinguals	10	4	6	0

As Table 4.3 shows, in Grade 3, two monolinguals and three bilinguals give creative answers. The last monolingual and five bilinguals give creative answers for "tin can".

Table 4.3

Grade 3, Creative thinking

Age	Group	No. of sts	Creative	Semi creative	Not creative
8-9	Monolinguals	3	2	1	0
8-9	Bilinguals	8	3	5	0

Table 4.4 is a summary table of all the children's answers from Grades 1 to 3.

Table 4.4

Summary table, Divergent thinking

Age	Group	No. of sts	Creative	Semi creative	Not creative
6-9	Monolinguals	13	5	4	4
6-9	Bilinguals	28	8	15	5

Exercise 5

This exercise measures cognitive control of linguistic processes. The children are given sentences of different natures: some are meaningful and grammatical, such as "Why is the dog barking so loudly?" Some are meaningful but ungrammatical. For example, "Why the dog is barking so loudly?" A third category of sentences is silly but grammatical, like "Why is the cat barking so loudly?" The last type of sentences is silly and at the same time ungrammatical: "Why the cat is barking so loudly?" Once they are given the sentences, the children are asked to find the grammatical sentences with total disregard to meaning (see Appendix H for complete proofs).

In Grade 1, three monolinguals out of six and six bilinguals out of ten cannot recognize or know whether a question is grammatically correct or incorrect. Two monolinguals and four bilinguals are able to recognize grammatical questions only when they make sense. When a question is meaningless, such as "Why is the cat barking so loudly?", they answer that it is not grammatical and therefore show that the lack of meaning has interfered and affected their judgment of whether the question is grammatical or not. Only one monolingual answers all the questions correctly. Table 5.1 states the results.

Table 5.1

Grade 1, Analysis of Linguistic Processes

Age	Group	Number	No interference	Interference	No concept of grammaticality
6-7	Monolinguals	6	1	2	3
6-7	Bilinguals	10	0	4	6

Table 5.2 shows that one monolingual out of four in Grade 2 and three bilinguals out of ten cannot say whether a question is grammatical or not. Three monolinguals and four bilinguals can recognize a grammatically correct question unless it is meaningless. No monolinguals show full understanding of the concept of grammaticality.

Table 5.2

Grade 2, Analysis of Linguistic Processes

Age	Group	Number	No interference	Interference	No concept of grammaticality
7-8	Monolinguals	4	0	3	1
7-8	Bilinguals	10	3	4	3

Three bilinguals out of eight in Grade 3 have no concept of grammaticality. Two monolinguals out of three show an understanding of grammaticality when the questions are meaningful, and five bilinguals show that same understanding. Only one monolingual among all the children is able to identify grammatically correct questions even when they are meaningless. All these results are stated in Table 5.3.

Table 5.3

Grade 3, Analysis of Linguistic Processes

Age	Group	Number	No interference	Interference	No concept of grammaticality
8-9	Monolinguals	3	1	2	0
8-9	Bilinguals	8	0	5	3

Table 5.4 is a summary table of all the children's responses.

Table 5.4

Summary Table, Analysis of Linguistic Processes

Age	Group	Number	No interference	Interference	No concept of grammaticality
6-9	Monolinguals	13	2	7	4
6-9	Bilinguals	28	3	13	12

Exercise 6

This exercise tests analogical reasoning. The children are given sentences to complete. Two examples of the sentences are as follows (see Appendix I for complete proofs).

The princess is beautiful, the monster is _____

Snow is ice, rain is _____

In Grade 1, three monolinguals out of six show ability in analogical reasoning and appropriate word expression to go along with it. So do three of the ten bilinguals. Only one monolingual shows ability in analogical reasoning but average vocabulary level in the completion of the sentences. The same applies to the remaining seven bilinguals. The remaining two monolinguals show no sign of

analogical reasoning at all since they are not able to complete the sentences with meaningful and logical words. One of them, for example, completes the sentence "Night is dark, day is _____" with the word "sun", and the other uses the word "ice" to complete "Snow is ice, rain is _____". Table 6.1 displays the results received.

Table 6.1

Grade1 Analogical Reasoning

Age	Group	Number	Analogical reasoning	No analogical reasoning	Analogical/ limited vocab
6-7	Monolinguals	6	3	2	1
6-7	Bilinguals	10	3	0	7

Table 6.2 shows that three monolinguals out of four in Grade 2, as well as six bilinguals out of ten, have the ability to reason by analogy and very good word expression. The remaining monolingual and the rest of the bilinguals show ability to reason by analogy but have weak vocabularies and word expressions. For example, one of the monolinguals, even after being asked twice, is unable to complete the first sentence "The princess is beautiful, the monster is _____". Another child completes the same sentence with "beautiful" and says "snow" to complete "Snow is ice, rain is _____". Two other children are unable to find a word to complete "Night is dark, day is _____".

Table 6.2

Grade 2 Analogical Reasoning

Age	Group	Number	Analogical reasoning	No analogical reasoning	Analogical/ limited vocab
7-8	Monolinguals	4	3	0	1
7-8	Bilinguals	10	6	0	4

The three monolinguals in Grade 3 and five bilinguals out of 8 show analogical reasoning abilities and good word expression. For example, two of those boys fill in "The princess is beautiful, the monster is _____" with "ugly", and the mentioned bilinguals provide "water" as a completion for "Snow is ice, rain is _____". Three other bilinguals show good analogical reasoning but lack appropriate word expression. An example is one's response to "The princess is beautiful, the monster is _____" which is "unbeautiful". All of these results are shown in Table 6.3.

Table 6.3

Grade 3 Analogical Reasoning

Age	Group	Number	Analogical reasoning	No analogical reasoning	Analogical/ limited vocab
8-9	Monolinguals	3	3	0	0
8-9	Bilinguals	8	5	0	3

Table 6.4 is a summary table of all the children's responses.

Table 6.4

Summary table, Analogical Reasoning

| Age	Group	Number	Analogical reasoning	No analogical reasoning	Analogical/ limited vocab
6-9	Monolinguals	13	9	2	2
6-9	Bilinguals	28	14	0	14

Analysis of Results

In this section of the chapter, the analysis of the results is presented. For every exercise, the results of the monolinguals received in the current study are compared to the results of their bilingual peers, and sometimes there is reference to the results of the original studies. On the basis of that comparison, the analysis is formulated and given.

Exercise 1

This exercise shows whether children have reached the semantic development stage or not (see Appendix D for complete proofs). In the current study, out of 6 six to seven year old monolinguals, one shows semantic preference (SE), three show phonetic preference (PH), and two fall under the neither category (NE). Chart 1 shows the percentages.

Chart 1, Semantic Development Stage, Grade 1 Monolinguals, Current Study

6 year old mono current study semantic development
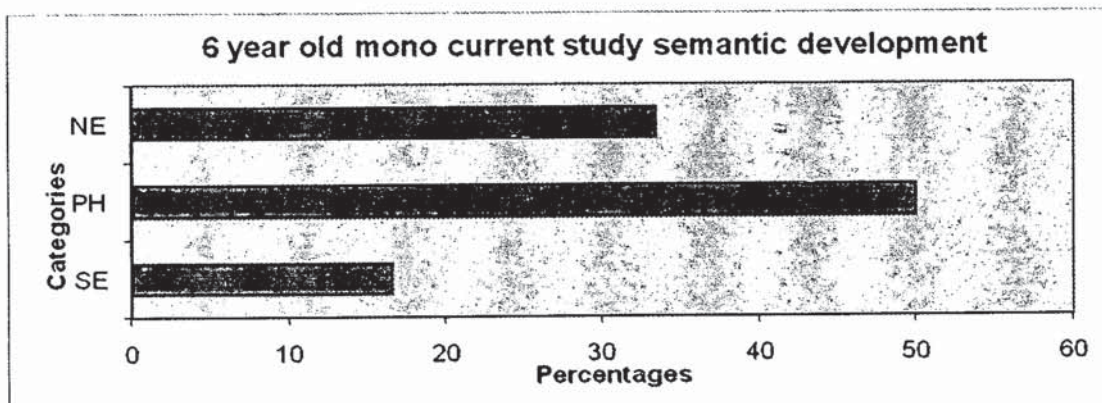
In Ianco-Worrall's experiment, there are two groups; the subjects' ages of one group range from 4 to 6 and the other from 7 to 9. Therefore, the analysis of the current study will be done similarly. The first group is considered the six to seven year old children, and the second group is the seven to nine year old ones.

Out of the 10 six to seven year old bilinguals in the current study, 2 go in the semantic zone, 6 in the phonetic, and 2 in the neither. The percentages are shown in Chart 2.

Chart 2, Semantic Development Stage, Grade 1 Bilinguals, Current Study
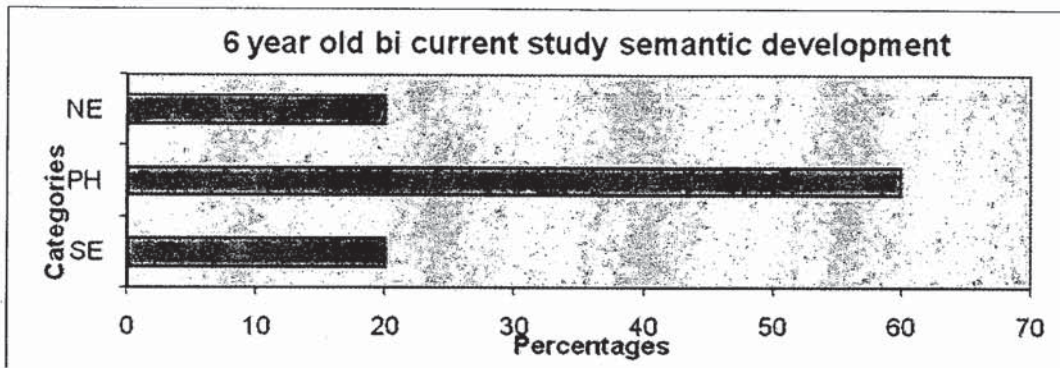
Only 20% of the bilingual children fall under the semantic category. More than half are in the phonetic zone. This could be due to the fact that in the schools following the Lebanese curriculum, English poetry is taught, which includes rhyming. Therefore, the children might always have more of an acoustic association among words than a semantic one. Ianco-Worrall finds that for this age group, the bilinguals reach a semantic development stage 2 to 3 years earlier than their monolingual peers (1972, p.1398). This does not hold true for all the bilingual sample in the current study. The results of the current study show around 12% difference between monolinguals and bilinguals at this age. The two children who choose semantic answers belong to type 6 in the early childhood bilingual acquisition; that is, they have been brought up in a home where the parents are

bilingual and they switch and mix languages. In Ianco-Worrall's study, all the bilinguals are Type 1 bilinguals; that is, they are brought up in a one-person, one-language environment. None of the children in the current study who belong to this type of early bilingual acquisition chooses semantic answers.

To conclude the grade 1 results of the current study, around 85% of the monolinguals have not yet developed into the semantic stage. Only one monolingual shows semantic preference in his answers by choosing the words that are semantically and not phonetically related to the original word. This child can be regarded as an exception because his English teacher describes him as very bright and mature for his age. Because he has skipped a class and is still among the highest ranking children in class, this proves that even though he is the youngest among his classmates, he is more advanced than they are in several cognitive areas. The semantic development stage is one of the cognitive areas where he is ahead of his classmates. The bilinguals are quite similar to the monolinguals in their choice of semantic answers but different in that they are more consistent in their answers.

In the current study, out of the 7 seven to nine year-old monolinguals, 3 show semantic preference, 4 show phonetic preference and none falls under the neither category. Chart 3 shows the percentages.

Chart 3, Semantic Development Stage, Grades 2-3 Monolinguals, Current Study

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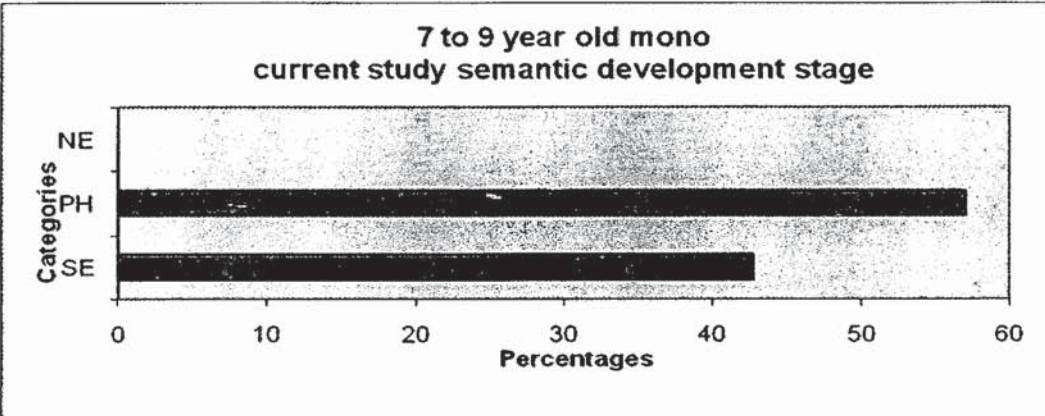
To translate the numbers for the second and third grade monolinguals, nearly 45% of the children choose semantic answers, and more than half choose phonetic answers. This once again can be because of the word association learnt at school. None of the children falls under the neither category. This shows that the monolinguals in the current study have understood what is asked of them, and they have a good grasp of the vocabulary of the language since they either choose phonetic or semantic answers.

Out of 18 bilinguals who are seven to nine years old, 5 go for semantic preference, 11 for phonetic, and 2 for the neither category. Chart 4 shows the percentages.

Chart 4, Semantic Development Stage, Grade 2-3 Bilinguals, Current Study
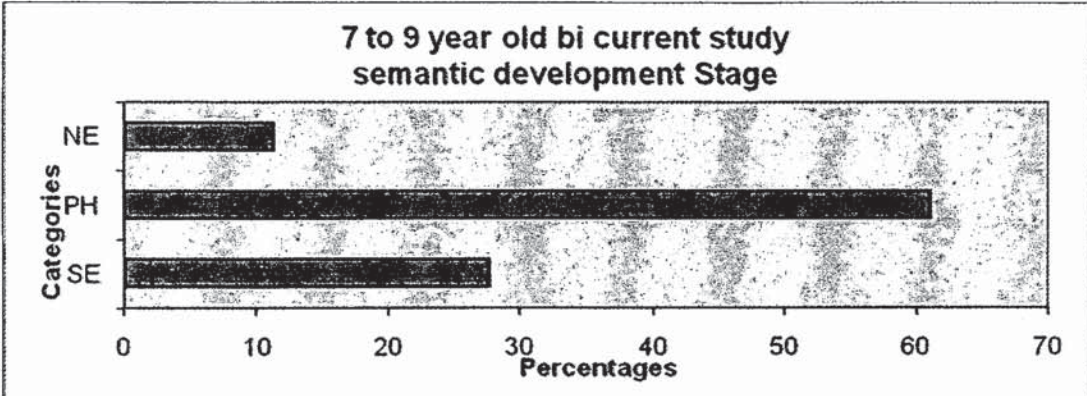
More than half of those children choose phonetic answers, so this is a good indicator of the way these children think. This shows that a lot of rhyming and word matching based on sound is taught in the Lebanese curriculum. Also, 4 out of the 5 children who choose semantic answers belong to type 6 in the early childhood bilingual acquisition; that is, the children's parents use two languages with them all the time. This switching back and forth from one language to the other could be a cause for letting these children think more of the words' meanings than sounds.

The bilingual children show a lower percentage at the semantic stage than their monolingual peers. This shows that the bilinguals of this study, at this level, are not superior to their monolingual peers. Also, none of the monolinguals falls in the neither category; they all knowingly choose the words that show either phonetic or semantic similarity, while around 10% of the bilinguals are inconsistent in answering and have to be placed in the neither category.

The results of grades 2 and 3 are different from those of grade 1. The monolinguals of grade 3 show a 100% consistency in answers. They either choose the semantic or the phonetic answers across all 8 sets of words. Therefore, they have all knowingly either chosen the word that resembles the standard one in sound or in meaning. The number of children that chooses the semantic similarity is double the number that chooses phonetic similarity. The results are consistent with Ianco-Worrall's (1972) findings because they indicate that as monolinguals mature, their semantic development stage matures as well, and they start to focus more on words' meanings than sounds (p.1398). The bilinguals of this study do not show that kind of progression and maturity in answers. Two students are very inconsistent and have to be placed in the neither category for showing no consistency in the pattern of answers. The majority chooses phonetic similarity in the words.

After conducting this experiment, the results show that younger bilingual children, aged six, have more controlled and consistent answers than their monolingual peers, and they are slightly more developed in the semantic developmental stage. As for the older children, those aged 7 to 9, the monolinguals are at a higher position in the semantic developmental stage than the bilinguals. They have a better grasp of the meaning of the words. It may be due to their

exposure to only one language and their having had more time to focus on the vocabulary. These monolinguals communicate in English with their family members, their teachers, and their friends at school, so this extensive exposure to the language gives them an advantage over the bilinguals when it comes to being more proficient and knowledgeable in the use of the vocabulary. The bilinguals have two sets of words in their system and have to deal with what word means what word in two totally different languages, English and Arabic.

In a comparison of results of both studies, Ianco-Worrall's (1972) and the current study, there is a similarity in that semantic preference increases as a function of age in monolinguals. They are different in that Ianco-Worrall (1972) finds that bilinguals reach a stage in semantic development 2 to 3 years earlier than their monolingual peers, while the current study finds a very slight superiority of 12% in that. The difference is also seen in the monolinguals who give inconsistent answers in Ianco-Worrall's study. The 7 to 9 year-old monolinguals in the current study show no inconsistency at all. They give 100% of the answers either following sound or meaning choices. This shows a full understanding of what has been asked of them. In Ianco-Worrall's study, 38% of the 7 to 9 year-old monolinguals show inconsistency in their answers. Another difference is that in the current study, the 8 to 9 year-old bilinguals do not show any sign of development in the semantic stage; on the contrary, the choice of semantic preference decreases in comparison to the results of the children in grades 1 and 2. On the other hand, in Ianco-Worrall's study, the bilinguals show a slight improvement of 5% in the older children.

The results of the current study in relation to the vocabulary of bilinguals are similar to what Madorah Smith (1949) and Ben-Zeev (1977) discuss in their studies. Smith believes that bilinguals have an average-sized vocabulary (p.309), and Ben-

Zeev talks about the vocabulary deficit of bilinguals (p.1010). The fact that bilinguals have a low percentage in semantic choice shows that they may not have understood the meanings of the words and therefore chose the words that are similar in sound to those given to them.

Exercise 2

This exercise consists of 3 parts; the children are asked 1) to explain the names of things, 2) whether names of things may be interchanged, and 3) when names are being interchanged in play whether the attributes of the objects change along with the names. The notion being tested is whether bilingualism leads to the earlier realization of the arbitrary nature of name-object relationship (see Appendix E for complete proofs).

Part 1: In Grade 1 in the current study, the results show that the bilingual children can understand and reply to a question that they have never come across before more easily than monolinguals. All of the bilinguals try to find a reason, and eventually, they all give answers that fall in the attributes category (AT), and so do three monolinguals. On the other hand, one monolingual shows an understanding of the notion that names are arbitrarily assigned to objects (AB). As for the others, one is very confused and cannot answer the questions, and the last one shows inconsistency (DI). In Grade 2, half the monolinguals have no answer (IG) for the questions while only one-third of the bilinguals do not answer. More than half of the bilinguals understand that they need to explain the reason behind naming objects and rationalize to find the reason. Only a quarter of the monolinguals does that. One bilingual shows complete understanding of the notion that names are arbitrarily assigned to objects. The results in general show that bilinguals are more advanced in the understanding of the arbitrary relation of names to their objects. In Ianco-

Worrall's study, there were no differences between bilingual and monolingual groups in the types of explanations they offered. The majority of the answers fell under the attributes category; that is, "a cow is called a cow because you milk it".

The grade 3 results are similar to those of grade 2. The majority of bilinguals have the ability to try and figure out the answer to the questions given to them. The only difference here is that monolinguals show a better understanding of the notion that names are arbitrarily assigned to objects. Charts 5 and 6 show the percentages of the children's explanation of the names of things from Grades 1 to 3. Chart 5 is for the monolinguals and Chart 6 is for the bilinguals.

Chart 5, Explaining Names of Things, Grades 1-3 Monolinguals, Current Study
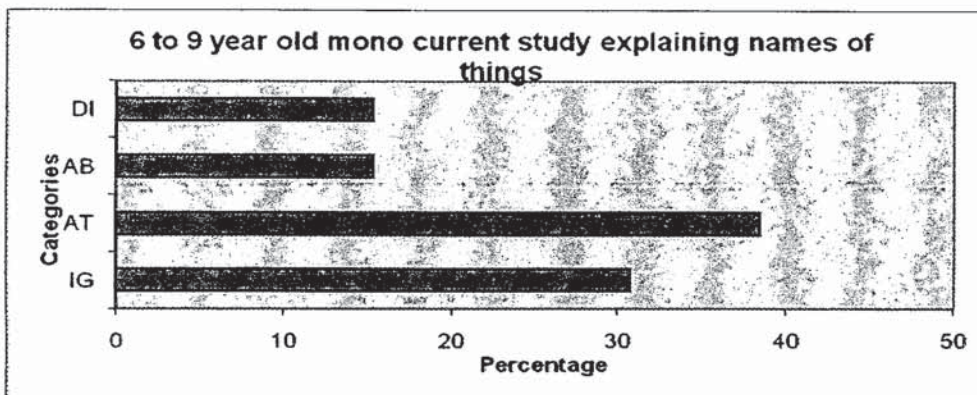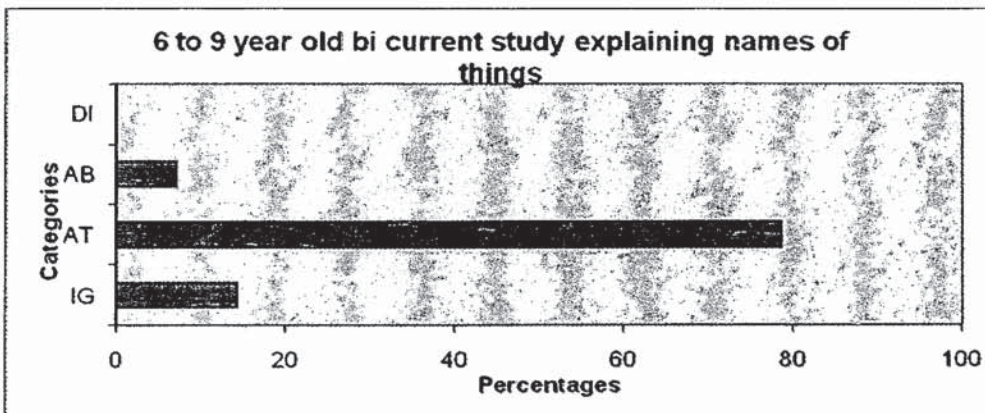

Chart 6, Explaining Names of Things, Grades 1-3 Bilinguals, Current Study

The conclusion reached is that bilinguals are more open to understanding new notions they come across. All of the children are somewhat surprised by the questions, and while 46% of the monolinguals show inconsistency and lack of understanding or do not provide answers, only 13% of the bilinguals answer "I don't know". The exposure to two languages and the fact that there are two totally different words that represent each object each in a different language may have helped the bilinguals to be more open and more ready to accept new concepts they come across and try to make sense of them.

Part 2: In Grade 1, among all the monolinguals and bilinguals, only one bilingual shows an understanding of the notion that names are arbitrarily assigned to objects (YY). Also another bilingual is the only child that answers "yes" to the next set of questions (NY), "Suppose you were making up ....?" This shows that he has actually developed to the stage where he can understand the notion previously mentioned. Chart 7 shows the percentages of answers of monolinguals. IN is indicative of children who are inconsistent in their answers.

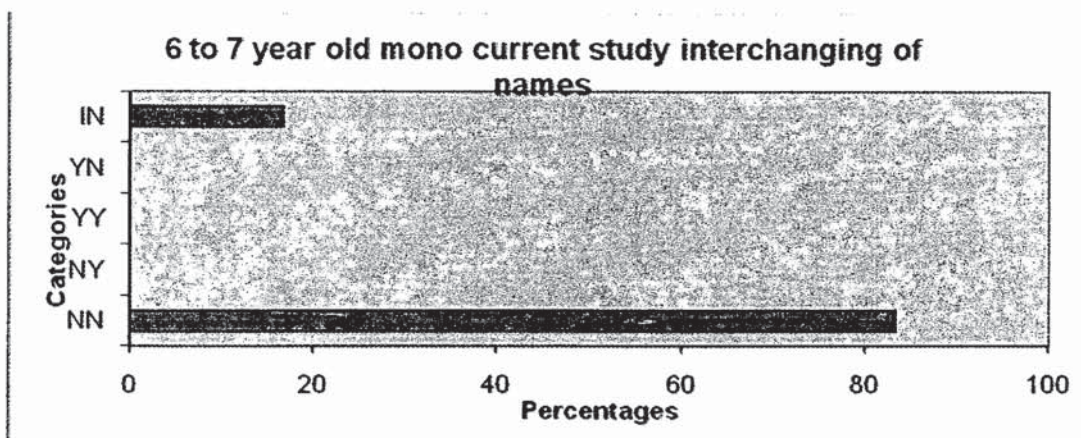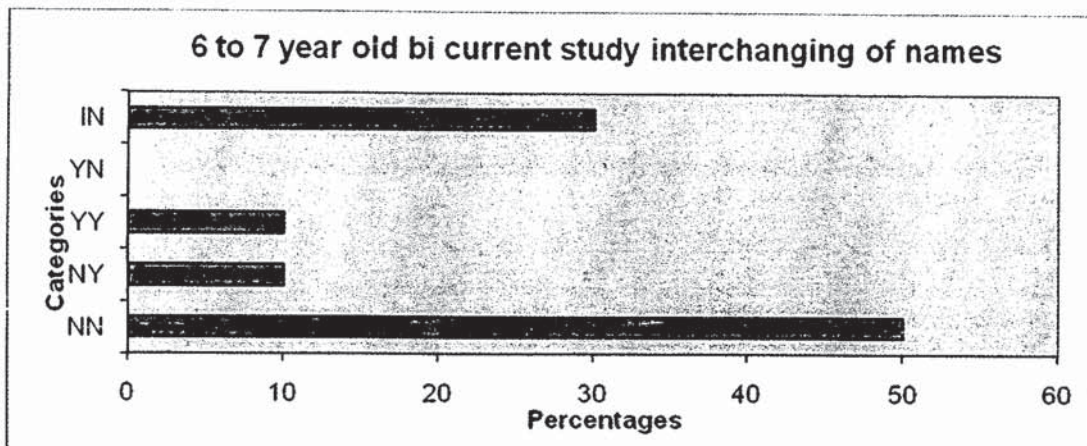Chart 7, Interchanging Names of Things, Grade 1 Monolinguals, Current Study

Chart 8 shows the percentages of answers of bilinguals in the interchanging of objects' names.

Chart 8, Interchanging Names of Things, Grade 1 Bilinguals, Current Study

6 to 7 year old bi current study interchanging of names

As for Grade 2, the children show superiority in their answers in relation to the children in Grade 1. Four bilinguals and one monolingual show that they have reached the stage where the notion of arbitrariness of words is developing. The bilinguals in both grades 1 and 2 show that they are developing the notion that words are arbitrarily assigned to objects more than their monolingual peers. This may be due to the knowledge of and fluency in two languages. Bilinguals know that each object has two different names that represent it, and it is therefore easier for them to understand that names are arbitrarily given to objects and can be changed. In Ianco-Worrall's study, in both age levels, the bilinguals are the highest proportion of children to be classified in the No-Yes combined response category (4 out of 10 in 4 to 6 year old group; 10 out of 17 in 7 to 9 year old group), while the great majority of monolinguals are classified in the No-No combined response and Inconsistent category (1 out of 12 and 9 out of 12 in 4 to 6 year old group; 5 out of 16 and 5 out of 16 in 7 to 9 year old group). This means that the bilinguals believe that in principle the names of objects can be interchanged.

In Grade 3 in the current study, the results are slightly surprising since not a single student answers yes-yes. Two monolinguals and three bilinguals exhibit

understanding of the notion of arbitrariness of names of objects by answering yes to the second set of questions. At this age, monolinguals show a better development of the notion than bilinguals. In Ianco-Worrall's study, the majority of bilinguals agree that names of objects can be interchanged, while the majority of monolinguals say they cannot. The results received from the older children are not consistent with the results of Ianco-Worrall (1972) since the proportion of Grade 3 monolinguals in this study that show an understanding of the concept that names are arbitrarily assigned to things is higher than that of the bilinguals of the same age group. This may be due to the factor of age. The monolinguals are more at ease in the use of the English language since they are exposed to it all the time as opposed to the bilinguals who have to constantly deal with two languages, sometimes interchangeably. Perhaps, for the monolinguals, it is easier to understand the question "....then could you call a "dog" cow and a "cow" dog?" The use of the word "then" may make more sense and provide a hint as to what the answer should be to the children who are more fluent and proficient in the use of the English language. Charts 9 and 10 show the percentages of the monolinguals and bilinguals in the current study who interchange names of objects.

Chart 9, Interchanging Names of Things, Grade 2-3 Monolinguals, Current Study

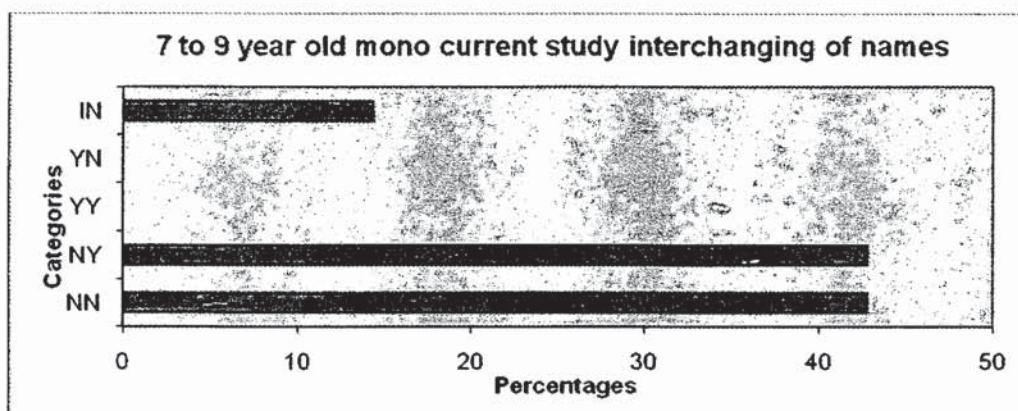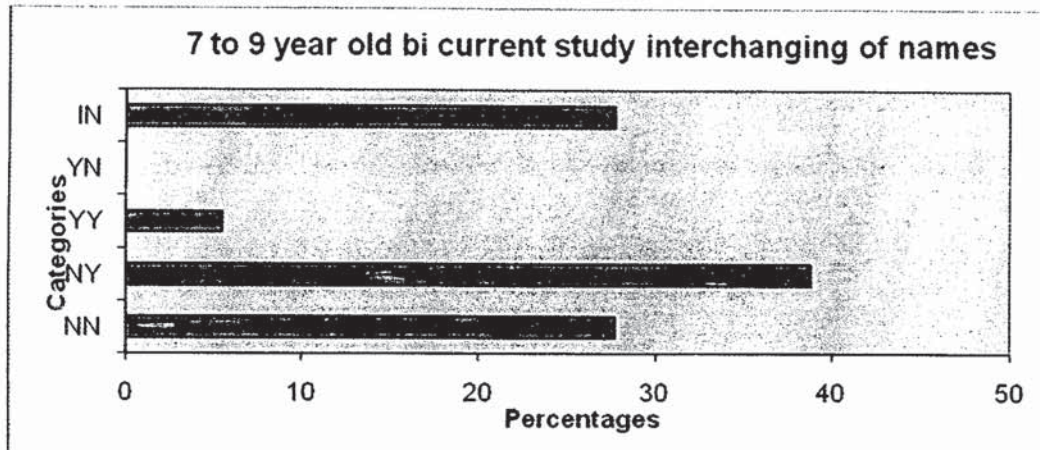7 to 9 year old mono current study interchanging of names

Chart 10, Interchanging Names of Things, Grades 2-3 Bilinguals, Current Study

Part 3: In Grade 1, the results show no significant differences between bilinguals and monolinguals. The majority in both groups does not have the ability to separate the qualities of objects from their names. This is normal since only two bilinguals have the understanding of the notion of arbitrariness of names of objects. The monolinguals of Grade 2, as opposed to those of Grade 1, show a better ability to separate the qualities of objects from their names. But nearly half of the bilinguals get the answers all wrong. This result, for the monolinguals, is consistent with the result of Part 2 but not so much for the bilinguals, who are superior to monolinguals in Part 2. As for Grade 3, the results show that the ability to interchange the names of objects and separate the qualities of objects from their names is more developed in monolinguals.

The results of Ianco-Worrall's study show that the proportion of children consistently correct across all three games is 50% for the younger children and 88% for the older children. Although the ability to interchange names of objects in play improved with age, there were no differences between bilinguals and monolinguals at either age level. In the current study, there were no differences between bilinguals and monolinguals only with the younger children of Grade 1. This result

is consistent with that of Ianco-Worrall's (1972) and also the study of Cummins and Mulcahy (1978) who find no difference between balanced and dominant bilinguals regarding awareness of the arbitrary nature of word-referent relationship (p.1239). In Grades 2 and 3, the results differ because the monolinguals show a better ability to separate the qualities of objects from their names. In this part, the children are told that the objects' names will be replaced by other names.

From the results, it is shown that once the older monolinguals know and understand, because they are told that this is a game, that names of words are to be interchanged, they are able to separate the qualities of objects from their names. This is due to the factor of age. The older the children are, the easier it is for them to understand this notion. This is not apparent in the older bilingual sample. The results of the bilinguals show that they are confused. The existence of two linguistic codes in their brains may be a deterrent of the ability to separate qualities from their objects. The charts below display the results. "C" refers to correct answers across the three sets of questions. "W" is when the children get all the answers wrong. "M2" is when the children have mixed answers and have answered only one correctly. "M1" is when the children have answered two correctly.

Charts 11 and 12 show the percentages of the monolinguals and the bilinguals.

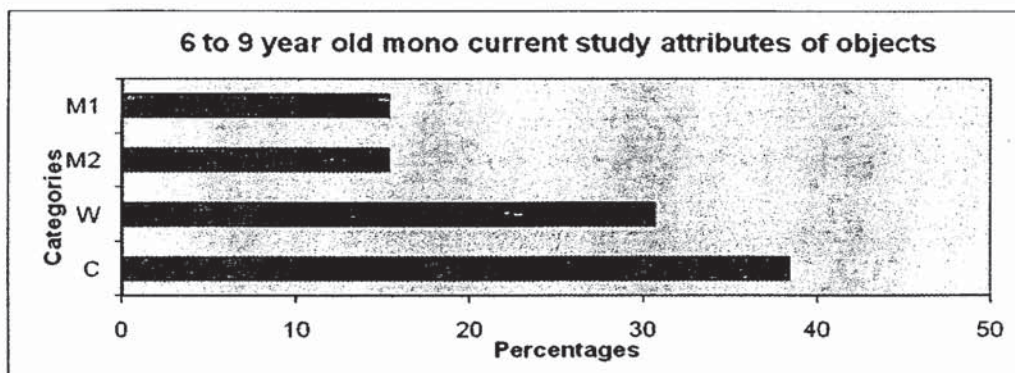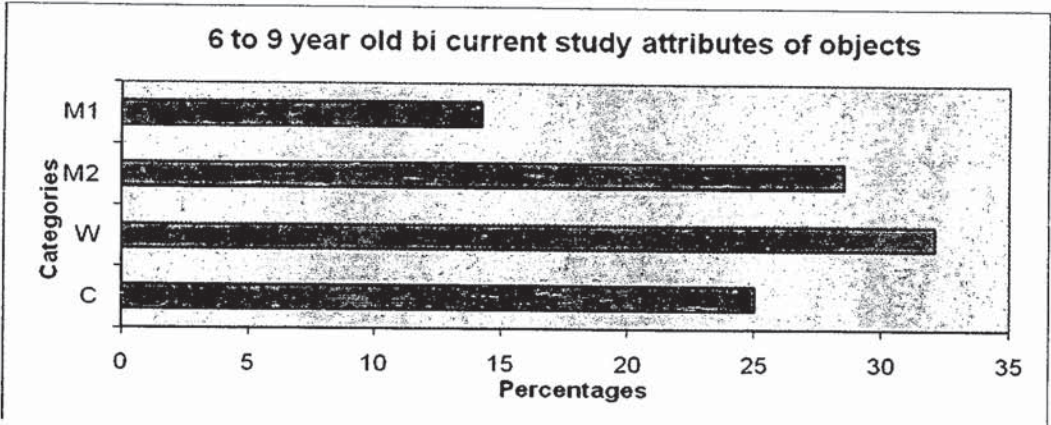Chart 11, Attributes of Objects, Grades 1-3 Monolinguals, Current Study

6 to 9 year old mono current study attributes of objects

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Chart 12, Attributes of Objects, Grades 1-3 Bilinguals, Current Study

6 to 9 year old bi current study attributes of objects

To conclude the results of this exercise, all the bilinguals exhibit more openness to solving or trying to make sense of new things they encounter. They try to answer a question that is surprising for them and which they have never come across before. They do that much more easily and willingly than monolinguals. As for the notion of arbitrariness of words, when asked to interchange the names of things, the younger bilinguals of Grades 1 and 2 show better understanding of the concept than their monolingual peers while the opposite is true for the third graders. The older monolinguals outperform their bilingual peers when it comes to interchanging the names of objects and knowing whether they retain their qualities. The younger monolinguals and bilinguals both perform badly when asked about that.

Exercise 3

This exercise involves symbol substitution tasks (see Appendix F for complete proofs). In the current study, the results show no superiority to bilinguals in either part of the experiment. On the symbol substitution task, the monolinguals and bilinguals in grades 1 and 2 have very similar results in that the Grade 1 children show around 30% understanding of symbol substitution tasks and Grade 2 show around 70% of that; whereas, with the older children, the ones in grade 3, the

results show superiority to monolinguals. For example, all the monolinguals are able to replace the word "turtle" for "airplane" and still know and demonstrate that the object remains the same and is still able to fly even with the change of name. Only half of the bilinguals show that kind of understanding. Concerning the items where the children are expected to violate selectional rules in a sentence by replacing one word for another, the results do not show any superiority to the bilinguals. Both monolingual and bilingual children across all the ages rarely violate the selectional rules and replace one word for the other. The study Ben-Zeev conducts yields results that show the superiority of bilinguals in both parts of the experiment: the understanding of word arbitrariness and the ability to set aside selectional rules of sentence syntax when required. This result means that bilinguals have an approach to syntax which is highly analytic and goes beyond the mastery of ordinary syntactic rules (Ben-Zeev, 1977, p.1017).

By having two referent symbols for most referents, that is objects or events, the bilingual child learns early that words are not intrinsic but arbitrary and reaches the knowledge that there is no determined relationship between a word and its referent (Ben-Zeev, 1977, p. 1010). Diaz (1985) believes that bilinguals are able to see language form as well as function and they know that the attributes of an object do not transfer to the word itself. They are able to name an object any nonsense name and know that it still refers to the same object. By having two words for the same referent, they become more flexible cognitively (cited in Lee, 1996, p.510).

Thus, bilinguals are expected to be superior in the ability to free referents from their given symbols and view them as the same referents even when given a different symbol. Since bilinguals have experienced more than one language code system, they should be able to abandon the rules of one system for a different set of

rules when necessary. For success on the second part of the experiment, the bilinguals should be able to ignore the semantic meaning of individual words and the selectional rules which govern the usual relationships between classes of words within the sentence (Ben-Zeev, 1977, p.1012).

The explanation for the result received in this study may be that monolinguals have full mastery of the rules since they have one syntactic system and have more time to master it than bilinguals. It is possible that the factor of age is in play here. The older monolinguals are able to replace the names of words and still know that the attributes remain the same because at the age of 8 and 9 this notion may start to develop. It is possible that at this age, the bilinguals have been exposed to two languages all their lives and are at this stage studying the grammar of both at school. The Arabic grammar is completely different from that of English, so it is very probable that confusion sets in at this stage and starts to become apparent in showing some disadvantages. The advantages of bilingualism can start to be apparent again after several years. One more reason for the success of monolinguals in knowing the arbitrary nature of word-referent relationship can be, according to Aronsson's analysis (1981), that monolinguals have lexical arbitrariness which is stylistic, such as distinguishing between "guy" and "boy" (cited in Romaine, 1995, p.113).

The results of exercises 2 and 3 are consistent especially when it comes to the older children, for they both show that the monolinguals outperform their bilingual peers in the tasks given to them. As for the results of the Grades 1 and 2 children, in Exercise 2 the bilinguals outperformed their monolingual peers while in exercise three no difference is apparent. This may be due to the similarity between the exercises and the monolinguals learning from the first and applying in the

second. For instance, a monolingual child may have answered that there is no way for a dog to be called cow and that the said "dog" can never have horns, but when the third exercise was given to him/her the perspective may have changed because the child is shown the airplane and told that this "object" is to be called "turtle". This time the question may be much clearer to him/her because the toy airplane is lying on the table right in front of his/her eyes.

Exercise 4

This exercise tests divergent thinking (see Appendix G for complete proofs). From the results received, it is very clear that the older children are more prone to giving creative answers (C) to the questions of uses for a "brick" and for a "tin can", while, in general, the younger ones in Grade 1 cannot find any creative response (NC), and it is apparent that the children have a bit of a difficulty finding unusual uses for a brick but have no problem at all finding very creative uses for a "tin can" (SC). This may be due to the children not having a lot of contact with building materials, as opposed to the daily contact with a "tin can". Most, if not all homes, have foods preserved in tin cans, and the children see their caregivers emptying the contents into plates and using the tin cans for several other reasons. In grade 1, both groups have the same level, while in Grade 2 there is superiority for bilinguals. Charts 13 and 14 show the percentages.

Chart 13, Creative Thinking, Grade 2 Monolinguals, Current Study

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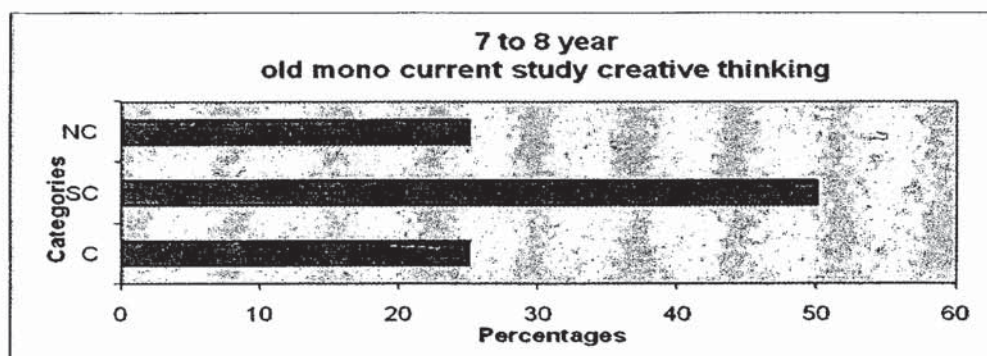
Chart 14, Creative Thinking, Grade 2 Bilinguals, Current Study

7 to 8 year old bi current study creative thinking
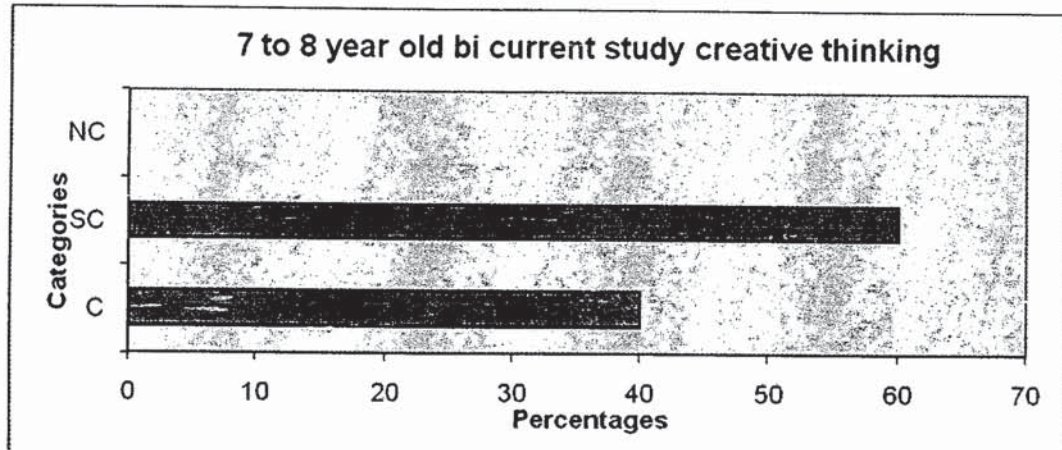
But in grade 3, the monolinguals show superiority in creativity. Charts 15 and 16 show the percentages of Grade 3 children.

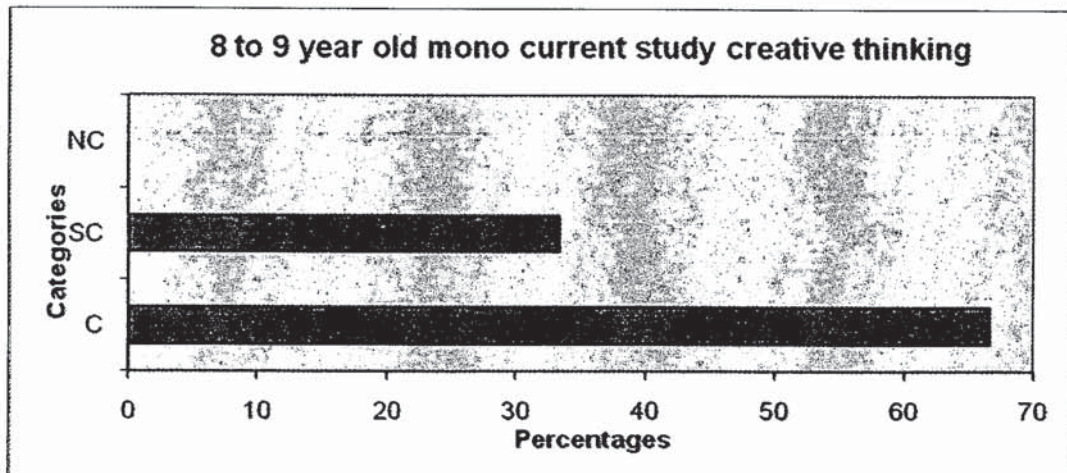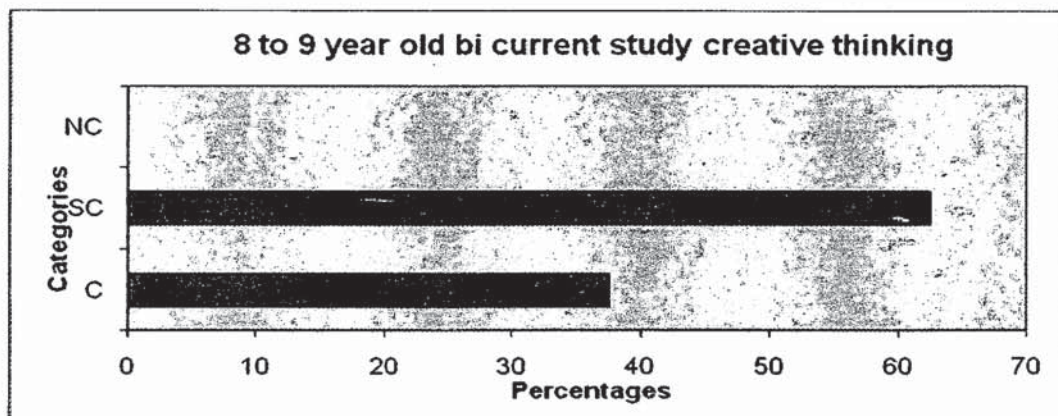Chart 15, Creative Thinking, Grade 3 Monolinguals, Current Study

8 to 9 year old mono current study creative thinking

Chart 16, Creative Thinking, Grade 3 Bilinguals, Current Study

8 to 9 year old bi current study creative thinking

These results are not similar to those that Ricciardelli (1992) receives. She states that out of 24 studies, 20 studies show the superiority of bilinguals on divergent thinking skills (p.303). Also, according to Baker (2006), the knowledge of two languages should enhance a person's creative thinking skills because having two different labels for one referent results in a wider variety of associations (p.153). From his study, Carringer (1974) also gets results which show the superiority of bilinguals (p.500).

In Grade 1, there is no notable difference between the monolinguals and the bilinguals. These children are still young and may not have the sufficient vocabulary and expression skills to explain their views and thoughts. As for the older children, those in Grade 2, their results are consistent with the studies previously done. The bilinguals exhibit that their knowledge of two languages has enriched them with a broad imagination and a variety of associations. But the results of the oldest children, those in Grade 3, do not conform to the review of literature in that the monolinguals outperform the bilinguals in divergent thinking skills. The reason may be that monolinguals possess a wider vocabulary and are able to better express themselves with the use of that extensive word bank they have. The vocabulary deficit that bilinguals have in comparison to monolinguals can hinder the production of word associations (Ben-Zeev, 1977, p.1010).

The results of the bilinguals in Grades 2 and 3 are very similar; it is the monolinguals that develop and show much more creativity with age. This is natural since the research is dealing with cognitive issues, and the older the person gets, the better they perform.

Exercise 5

This exercise deals with the knowledge of grammatical structures (see Appendix H for complete proofs). In grade 1, 50% of the monolingual and bilingual children show no understanding of the whole concept of grammaticality since they are not able to tell whether a sentence is grammatically correct or wrong. The results of the 7 to 8 year old children show that bilinguals judge the grammaticality of the sentences much more accurately than their monolingual peers. Charts 17 and 18 show the percentages of the monolinguals and the bilinguals of Grade 2.

Chart 17, Grammaticality of Sentences, Grade 2 Monolinguals, Current Study

7 to 8 year old mono current study grammar
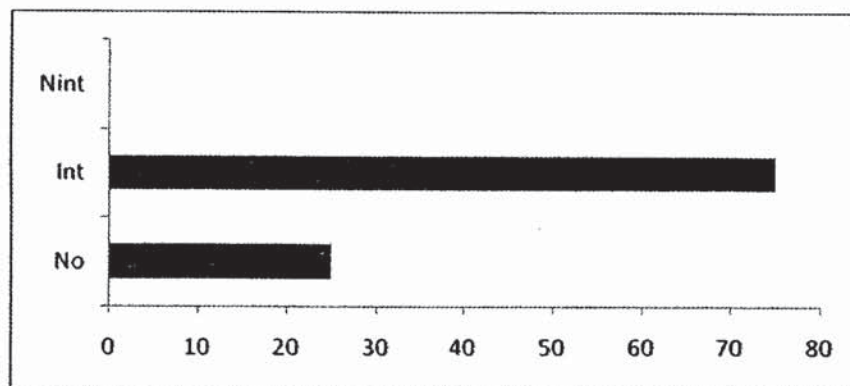
Chart 18, Grammaticality of Sentences, Grade 2 Bilinguals, Current Study

7 to 8 year old bi current study grammar
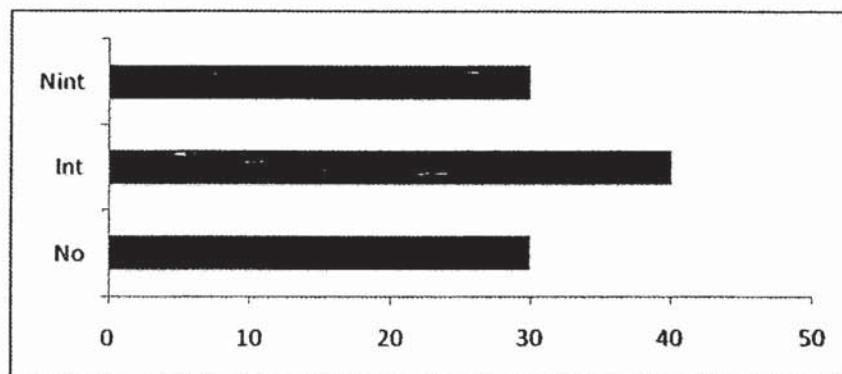
As for grade 3 children, 38% of the bilinguals exhibit no understanding of the concept. Charts 19 and 20 show the percentages.

Chart 19, Grammaticality of Sentences, Grade 3 Monolinguals, Current Study

8 to 9 year old mono current study grammar
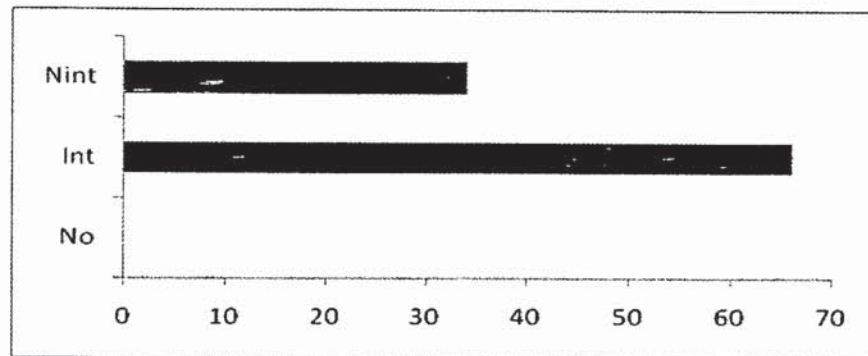
Chart 20, Grammaticality of Sentences, Grade 2 Bilinguals, Current Study

8 to 9 year old bi current study grammar
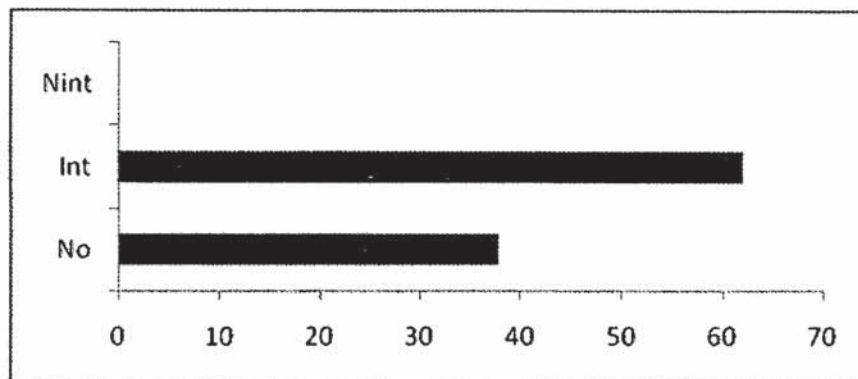
The results that Bialystok (1987) receives after conducting this same experiment on five to nine year old children show that the bilinguals judge the grammaticality of the sentences much more accurately than their monolingual peers across all the age groups. That is, they are able to tell whether a sentence is grammatical or not without the interference of meaning (cited in Baker, 2006, p. 157).

The results received in Grade 1 in the current study show that the children have not yet developed the sense of knowing whether sentences are grammatical or

not. Even the monolinguals, whose native tongue is English, cannot tell whether the sentences are correct or not. This is foreseen since native speakers of the English language sometimes make errors in grammar. The children at this age do not take grammar lessons which include adverbs and the difference between a grammatically meaningful sentence and a grammatically meaningless sentence at school yet (Lebanese Curriculum, 1997). The Grade 2 results are similar to the results that Bialystock receives. They show the superiority of bilinguals when judging the grammaticality of sentences. But the results of the bilinguals in Grade 3 contradict the results of Bialystock since the monolinguals perform much better than the bilinguals. These results relate to Ben-Zeev's (1977) view of bilinguals and grammatical structures. She believes that bilingual children are prone to making more grammatical errors than other children because they have a limited exposure time to each language (p.1009). This result can also be due to the two grammatical structures, English and Arabic, which have totally different grammars, overlapping in their minds. At this age, in school, the children are taught grammar lessons in both languages and this exposure to two different linguistic systems can cause the children to pass through a period of confusion. Another reason can be the vast difference in both linguistic systems. The children have to comprehend and work with the complicated grammar of Arabic, which is completely different from that of English. The monolinguals perform much better and show better and higher levels of analysis of linguistic knowledge. Their performance can be due to their dealing with one linguistic system and therefore being better able to comprehend it and analyze it.

Exercise 6

This exercise deals with analogical reasoning (see Appendix I for complete proofs). The results show that younger bilingual children aged 6 have stronger and more advanced analogical reasoning skills than monolinguals their age, but they have weaker vocabularies. Charts 21 and 22 show the percentages.

Chart 21, Analogical Reasoning, Grade 1 Monolinguals, Current Study

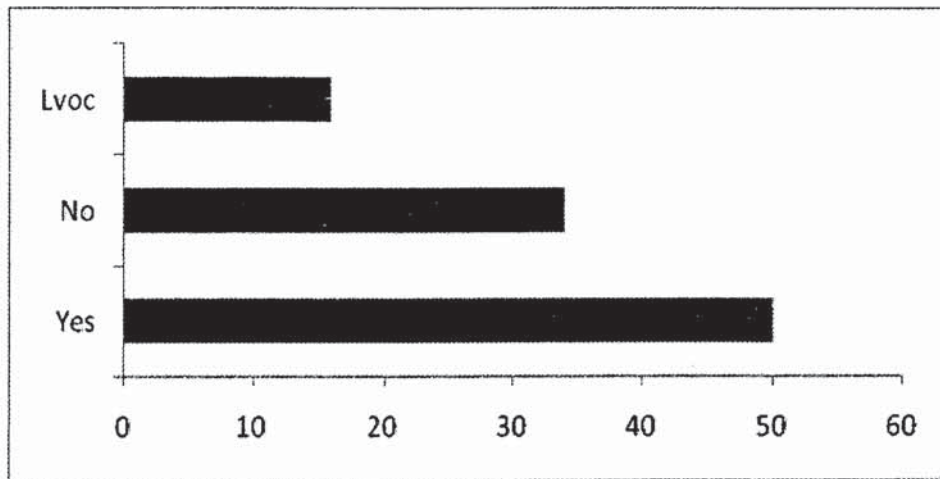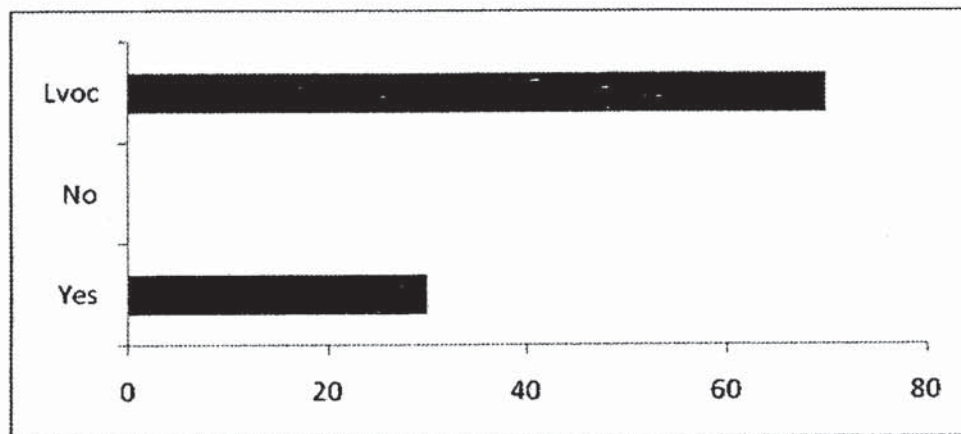**6 to 7 year old mono current analogical reasoning**

Chart 22, Analogical Reasoning, Grade 1 Bilinguals, Current Study

6 to 7 year old bi current analogical reasoning

In Grades 2 and 3, which have the slightly older children, the results are very similar for monolinguals and bilinguals, where both show a solid ability to reason

by analogy. The discrepancy is obvious in vocabulary since bilinguals show a delay in vocabulary structures. The results are very similar to those of Diaz (1985), who concludes that the more proficient the bilinguals are in two languages, the stronger their analogical reasoning is (cited in Baker, 2006, p.149). The study is conducted on 6 and 7 year old children, so what applies to it is the result received from Grade 1 and Grade 2 children. As the children become older and more mature, their brain develops better advanced reasoning skills.

The results of all the children grouped together prove that the bilinguals have weaker vocabularies. The numbers are indicative of the fact that monolingual children are more at ease and fluent in the English language, and that is due to their constant exposure to the words in just one language. Bilingual children learn the name of the same object in two different languages and have to deal with two different linguistic systems, so it is very natural for monolingual children to have more fluency and a more extensive vocabulary in their native tongue. Also, the environment the bilingual children are living in is Arabic, and the exercises are given to them in English.

To conclude this chapter, a summary of the results of every exercise is stated. In the first exercise, the one that deals with the semantic development stage, the bilinguals outperform their monolingual peers by a 12% difference at the grade 1 level, but the monolinguals at the grade 2 and 3 level outperform their bilingual peers. The second and third exercises test the knowledge of arbitrariness of word-referent relationship. The bilinguals in Grades 1 and 2 outperform their monolingual peers in that area, but the monolinguals in Grade 3 show better understanding of the concept than their bilingual peers. The fourth exercise tests divergent thinking skills. The children in Grade 1 have the same results; they all

cannot give creative answers and that is due to their young age. In Grade 2, the bilinguals are clearly superior to monolinguals in giving creative answers. But in Grade 3, the monolinguals outperform the bilinguals. The fifth exercise tests whether the children can correctly judge the grammaticality of sentences. The results received are that 50% of the first graders, be it monolinguals or bilinguals do not have that concept to begin with. The bilinguals in the second grade outperform their monolingual peers, but the in the third grade, the opposite is true. The last exercise tests analogical reasoning. The bilinguals outperform the monolinguals only in one level, Grade 1. In the other grades, both perform similarly when it comes to the ability to reason by analogy but the monolinguals outperform the bilinguals in the use of vocabulary. From the analysis of the results that has been presented, the conclusions, limitations, and implications of this study are given in the following chapter.

Conclusions, Implications, and Limitations

Conclusions

The first hypothesis "six to nine year old balanced bilingual children from private schools reach a semantic development stage two to three years earlier than their monolingual peers" holds true only for the younger bilinguals of this study. The Grade 1 bilinguals outperform their monolingual peers in choosing more semantic answers and fewer inconsistent answers, and therefore prove that, at this age, they have reached a semantic development stage earlier than their monolingual peers. But the part of the hypothesis which states "two to three years earlier" does not hold true because first, the older monolinguals do not give any inconsistent answers and second, they give double the number of semantic answers (around 40%) that is given by the Grade 1 bilinguals (20%). The older bilinguals are outperformed by their monolingual peers. The monolinguals in Grades 2 and 3 show better understanding of the words in the exercise and of what has been asked because they have 100% consistency in answering as opposed to the bilinguals who have more than a 10% of inconsistent answers. The monolinguals also have more semantic answers. They have around 40% semantic answers while the bilinguals have less than 30% semantic answers.

The second hypothesis "six to nine year old balanced bilingual children from private schools comprehend the arbitrary nature of word-referent relationship and that words are just symbols as opposed to their monolingual peers" applies to the younger bilingual children in Grades 1 and 2 but not for their older peers in Grade 3. This hypothesis is tested through two exercises which, grouped together, have four parts. The results are consistent in both exercises except for a slight difference with the monolinguals' answers in Grades 1 and 2 in the second and third exercise where

learning may have taken place. The third part of the first exercise involves interchanging names of objects and animals and asking the children about the objects' attributes. The monolinguals in Grades 1 and 2 do not understand the notion that an object's name can change but it still retains its attributes. This is shown in the results. But, when they are asked the questions in Exercise 3 and shown the toy airplane for the first question, their results improve. However, the third-grade monolinguals outperform the bilinguals in both exercises by giving correct answers to all the questions except for the last one in Exercise 3, where two monolinguals do not violate the rules of the more complex item.

On the other hand, the bilinguals across all the grades are much more apt to trying to solve problems they have never encountered before such as when asked "Why is a dog called a dog?" Even when they have no clue about the answer to a question they believe is ambiguous and weird, they are keen on trying to find a suitable answer. Their knowledge and comprehension that words are arbitrary is more apparent when they are younger. 40% of the bilinguals in Grade 2 are classified in the No-Yes response category, and 10% are classified in the Yes-Yes category. In Grade 3, the bilinguals rarely give correct answers as opposed to their monolingual peers. This shows that at the level of Grade 3, the bilinguals pass through a period of confusion that may be due to the two linguistic systems they have.

The third hypothesis "six to nine year old balanced bilingual children from private schools get higher scores on divergent thinking skill exercises than their monolingual peers" applies to the second grade bilinguals only. The monolinguals and the bilinguals of Grade 1 rarely give creative answers because of their young age which results in a lack of sufficient experiences that trigger associations

between words and creativity in thinking. The monolinguals of the third grade outperform their bilingual peers who, 65% of the time, provide creative answers only to one of the questions because at this stage of their development they are confused in that they cannot do a lot of creative thinking because of the overlap of languages in their brains due to the differences between English and Arabic in grammar, vocabulary, and phonology (Shoebottom, 2007, p.1). So, this hypothesis holds true only for the bilinguals in the second grade whose ages range between 7 and 8.

The fourth hypothesis "six to nine year old balanced bilingual children from private schools identify grammatical sentences as opposed to their monolingual peers" is true only for the children in the second grade. In Grade 1, 50% of the monolinguals and bilinguals do not know the concept of grammaticality; this is evident when they choose incorrect answers to the questions in exercise five that test knowledge of grammaticality of sentences. The other half is affected by the interference of meaning; therefore, if the sentence is grammatical but meaningless, they believe it to be incorrect grammatically. However, the bilinguals in the second grade outperform their peers and show that 30% of them are not affected by the interference of meaning unlike 75% of the monolinguals who say that sentences are ungrammatical if they are meaningless. Contrary to the second-grade bilinguals, the bilinguals in Grade 3 regress, and none of them shows lack of interference of meaning with the grammaticality of sentences. Nearly 40% exhibit a lack of knowledge of the concept. On the other hand, 35% of the monolinguals show an understanding of the concept without allowing interference of meaning to affect the result, and 0% show lack of knowledge of the concept.

The fifth hypothesis "six to nine year old balanced bilingual children from private schools get higher scores on analogical reasoning skill exercises than their monolingual peers" holds true only for the first graders. 35% of the monolinguals in Grade 1 do not have the ability to reason by analogy while 100% of the bilinguals do. The difference in the other grades is that the monolinguals have much better vocabularies than the bilinguals but both have very similar analogical reasoning skills.

The children in the study have been chosen from four private schools, and they all have parents who come from middle to high socioeconomic backgrounds. According to Romaine (1995) such parents encourage their children to learn and speak two different languages; their bilingualism is rewarded (p. 115). Brown (2005) also believes that these children are advantaged because of the influence of non-school factors such as the presence of a print-rich environment (p. 337). If the children were taken from a low socioeconomic background, the results would probably have differed in that the children would not have been proficient in both languages. The probability of being balanced bilinguals would have been low (Romaine, 1995, p.32; 115).

Most of the results received show an advantage to the young bilinguals, those aged 6 and 7. The older bilinguals, whose ages range from 8 to 9, are mostly at a disadvantage in all the cognitive areas tested except for analogical reasoning. This disadvantage is probably due to the confusion that results as an effect of learning two totally different languages, English and Arabic which have differences in grammar, vocabulary, and phonology (Shoebottom, 2007, p.1).

The results received show that bilinguals across all the ages tested have weaker vocabularies than the monolinguals. This is due to less exposure to the

language. According to Ben-Zeev (1977), bilinguals have weaker verbal abilities because they are exposed to two different languages and use the vocabulary of each language much less than monolinguals do (p.1015). Therefore, their verbal expression suffers in comparison to the fluency of monolinguals in the English language. Rescorla (2004) also believes that children growing up in bilingual environments have smaller vocabularies than monolinguals (p. 1216).

Implications

Several implications have resulted from the study. Each will be presented in relation to the hypothesis it originated from.

When talking about the semantic development stage, the monolinguals outperform their bilingual peers at the levels of Grades 2 and 3. This is not true for the first graders. Therefore, attention needs to be paid to the bilinguals in Grades 2 and 3 because at those levels they have lost their superiority over monolinguals. The parents, teachers, and schools through their curriculum have a responsibility in trying to help those children and keep them from falling behind instead of improving.

The exposure of bilinguals to two languages makes them more accepting to new concepts they come across, and this is part of the cognitive flexibility that Diaz (1985) and other linguists believe that bilinguals possess (cited in Baker, 2006, p.149). They try to make sense of new things and concepts and find reasons and explanations that will make them more understandable and logical, and that is why they find answers to the questions they are asked in the first part of Exercise 2 of the study. The older monolinguals, the ones aged 8 to 9, reply and only one of them does not give answers. This shows that as children mature, they become more relaxed and prone to receiving new ideas they come across; this is evident from the

answers these children give in the current study. The younger bilinguals show better knowledge of the arbitrariness of word-object relationship because they are exposed to two languages and have to daily deal with the same objects and call them two completely different names, one in Arabic and the other in English. According to Leopold (1949, cited in Wei, 2007, p.303) and Ianco-Worrall (1972, p.1391), this helps them understand that an object can be called any nonsense name and still remain the same object. The surprising fact was that the bilinguals in Grade 3 were totally confused and showed no understanding of the concept which was very well exhibited by their younger bilingual peers. The conclusion reached is that at this stage of their development, the bilinguals reach a stage of confusion (Genesee, 1994, p.3) and need attention and care to retain the advantages their peers show at a younger age. This confusion, according to Genesee, may occur because of the in-depth learning of grammatical structures in two languages.

The ability of bilinguals to give creative answers to the questions in Exercise 4 is apparent in Grades 2 and 3. In Grade 1, there is no notable difference between the monolinguals and the bilinguals. They both rarely give creative answers because of their young age and a lack in their vocabulary banks (Genesee, 2007, p.2; Ben-Zeev, 1977, p. 1015) which would allow them to make associations and provide unusual uses of objects. As for the children in Grade 2, the bilinguals exhibit that their knowledge of two languages has enriched them with a broad imagination and a variety of associations. They outperform their monolingual peers because of this exposure to two languages which gives them a chance to expand their imagination and have more solid associations (Wei, 2007, p.21; cited in Romaine, 1995, p.115). The monolinguals in Grade 3, on the other hand, are the ones who outperform their bilingual peers in this task. The reason may be that

monolinguals at this age have become more proficient in the English language than the bilinguals who communicate in Arabic as well. The latter do not have the time that monolinguals do in practicing and using the English language, and therefore it is easier for the monolinguals to possess a wider vocabulary (Rescorla, 2004, p. 1216) and be able to better express themselves with the use of that extensive word bank they have. This vocabulary deficit that bilinguals have may negatively affect their written and oral expression when compared to monolinguals (Ben-Zeev, 1977, p. 1015).

The bilinguals in the second grade are the only bilinguals who exhibit knowledge of the grammaticality of sentences. The bilinguals in the third grade show confusion and a total lack of ability in judging whether sentences are grammatical or not. At this age, and consistently with the results of the previous exercises, the bilingual children show confusion in their answers. The fact that English and Arabic differ in several areas such as grammar, vocabulary, and phonology is a reason (Shoebottom, 2007, p.1). The children should learn and understand the grammatical structures of the Arabic language, which are completely different from those of the English language and be tested in both. The monolinguals in Grade 3 perform much better and show higher levels of analysis of linguistic knowledge. Their performance is a result of having one linguistic system which they are exposed to. At this age, they have matured and have practiced it for a longer period of time, which is in this case two years, so also studying its grammatical rules at school may have helped the monolinguals become more proficient in the language (Genesee, 2007, p. 3) and be more attentive to the errors made by others while communication takes place (Genesee, 2007, p. 3).

The results received from testing the analogical reasoning of children prove that the young bilinguals aged 6 to 7 are the only bilinguals that have an advantage over their peers in this study although they have weaker vocabularies. Monolingual children tend to have better and more extensive vocabularies than bilinguals because they are only communicating using one language, and this language is what they are exposed to at school, at home, with their family, and with their friends (Rescorla, 20004, p. 1216). It is natural that they be more at ease and fluent in the English language. Bilingual children learn the name of the same object in two different languages and have to deal with two different linguistic systems (Shoebottom, 2007, p.1). On the other hand, monolingual children only learn the name of an object in one language, and this gives them time to learn more words and augment their vocabulary banks.

All the results presented along with the analysis given have led to some important changes that need to be implemented in the curriculum and issues that should be addressed by the schools, teachers, and the parents of bilingual children.

The disadvantages that are seen in the study are in the 8 to 9 year old children. At this age, the confusion the children go through is very clear in all the exercises given to them. Therefore, few additions need to be made to the curriculum of Grade 3, and the school and teachers should be aware that this is a critical age and the children need extra attention and support especially during this period.

The curriculum:

A few minor additions may be made to the curriculum of Grade 3. This only applies to language arts, which in this case are two subjects, English and Arabic. Some of the reading texts provided in the children's books should deal with the

same themes and should be given at the same time (Genesee, 2007, p. 33). For example, a chapter that teaches the seasons of the year should be given in both Arabic and English classes during the same week. This will allow the children to learn the names of the same objects in their two different languages at the same time and therefore strengthen the chances of comprehension of the topic and retention, and recall when necessary of the newly taught vocabulary because of the intensive exposure to it all week long.

Besides presenting the same themes at the same time, the curriculum should focus on and give time to constant follow-up in those two subjects. This may be done on a daily basis. Testing children by giving them a 5 to 10 minute daily formative exercise about the material taught on that same day helps the teachers to monitor the progress their students are making; therefore, if a student has not understood or retained the information taught on that day, the teacher's intervention is simpler than in a case where the child has difficulties with a whole week's material. Thus, the teacher's role and contribution are necessary.

The teachers

The most important aspect the teachers should improve in bilingual children is their vocabularies. The English and Arabic teachers should teach the children a lot of meaningful vocabulary for their age and elicit the newly learnt vocabulary in their writing assignments or incorporate it in class discussions (Genesee, 2007, p.33). Therefore, if this is done, the children's vocabulary banks will improve and make up for the deficiency they have.

The more proficient the children are in both languages, the more apparent the cognitive advantages are. This is shown in the studies of Cummins and Mulcahy 1978, Duncan and De Avila 1979, and Kessler and Quinn 1982 through

the threshold hypothesis (cited in Baker, 2006, p.171). Therefore, the language teachers of each class should, every week, hold a meeting to discuss each child's progress and to check the level of proficiency each child has reached in both languages. With the daily formative exercises which are to be given, it will be easy for the teachers to monitor their students' learning and report it to the other concerned teachers. If the teachers detect a low level of proficiency, measures should be taken to improve the areas or skills the child is deficient in. For example, the teachers may give the child short stories to read and prepare vocabulary exercises that check the ability to use the newly learnt words. Extra attention, such as often being called on in class, should be given to that child, and the child's parents should be contacted and informed of what needs to be done to improve the child's proficiency and fluency.

The parents

Parents of bilingual children should know that bilingualism, if it does not result in cognitive advantages, does not hinder learning or cognitive growth. There might be a period of confusion that the bilingual child may pass through (Genesee, 1994, p.1), but with the help of the school and the home, the child should overcome it.

Parents of bilingual children should try to expose them to different situations in both languages (Genesee, 2007, p. 32). The parents should work on helping their children become more proficient in both languages. Eventually, they would be helping them become balanced bilinguals, and therefore ensure that their children will get cognitive advantages. And if the children pass through a slight period of confusion, besides the help of the teachers at school, the parents can also help the

children to strengthen their vocabulary and become more proficient in both languages.

When the bilingual children reach the age 8 or 9 and negative results and confusion may start to show, the parents should support the child and be very attentive to his/her needs. Every day, the caregiver should tutor the child or, if the child already studies alone, monitor the homework being done. Also, the caregiver should review what has been done at school to ensure full comprehension of material learnt. It is crucial that, along with the help of the school teachers, the parents work on improving and expanding the vocabulary of the child (Genesee, 2007, p.32). This can be done by 1) having the children read stories in English and Arabic, and then retell them to their parents using the language of the story and give their opinion of the events and characters, 2) watching educational children's movies and programs, and 3) playing educational games which require questioning and answering, forming sentences, and describing objects and people (Genesee, 2007, p.33). The parents may be involved in all of those activities which are fun for the children but at the same time allow the parents to monitor their learning (Genesee, 2007, p.33). When this is done, the child will have a better chance of improving the vocabulary and proficiency of both languages, and therefore, may eliminate some of the confusion.

It would be interesting if this study were replicated but as a longitudinal one. Then, after 3 to 4 years, the same children would be tested again, and the results would be compared to find whether the advantages the younger bilinguals had recur in later years and whether monolinguals are inferior to their bilingual peers on measures of cognitive development.

A longitudinal study can be conducted to compare dominant bilinguals to balanced ones. Besides testing the relationship between bilingualism and cognitive development, the study would also be testing the threshold hypothesis to find out whether or not it holds true for Arabic-English speaking Lebanese bilinguals.

Limitations

In the current study, the older bilinguals, those aged 8 and 9, are mostly outperformed by their monolingual peers, as shown in the results and analysis parts as well as the conclusion and implication part. On the other hand, in the original studies, bilinguals are superior to the monolinguals in all the cognitive areas tested. This sheds light on the possibility that the bilinguals chosen by the school teachers and according to school results may not have all been truly balanced bilinguals. This relates to the threshold hypothesis, which states that the more proficient the child is in both languages, the more apparent the advantages are on his/her cognitive abilities. It is difficult to find truly balanced bilingual children in the same class.

It was also very hard for the researcher to find the monolingual sample especially in the Lebanese Arabic-speaking environment. Very few schools have monolinguals in the English language. Therefore, the sample was a small one made up of six children in Grade 1, four children in Grade 2 and three children in Grade 3.

In conclusion, this study has compared some cognitive abilities of 6 to 9 year old Arabic-English bilingual Lebanese children such as the semantic development stage, the arbitrariness of word-object relationship, creative thinking, knowledge of grammaticality of sentences and analogical reasoning to monolinguals in the English language. The results obtained were not all consistent with the previous studies made in this field. Therefore, new conclusions were made that adapt to the Lebanese community and implications were given as to what may be

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done to avoid any negative development in the cognitive abilities of the bilingual children in our community.

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Appendixes

Appendix A: Description of Children

The following are nine bands and their descriptive statements in relation to fluency, coherence, grammatical accuracy and pronunciation. A language teacher who has been teaching a child for several months can place him/her in an appropriate band for his/her level.

9 expert user: has fully operational command of the language; appropriate, accurate and fluent with complete understanding

8 very good user: has fully operational command of the language with only occasional unsystematic inaccuracies and inappropriacies. Misunderstandings may occur in unfamiliar situations. Handles complex detailed argumentation well.

7 good user: has operational command of the language, though with occasional inaccuracies, inappropreacies and misunderstandings in some situations. Generally handles complex language well and understands detailed reasoning.

6 competent user: has generally effective command of the language despite some inaccuracies, inappropriacies and misunderstandings. Can use and understand fairly complex language, particularly in familiar situations.

5 modest user: has partial command of the language, coping with overall meaning in most situations, though is likely to make many mistakes. Should be able to handle basic communication in familiar situations.

4 limited user: basic competence is limited to familiar situations. Has frequent problems in understanding and expression. Is not able to use complex language.

3 extremely limited user: conveys and understands only general meaning in very familiar situations. Frequent breakdowns in communication occur.

2 intermittent user: no real communication is possible except for the most basic information using isolated words or short formulae in familiar situations and to meet immediate needs. Has great difficulty understanding spoken and written language.

1 non user: essentially has no ability to use language beyond a few isolated words. (Baker, 2006, pp. 29-30)

Appendix B: Info about children

The following questions are asked to the children's English and Arabic teachers: Does the student frequently participate in class? Does the student answer confidently when asked a question?

Student's Name	Participates frequently	Answers confidently

Appendix C: Uses of English and Arabic

The chart shows the language used by the children with their parents, siblings, neighbors, friends, and relatives.

Name of Subject:	English	Arabic
Mother		
Father		
Siblings		
Neighbors		
Relatives		
Friends		

The researcher tells the children:

I have three words: cap, can, and hat. Which is more like cap, can or hat?

I have three words: mat, map and rug. Which is more like mat, map or rug?

I have three words: doll, toy, and dog. Which is more like doll, toy or dog?

I have three words: hit, beat, and hip. Which is more like hit, beat or hip?

I have three words: take, tape, and get. Which is more like take, tape or get?

I have three words: cheer, shout, and cheek. Which is more like cheer, shout or cheek?

I have three words: shop, show, and store. Which is more like shop, show or store?

I have three words: great, big, and gray. Which is more like great, big or gray?

Names	cap	Mat	doll	hit	take	cheer	shop	Great

(Ianco-Worrall, 1972, p. 1394)

Part 1

The researcher asks the children:

- Why is a dog called 'dog'?

- Why is a cow called 'cow'?

- Why is a chair called 'chair'?

- Why is jam called 'jam'?

- Why is a book called 'book'?

- Why is water called 'water'?

The results:

Names	Dog	Cow	chair	jam	book	Water

Part 2

It involves three pairs of names: dog and cow, chair and jam, book and water.

The researcher asks:

- Could you call a dog 'cow' and a cow 'dog'?

- Could you call a chair 'jam' and jam a 'chair'?

- Could you call a book 'water' and water a 'book'?

- Suppose you were making up names for things, could you then call a cow 'dog' and a dog 'cow'?

- Suppose you were making up names for things, could you then call a chair 'jam' and jam a 'chair'?

- Suppose you were making up names for things, could you then call a book 'water' and water a 'book'?

The results of the first three questions:

Names	dog/cow	jam/chair	book/water

The results of the last 3 questions:

Names	dog/cow	jam/chair	book/water

Part 3

The researcher tells them:

Let us play a game. Let us call a dog 'cow'. Then:

- Does this 'cow' have horns?

- Does this 'cow' give milk?

Let us call a chair 'jam'.

- Can you eat this 'jam'?

- Can you sit on this 'jam'?

Let us call a book 'water'.

- Can you drink this 'water'?

- Can you read this 'water'?

The results are as follows:

Names	dog/cow	chair/jam	book/water

(Ianco-Worrall, 1972, p.1394)

The researcher tells the children:

You know that in English this is named airplane (show them a toy airpiane). In this game its name is 'turtle'.

- Can the turtle fly?

- How does the turtle fly?

For this game the way we say 'I' is to say 'macaroni'.

- So how do we say 'I am warm'.

For this game, the way we say 'into' is to say 'clean'.

- So how do we say 'the doll is going into the house'.

The results are:

Names	Plane/turtle	'I' is 'macaroni'	'into' is 'clean'

(Ben-Zeev, 1977, p. 1012)

Appendix G: Exercise 4

The researcher asks the children: How many uses can you think of for a brick?

How many interesting or unusual uses can you think of for a tin can?

The results are:

Names	Brick	tin can

(Baker, 2006, p.152)

Appendix H: Exercise 5

The researcher asks: Which of the following sentences is grammatical?

Sentence 1: Why is the dog barking so loudly?

Sentence 2: Why the dog is barking so loudly?

Sentence3: Why is the cat barking so loudly?

Sentence 4: Why the cat is barking so loudly?

The results:

Names	sentence 1	sentence 2	sentence 3	sentence 4

(Bialystock 1984, cited in Baker, 2006, p.157)

Appendix I: Exercise 6

The researcher tells the children: Complete the following sentences with meaningful words.

Sentence 1: The princess is beautiful, the monster is _____

Sentence 2: Snow is ice, rain is _____

Sentence 3: Night is dark, day is _____

Sentence 4: Winter is cold, summer is _____

The results:

Names	sentence 1	sentence 2	sentence 3	sentence 4

(Diaz, 1985, cited in Lee, 1996, p. 506)