Bilingual Acquisition and Metalinguistic Development
A Study in Context

by

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Abstract

Metalinguistic development is not only a function of cognitive maturation, but also of contextual variables. The purpose of this study is to examine the effect of one such environmental factor, the simultaneous acquisition of two languages, on metalinguistic development.

An examination of naturalistic data reveals features of the bilingual acquisition context which differ from monolingual acquisition. Bilingual children must learn two different linguistic systems to express the same meanings. In addition, they must separate the two systems and learn to use them in appropriate contexts, a process which results in the bilingual phenomena of translation and code-switching. These features of bilingual acquisition foster an early realization of the arbitrary nature of language and stimulate the separation of meaning from form. Moreover, they promote an awareness of the pragmatic variability of linguistic form.

Metalinguistic abilities of bilingual and monolingual kindergarten children are tested by means of a word segmentation task and two grammatical awareness tasks. The results suggest that the assumption that bilinguals exhibit a more formal approach to language than monolinguals must be altered to a more context-oriented model, namely that bilinguals focus more on the pragmatic application of form to meaning in a particular communicative situation. Moreover, linguistic proficiency is found to be a very significant variable, suggesting that general language ability is very closely linked with metalinguistic awareness. In a bilingual or multilingual context, this finding provides some support for the 'linguistic interdependence' hypothesis (Cummins, 1979) and underlies the need for the development of proficiency in both languages.

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Contents

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Dedication

This thesis is dedicated to
my sons,
Michael and Johannes

Chapter 1

Introduction

This study is a synthesis of two major strands of applied psycholinguistic research: the first, the development of metalinguistic abilities in children, and the second, the linguistic and cognitive effects of bilingualism. The main concern is the effect that learning two languages at an early age has on the development of metalinguistic abilities in young children. Vygotsky (1986) was among the first to remark that the learning of a second language promotes the ability of the child to "see his language as one among many, to view its phenomena under more general categories, and this leads to awareness of his linguistic operations" (Vygotsky, 1986: p.196). It is this awareness of one's "linguistic operations", actually of one's linguistic system(s), which is referred to as "metalinguistic awareness."

A number of studies, such as those of Ianco-Worrall (1972), Ben Zeev (1977), Cummins (1978), Bialystok (1986a, 1986b, 1988), Galambos and Goldin-Meadow (1990) have indeed found bilingual children to exhibit superior performance on tasks requiring metalinguistic skills. A closer examination of these studies, however, reveals that, whereas bilinguals did perform better on certain tasks, on others they did not. Moreover, there are differences between different bilingual populations of the same age. So we are led to ask not only whether there is a difference between bilinguals and monolinguals in metalinguistic ability, but also what exactly this difference is and how it develops. The purpose of this study is to examine these questions in the light of special features that the bilingual acquisition experience and environment provide. These unique features allow us

to explain the differences in monolingual and bilingual behaviour found in the research literature.

1.1 Language, Context, Bilingualism, and Metalinguistic Development

Language is always acquired in context. No theory of language acquisition, or, for that matter, metalinguistic acquisition theory, denies the role of environmental or input factors in acquisition and development. If we assume that bilingual acquisition does indeed stimulate metalinguistic development, we must address the question of just which factors are unique to the bilingual acquisition context which would promote such a development. Unlike the monolingual, the bilingual child is faced with a unique task: the separation of two languages, both when trying to make sense of his/her linguistic environment (i.e., the input) and when trying to express himself/herself (i.e., his/her output). In cases of simultaneous acquisition (acquisition of two or more languages at the same time), the child is presented from the very beginning with at least two referents for every meaning. The argument made here is that this leads to an early realization of the arbitrary link between form and meaning and to the separation of formal linguistic system from context. This process of decontextualization is further reinforced by the resulting bilingual behaviours of translation, code-mixing (language mixing), and code-switching. The latter two, in particular, stimulate the development of a special monitoring function, which, as we will see, is present at an early age in all children. It is the development of this monitoring function, as well as the early understanding of the arbitrary nature of language, which underlie the differences in the research literature referred to above.

To demonstrate how the above process occurs, I will examine types of metalinguistic phenomena which occur naturally in children's speech. The majority

of the data I will look at is taken from Leopold's extensive observations of the simultaneous acquisition of two languages, English and German, by his daughter Hildegard (Leopold, 1949). It will be supplemented with notes made of metalinguistic utterances produced by my own children. It should be noted that Hildegard acquired her two languages in a fairly strict one-language, one-parent environment, where her father addressed her solely in German and her mother spoke to her in English. My children were raised in a similar environment, although the languages spoken by the parents were reversed.

The naturalistic data I will examine will be divided into two categories: first, those that occur in both monolingual and bilingual children; and second, those which are found only in bilingual contexts. Comparing the mono- and bilingual acquisition contexts, I will demonstrate that bilingual acquisition is conducive to the development of certain metalinguistic abilities. Based on this analysis, a context-based model of bilingual metalinguistic development will be presented. Then, the research literature on bilingual/monolingual differences will be reviewed in the light of this context model and a general cognitive development model. During the course of this discussion, the explanatory adequacy of these two models will be compared, not only in terms of their ability to account for the research literature, but also in terms of their predictive power concerning the performance of monolinguals and bilinguals on the metalinguistic tasks which are the measures used in the present study.

1.2 Statement of Research Question

The purpose of the empirical study is to test whether the experience of simultaneously acquiring two languages actually does result in increased awareness of linguistic units and systems. This will be examined by means of two tasks: a word segmentation task and a grammatical awareness task. In terms of skills,

we may see the former as being the ability to discriminate and extract individual units, in this case **words**, from the stream of natural speech. This ability entails the children's having some notion of the linguistic unit which they are segmenting. The grammatical awareness task measures the ability to correct ungrammatical sentences and subsequently explain those corrections. Both the correction and explanation tasks require a good deal of analytical ability, but the latter requires additional analytical/logical operations, as well the ability to verbalize this knowledge.

The contextual model allows us to make three hypotheses concerning bilingual/monolingual performance on the above tasks. Firstly, since the presence of two linguistic forms for each referent fosters an early awareness of form-referent relationships, bilinguals will perform better on the word segmentation task. Secondly, being more aware of the formal aspects of language, the bilinguals will make more grammar-oriented corrections in the grammatical correction task. Thirdly, since the explanation task requires different knowledge and abilities, bilinguals should exhibit no greater greater capacity than monolinguals to give grammatical explanations. It is the testing of these three hypotheses which is the basis of the empirical study.

Chapter 2

Theoretical Considerations

In examining metalinguistic development, a number of recurring definitional problems or theoretical ambiguities arise. The most important of these are as follows.

2.1 Definition of Metalinguistic Awareness

One important question is what exactly is meant by 'metalinguistic awareness'. I will adopt the working definition proposed by Tunmer and Herriman (1984) who regard metalinguistic awareness as being:

> the ability to reflect upon and manipulate the structural features of .... language, treating language itself as the object of thought, as opposed to simply using the language system to comprehend and produce sentences. (Tunmer & Herriman, 1984: p.16)

As Bialystok (1991) and Tunmer and Grieve (1984) note, it is important to isolate the notions of metalinguistic task, ability and awareness. In terms of task and ability, there is the need to link the performance of a certain task with the proper ability. Much of the confusion in the research findings up to now arises from differences in experimental tasks and uncertainty as to exactly what is being measured. The real intractable difficulty arises, however, in differentiating the final two, ability and awareness. This is an epistomological problem that haunts the research: just when does a demonstrated ability to perform a certain task become a display of awareness? As this problem is really seated in the realm of

a theory of consciousness,[1] I will focus mainly on the notion of ability, keeping in mind that the distinction still expresses itself in terms of how 'conscious' or 'explicit' an ability is.

2.2 Linguistic vs. Metalinguistic

A second question arises out of the first: i.e., the difference between linguistic ability or behaviour and metalinguistic ability or behaviour. Put simply: at what stage is linguistic behaviour metalinguistic? Perhaps instead of insisting on a dichotomy of awareness, it would be more useful to view metalinguistic behaviour as a function of the degree of access the individual has to their linguistic systems, categories, and knowledge (as suggested by Mattingly, 1984; Leong, 1987, 1991). In essence, all metalinguistic behaviour is linguistic. The differentiation of the two terms is a question of the degree of explicitness and sophistication of verbal behaviour, and where one draws the line is necessarily arbitrary.

A number of experimental tasks and behaviours have been labelled as metalinguistic by various researchers. A general list would include grammaticality judgements and/or corrections (Gleitman, Gleitman & Shipley, 1972; Pratt, Tunmer, & Bowey, 1984; Bialystok, 1986b, 1988; Hakuta, 1987; Galambos & Hakuta, 1988; Galambos & Goldin-Meadow, 1990), explications of ungrammaticality (Gleitman et al., 1972; Galambos & Goldin- Meadow, 1990), processing ambiguity, particularly humour (Shultz & Pilon, 1973; Fowles & Glanz, 1977; Hirsh-Pasek, Gleitman & Gleitman, 1978), and metaphor (for a summary of monolingual developmental research see Giles, 1990; for bilinguals, see John-

[1]One such attempt at a unified theory of consciousness has been made from a linguistic point of view by Jackendoff (1987). Working within a computational framework, Jackendoff sees awareness as being the result of projections from lower levels of representational structure. He does not, however, directly address the problem of defining in which instances one is 'aware'.

son, 1989, 1991a, 1991b). The list would also include segmentation tasks to define words (Holden & McGinitie, 1972; Ehri, 1975; Fox & Routh, 1975; Tunmer, Bowey, & Grieve, 1983), and their phonological constituents (Liberman, Shankweiler, Fischer & Carter, 1974; for literature reviews and discussion, see Nesdale, Herriman & Tunmer, 1984; Leong, 1987, 1991), as well as tasks testing children's knowledge of the metalinguistic term 'word' (Bowey, Tunmer, & Pratt, 1984; in a bilingual context, Bialystok, 1988) and the realization of the arbitrary nature of the word-referent relationship (Ianco-Worrall, 1972; Feldman & Shen, 1971; Bialystok, 1986a, 1988).

2.3 Definition of Bilingualism and Role of Linguistic Proficiency

The question of linguistic ability leads us to the question of language proficiency and the definition of exactly what is meant by the term 'bilingual.' Ever since the landmark study by Peal and Lambert (1962), proficiency in both languages, or **balance**, has been a key concept in bilingual research. Various researchers have noted that balanced or fully proficient bilinguals exhibit higher degrees of metalinguistic skill than monolinguals, whereas only partially proficient bilinguals do not (see Bialystok, 1988; Galambos & Hakuta, 1988). Moreover, the degree of bilingualism (i.e., balance) is related to the level of metalinguistic performance (Diaz, 1985; Hakuta, 1987; Bialystok, 1988; Galambos & Hakuta, 1988). Similarly, Bowey (1986), Bowey and Patel (1988), and for very young children, De Villiers and De Villiers (1972) have noted the high correlation between metalinguistic ability and general language ability in monolinguals.

2.4 Acquisition context

The definition of 'bilingual' goes beyond the concept of proficiency in two languages. As Romaine (1989) notes, bilingualism is a social phenomenon, not just a linguistic one. The acquisition context defines the linguistic (and arguably) the cognitive outcome. The term 'acquisition context' subsumes a number of parameters. Socio-cultural, educational, familial, and linguistic factors all play a role. In this study I will be concentrating primarily on the linguistic environment, but it should always be kept in mind that this environment interacts with and is, to a large degree, a function of the others. The particular linguistic context we are interested in here is what is referred to as simultaneous acquisition, where the child has been exposed to two languages regularly from a very early age, preferably from birth but certainly before the age of three.

2.5 Cognitive vs. Language Oriented Models of Development

Another question that will arise is that of whether to adopt a cognitive or a language-oriented model of metalinguistic development. Extensive research on metalinguistic development in psycholinguistics and educational psychology has revealed that, generally speaking, metalinguistic abilities blossom at the age of 6 or 7. This has led many researchers to hypothesize that metalinguistic development is related to a more general change of cognitive structure which takes place at this time (Hakes, Evans & Tunmer, 1980; Van Kleek, 1982; Bialystok & Ryan, 1985). It is at this age, as the child moves into what Piaget has called the stage of concrete operations, that the metacognitive abilities develop which allow the child to view his/her own mental structures, including those of the linguistic system(s). The support for this position comes from experimental evidence which shows that before the age of 5, most children are unable to do a variety of experimental metalinguistic tasks such as segmenting words into

phonemes or sentences into phonemes, or grammatical judgement tasks (Hakes et al., 1980). The other view is that metalinguistic functioning is part and parcel of language acquisition (see Clark, 1978; discussion in Tunmer & Herriman, 1984). The support for this position comes from observations of metalinguistic behaviour at a very early age in children.

In regard to the first position, a strict cognitive maturational explanation for metalinguistic development is called into question by evidence from naturalistic data (Clark, 1978). As we will see in Chapter 3, such data indicate that metalinguistic behaviour occurs at an earlier age than is generally found in the experimental literature. Indeed, the whole assumption that measures of cognitive development are independent of environmental factors is extremely questionable. For instance, Luria (1982) cites studies in which illiterate adult Russian peasants were not able to solve syllogisms as well as literate elementary school children, even though they were equal in intelligence. Luria also found that children could be coached to do supposedly metacognitive tasks at a much earlier age than would be expected in a traditional Piagetian model of cognitive development. In the metalinguistic research literature, Tunmer et al. (1983) and Fox & Routh (1975) demonstrated that with negative feedback and a number of trials children could isolate words at an earlier age than had been found in previous research. It is an open question as to whether such feedback was only instrumental in telling the children exactly what the researchers were looking for (i.e., explaining the instructions) or whether the improved performance of the participants in these studies as compared to earlier studies was the result of their being 'taught' the metalinguistic skill in question.

Similarly, several researchers have found there to be a developmental progression in the development of the understanding of ambiguity in riddles (e.g., Hirsh-Pasek et al., 1978). However, McDowell (1979) sees the acquisition of riddles as the product of the learning of particular speech acts (ludic acts) through

social interaction. If, as McDowell claims, riddles are socially learned conventions, then children will not be able to properly interpret them if they have not learned them. A case in point was my attempt to test my oldest son's (age [7;4])[2] ambiguity judgements for humour. Although a long list of jokes was read to him, he did not 'get' any of them. However, on another occasion he was able to demonstrate an appreciation of lexical ambiguity (Hirsh-Pasek et al., 1978),[3] as shown in the following interchange with his father:

(1) F - We've all gone away.
J - We all gone away.
F - We have.
J - (with laughter) I'm gonna **weave** something.

This apparent contradiction can be explained by the fact that, having few contacts with like-age or older peers, and not having heard such forms of humour at home, John was unfamiliar with the form of the riddle, and did not really know how to react to it or what to look for. McDowell (1979) notes that children acquire the form (e.g., structural formula, intonation) of the riddle as a speech act long before they have a true understanding of the incongruences and expectations that underlie the humour in it. John probably had not had enough exposure to acquire these, but as shown by the conversation above, that did not mean that he was incapable of understanding and finding humour in phonological ambiguity on his own terms.

The language-oriented view of metalinguistic development assumes that conscious manipulation of language is present from a very early age. As they acquire

[2]The age of the child at the time of the utterance is given in the square brackets. The first number in the brackets indicates the year, the second the month.

[3]Since *we've* actually contains two morphemes, this example could alternately be seen as a case of what Hirsh-Pasek et al. (1978) refer to as 'morpheme-boundary ambiguity'. However, Hirsh-Pasek et al. define this category as applying only to polysyllabic words (e.g., *engineer - engine ear*).

language, children hypothesize, generalize, and induce rules from input and from the monitoring of the results of their output (feedback). A very strong version of this position would assume that such conscious development is not only not dependent on other cognitive development, but also may even be the stimulus for it.[4] In light of the findings of Hakes et al. (1980), and the evidence of various general developmental stages for the appearance of certain metalinguistic and linguistic behaviours (e.g., Kessler (1970) for syntactic structures, and Hirsh-Pasek et al. (1978) for ambiguity), this position seems overstated.

A milder version would assume that such active reflection on the linguistic system is indeed present in some form from an early age, but that while its development is linked to cognitive (and conceptual) development, it is certainly not bound by it. This position would move closer to a milder version of the cognitive development model, such as that of Van Kleek (1982), which would allow for environmental variables as important factors. It is also in agreement with crosslinguistic research on language acquisition, which suggests that certain conceptual and cognitive development must occur before corresponding linguistic functions or forms can be acquired (Slobin, 1985a).

In this study, I will take the position that even though metalinguistic abilities are present at an earlier age than is often assumed, there is indeed an interrelation between metalinguistic and metacognitive development. However, this does not presume that there is an absolute causal relationship in either direction. Each influences the other. And both are affected by environmental factors. One of these factors is exposure to two languages.

[4]This is an extension of the argument made by Tunmer & Myhill (1984), that increased metalinguistic awareness resulting from bilingualism is responsible for the precocious development shown on certain metacognitive tasks.

2.6 Experimental vs. Natural Data

The choice of the development model one ascribes to is to some degree a function of the data one accepts (see Pratt & Grieve, 1984). The cognitive development models are based upon experimental data, which are by their nature more conservative. The language-oriented approach to development comes mainly from observations of spontaneous metalinguistic remarks in case studies and field notes. Both have their strengths and both sources of evidence will be examined. First I will look at spontaneous speech data set within context, for in such a nebulous affair as deciding whether an utterance is metalinguistic or not, contextual and pragmatic variables are extremely important. Then I will examine the conclusions drawn from this analysis in the light of the empirical research literature, and then form and test hypotheses based on these conclusions.

2.7 Age and Onset of Schooling

As can be seen above, age is a very important component in any developmental model. It is particularly important here since all Piagetian cognitive development models are predicated on maturational stages of development. Moreover, as is often noted in the literature, formal schooling and literacy have a very strong effect on metalinguistic development. In a bilingual context, Hakuta (1987) and Galambos and Goldin-Meadow (1990) have found that higher levels of performance exhibited by bilinguals disappear with age and the onset of schooling. Even the type of literacy may influence the development of certain types of metalinguistic knowledge. For example, in a crosslinguistic study comparing Japanese and American children's awareness of phonemes and morae, Mann (1986) found that American first graders displayed a greater ability to count and delete phonemes, while their Japanese counterparts were better able to perform the same tasks with morae. Mann attributed these differences to the

differences in the scripts the two groups of children were exposed to. American children learn an alphabetic (phonemic) script, whereas Japanese children learn four types of scripts, two of which are moraic in nature. However, a further finding of the study indicated that the type of literacy alone could not fully explain the development of phonological awareness. Many Japanese grade 3 and 4 children were found to have developed a high degree of phonemic awareness, even though they had not learned a phonemic/phonetic alphabet. This latter result would seem to indicate that these components of metalinguistic skill do develop with age, rather than being solely dependent on literacy.

It is to minimize these confounding infuences of age, schooling, and literacy that this study focuses on acquisition in young children who are all of the same age and who have not yet been exposed to extensive literacy training.

Chapter 3

Bilingualism and the Development of Metalinguistic Abilities

3.1 Contrast and the Basis of Language Awareness

Clark (1987) has proposed that one of the basic mechanisms of language acquisition is a general principle which she refers to as the "Principle of Contrast." The Principle of Contrast basically states that the child assumes that every two forms contrast in meaning.[1] This means that for every form the child encounters, he/she will posit a single meaning for this form. Clark sees this principle as being critical for allowing the conventional use of one form for one referent within a speech community. It also means that children give priority to known words and assign or create new words to fill gaps in their lexicon. This principle functions not only at the lexical level, but also at the other levels of language (morphological, syntactic, phonological, pragmatic). The application of such a principle in creating a linguistic system implies a constant interaction between the child and his/her environment, a monitoring of the input and the success or failure of his/her output in the social milieu. Slobin (1985a) considers such monitoring to be such an integral part of language acquisition that he includes it among his basic acquisition principles. And it is just this sort of monitoring which may be the basis of metalinguistic activity. We will now see what light bilingual acquisition can throw on this issue.

[1]Clark notes that her Principal of Contrast is assumed in Slobin's principal of 'Unifunctionality' (Slobin, 1985a), and Wexler and Cullicover's (1980) 'Uniqueness Principal'. It is, however, more restricted in its claims than the former and more general than the latter (for discussion, see Clark, 1987: pp. 24-28).

3.2 Bilingual/Monolingual Differences

Like monolingual children, bilingual children also originally try to maintain a single meaning for each form. Where they differ from monolinguals, however, is that for every referent they have two forms in the input. This would necessarily present them with a violation of the principle of contrast. Thus, they are forced to abandon the notion of an absolute, across the board application of the principle, although such a process may occur gradually and with some resistance. The acquisition literature does show some evidence that, at least in the early stages of acquisition, the bilingual child does indeed try to construct a single lexicon (see Taeschner, 1983; Leopold, 1949; Redlinger & Park, 1980; Vihman, 1985; Clark, 1987) and perhaps even a single syntactic system (Volterra & Taeschner, 1978). Volterra and Taeschner (1978) propose a three stage separation of the bilingual system: 1) a single lexicon and a single syntactic system; 2) the differentiation of a unified lexicon into two separate lexicons, but the maintenance of a single syntactic system; 3) the separation of the syntactic system as well. Although the existence of a preliminary unitary syntactic system is strongly suspect (Meisel, 1989; Genesee, 1989; Fantini, 1978), the existence of the unitary lexicon is generally accepted, but not universally (see Genesee, 1989; Pye, 1986). In any case, the differentiation of even the syntactic systems occurs relatively quickly (Meisel, 1989; De Houwer, 1990; Fantini, 1978; Redlinger & Park, 1980).

This quick separation of languages is a natural outcome of the bilingual child's need to sort out the confusing and conflicting input in their environment. This conflict is resolved through the separation of the input as well as the child's linguistic knowledge into two languages. This is first evident at the lexical level, but it also occurs on the morphological and syntactic level. And it is this disengagement of word and referent, form and meaning, which leads the bilingual child to realize the arbitrary nature of language at an earlier stage

than a monolingual child. And it is this understanding, along with the constant monitoring required by switching between two systems, which spurs the development of a greater sensitivity to linguistic form and (non-language-specific) linguistic system, and which brings the child to view and reflect upon language as an object in itself. In other words, it leads him/her to develop metalinguistic abilities.

This process will now be illustrated with examples of spontaneous metalinguistic utterances by young children. First, I will examine metalinguistic behaviour common to the speech of all children, whether monolingual or bilingual. Then I will discuss some phenomena which are unique to bilinguals. The majority of the data I will look at is taken from Leopold's extensive observations of the simultaneous acquisition of two languages, English and German by his daughter Hildegard (Leopold, 1949). It will be supplemented at times with notes I have made of metalinguistic utterances produced by my own children, John and Ben.

3.3 Metalinguistic Expressions Common to All Children

In this section, spontaneous metalinguistic expressions noted by Leopold (1949) and the author have been analyzed into a general functional classification scheme.[2] In general categories, these include: 1) language play and creative use of language; 2) self-corrections; 3) corrections of others; 4) comments on language; and 5) conscious learning.[3] These categories are not exclusive; they do, as we

[2]This scheme follows to a large extent that of Slobin (1978). Clark (1978) has a somewhat similar classification, but she has a far larger number of categories. A purely bilingual classification of language awareness behaviour in young children (before the age of 4;0) can be found in Karniol (1990).

[3]Clark (1978) and other researchers have included metalinguistic acts which I will not address, such as ambiguity interpretation, riddling, and metaphor, but these are extremely complex phenomena and are generally acquired at a later stage than that which I will focus on here.

will see, overlap. I will examine each of these categories in turn.

3.4 Language Play and Creative Use of Language

The first category I will examine is that of language play and creative use of language. Some examples of these phenomena are given in (1)-(5) below:[4]

(1) B - di mɛkə di blɛtə di sɛkə di dɛkə [3;10]

(2) H - mɪl - wɔk - i 'Milwaukee'
fɪʃ- past - a 'Fischpasta' [3;0]

(3) H - There's an awful smell of rapples around here. Do you know what rapples are? Rapples are apples. [4;1]

(4) J - Kann ich bitte die *Ricardalada* haben.
'Can I please have the *Ricarda-jam*?
(with laughter) [7;1]

(5) F - Bist du nicht mein Schnuckipucks.
Are you not my *Schnuckipucks* (a term of endearment).
H - Ja ich - bin - dein - Schnuckipucks.
Yes, I - am - your - *Schnuckipucks.*
(slowly, with conscious effort) [3;9]

In the first example, the child, Ben, has tied together a string of bisyllabic real and nonsense words with certain common phonetic elements, in this case the vowels. Onset and rime are separated with the rimes of the syllables (the vowels) being held constant. This would seem to indicate an ability to break up syllables

[4]In all of the examples in this chapter, the speakers are designated by a singular letter: *H* refers to Hildegard; *J* to John; *B* to Ben; *M* to Hildegard's mother; and *F* to the father of whichever child is involved in the exchange.

into their constituents and to engage in rhyme. In the second example, Hildegard playfully segments a word into syllables, an ability which appears quite early. In the third, with the interplay between *rapples* and *apples* she also shows the ability to see rhyme, as well as to add and split off segments to accomplish this. The fourth is an interesting case, because the child, John, has taken the first two syllables of *marme/lade [ma(r)məladə]* 'jam', has linked it to the word, *mama* 'mom,' and then has substituted his mother's name, *Ricarda.* This involves a sophisticated level of manipulation of the language and reveals an active and creative analytical skill in the child. The alliteration and rhyming play such as that noted in (1)-(4) can range from relatively random free association of like sounds/syllables/words to deliberate, explicit rhymes and even limericks. As we can see from the data, the former occurs quite early and the latter quite late. While (1)-(4) demonstrate a certain knowledge of and ability to isolate phonological elements, (5) involves play on the syntactic level. Here, Hildegard indulges her father by playing a verbal transformation game. In this game, Hildegard would respond to her father's question using the question as the basis of the answer. This answer would require the manipulation and alternation of structures, much like pattern practise drills in second language learning.

3.5 Self-Corrections

Already at an early age children demonstrate the ability to correct their own mistakes as well as those of others. Correction implies monitoring of the utterance, recognition of the mistake, and access of the linguistic system to supply the correction. Thus, they can be viewed as metalinguistic acts. Some examples of self-corrections (all from Hildegard) are given below:

(6) It don't ... It doesn't. [3;0]

(7) kennst du er ...den?
'Do you know he...him' [5;2]

(8) Ich habe auf'n Kopf ein bisschen geklopfet - geklopft.
'I hit him a little on the head.' [5;4]

(9) Ich habe den Stein gewerft ... geworfen, nicht gewerft.
'I threw the stone ... ' [5;5]

(10) zweimal, das ist das dreite ... das dritte
'Twice, that's the third' [5;4]

These five examples are cases of morpho-syntactic corrections. At the age of three Hildegard is already able to correct the omission of the third person singular marker in (3). In (7) she corrects her improper use of the nominative with the correct accusative form of the third person personal pronoun, while in (8) she corrects the morphophonemics of the past participle (*geklopfet - geklopft*). Example (9) is particularly valuable as it demonstrates an explicit attempt to repair. Hildegard has overgeneralized the German regular past participle suffix *-t* to the verb *werfen* 'throw', which actually takes the less regular inflection *-en*. She realizes her mistake and comments that it is really *geworfen* and not *gewerft*. Example (10) can also be interpreted as a morphophonemic correction. Hildegard realizes that she has incorrectly mixed the cardinal *drei* with the irregular ordinal *dritte*. What she has done is derive the ordinal according to the regular pattern, applying the regular derivational ending *-te* to the cardinal stem *drei*.

3.6 Corrections of Others

Similar patterns are also found in children's corrections of others:

(11) F - Wir fahren aufs Boot.

B - Nein ... Wir fahren ins Boot.
'No, we're driving into the boat' [3;6]

(12) M - harter
H - härter, heißt es, mama
'It's (should be) *härter*, mom.' [5;3]

(13) B - What did the big chim*ley* say to the little chim*ley*? [4;6]
S - Chimley...?! (laughs) [Adult]
V - No! It's chim**ney**! [4.0]

In (11) the child, Ben, corrects the adult's use of prepositions, stating quite reasonably that they are driving 'into' (*in*) and not 'onto' (*auf*) the ferry. One could see this as a semantic rather than a grammatical correction, but, in any case, it shows a conscious mental weighing of the use of prepositions. In (12) Hildegard corrects her English-speaking mother's German, this time providing the umlaut which is part of the comparative morpheme. We can thus see this as a morphophonemic correction. And here the grammatical nature of the correction is not in doubt. In example (13), we see a case of one child, Veronica, correcting a mistake in pronunciation made by another child, Ben. The adult (S) first identifies the form as being out of place, but Veronica is able to identify the mistake and, with contrastive stress, indicate the correct replacement for the violation.

However, it could still be argued that the above examples are actually the product of linguistic processes and are not really metalinguistic in nature. Or, even if one accepts the label "metalinguistic", it might be argued that the production of such utterances requires implicit knowledge rather than explicit knowledge. Clark (1978) notes that children can implicitly reflect upon the knowledge of linguistic units such as words, syllables, and phonemes much sooner

than they can explicitly; i.e, that they can identify and manipulate such units before they can explain or label them. This is once again a question of just how one defines "metalinguistic". Perhaps, as Clark (1978) suggests, the ability to explicitly analyze language into units and reflect on structures emerges quite late simply because children lack the metalinguistic vocabulary to express themselves (see also Slobin, 1978). In any case, what the data do show is that children have the capability of monitoring their own utterances and those of others. In addition, when they recognize a mistake they are capable of correcting it systematically.

3.7 Comments on Language

Compared to those in the preceding categories, these expressions are more overtly metalinguistic in nature. The child indicates by his/her comments on linguistic structure that they are indeed aware of, or at least searching for system. Some examples of such comments by Hildegard are shown below:

(14) Wenn Mutti Deutsch spricht, denn sagt sie: "Ich gehe draussen..."
Ich sage: "Ich gehe aus," draussen ist doch da (pointing to street).
'When mom speaks German, she says: "I'm going outside (*draussen*)"
I say: "I'm going out (*aus*)." Outside is [out] there.' [5;5]

(15) H - ...der Hamburg... (name of ship)
F - ...die Hamburg...
H - Ist der Schiff denn eine Frau?
'Is the ship a woman, then?' [5;6]

In (14), Hildegard explicitly comments on her mother's German (her mother's L2), and indicates, according to her evaluation, why it is wrong. In (15), Hildegard reveals with her comment that she has equated grammatical gender only

with sex. She now seeks to discover the reason for the incongruence of this with adult usage. Comments can also reveal the workings of analysis and reanalysis inside the child. This is demonstrated in (16), where Ben reflects on a word his father has just spoken, extracting the base (*schön*) from the declined nominative singular, neuter form.

(16) B - schönes ... "schön" ist da drin.
'nice + nom.-sg.-n. .... "nice" is in there' [3;10]

This process of systematic analysis can also be seen in the next two examples of comments (17-18), which show the development of the first clear, explicit explanations of linguistic rules that Leopold notes.

(17) H - It's all ours ...it's yours and mine and mama's. [3;7]

(18) H - If there is one , you have to say *schuh.*
If there are two, you have to say *schuhe.* [4;2]

In (17) Hildegard is expanding on the word 'ours', showing a clear understanding of what this possessive pronominal form encompasses. Example (18) is a clear explicit explication of the plural rule for this form in German. This is all the more interesting in light of the findings of Hakes et al. (1980) and others (see Nesdale & Tunmer, 1984) that generally before the age of 5 children tend to focus on the meaning of an utterance rather than on the form.

Such comments need not only be in the realms of phonology or morphology/syntax. They may also be metapragmatic in nature, as in Ben's comments in the exchange in (19) below. Ben and his father are wrestling. Unable to break free, Ben makes up a rhyme which his father strongly objects to. Ben then rather sorrowfully tries to explain that he was only trying to make a rhyme, which for him is obviously associated with play (cf. examples (1-4))

(19) B - Let me go, you bum-do
F - Hey! Why should I play with you when you speak to me like that?
B - I'm sorry. I was just making a rhyme. [4;2]

3.8 Conscious Learning

A further dimension of metalinguistic utterances in children is that of conscious learning. The child makes direct requests for linguistic entities and structures, asks for definition and structure, and consciously practices new forms. Indeed, (14) above is a good example of this. Others can be seen in (20) and (21).

(20) H - lauf laufen (experimenting)
(Father indicates *lauf* is the correct form (of imperative)
(H. requests word for *go* in German)
F - gehen
H - geh [4;7]

(21) H - You know, grandpa says 'yourn', 'this is yourn',
why does he do that? [3;9]

In (20), Hildegard is consciously practicing the German imperative. She asks her father for a vocabulary item and then tries out her rule with that item. A somewhat different, complex example of active learning behaviour can be seen in (21). Here Hildegard has noted what for her is a peculiarity in her grandfather's speech and looks for a systematic explanation.

It is evident from the above data that the child is actively involved in monitoring and improving his/her language output from an early age. Moreover, he or she monitors the speech of others and reacts to feedback from others to his/her own speech. And some of the child's linguistic output in this context could defi-

nitely be labeled as metalinguistic, even granted the scepticism with which such "uncontrolled" (i.e., non-experimental) phenomena must be approached.

3.9 Uniquely Bilingual Phenomena

In examining particularly bilingual metalinguistic phenomena, I will focus not on the previously mentioned categories, but on certain processes and contextual features which separate the bilingual from the monolingual. As we have noted, the bilingual child at first seems to try to develop a one-to-one mapping of form to meaning. This can be seen in the exchange between Hildegard and her father in (22) below.

(22) F - Käse 'cheese'
H - dɛʃ
H - diʃ(her English word for 'cheese') [2;2]

For Hildegard this is actually a self-correction. In repeating her father, she has blended two words, her English word *diʃ* with her father's German word *käse*. Realizing the incongruence of the expression, she corrects herself with her original English word, which she maintains for some time even when speaking to her German-speaking father. Leopold (1949) notes that Hildegard would often persist with a currently dominant form from one language in both languages.

Yet there is evidence that even at an early age Hildegard was starting to differentiate her languages. This can be seen primarily through her early translations and metalinguistic comments. Note the example of translation found in (23).

(23) M - What did mama tell you!
H - No, no
M - Don't you know what "no no" means!

H - Nein, nein [1;6]

This not only shows a translation capacity at an early age [1;6], it also demonstrates a particularly bilingual rendering of the metalinguistic verb *mean. Mean* in a bilingual environment is not only a request for definition or explanation, but also for translation. Indeed, Leopold notes that already at age [2;0] Hildegard seemed to consciously ask for words in both languages for the same meaning, going first to one parent to get the English or German word, then to the other parent to get the word in the other language. As she got older, she began to make specific requests for translations, as in (24) and (25).

(24) I say 'napkin' [napənt], you say it in German [dɔmən], mama [2;6]

(25) Papa, what is *deutsch specken* "practice"?
'Papa, how do you say "practice" when speaking German?' [3;6]

During this period there was an increase in translations, both requested and unrequested, as in (26) and (27), respectively.

(26) *unterwäsche* means 'underwear'
(after hearing her father mention 'underwear') [2;6]

(27) H - ...nose
F - Wie heißt das auf Deutch?
'What does that mean in German?'
H - Nase. [3;0]

It would indeed seem that the translation ability is present from a very early age. Interestingly enough, example (23) occurs at an age where Leopold himself suggests that Hildegard has an undifferentiated linguistic system. Such early translation behaviour has been noted in other studies of bilingual children.

Karniol (1990) notes that Karen, an English/Hebrew bilingual child, was able to translate her own speech and make requests for translation by the age of [2;1]. Karniol also gives data showing that Karen was also able to translate the speech of others at [2;5]. Levy (1985) also found that her child was able to translate regularly before the age of [2;0]. In fact, by the age of [2;0] she was able to translate on request consistently. Even the use of the names of the two languages (as Hildegard does at age [2;6] for German in (24) above) reflects a certain metalinguistic insight, as well as an indication of the child's ability to separate the two languages. Karniol (1990) gives an example of Karen's being able to note and comment that other individuals spoke Hebrew by the early age of [2;1].

Children growing up in an environment where more than one language is spoken not only will be exposed to different words and structures for the same concept, but also will be presented with different phonological systems, even different pronunciations of the same word. This is nowhere more evident than in Hildegard's metalinguistic comment on the pronunciation of her own name in (28):

(28) H - *Opa* ('grandpa') might call me Hildegard [d],
in German though: Hildegard [t] [4;9]

Leopold interprets this statement as indicating that Hildegard has marked the voicing contrast on the final phone resulting from the German final devoicing rule. In addition, it indicates the clear association of a particular language with a particular person which is the basis of code-switching.

Like the monolingual, the bilingual child is also involved in conscious learning. For the bilingual, however, this often takes the form of translation, as demonstrated in examples (24-26). There is even conscious learning through translation as a form of language play. We can see an example of this in (29).

(29) schreibaby - schreibaby - squealbaby. 'crybaby' [3;2]

Hildegard also demonstrated the awareness of her two languages being two different systems in her self-corrections, both spontaneous and in reaction to feedback from others, as can be seen in (30) and (31), respectively.

(30) This is a *wasser* - water [3;3]
(to non-German-speaking cousin)

(31) F - Ich glaube 'I believe so.'
H - He glaubs (translating to mother) [3;9]
(Mother and father laugh. H pauses, reflects, and asks if *He thinks* is correct.)

The correction of language mixing in (30) demonstrates quite clearly the effects of feedback in the bilingual environment. It is such feedback that draws attention to mistakes in output. As Fantini (1978) notes, the uncomprehending silence, questions, overt corrections and laughter that their speech may produce in others help focus the child's attention on the form of his/her utterances. Such feedback also leads at a very early stage to code-switching behaviour. Bilinguals quickly learn to switch languages in accordance with the characteristics of interlocutors and other contextual factors. Indeed, the apparent ability of bilingual children to adapt their choice of language to the conversational context has led some researchers to reject the notion of bilinguals ever having a unified linguistic system, either on the syntactic level (De Houwer, 1990; Genesee, 1989), or even on the lexical level (Genesee, 1989). This social differentiation of language is an extension of the process we have already noted occurring at the end of the second year for Hildegard. It is first indicated by the use of different languages with different people (e.g., Hildegard's translation requests), then by comments indicating that people are using different languages (Fantini, 1978) and the use

of the terms for the two languages (as in examples (24-25)), and finally by conscious statements concerning the linguistically or pragmatically motivated use of a particular language. The culmination of such a sequence can be demonstrated in the metapragmatic statement of language use in (32) below. The child, John (age [4;3]), has just returned from a two month sojourn in Sri Lanka, where for the first time he began to speak English regularly. For the first week after returning to Germany, he continued to speak English with his anglophone father. Then, one day he started to address his father solely in German. After a few such conversations his father asked him why this was so. His answer is enlightening.

(32) F - Why don't you speak English with me any more?
J - Papa. Jetzt sind wir in Siegsdorf. Und in Siegsdorf spricht man Deutch.
'Papa. We're in Siegsdorf now, and in Siegsdorf one speaks German.'

In example (32), John is clearly delineating languages by setting. Since everyone in his home village (Siegsdorf) spoke German, German was obviously the language that should be spoken there.

Fantini (1978) notes that the setting is only one factor influencing a bilingual's perception of what language is to be used. The function and the form of the discourse are important, as well as, of course, the interlocutor. For example, as regards the latter, children associate a certain language with a certain person, with certain stereotypical physical features or characteristics, or even with certain forms of relationships, such as intimacy (Fantini, 1978; see also Saunders, 1982).

Thus, we see that bilingual acquisition has a social dimension as well as a linguistic one, and that the two interact. It is within this social context that the bilingual child is exposed not only to differential input, but also positive and

negative feedback. This is also true for a monolingual child, but the difference is that, with two very different codes to use in varying sociolinguistic contexts, the chances of anomaly resulting from linguistic and pragmatic breakdown, and ensuing negative feedback, are greater for the bilingual. This is not to say that negative feedback is the primary mechanism in linguistic or metalinguistic development. As we have seen, there is a good deal of monitoring and conscious learning going on.

3.10 Summary and Discussion - A Context Model

The data show very clearly that even very young children can display a variety of metalinguistic behaviours in their spontaneous speech. Such metalinguistic behaviour is already evident by the age of 5 on the pragmatic, syntactic, morphological, lexical and phonological levels. The development of metalinguistic abilities is, however, affected by a number of contextual factors, including the acquisition of more than one language. Bilinguals differ from monolinguals in that the necessity of separating the two languages within the bilingual acquisition context accelerates the break-down of the tight union of form and referent assumed in Clark's Principle of Contrast. This results in a unique bilingual activity: translation. Indeed, as Malakoff and Hakuta (1991) have noted, translation is in itself a metalinguistic act. The mixing of languages in code-switching acts as a further stimulus to metalinguistic development in that communicative feedback from his/her environment constantly alerts the child to transgressions or success in this regard. This would arguably lead to a high degree of monitoring and a greater ability to separate the two systems, which would in turn result in an increased knowledge of languages as formal systems. Although this would be most evident at the level of the lexicon, one would expect to extend beyond it to the domains of morphology and syntax, and perhaps even to phonology.

Thus, we would expect bilinguals to show higher degrees of metalinguistic skill in manipulating or reflecting on the nature of linguistic structure. Indeed, this is the beginning of viewing language as an object in itself. It is important to note, however, that there is nothing in the acquisition context that suggests that bilinguals should know more about the structures of a particular language than a monolingual. This moves into the domain of proficiency. It should also be pointed out that the features of the bilingual context do not justify making any assumptions about increased abilities to define or explain metalinguistic units such as the word, or to logical analytical functions such as reason. And this is indeed what is found in the experimental literature, which we will now examine.

3.11 Experimental Literature

As I noted earlier, the research literature shows bilinguals to be superior to monolinguals in the performance of some metalinguistic tasks, but similar or inferior to monolinguals on others. As Bialystok (1991) and Johnson (1991) have pointed out, this seems to be largely a function of which task is used and which ability it taps. We find that bilinguals consistently outperform monolinguals on metalinguistic tasks which require separating form from meaning, such as demonstrating the arbitrary nature of words, as seen in studies by Feldman and Shen (1971), Ianco Worrall (1972), Ben Zeev (1977), Cummins (1978), Bialystok (1986a, 1988). Bilinguals have also been better able to interchange terms or names for objects in symbol substitution tasks (Feldman & Shen, 1971; Ianco Worrall, 1972; Cummins, 1978; Bialystok, 1988), and use the new term in sentences (Feldman & Shen, 1971).

In cases where bilinguals have not outperformed monolinguals, their behaviour and strategies have been noted to be different. For instance, Rosenblum and Pinker (1983) found bilinguals to exhibit no advantage over monolinguals

on name manipulation and renaming tasks, but found that they gave quite different justifications for their responses. Whereas monolinguals tended to say that changing the name of an object was permissible because the original referent of the new name shared some identical features with the object, bilingual children were more likely to make reference to the task context, saying that it was possible to change names because the task was a game. This would seem to indeed indicate that the bilinguals had a more sophisticated notion of the completely arbitrary nature of the word/referent relationship.

Bilinguals have also been found to be superior to monolinguals on tasks requiring them to focus on form, despite a distracting semantic context (Bialystok, 1986b, 1988), as well as on tasks requiring them to hold the grammatical form of an utterance constant in the face of a change which should produce corresponding grammatical changes in the sentence (Ben Zeev, 1977). Concerning the former, Bialystok (1986a) found that bilinguals were more able to judge and correct sentences which were semantically anomalous, but grammatically correct. In a second study (Bialystok, 1988), she also found fully proficient bilinguals to be able to outperform monolinguals when correcting grammatical errors. Similarly, Galambos and Goldin-Meadow (1990) found that a group of Spanish/English bilinguals were better at noting grammatical errors than a Spanish monolingual control group. When linguistic proficiency was factored out, they were also superior to a monolingual English group on the same task.

Bilingual children have not, however, significantly outperformed monolinguals on tasks such as articulating the concept of word (Bialystok, 1988), indicating an understanding of the non-physical nature of words (Cummins, 1978; Bialystok, 1986a), or metaphor interpretation (Johnson, 1991a). They have also shown no advantages on certain judgement and correction tasks where anomaly did not play a distractive role (Bialystok, 1986b). Although there are some contradictions, as in the case of differential findings on grammaticality judgements

(compare Bialystok, 1986b, first experiment, with Bialystok, 1986b, second experiment, and Bialystok, 1988), and the ability to use interchanged names in a relational sentence (compare Feldman & Shen, 1971, with Ianco Worrall, 1972), three tendencies clearly emerge:

1) Young bilingual children demonstrate a higher degree of appreciation of the arbitrary nature of the word/referent association.

2) Bilinguals outperform monolinguals on tasks requiring sensitivity to form while excluding the effects of meaning. This is particularly evident in Galambos and Goldin-Meadow's (1990) finding that, when they correct sentences, bilinguals show a completely form-based strategy while monolinguals tend to focus on content.

3) This greater appreciation of form does not, however, seem to result in any advantage for bilinguals on tasks which are more analytic in nature, such as defining metalinguistic terms, differentiating between the referential and the physical attributes of words, and giving explanations for ungrammaticality.

3.12 Explanatory Models

One possible explanation of these results is to say that through their unique acquisition context, bilinguals have a greater awareness of linguistic form, but not supralinguistic functioning. This awareness of form is multidimensional. The bilingual child is not only more likely to discover the arbitrary relationship between form and meaning at an early age, but also the awareness of two forms for every referent should promote the awareness of entirely different linguistic

systems to express the same meanings. Another, more basic statement of this latter process is to say that constant monitoring is required to keep the two languages separate and to 'switch into' the appropriate language in a particular context, and that this monitoring promotes a greater ability to attend to form rather than meaning.

Another possible explanation of the research findings is to view the results in terms of a cognitive development model, as does Bialystok (1991). Bialystok regards metalinguistic development as being the product of two general metacognitive skills: control of processing and analysis of knowledge. She argues that bilinguals have a greater degree of control of processing, the cognitive executive function which directs attention and cognitive resources to tasks. This would explain bilinguals' better performance on tasks which require paying attention to form and ignoring distracting semantic contexts. Bilinguals do not, however, necessarily have higher levels of the higher analytical function, analysis of knowledge, which is required for such tasks as explaining metalinguistic or other concepts, or for correcting grammatical sentences. This is very much a function of the proficiency of the child in his/her languages.

This differential development of abilities is logical in light of our discussion of the special features of the bilingual environment in metalinguistic development. The monitoring we have spoken of would be a function of the control executive in Bialystok's model. And it is the constant monitoring required to separate the two languages in the child's environment and own speech which stimulates the development of this cognitive function.

Thus, in a sense, the two approaches we have discussed are congruent. They are really different perspectives of a similar process. The one is based on the function of acquisition principles in a special acquisition context, whereas the other is a cognitive model based on information processing theory. Both lead us, however, to similar predictions concerning metalinguistic development in

bilinguals. Indeed, the second may be described as being a product of the first. As Cummins (1976) argues, the separation and differentiation of the bilingual child's two languages, the child's "version of contrastive linguistics", as so aptly put by Lambert and Tucker (1972), may lead to the 'objectification' of language in general. In Piagetian terms, this objectification is a function of 'decentration', which is in turn a function of the cognitive control executive (van Kleek, 1982).

There are some cases, however, where the study of the acquisition context may give us certain insights which might not be clearly indicated by the cognitive development model. One such area is segmentation tasks, which have been studied in monolingual children by a number of researchers (for reviews see Bowey & Tunmer, 1984; Leong, 1987, 1991). According to Bialystok (1991), segmentation and word counting require high degrees of both control of processing and analysis of knowledge. Although Bialystok (1986a) herself finds that, because of their high levels of control, bilinguals should, and do, have an advantage on such a task, when we consider that high degrees of analysis are also involved, such a hypothesis does not flow naturally out of the model. Cognitive control may allow a child to pull units out of a phrase, but this extraction of units can only be productive if there is a clear concept of exactly what unit is to be pulled out. Reference to the acquisition context, however, clarifies this ambiguity.

The bilingual is constantly exposed to and uses two words for the same referent, and is constantly made aware of this, particularly in situations of code-switching and language-mixing. This can be seen in cases like (28) above, *He* **glaub***s*, where Hildegard has mixed English and German, using the German unbound morpheme *glaub-* 'think' with the English verb inflection *-s* while translating a sentence from German to English.[5] Negative feedback to such utterances,

[5]This kind of mixing is common in cases of bilingual acquisition. Another such example can be seen in the following example from Ben [3:10]: *er hat mich ge*kickt. Such cases would

as well as the need to shift from language to language to understand them in the speech of others, would suggest that the concepts of words as categories of form and referent matches would develop earlier in bilinguals, leading to better performance on word counting/segmentation tasks.

Another area where the acquisition context may clarify uncertainties left by cognitive models is that of grammatical awareness. If we assume that bilinguals develop more cognitive control, then we would indeed expect them to outperform monolinguals on tasks requiring them to focus on form in a distracting semantic setting. This does not hold, however, for tasks where there is no such semantic anomaly, such as correcting semantically clear, but grammatically incorrect sentences. Bialystok (1986b, 1988) sees such tasks as requiring high degrees of analysis. Thus, if increased cognitive control were the main benefit of childhood bilingualism, we would expect that bilingual children would show no advantage over monolinguals on this task. However, as we have already noted above, they sometimes do (Bialystok, 1988; Galambos & Goldin-Meadow, 1990).

Interestingly, Bialystok herself expands her theory to include the possibility that high levels of bilingualism will also result in high degrees of analysis (Bialystok, 1988). This notion is supported by her finding that balanced bilinguals performed better than less proficient bilinguals and monolinguals on a purely grammatical correction task. It is somewhat contradicted, however, by her earlier finding that fully fluent bilinguals made fewer grammatical corrections of ungrammatical, anomalous sentences than did monolinguals (Bialystok, 1986b). This apparent contradiction could be a function of the different acquisition environments and/or biliteracy, but it shows clearly that the entire argumentation is rather fuzzy. Nevertheless, assuming that bilingualism may also promote high degrees of analysis, we might expect that fully bilingual children would indeed

make one suspect that the basic unit which would be salient and easiest to access would be the unbound morpheme.

make more grammatical corrections than monolinguals on a grammatical correction task. This assumption is to some degree supported by the findings of Galambos and Goldin-Meadow (1990). However, if increased levels of analysis of knowledge are truly behind this apparent bilingual superiority, this heightened grammatical orientation should extend to a task requiring even higher degrees of analysis, the explanation of the grammatical rules behind the corrections. This assumption, however, is not supported by the Galambos and Goldin-Meadow (1990) study. They found no difference between bilinguals and monolinguals on this task.

Our acquisition context model, however, allows us to resolve this anomaly. The heightened awareness of form and structure resulting from the experience of learning two (or more) languages should permit the bilingual child to adopt a more formal approach to language tasks. Thus, we would expect the bilingual to give more formal, grammatically oriented corrections when requested to do so. However, there is nothing in this context which should encourage the logical, analytical, and experiential process required to make an explicit logical explanation of ungrammaticality. This is accessing the child's abstract knowledge at a higher level than that which is required to separate and maintain his/her two linguistic systems.

It is just these tasks and differences which are the focal point of this study.

3.13 Hypotheses

The present study employs a word segmentation task and a grammatical awareness task in order to analyze two different aspects of metalinguistic awareness in bilingual and monolingual children. The former is used as a measure of children's conceptual knowledge of a particular linguistic unit, while the latter is used to assess the degree to which they are aware of their syntactic systems.

The word segmentation task is a completely different task than the definition of term 'word' as a metalinguistic construct (Bialystok, 1988) or word recognition tasks (Bialystok, 1988). Rather, it is a matter of the child segmenting words out of the speech stream and marking them with either counters (e.g., Bialystok, 1986a) or taps (e.g., Tunmer et al., 1983). In this way, the children indicate that they have developed a notion of the conceptual linguistic unit which we refer to as the 'word', even if they are unable to articulate it. The grammatical awareness task actually comprises two parts: grammatical correction, and the explanation of those corrections. These two tasks together access three separate abilities. The first part, correction of ungrammaticality, requires the ability to note that certain forms are inconsistent with the grammatical system, and the ability to access grammatical knowledge to identify the error and correct it. The second part, explication, requires not only the ability to access and use the linguistic system, but also to explicitly verbalize knowledge of its workings in order to explain why the corrected version is superior to the original.

The contextual model would lead us to make the following hypotheses concerning bilingual/monolingual performance on the above tasks:

1) The realization of there being two forms for each referent, particularly at the level of the unbound morpheme, will result in bilinguals' outperforming monolinguals on the word segmentation task. In addition, it should result in their adopting a segmentation strategy based more on the notion of the meaningful unit.

2) The bilinguals will make more grammatical corrections in the grammatical correction task. Although this conclusion is not blatantly obvious from our acquisition context model, it can be drawn from it. The attention to form required to separate the bilingual child's two linguistic systems, and the resulting

'objectification' of language, should result in a greater overall sensitivity to form. This is also the overwhelming tendency seen in the research literature.

3) This bilingual sensitivity to form should not result, however, in bilinguals being more able to give more grammatical explanations in the explanation task, which is a function of a different level of experiential and analytical, logographic knowledge.

Chapter 4

Study Design

4.1 Subjects

The subjects of this study were two groups of kindergarten (primary 1) children, one monolingual and the other bilingual. The monolingual group consisted of 10 children from the English kindergarten at Willows Elementary School, a school in a predominantly English-speaking, middle class neighbourhood in Oak Bay, British Columbia, Canada. Originally there were twelve children in the group, but one was discovered to suffer from an aural disability and another was found to come from a language-deprived background in Romania, so these two were excluded from the sample. A further child was found to have been exposed to Chinese up to the age of three. However, as she had had almost no contact with the language since that time and was considered by her parents to be functionally monolingual, she was included in the monolingual group.[1] The bilingual group, on the other hand, consisted of 5 children from the afternoon kindergarten at the École Brodeur in Esquimalt, British Columbia. Although labelled as French dominant by the school, three of the children had been raised bilingually in the home and the other two had had extensive exposure from a very early age to English, having lived in an English-speaking area. In all cases the children were labeled by both their teacher and their parents as being bilingual. In fact, two of them were found to be trilingual. Of the two trilinguals, one had been exposed to German from birth, and the other to American Sign Language. All were

[1]This child will be the subject of continued discussion later when we discuss the data. In some ways she did indeed match the profile of the bilinguals.

what could be labelled 'early' or even 'simultaneous' bilinguals, as all five of them had been exposed to two languages from birth. In order to ascertain that the children had sufficient English proficiency to take part in the experiment, the researcher conducted interviews with the children in English and also gave them an adapted form of the Peabody Picture Vocabulary Test. There were originally nine children in this group, but three had to be excluded because they did not have the necessary degree of English proficiency to be considered bilingual, and a further child did not do the tasks. The two groups were evenly matched in terms of the ratio of females to males (40% females - 60% males). At the time of testing, the children varied in age from 5;4 to 6;6. The age range of the monolingual group was from 5;4 to 6;5, with a mean age of 5;10, while the age range of the bilingual group was from 5;6 to 5;11, with a mean age of 5;9.

Originally, it was hoped to have a sample size of at least 15 children in each group, but it proved extremely difficult to locate that many cases of simultaneous bilingual acquisition in the same age group. Since one year at such a young age represents tremendous developmental changes, it was deemed better to carry out the experiment only on this population. Moreover, since formal schooling has such a strong correlation to metalinguistic development (see section 2.7), it was necessary to have children with essentially the same amount of exposure to this environment. Although it might have been possible to supplement this group with other children who had been extensively exposed to another language other than French, in light of the possible role of language transfer it was considered better to maintain a relatively linguistically homogeneous bilingual group, preferably one of whose languages the experimenter had some knowledge.

4.2 Materials

4.2.1 Peabody Picture Vocabulary Test

The Peabody Picture Vocabulary Test (henceforth PPVT) was given as a general measure of language proficiency. The PPVT is in itself a measure of verbal intelligence, but since its use in the landmark study of Peal and Lambert (1962), it has been used in a large number of experiments as an indicator of language ability. This would seem to be justified in light of the finding of Lemmon and Goggin (1989) that vocabulary scores correlate more with other measures of linguistic ability than any other single indicator of language proficiency.

Since I was using the PPVT as an indication of language proficiency, I followed Galambos and Goldin-Meadow (1990) in not using the standard baseline procedure. Instead, the same number of pictures was shown to each subject. In order to decrease the testing time, the PPVT was not given in its entirety, but only from question 15 to 80. The starting and end point were arrived at after trials with monolingual children to determine where the first mistakes were made and what the maximum upper baseline would be.

4.2.2 Language Use Questionnaire

Since the acquisition environment plays a role in language development, it is important to know just which languages the child has been exposed to, as well as the form and degree of such exposure. This was accomplished in this study through a language use questionnaire sent to and filled out by the parents of the children involved. Two different questionnaires were sent out, one for the bilingual group and a shorter form for the monolingual. The shortened form was sent to the monolingual group because it was only necessary to ascertain that there had been no significant exposure to a second language, whereas in

the case of the bilingual group it was of theoretical interest to know the relative dominance and patterns of use of and exposure to the two (or more) languages.[2] The long form of the questionnaire can be seen in Appendix C.

4.2.3 Word Segmentation Task

The word segmentation task comprised 27 phrases and short sentences, the smallest being 3 syllables in length and the largest, 5 syllables (See Appendix A). The length of the strings was kept to 5 syllables and under to avoid overtaxing the children's memory capacity, a danger noted by Bowey and Tunmer (1984). Moreover, the strings were phrases found in natural speech, not a collection of semantically or syntactically unrelated or unnaturally ordered words.

Tunmer et al. (1983) note that children between 4 and 7 years of age tend to go through three stages in the acquisition of word segmentation skills. The first is a syllable segmentation strategy whereby, instead of segmenting by words, the child segments by syllables. The second is a stressed syllable or phrasal stress strategy whereby the child delineates a word as a stressed element. This means that he/she no longer counts unstressed syllables in a multisyllabic word as separate words. It also means, however, that the child does not identify unstressed functors such as articles or pronouns as being words. The third strategy, one that generally develops around the age of 6, is morpheme-based; i.e., the child recognizes words as being morphemes. Although there is less likelihood of overlooking unstressed functors than with the second strategy, this can still lead to the child's recognizing a word formed of several unbound morphemes (compounds) as being more than one word. This is particularly true in the case of compounds, such as *blackboard*, which will, understandably, be analyzed as being two words. At this stage, however, the children are on the threshold of

[2]For an excellent summary and discussion of the role of acquisition contexts, see Romaine (1989).

developing a mature concept of the word.

With these factors in mind, the task was designed so that the strings were not only varied in length, but also in the presence or absence of unstressed and stressed determiners or pronouns, such as *ă blácкbòard* and *mý dáddў*, [3] respectively. The ratio of words to syllables was also varied. This meant that, while the number of syllables and words were identical in a few phrases, in the majority there were fewer words than syllables. This was done to ensure that children were actually following a word-based segmentation strategy and not a syllable- or stressed-syllable-based strategy. In addition, of the multisyllabic words included in the tasks, some were compounds and others not, as in the case of *ă blácкbòard* [4] and *ă dóctŏr*, respectively.

The above-mentioned factors were included in the design of the segmentation task in the belief that there would be differences in the strategies employed by the bilingual and monolingual groups. The fact that the bilingual child is required to differentiate between referents in two languages for the same meaning would seem to suggest that he/she would be more likely to move into a morpheme- or word-based segmentation strategy at an earlier age than a monolingual. Whereas Tunmer et al. (1983) used only noun phrases, in this study it was decided to also include some short sentences because of the difference in intonation/stress patterns and the presence of certain unstressed verbal forms and pronouns, as in *Ĭs hĕ cómĭng?* and *Hăve yŏu sèen dád?* In unmarked set-

[3]The notation being used here is the standard notation used for marking stressed and unstressed syllables. It should not be confused with a similar, but different notation used in the metrical analysis in Section 2.4.

[4]It can be argued that, seen from the viewpoint of developmental acquisition, such compounds are acquired as single morphemes, rather than being analysed by the child as two unbound morphemes functioning as one. If we accept that this is the case, it is then possible that at a later stage of development these unitary forms will be reanalysed into their unbound morpheme constituents. Assuming this, it is a moot point whether a child's segmentation of a compound as being one word indicates a primitive first analysis, or is evidence of a final, more sophisticated representation after an intermediate stage where the word is analysed as two morphemes.

tings such as these, auxiliaries and pronouns are considered functors; only under conditions of semantically or pragmatically oriented emphasis or contrast will they be stressed (see Cruttenden, 1986). In addition to the unstressed functors and pronouns mentioned above, there were also deitic functors which were stressed in the phrases in which they occurred, as in the case of the *that* in *thát cówbóy*. In keeping with the exploratory nature of the study, a number of other theoretically interesting parameters were also included. These included phrases containing polysyllabic compounds, such as *watermelon* or *pineapple*, polysyllabic non-compound words, such as *carpenter* and *beautiful*, as well as *kindergarten*, a loanword which has the form (phonologically) of a compound, and which could be seen as being composed of two unbound morphemes (*kínděr - gàrtěn*), although one of these two possible morphemes is found nowhere else in the English language.

The segmentation task itself was presented in the form of a tapping game. The children were instructed to listen to each sentence/phrase, then to say the words in the phrase/sentence and tap out the number of words as they said them. This procedure has been used in a number of studies involving word or phoneme segmentation (e.g., Liberman et al., 1974; Tunmer et al., 1983).[5] The number of taps were written down for each phrase. If there was any doubt, the phrase was repeated by the researcher and the child's second response was recorded as the proper one. To ensure accuracy, the sessions were audio-recorded and later reviewed. Before beginning the task, the children were given 12 trials in order to ascertain that they had understood what was being required of them (for task and procedure, see Appendix A). As Bowey and Tunmer (1984) note,

[5] A different task was used with children of this age by Fox and Routh (1975), who asked children to repeat just 'a little bit' of the sentence/phrase. The procedure was repeated with each 'bit' thus segmented, until the children reached the level of the individual words. This method was not used here because it does not indicate in any way that the child is segmenting a particular unit (as noted by Bowey & Tumner, 1984). Moreover, there was an excessive amount of modelling of correct answers by the researchers.

children of this age do not necessarily have a complete understanding of the metalinguistic term 'word', but may still have formed a concept of the linguistic unit. The trials are intended to draw their attention to the fact that it is just that unit which is to be extracted.

4.2.4 Grammatical Correction and Explanation

The grammatical correction task consisted of 6 ungrammatical declarative sentences, each with a different type of grammatical error. The sentence types were taken from a study by Galambos and Goldin-Meadow (1990), which compares monolingual and bilingual children's ability to judge, correct, and explain their corrections of ungrammaticality. As a part of this study, Galambos and Goldin-Meadow made a ranking of the ungrammatical structures in their task, grading them according to the degree of difficulty children had in correcting them. The sentence types used here were among the easiest found in this inventory. Unlike Galambos and Goldin-Meadow (1990) or Bialystok (1986b), who presented their subjects with both grammatical and ungrammatical sentences and asked them to judge whether or not they were well-formed, the children were given only semantically clear, ungrammatical sentences, and then asked to correct these sentences. The items were presented by means of a puppet, who asked the child to help him by telling him the right way to say the things he would tell them, all of which were wrong or 'sounded funny' (see Appendix B for testing procedure and task). When they made a correction, the children were then requested to explain their answer. The interviews were audio-recorded and then later transcribed.

4.3 Procedure

4.3.1 Order of Testing

The researcher first spent 3 days in each of the kindergartens, interacting with the children so as to overcome any shyness or reservations the children might have towards him. In this way the effects of the so-called 'observer's paradox' (Labov, 1970) could be mitigated. The children were then administered the Peabody Picture Vocabulary Test. The test was administered first on consecutive days in the monolingual group, and then on the next two school days in the bilingual class.

The PPVT was given to the monolingual group primarily as a control. For the bilingual group, however, it was used as a measure of their English ability. Since they had been classified as French-dominant by the school, it was assumed that they had had sufficient contact with French to justify their being proficient in that language. After the administration of the PPVT, three children were deemed as having insufficient knowledge of English for them to qualify as being bilingual, or indeed to do the tasks. Upon the completion of the PPVT, the questionnaires, which were number-coded for confidentiality, were sent to the parents via the children. Unfortunately, not all of these were returned, even though second copies were sent out.

The administration of the metalinguistic tasks was begun one day after the PPVT. In the monolingual group, this meant that testing was conducted in the same week over a two-day period. In the bilingual group, the metalinguistic tasks were given on a single day in the following week. For both groups, the full battery of tasks was given to each child in a single session, with exactly the same procedure. The word segmentation task was administered first, followed by the grammatical correction and explanation task. All tests were carried out in a separate room in the same school and were administrated by the researcher.

In the case of three children, one bilingual and two monolinguals, the testing or a part thereof was conducted at their home at a later date. The tests were administered in exactly the same manner as they were to the other children.

Of the two tasks, the word segmentation task was administered first and then the grammatical correction task. The entire length of the testing session was 15 to 20 minutes. One monolingual and one bilingual child failed to complete the task and had to be excluded from the study.

4.3.2 Anomalies and Practical Difficulties

Several practical and technical difficulties arose during the testing sessions. One major problem was that of maintaining the children's interest for the entire duration of the session. Although almost all the children retained their interest and concentration for the first task (word segmentation), which was also the easier of the two, by the end of the second task some of the children were tired or distracted and performed the task perfunctorily.

Another problem which arose was the task's taking a different form of play for the child from that originally intended by the researcher. For example, in the word segmentation task, one child joyfully hammered out with increasing gusto ever larger numbers of taps. At first he only tapped once for every syllable, but as he became more involved and entertained, the number of taps bore little correspondence to the number of any of the linguistic units of the phrase. It was also difficult to get some children to focus on the task at hand. In one extreme case, a boy shot himself in the mouth with an elastic and testing had to be suspended. When it was later recommenced, the subject in question was not particularly responsive, although this might also be due to other factors, since his level of performance in all the tasks was the poorest of all the monolingual subjects.

One of the bilingual children and two of the monolingual children had to be tested at home at a later date, either because of their being absent at the time of the original testing or because of recording problems. For the lone bilingual, this involved both the word segmentation and the grammatical awareness tasks, whereas in the case of the monolinguals it involved only the grammatical awareness task.

One final difficulty arose as one child was doing the word segmentation task. After the first ten items, I noted that, unlike the other children, the child was attempting to look at the list of phrases. Indeed, she had, up to this point, had only one incorrect response. However, when the strings were read again with the paper hidden from her view she still scored almost perfectly, indeed even correctly segmenting the string she had previously made a mistake on. This latter fact, combined with the fact that she also performed very well on the grammatical awareness task would seem to indicate that she is indeed very linguistically aware. Nevertheless, it is possible that her results have been slightly skewed by her seeing the words written out on the list.

4.4 Analysis

For the PPVT and the word segmentation tasks, the scores of the correct responses for each child were compiled and the mean taken for each of the two groups. In the case of the grammatical awareness task, the two subtasks, correction and explanation, were analyzed separately, but along the same parameters. I will now discuss the various analyses of the linguistic tasks in some detail, beginning with the word segmentation tasks.

4.4.1 Word Segmentation

Since a preliminary analysis of the word segmentation task did not reveal any clear differences between the two groups, the data were further analyzed along the parameters of different strategies. First, scores were compared for strings in which the number of potential unbound morphemes differed from the number of words. Essentially, these were phrases in which compounds were found, such as *that cowboy.* The purpose of this analysis was to see whether the children were segmenting according to the notion of unbound morpheme or to a more fully developed notion of word. Then, a second analysis was made of environments where the number of syllables elements was unequal to the number of meaningful elements (morphemes and words); e.g., *a watermelon.* This was done to determine whether the children were following a syllable or meaningful unit based segmentation strategy. Similarly, in order to establish the relative strength of stress and syllable strategies, an analysis was performed on elements where the number of stressed elements was unequal to the number of syllables; e.g., *ă dóctŏr, Hăve yŏu sèen móm?* This third analysis entailed a number of theoretical problems, however.

There were a number of difficulties inherent to the decision as to what to consider a stressed element. The perception of stressed versus unstressed is not cut and dry. Our first problem here is one of understanding, defining and quantifying 'stress.' Phoneticians generally consider stress to be composed of three elements: pitch, length, and loudness (Abercrombie, 1964, 1967; Cruttenden, 1986; Brown, 1990.) Of these, pitch change is thought to be the most important in the perception of what is stressed and what is unstressed (Cruttenden, 1986; Brown 1990). Two points should be emphasized here: first, since stress is a perceptual phenomenon, it is always **relative** changes and differences in these parameters which are important; second, we must make a distinction between

phrasal stress or 'tonic', which is certainly a function of accent (or pitch changes) and word stress.

In regard to this second point, it is this tonic which is regarded as 'phrasal stress' in Tunmer et al. (1983). In their study, responses analysed as falling into this category were lumped together with responses based on word stress to constitute the general parameter of stress. Since they used only noun phrases which were restricted to at most three words, there was only one tonic and one accent, even though there might be more than one word stress. Examples of two such cases would be (1) and (2) below (taken from Tunmer et al., p. 583):

(1) a dóctor
(2) thĕ cóld bédròom.

In example (1), the tonic and the single word stress are identical. In the second example, only the tonic is marked. However, two of the words have their own word stress, and one even has a primary and a secondary stress; i.e., thĕ cóld bédròom. For both of the above phrases, Tunmer et al. considered a single tap to indicate a phrasal stress strategy. However, I have analysed a single tap as indicating a stress strategy only in cases where there is a single stressed element in the phrase (e.g., *a dóctor*). During the course of the study, it was my experience that only one child exhibited a number of turns where he only tapped once for each phrase. In such cases where there was more than one stressed word, we are not really sure that the child is reacting to tonic stress or just to the conclusion of the phrase. Moreover, in the case in question, the single tapping behaviour was accompanied by nonverbal behaviour showing distraction and lack of interest. Therefore, the few such responses which occurred were recorded as anomalies.

Some of the responses did not fit into the realm of either phrasal or word

stress.[6] Yet neither did they correspond to the number of morphemes or syllables. This does not mean, however, that the children were not following some stress-based strategy. Rather they may have been following different rhythmical strategies, which I will call **metrical** strategies. Such analyses are based on the rhythm of speech, on timing rather than on changes in pitch. When one speaks of stress one also speaks of rhythm, and when speaking of a segmentation strategy, it is not easy to determine which stress/rhythm-based strategy the child is using. Indeed, even the theoretical definition of the metrics of stress is not all that clear.[7]

Abercrombie (1964) proposes an interesting model for analyzing stress. Central to this model is the notion of the **foot**, the foot being defined as comprising a stressed syllable and all unstressed syllables up to, but not including, the next stressed syllable. Thus, within the foot there can be only one stressed syllable and any number of unstressed syllables. Now, in a stress-timed language like English we would expect the stressed syllable to be the longest and the other unstressed syllables to be shorter. Abercrombie argues that this may be so perceptually, but not phonetically. Phonetically speaking, unstressed syllables can be equal in length and perhaps even longer than stressed syllables, depending on their phonematic make-up. Therefore, Abercrombie posits three possible bisyllabic foot types in the RP dialect of English: one where the stressed first syllable is short and the second syllable is long (˘ —); a second, where both syllables are of equal length (∩∩); and a third where the first syllable is long and the second is short (— ˘). These three types, which Abercrombie named A, B, and C, respectively, can be seen in the three examples below (from Abercrombie, 1964: p.219)

[6] What Tunmer et al. (1983) refer to as 'syllable stress.'

[7] See Cruttenden (1986) for a discussion of this point.

(3)

	|˘ — |
Type A	|atom|
	|∩ ∩|
Type B	|greater|
	| — ˘ |
Type C	|tea for| two

This metrical analysis opens some interesting explanatory possibilities, as we will see when we examine the results of the study. It is especially interesting when we examine what we may call 'unstressed feet.' These are metrical feet for which there are no stressed syllable. This occurs in cases of *anacrusis* (Cruttenden, 1986), a situation where one or more unstressed syllables appear at the beginning of an intonation group or utterance. An example of anacrusis in our word segmentation task would be the following: [8]

(4)

.	.	´	.
Is	he	co-	ming?

When spoken with 'normal' intonation, there is only one stressed syllable in this phrase, the first syllable of *cóming*. However, many of the children in this study segmented this phrase as two words. These children were not segmenting according to syllables (4), words (3), stressed elements, whether phrasal or word (1). If we analyze the phrase in terms of metrical feet, a possible answer becomes clear.

(5)

.	.	|	´ .	|
Is	he	|co-ming?		|

Metrically speaking, there is by definition only one foot here, the bisyllabic foot consisting of |*có-ming*|. The beginning of the phrase consists of two unstressed functors which form a sort of 'run-up' to the foot. These are the anacrusis.

[8]The notation here is once again different from what we used before. This is done so as not to confuse it with Abercrombie's notation. Here the '.' symbol denotes an unstressed syllable, while the '´' symbol indicates the tonic or primary accent. The latter also differs somewhat from the notation of Cruttenden (1986) and Brown (1990).

Brown (1990) makes the point that in verse such a run-up from a pause to the next foot is similar to a silent stress in the metre of verse. Extending this observation, we can relate the notion of the silent foot to the function of anacrusis. In other words, when there is an anacrusis before the first foot (before the first word stress) this anacrusis is analysed as a foot in itself, in our context, as a word. And this is borne out by the segmentation strategies of many of the children. For example, as they said the phrase, *Is he coming?*, they split it into two components: the anacrusis, *Is he*, and the foot, *coming*; i.e., *Is he |co-ming|?*. Interestingly, even some of the children who tapped the correct three taps for this sentence, still maintained the anacrusis *Is he* as a single word, but split *coming* into two. Here we might be seeing the effects of syllable length within the foot. The foot consisting of *có-ming* is what Abercrombie (1964) refers to as a Type B foot (see above); i.e., a foot containing two syllables of equal length, as shown in (6) below.

(6) ˘ ˘ | ∩ ∩ |

Is he |co- ming|?

Thus, the segmentation strategy shown by these children could be based mainly on rhythm, the units corresponding to acoustic duration. [9]

As we will see in Chapter 4, these may not be the only strategies children use. Strategies may definitely vary from child to child, and even the same child may use more than one different stress strategy. This makes it extremely difficult to speak of one single stress strategy, or one single basis for analysis. The approach adopted here was to take analyses of tonic and acoustic stress as the basis of the analysis, but to allow for other cases where it was clear that

[9]It might also be argued that this case is the product of a faulty morpheme analysis resulting from the child pragmatically acquiring *Is he* as a single form carrying a 3rd. person singular interrogative function, but this is just speculation. The metrical analysis receives some further support from children's segmentation of other phrases in the text.

the child was employing a segmentation strategy that could be based on other metrical strategies, particularly in cases where these differed from the number of morphemes and syllables in the phrase.

Since it is extremely difficult to utter the same phrase a number of times in exactly the same way, the researcher reviewed the tapes of the sessions and for each child transcribed the tonic and word stress for the phrases which the experimenter had modelled for that child. In addition, for anomalous cases the tester's input was analyzed on a metrical basis as discussed above. These transcriptions were then used to help analyze whether or not the child was responding to special stress cues in a particular phrase. To check the reliability of the transcriptions of stress, two phonologists transcribed the taped presentation of the task to two of the subjects. These transcriptions were then compared to those of the researcher.

A fourth analysis was then conducted of phrases in which the number of stressed elements differed from the number of syllables (e.g., *Whàt dŏ yŏu sée?*) in order to determine which strategy was followed in such circumstances. Then, since there was an overlap of the number of units of meaning and the number of syllables or stressed elements in many of the phrases in the fourth analysis, a separate sub-analysis was done of the responses which were unequal to the number of units of meaning within that particular phrase. This comparison could be seen as a form of error analysis performed on sentences where the number of stressed elements did not equal the number of syllables.

Subsequent to that, a fifth analysis was made of those phrases where the numbers of the three types of elements occurring in the phrase do not overlap; i.e., where the number of meaningful units is unequal to the number of syllables or stressed elements, and at the same time the latter two are not equal to each other (e.g., *a wátermèlon*).

Finally, using the results from the last four analyses, a strategic profile was

developed for each child. The first step in establishing such a profile was to establish what the primary and secondary strategy was in each analysis. This was done by first ascertaining whether the response to a particular question corresponded to the number of meaningful units, stressed elements or syllables in that question. Then these were compiled and the category with the largest number of responses was taken to be the indicator of the primary segmentation strategy used by that child within the context of that analysis. The second largest type of scores was taken as indicating the secondary strategy. In cases where there was very little difference ($< 20\%$) in the number of responses indicating two different strategies, then the strategy, whether primary or secondary, was said to be mixed. These profiles for the individual analyses were then scored according to a three point system, where the primary strategy was awarded 2 points and the secondary strategy awarded 1 point. Where there was a mixed primary stress strategy, each of the two strategies involved was weighted as having a score of 1.5. Similarly, in the case of a mixed secondary strategy, each of the two strategies was awarded 0.5 points. The scores for all three analyses were then totaled and an overall strategy profile worked out based on the total values awarded to each strategy type.

4.4.2 Grammatical Awareness Tasks

The interviews for the grammatical awareness task were transcribed and then the responses analyzed according to whether they were content or grammatically oriented. Any attempt by the child to correct would be scored as being grammatically oriented so long as the child attempted to change the structure along grammatical as opposed to semantic lines. On the other hand, if the child made significant semantic changes to the structure, such changes were analyzed

as being content-oriented. Examples of these two types can be seen below.[10]

Corrections

I. Grammar-Oriented

(1) T - The dress are very nice.
S - The *dress* is

(2) T - Them often come to dinner.
S - They *often.*

(3) T - John played a long time tomorrow.
S - *Tomorrow?* ....does(?)... Yesterday.

(4) T - She dressed myself every day.
S - She will dress me every day.

(5) T - We go to school in Monday
S - We go to school *on* Monday.

II. Content-Oriented

(6) T - John drinks milks.
S - Your dad drinks milk.

(7) T - Them often come to dinner.
S - Them often get to dinner.

(8) T - The dress are very nice
S - She is very nice.

(9) T - We go to school in Monday.
S - My school. I like school.

(10) T - She dressed myself every day.
S - She dressed myself good every day.

[10]In these examples, *T* refers to the experimenter, and *S* refers to the subject.

If no attempt was made to correct the sentence, or if it was simply repeated or deemed acceptable by the child, no response was scored. If a response in no way pertained to the task at hand (i.e., was nonsensical) it was not scored either. One rather charming example may be seen below:

(11) T - She dressed myself every day.
S - I can't say that.
T - Yeh, but what can you say? What sounds better?
S - I love you.

In the case of explanations, grammar-oriented responses were of two types. The first type was identifications. A response was scored an identification when the child pinpointed the structure that was wrong or had been changed. For Galambos and Goldin-Meadow (1990), such cases of identification had to be clearly singled out by a separate comment. In this analysis, it was also sufficient if the children clearly indicated through contrastive stress that they had noticed exactly what was wrong with the sentence and had corrected specifically that part. The second category of grammatical explanations was that of explicit statements of grammatical rules. These were rare in the data and limited to just a few children. Examples of these two types of explanations can be seen below.

Explanations

I. Grammar Oriented

A. Identification

(12) T - We go to school in Monday
S - We go to school *on* Monday.
T - What's wrong with '*in* Monday.'
S - It's not how you say it.

(13) T - John drinks milks.
S - John drinks *milk*.

B. Rule-based Explanations

(14) T - She dressed myself every day.
S - She ... her ....
S - She dressed herself every morning.
T - How is that better?
S - It's all the same kind of word.

(15) T - She dressed myself every day.
S - I dress myself every day.
T - Why is that better?
S - Because *she* didn't. You *yourself* did.

(16) T - Why is yours better?
S - Because .. daa.. John drinks *milk* and you said: John drinks *milks* ... John drinks milk at two times; he goes like this ... (acts out drinking two glasses) and that's not polite.

(17) S - We go to school *on* Monday.
T - What's the matter with '*in* Monday.'
S - Because '*in* Monday' would have to go inside Monday and how could you do that? It's up in the air.

(18) T - John drinks milks.
S - John drinks milk.
T - Why is that better than what I said.
S - Cause a lot is one milk.

(19) T - Jean played a long time tomorrow.
S - It's not tomorrow yet, yesterday or today.

(20) T - She dressed myself every day.
S - I dressed myself.
T - Why ....?
S - You dress *your*self.

(21) T - She dressed myself every day.
S - Wrong. *You* should .. dress yourself.

II. Content Oriented

(22) T - The dress are very nice
S - She is very nice.
T - What was wrong with what he [the puppet] said?
S - Because it's not only a dress; it's somebody in the dress.

After the children's responses were analyzed along these parameters, the two grammar-oriented response types were then joined together into one general category.

Chapter 5

Results

5.1 Overview of the Results

The overall results for the two groups are shown in Table 1 below.

Table 5.1: Comparison of Group Means - All Tasks

Tasks	Monolinguals	Bilinguals	P-Values
PPVT	45.1	37.2	.002*
Word Segmentation	13.5	14.2	.782
Grammatical Correction			
Grammar-oriented	4.8	2.8	.006*
Content-oriented	0.4	1.6	.001*
Grammatical Explanation			
Grammar-oriented	3.5	1.4	.052*
Content-oriented	0.3	0.2	.705

*$p \leq .05$

The probability values show that the monolinguals scored significantly higher on the vocabulary task, but not on the word segmentation task. They also registered significantly higher numbers of grammar-oriented responses on the grammatical correction and explanation tasks. Although the probability of the latter comparison (.052) was not quite at significance level ($p \leq .050$), the more conservative separate variance estimate found a probability of .024, which is well under the significance level. The only parameter on which the bilinguals significantly outscored the monolinguals was in the number of content-oriented corrections. Taken in conjunction with the difference in grammar-oriented responses between

the two groups, this would seem to suggest that in the grammatical awareness task the monolinguals were more likely to focus more on formal characteristics, while the bilinguals had a greater propensity to focus on meaning.

The above results form a macro-analysis of the data. In addition, a number of detailed analyses were carried out on the individual tasks (see section 2.4). The results of these are examined in turn.

5.2 Vocabulary Scores

In all but one case, the PPVT scores for the monolinguals were higher than for the bilinguals. This resulted in a corresponding difference in mean scores, with the monolinguals having a mean of 45.1 and the bilinguals having a mean of 37.2. This suggests that the monolingual children are more proficient in English than the bilingual children. Indeed, as seen clearly in Tables 2 and 3 below, only one of the bilingual children scored anywhere close to the monolingual mean.

Table 5.2: PPTV and Word Segmentation Scores - Monolinguals

Task	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
PPVT	48	37	48	46	47	45	41	45	45	49	45.1
Wordseg	17	9	9	13	12	16	14	13	9	23	13.5

Table 5.3: PPTV and Word Segmentation Scores - Bilinguals

Task	Subject					Mean
	1	2	3	4	5	
PPVT	32	35	38	43	38	37.2
Wordseg	9	10	14	20	18	14.2

If we examine the scores of the bilingual subjects, we can divide the group into two subgroups: a mid-high scoring group consisting of subjects 3-5, and a low

scoring group comprising subjects 1-2. It is interesting to note that subjects 1-2 were the two trilinguals in the group. The dichotomy between the two subgroups is even more pronounced on the word segmentation task, which we will now examine.

5.3 Word Segmentation Task

Contrary to the first hypothesis, the results of the word segmentation task (Tables 2-3) showed no clear distinction between the two primary groups. However, it should be noted that, despite the bilinguals' apparent disadvantage in terms of language proficiency, they did have a slightly higher mean score (14.2) than the monolinguals (13.7). Indeed, two of them posted the second and third highest scores of the entire sample and three of them were in the top seven.[1] This leaves us with the bottom eight, two of whom are bilinguals. Indeed, these two are in the bottom five of the sample. It is interesting to note that, as with the PPVT scores, these two are the two trilinguals in the bilingual group.[2]

Although there were no large differences in the means of the bilingual and monolingual groups, an in-depth analysis of the responses of the individual children revealed some interesting tendencies regarding the strategies employed by the members of the two groups. As mentioned in section 2.4.1., this involved a total of five additional analyses along a number of different parameters. We will now examine the results of these.

The first additional analysis was to see whether the children were following a segmentation strategy based on the unit of the word or that of the unbound morpheme. The results can be seen in Tables 4 and 5 below. As can be seen from these tables, there was little difference between the monolingual and bilin-

[1] If we were to count the monolingual who had been exposed to Chinese as a very young child together with the 'true' bilinguals this total would be 4 of the top seven.

[2] We will go into the possible reasons for these results in Chapter 4.

gual groups on this parameter. Out of a possible 7, the bilinguals had a mean of 3.0 word-strategy-based responses, as compared to a mean of 2.6 unbound-morpheme-based responses, whereas the respective means for the monolingual group were 2.8 and 2.8.[3]

Table 5.4: Word vs Unbound Morpheme Strategy - Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Word	6	2	1	2	1	4	3	2	2	5	2.8
Morpheme	-	3	4	4	4	2	4	2	3	2	2.8
Syllable	-	1	1	1	1	1	-	1	2	-	0.8
Stress	1	-	-	-	1	-	-	1	-	-	0.3
Anomalies		1	1	-	1	-	-	1	-	-	0.3

Table 5.5: Word vs Unbound Morpheme Strategy - Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Word	1	4	1	5	4	3.0
Morpheme	4	1	4	2	2	2.6
Syllable	1	1	1	-	1	0.4
Anomalies	1	1	1	-	-	0.6

However, when we examine contexts where the number of syllables differs from the number of meaningful units (words and/or unbound morphemes), we can see one interesting difference in the mean scores of the two groups. Although both groups exhibit the same mean score for meaningful units (10.2), the mean for syllable-strategy-based responses for the monolinguals is 5.7, as compared to 3.6 for the bilinguals. The results are shown in Tables 6 and 7.

[3]Separate categories have been made for syllable based responses and anomalies in order to account for answers that do not fall into the two categories/strategies being contrasted. This practice will be continued in all of the subsequent tables as the two main strategies being contrasted in the analysis never account for all of the responses. Indeed, a third factor/strategy sometimes accounts for more responses than the two being contrasted, as we will see in the analysis of contrastive contexts for stress versus morpheme strategies.

Table 5.6: Syllable vs Meaningful Unit Strategy - Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Syllable	1	12	8	5	6	8	1	6	14	-	5.7
Meaningful Unit	14	6	7	10	12	12	12	9	6	20	10.2
Stress	6	2	4	6	3	1	8	5	1	1	3.7
Anomalies	-	1	2	-	-	-	1	-	-	-	0.4

Table 5.7: Syllable vs Meaningful Unit Strategy - Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Syllable	9	2	7	-	-	3.6
Meaningful Unit	7	6	8	15	15	10.2
Stress	1	5	3	-	4	3.2
Anomalies	1	5	-	-	-	1.2

The analysis of contexts where meaningful units and stress could theoretically clash also reveals some slight differences between the two groups. Although there was little difference between the two groups in terms of their mean scores for responses based on a meaningful unit strategy, the bilingual group did have a slightly higher mean score for responses based on a stress strategy, 3.6 as opposed to 2.6 for the monolinguals (see Tables 8 and 9). Interestingly, once again, the monolingual group had a higher mean score for syllable-strategy-based responses, 3.4 as compared to 1.2 for the bilinguals.

Table 5.8: Meaningful Unit vs Stress Strategy - Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Meaningful Unit	7	7	6	10	8	8	9	9	7	15	8.6
Stress	7	1	3	5	5	1	6	4	-	-	2.6
Syllable	1	6	4	-	2	6	-	1	8	-	3.4
Anomalies	-	1	2	-	-	-	1	-	-	-	0.4

Table 5.9: Meaningful Unit vs Stress Strategy - Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Meaningful Unit	8	5	11	11	10	9.0
Stress	2	6	1	4	5	3.6
Syllable	3	-	3	-	-	1.2
Anomalies	2	4	-	-	-	1.2

Table 5.10: Syllable vs Stress Strategy - Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Syllable	2	16	11	7	9	12	2	7	18	5	8.9
Stress	18	4	10	11	11	10	17	10	3	11	10.5
Meaningful Unit	4	3	1	6	4	2	5	6	3	8	4.2
Anomalies	-	1	2	-	-	-	-	-	-	-	0.4

Table 5.11: Syllable vs Stress Strategy - Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Syllable	11	3	12	3	5	6.8
Stress	6	11	7	17	16	11.4
Meaningful Unit	5	4	4	4	3	4.0
Anomalies	2	6	1	-	-	1.8

The analysis of contexts where the number of syllables theoretically would differ from the number of stressed elements (see Tables 10 and 11) reveal the same differences as regards syllable strategies. The mean scores of the two groups did not differ greatly for responses which coincided with stress, the bilingual group having a slightly higher mean (11.4) than the monolinguals (10.5). However, the monolinguals had a noticeably higher mean score for responses coinciding with the number of syllables in the phrase, 8.9 as compared to 6.8, indicating once again a possibly greater tendency on the part of some of the monolinguals to follow a syllable strategy. There was only one subject in the study who had more stress- than meaningful-unit-based responses, Bilingual subject no. 2, who happened to be one of the trilinguals. Indeed, of the bilinguals, the trilingual subgroup (Subjects 1-2) were the least likely to segment according to the number of meaningful units.

As mentioned in Chapter 4.4.1, in many of the contexts where the number of syllables and the number of stressed elements differ, either one or the other may overlap with the number of meaningful units. Tables 12 and 13 below show the sub-analysis of responses included in the above analysis which were different from the number of meaningful units. The results of this 'error analysis' are congruent with those of the main analysis. The bilinguals' mean score for stress-based responses is slightly higher than that of the monolinguals (4.0 to 3.6), while the reverse is true for syllable-based responses. The difference for the syllable-based responses was more pronounced, however, with the monolinguals having a mean of 5.7, as compared to the bilingual mean of 4.0.

Table 5.12: Syllable vs Stress where Response ≠ Morpheme – Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Syllable	-	12	8	5	5	7	1	6	13	-	5.7
Stress	8	2	4	4	5	1	6	4	1	1	3.6

Table 5.13: Syllable vs Stress in Responses ≠ Morphemes – Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Syllable	9	2	8	-	1	4.0
Stress	2	7	2	4	5	4.0

The actual analysis of contexts where there was no overlap in the number of meaningful units, stressed units and syllables confirmed the tendencies noticed above. The results can be seen in Tables 14 and 15 below. The monolingual group averaged twice as many syllable-strategy oriented responses as the bilingual groups, the means for the two groups being 2.4 and 1.2, respectively. The bilinguals on the other hand showed a slightly higher mean score for stress-oriented responses, while there was almost no difference for meaningful units.

Table 5.14: Syllable vs Stress vs Meaningful Unit - Monolinguals

Strategy	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Syllable	-	6	4	-	1	6	-	1	6	-	2.4
Stress	4	1	3	3	3	-	4	2	-	-	2.0
Meaningful Unit	5	2	2	6	5	3	5	6	3	9	4.6

Table 5.15: Syllable vs Stress vs Meaningful Units - Bilinguals

Strategy	Subject					Mean
	1	2	3	4	5	
Syllable	3	-	3	-	-	1.2
Stress	1	4	1	3	4	2.6
Meaningful Unit	5	3	5	6	5	4.8
Anomalies	-	2	-	-	-	0.4

5.3.1 Strategy Profiles

The strategy profiles drawn up for each individual on the basis of each of the four analyses were weighted and combined into a general strategy profile (see Chapter 4.4.1). These general profiles are given below in Tables 16 and 17.

Table 5.16: Strategy Profiles - Monolinguals

	Subject									
	1	2	3	4	5	6	7	8	9	10
Primary Strategy	M	Syl	Syl*	M	M	Syl/M	M	M	Syl	M
Secondary Strategy	Str	M	M*	Str	Str	-	Str	Str	M	-

* In these cases the difference between primary and secondary is minimal.

Table 5.17: Strategy Profiles - Bilinguals

	Subject				
	1	2	3	4	5
Primary Strategy	M	M*	M	M	M
Secondary Strategy	Syl	Str*	Syl	Str	Str

* In these cases the difference between primary and secondary is minimal.

If we then compare the two groups we can see that whereas all of the bilinguals would appear to follow a primary segmentation strategy based on the notion of the meaningful unit (word and unbound morpheme), several of the monolinguals

seem to rely mainly on a syllable strategy (or, in the case of Monolingual Subject No. 3, an even mix of the two). The one bilingual child who might be said to have a mixed primary strategy has a meaningful unit/stress strategy and not a syllable strategy. [4]

This difference in the groups becomes more pronounced if we relax our criteria to allow subject 7 of the monolingual group to be included in the bilingual group. Subject 7 was originally included in the monolingual group because, although she had a Chinese/Canadian mother, she said she could not speak any Chinese and her mother did not speak to her in Chinese. However, the language use questionnaire revealed that her mother had spoken to her in Chinese up to the age of 3, as had her grandparents before they moved away. Thus, although she is now, for all intents and purposes, a monolingual, she did have extensive and prolonged exposure to another language at an early age. Interestingly, her profile matches very well with that of the bilinguals as she has a meaningful-unit primary strategy with a strong stress secondary strategy. If she were to be included in the bilingual group, then of 6 children who have been extensively exposed to another language, all 6 would have the meaningful unit as their primary segmentation strategy. Of the remaining 9 monolinguals then, only 6 would have meaningful unit primary strategy, while 4 (one case being the mixed syllable/morpheme strategy child mentioned above) would have a syllable-based primary segmentation strategy.

Other than these differential group tendencies in strategies, we can only speak of individual differences. In both bilingual and monolingual groups, different individuals exhibited different strategies. Among the monolinguals, two basic patterns emerge: 1) a meaningful-unit-based primary strategy with a

[4]One subject among the bilingual population did give more syllable strategy responses than meaningful unit responses in one of the analyses (syllable vs meaningful unit strategy), but the entire profile, including the syllable versus stress versus meaning analysis of mutually exclusive contexts, indicated that the primary tendency was towards meaning.

stress-based secondary strategy, and 2) a syllable-based primary strategy with a meaningful-unit secondary strategy. Thus, the secondary segmentation strategy was never syllable-based. Moreover, there were no cases where segmentation by stressed units was the secondary strategy of those who had primarily syllable segmentation strategies. In regard to stress as a primary strategy, the only subject of the entire sample (both bilinguals and monolinguals) who had a stress strategy as their primary segmentation strategy was a bilingual child.[5] However, in neither of the groups, whether monolingual or bilingual, was there a single child who had any permutation of stress and syllable as their primary and secondary strategies.

One final note should be made here about the bilingual/trilingual dichotomy in the bilingual group. As noted at the beginning of this chapter, the two trilinguals as a subgroup performed more poorly on both the PPVT and the word segmentation task than the other three children, who were simply bilingual. The gap between the two groups was especially pronounced for the word segmentation task. In terms of their strategies, however, the two trilinguals were very different. One subject had a pronounced tendency to fall back on a syllable strategy, almost to the point of having a mixed syllable/meaningful unit strategy, whereas the other trilingual showed almost no tendency to segment by syllable, indicating instead a very strong secondary stress strategy. If it could be said that a similarity between the two exists, it would be that they both did not have a very strong meaningful unit strategy. In both cases, the secondary strategy was almost as strong as the primary meaningful unit strategy.

[5]This subject has been discussed in section 2.4. If I had interpreted the large number of inappropriate single tap responses as indicating a tonic stress strategy, as did Tunmer et al. (1983), then the number of responses scored as being the product of a stress-based strategy would have been far greater and his primary segmentation strategy would have been based on stress.

5.4 Grammatical Awareness

The results of the grammatical awareness tasks did not entirely conform to the expectations expressed in the hypothesis. As we saw in Table 1, the monolinguals seemed to display a significantly greater number of form-oriented responses than the bilinguals. Not only did they provide more grammatically based explanations, but also, contrary to my predictions, more grammar-based corrections (see Tables 18 and 19) Whereas the monolinguals as a group managed a mean score of 4.8 out of a possible 6.0 grammatically oriented corrections, the bilinguals had a mean score of only 2.8. Moreover, whereas only one bilingual child managed to get a score of 4 (the others being below that), 9 of the 10 monolingual children scored 4 or above. The bilinguals, on the other hand, had more content-oriented corrections, with a mean score of 1.6 as compared to only 0.4 for the monolinguals.

Table 5.18: Grammatical Correction and Explanation - Monolinguals

Task	Subject										Mean
	1	2	3	4	5	6	7	8	9	10	
Correction											
Grammar-Oriented	5	2	5	4	6	5	5	5	5	6	4.8
Content-Oriented	1	-	-	-	-	1	-	1	1	-	0.4
Explanation											
Grammar-Oriented	2	-	2	2	6	5	3	4	5	6	3.5
Content-Oriented	1	-	-	-	-	1	-	1	-	-	0.3

Similarly, the monolinguals gave proportionately 2 1/2 times more grammatically oriented explanations than the bilinguals, the respective means being 3.5 and 1.4. Indeed, there were very few cases of grammar-oriented explanations made by the bilinguals. Neither bilinguals nor monolinguals displayed any penchant for content-oriented corrections, there being only four such responses, three of which came from monolinguals and one from a bilingual.

Table 5.19: Grammatical Correction and Explanation Scores - Bilinguals

Task	Subject					Mean
	1	2	3	4	5	
Correction						
Grammar-Oriented	1	3	4	3	3	2.8
Content-Oriented	2	1	2	1	2	1.6
Explanation						
Grammar-Oriented	-	1	3	2	1	1.4
Content-Oriented	-	-	1	-	-	0.2

5.5 Intertask Analysis

A correlational analysis of various task scores was also performed: first for the entire sample (i.e., both monolingual and bilingual); then for the monolingual group; and finally for the bilinguals. The results of this intertask analysis are given in Tables 20-22.

Looking at the analysis for the total subject population, we can see that there is a highly significant correlation between the measure of linguistic proficiency, the PPVT, and the number of grammatically oriented responses a subject gave on the grammatical correction task (Gramcor). There is also a significant correlation between PPVT score and the number of grammar-oriented responses on the explanation task (Gramex). The only other significant correlation is between the grammar-oriented responses on the two different grammatical awareness tasks. This suggests that there is a cross-group relationship between linguistic proficiency and grammatical responses on the grammatical awareness task in general. However, there is no such correlation between word segmentation performance and linguistic proficiency or between word segmentation scores and any of the other types of responses. And there is no significant correlation between the content-oriented responses on the correction and explanation tasks (Contcor and Contex, respectively), or between either of them and any of the

other response types.

The intertask correlations for the monolingual group (Table 21) are consistent with this pattern. There is a significant relationship between performance on the PPVT and the number of grammatically oriented corrections. There is also a significant correlation between the number of grammatically oriented responses on the two grammatical awareness tasks. However, there is no correlation between the PPVT scores and grammar-oriented explanations.

The correlation analysis of the bilinguals' scores did not reveal any statistically significant correlations between the various task measures. However, this is largely a product of the small sample size. For example, the correlation value for the PPVT and the word segmentation task is almost as high as it can be without being identical; yet, the correlation does not reach the significance level (one tailed probability $<.01$). Looking at the raw correlation values, we can see once again a seemingly high correlation between the number of grammatically oriented responses on the two grammatical awareness tasks.[6] There is not the same strong correlation between the PPVT and grammatical responses. The real difference between the two groups, however, is in the correlation of the PPVT with the word segment task. This appeared to be quite marked for the bilinguals (.9246), while it was definitely not so for the monolinguals (.4574).

[6]Both of these correlations are significant, however, at the less stringent significance level of $p<.05$.

Table 5.20: Interaction Between Tasks - Both Groups

	Wordseg	Gramcor	Contcor	Gramex	Contex
PPVT	.3697	.8601**	-.5669	.6872*	.1805
Wordseg		.3091	.0465	.3276	.1811
Gramcor			-.4809	.8645**	.2641
Contcor				-.3032	.3626
Gramex					.2177

*p<.01, **p<.001

Table 5.21: Interaction Between Tasks - Monolinguals

	Wordseg	Gramcor	Contcor	Gramex	Contex
PPVT	.4574	.7863*	.1539	.5237	.1709
Wordseg		.4918	.0491	.4348	.2890
Gramcor			.1516	.8262*	.1216
Contcor				.2137	.8018
Gramex					.0571

*p<.01, **p<.001

Table 5.22: Interaction Between Tasks - Bilinguals

	Wordseg	Gramcor	Contcor	Gramex	Contex
PPVT	.9246	.6255	-.4021	.6761	.1094
Wordseg		.4833	-.1516	.4825	-.0232
Gramcor			-.1667	.8807	.6124
Contcor				-.0801	.4082
Gramex					.7845

*p<.01, **p<.001

Chapter 6

Discussion

6.1 Discussion of the Results

6.1.1 Summary of Results in Relation to the Hypotheses

The results of the various tasks were in some ways consistent with the hypotheses and in others not. As one would expect, the bilinguals were not as proficient in English as the monolinguals. This is not surprising considering that French was the main language in most of the bilinguals' homes, as well as being the language of instruction at school. Moreover, as noted in many studies, bilingual children may lag behind in one or the other of their languages, depending on the acquisition context (e.g., see Leopold, 1949). However, contrary to the first hypothesis, the bilingual children did not show a significant advantage over the monolinguals on the word segmentation task. Nevertheless, they did, as a group, perform slightly better on the task than the monolinguals, even though their proficiency in English, the language of the task, was significantly lower. This would seem to indicate that if the English proficiency of the two groups were equal, then bilingual performance on this task could have actually been markedly superior. This is supported to some extent by the results, which show that, although there is no significant relationship between linguistic proficiency and word segmentation performance for the monolinguals, the bilingual children's relative ranking for the two tasks was identical. One finding that was predicted by the model was the difference in strategy profiles found between the two groups. As could be expected, the bilinguals did exhibit a slightly greater

tendency to segment phrases according to a meaningful unit strategy. This result is logical in light of the constant contrast of form and referent to which the child is exposed throughout his/her acquisition of the two languages.

The second hypothesis, that bilinguals would exhibit a greater number of grammatically oriented responses in the grammatical correction task, was also not supported by the data. Indeed, exactly the opposite was found; the monolinguals had significantly more of this type of response. In searching for reasons for this discrepancy, we should perhaps once again look to the differences between the two groups in English ability. That there could possibly be a correlation between proficiency and grammatical correction ability is underscored by the strong statistical correlation found between these two variables.

The results of the grammatical explanation task did, on the other hand, support the third hypothesis. As predicted, the bilinguals did not produce any more grammatically oriented explanations than the monolinguals. What was interesting, however, was that the monolinguals once again had significantly more of such responses. A possible explanation for this tendency may once again be differences in proficiency, since there is a statistical correlation between these two variables.

We will now examine in detail the ramifications of these findings.

6.1.2 Grammatical Awareness

There is definitely a pattern to the results of the grammatical awareness tasks. In terms of overall performance by both groups, we can see a relation between three measures: linguistic proficiency, grammatical corrections, and grammatical explanations. Since there is a strong correlation between the two grammatical awareness tasks, but no correlation between either of these tasks and the word segmentation task, it would appear that the grammatical explanation and

correction tasks do indeed tap different abilities than the word segmentation task. Moreover, it could be that the two grammatical awareness tasks are actually functions of the same metalinguistic or metacognitive skills, and that these skills are themselves somehow related to language ability. We will now examine just what the nature of this relationship may be.

Previously, it was argued that both the grammatical explanation and correction tasks were functions of the abilities to access certain levels of systematic representation of the linguistic system, to note any inconsistency of the utterance with it, to analyze this inconsistency, and then to retrieve what was, according that system, the correct response. Grammatical explanation required the additional access of a higher level of systematic representation and a higher level of analytic function. Although there is no specific feature of the bilingual acquisition context which would necessarily directly promote such a capacity, it was argued that having to separate two linguistic systems to convey the same meaning would promote in the bilingual child a greater realization that linguistic form is distinct from the message it conveys. This would then stimulate a more formal approach to language, which should result in more grammatically oriented responses on a correction task. This would not, however, extend to the more analytic task, the explanation task.

In light of the data here, an alternate explanation seems more likely. It would appear that both the correction and explanation tasks actually require an ability or level of representation which exposure to two languages alone does not foster. Indeed, Galambos and Goldin-Meadow (1990) found this to be the case for the explanation task, but they found that their bilingual groups were definitely more form-oriented in their approach to correction tasks. The results of the present study call this latter finding into question. In order to explain the task score differences found in their study, Galambos and Goldin-Meadow claim that the two tasks require different levels of explicit awareness. One tentative

piece of support for this notion which we find in the results of the present study is the fact that, while the bilingual subjects were able to make a fair number of grammatical responses in the correction tasks, they managed very few responses at all on the explanation task. There was also a slight trend in this direction for the monolinguals, but nowhere as pronounced as it was in the case of the bilinguals.

What the results do strongly suggest is that there is indeed a common skill or mental operation involved in the performance of both tasks. This does not exclude the possibility, or better stated, the probability, that there are extra skills, operations and/or levels of access required for the explanation task which are not needed for the correction task. The question is just what the nature of this common ability is. As discussed in section 3.12, Bialystok (1986a, 1988), views the correction ability as being a function of knowledge of analysis, one of the two metacognitive abilities behind metalinguistic development. Assuming this to be the case, we can say that such an activity as explaining a grammatical rule, or a violation thereof, involves even higher levels of representational structure, which are themselves the product and object of correspondingly higher levels of analysis.[1] In other words, both of these tasks require more analytic knowledge rather than attention to form. Attention to form is required to catch the incongruence of an ungrammatical sentence, but, as we have already discussed, the actual correction requires analytical processing as well. It also necessitates linguistic knowledge, both to locate the problem and to produce a grammatical alternative.

[1]Karmiloff-Smith (1986) views such restructuring as an integral part of acquisition and metalinguistic development. According to her, forms are first learned pragmatically, being functionally bound to context. These forms are then eventually analyzed into systematic grammatical relations. These formal grammatical structures are subsequently repeatedly reanalyzed and restructured into higher levels of representational structure. This movement from context-bound to abstract structures is accompanied by a progression from implicit to explicit knowledge of these structures, in other words, towards metalinguistic awareness.

The concept of knowledge or representational structure is closely tied to the notion of linguistic proficiency. Obviously, for one to construct systematic relationships between linguistic forms, one must first know what the forms are, what meaning they convey, and what distribution and contextual environments they occur in viz-à-viz other forms. This is a function of proficiency in a particular language. 'Proficiency' can refer to either passive knowledge (comprehension) or active knowledge or ability (production). The child must have the passive knowledge of the linguistic system to be able to hear ungrammaticality as being such. Therefore, this passive competence is the very basis of the correction and explanation abilities. This is corroborated by studies by Bialystok (1988) and Diaz (1985) that found the degree of bilingualism to be correlated to judgement and correction tasks. It is thus no surprise that proficiency was found to be so strongly linked to the two tasks in this study.

The 'degree of bilingualism' refers simply to how proficient the child is in his/her weaker language. As mentioned in 2.3, even among monolinguals, verbal ability (as measured by the PPVT in this experiment) has been found to be strongly correlated to performance on grammatical correction tasks (Bowey, 1986; Bowey & Patel, 1988). Moreover, more balanced (proficient) bilinguals have outperformed less proficient bilinguals on similar tasks (Diaz, 1985; Bialystok, 1986b; Galambos & Hakuta, 1988). However, the unanswered question is whether children exhibit higher degrees of grammatical awareness because they have more language ability, or whether they have a higher degree of verbal ability because they have higher levels of an underlying cognitive/metalinguistic ability which also allows them to perform well on this particular metalinguistic task. The data of this study do not help in determining exactly what the nature of the relationship between the two variables is, but it is very clear that proficiency is intrinsically linked with grammatical awareness.

The children in this study were deemed to be fluent bilinguals. Although,

because of the lack of an objective test, their French ability could have been overestimated by their school and parents, their English ability was certainly of a level where they could understand the task and vocabulary. In addition, the grammatical errors and sentence structures were simple in nature. Thus, although it would be convenient to attribute the differences between the two groups to differences in proficiency, it is unlikely that this is the sole explanation.

It would be helpful to re-examine the role of the acquisition context at this point. It was claimed in Chapter 1 that the necessity of dealing with two languages would make the bilingual child precociously aware of languages as being arbitrary formal systems, and that this awareness would lead to a more formal approach to language. In light of the findings of this study, however, it does not seem that this formal approach to language would imply a greater knowledge of a particular linguistic system as a system of structural relationships.

It is necessary to redefine what is meant by 'a formal approach to language.' Instead of speaking of a precocious bilingual ability to attend to the formal (i.e., grammatical) system of particular languages, it might be more proper to see the bilingual acquisition context as promoting the development of the awareness of the formal characteristics of language per se. After analyzing monolingual-bilingual differences on different tasks, Johnson (1991a) concludes that bilinguals tend to show an advantage over monolinguals in tasks where it is necessary to concentrate on or isolate form in a distracting semantic context. Thus, any formal orientation to language that the bilingual environment encourages is limited to the ability to see form as form and meaning as meaning, and to maintain the separation of the two when it should be required. This ability could be seen as a function of the control of processing function postulated by Bialystok and Ryan (1985).

In acquisition, bilingual children have to make original form-meaning mappings in the same way as monolingual children. Where bilinguals differ is that

they must sort the two forms that they learn for that meaning according to particular linguistic and social contexts. Therefore, to a greater extent than the monolingual, the bilingual is forced to attend to form in context; i.e., to be able to switch into a particular linguistic mode in a particular environment. This does not require a deep systematic awareness of the structures being used, but rather an ability to attend to the relationship between form, meaning, and context. The findings of Rosenblum and Pinker (1983) cast an interesting light on this point. As discussed in 3.10, Rosenblum and Pinker found that, although monolingual children switched names for referents just as readily as a comparable group of bilinguals, the bilinguals were far more likely to justify their responses by appealing to the context of the game, saying that the game allowed and required them to do that. Therefore, it is possible to view any bilingual propensity towards being more attentive to the form of language as actually being a function of a greater awareness that the relation of form to meaning can vary or be varied according to context. And it is just this realization which allows them to fix their attention on forms to the exclusion of meaning. This is a far cry, however, from the continual representational restructuring required to develop grammatical systems and the ability to make the knowledge contained in these systems explicit on demand, as is required in the grammatical awareness tasks.

In this new interpretation of the notion of a 'formal approach to language' lies a possible reconciliation of certain conflicting statements made by other researchers. On the one hand, some researchers (e.g., Galambos & Goldin-Meadow, 1990) claim that bilinguals exhibit a greater awareness of linguistic form and a more form-based approach to language, while others, such as Leopold (1949), suggest that bilingual children are forced to concentrate more on the meaning of an utterance than on the word(s) which convey it. Both approaches are to some extent part and parcel of the same process. A more formal approach to language need not lead to higher numbers of form-based

grammatical corrections, but with sufficient levels of proficiency and conducive environmental factors (e.g., biliteracy) it might. It does, however, definitely extend to the ability to see and to control form as separate to meaning. And this control is a necessary means to a functional end. Here, we see a confluence with Leopold's position. The bilinguals' primary goal is effective communication. The child learns at an early age that the meaning is indeed separate from form, and that that separation allows, even requires, him/her to exert attentive control in his/her linguistic interactions. Thus, the child is concerned with form where it interferes with the transfer of meaning (e.g., repairs in code-mixing). This may appear to go against the concept of 'objectification' put forward by Cummins (1976). However, it is not that no such objectifying of language occurs, it is just that it occurs for certain concepts and processes and not for others. And the precocious development of such an objective approach to language, individually variable as it is, is the effect of the dynamics of the acquisition context. Both monolinguals and bilinguals may acquire language in an environment which is conducive to such a development, but the bilingual's environment is inherently so.

6.1.3 Word Segmentation Task

The above discussion only indirectly addresses the question of why bilinguals did not significantly outperform monolinguals on the word segmentation task. The conceptual structures which comprise the notions of linguistic units are different than those which constitute the knowledge of the grammatical system(s). Some of these are primarily related to acoustic cues, such as the syllable, whereas others, such as the word, are the products of form-to-meaning mappings. This form-to-meaning mapping must be central to any theoretical account for language acquisition (e.g., Slobin, 1985a), for language is the primary human vehicle

for communicating meaning, and the whole thrust of acquisition is for the child to recognize, understand and produce the forms which carry this functional meaning. One of the principle processes of acquisition is 'extracting' chunks of sound from the input (Peters, 1985) and associating them with the meaning they are intended to convey. In this the child is helped by acoustic cues, such as stress, pauses and intonation (Peters, 1985), as well as by contextual and pragmatic cues. For this process of extraction to lead to the metalinguistic realization of the existence of a unit which we call a word, there must be a systematic distinction as to which formal units are the consistent bearers of individual units of meaning. This should be easiest to accomplish with referential meaning. It is therefore not surprising that researchers such as Holden and MacGinitie (1972) and Ehri (1975) should have found that children find content words easier to segment out of a phrase than function words.[2] It is just here that we would expect to see some monolingual-bilingual differences. Bilinguals are exposed to two referents for each meaning. This exposure, together with the necessity of separating these forms, both in what the child hears and says (i.e., comprehension, production and repair in situations of language mixing, code-mixing, and code-switching), stimulates the development of the abstract notion of singular units of meaning being related to singular units of form, in other words, unbound morphemes or words. It is for just these reasons that one would expect the bilingual to be better at this task.

The lack of a significant bilingual advantage in the scores on the word segmentation task could result from a number of factors. The first possible explanation is that bilingualism simply does not affect the developmental definition of metalinguistic units. One could argue that neither the condition of having two forms for every referent, nor the process of constantly having to separate

[2]In English, which was the language of these studies, content words are of course also more salient because they are almost always stressed.

these two forms in different contexts, has anything to do with the development of word segmentation ability. In this case, the concept of word is the simple product of continuing reanalysis by the child, no matter what language he/she is learning. Although there is no possible way to discount this argument without some evidence to the contrary, it ignores the fact that, even though the differences were not statistically significant, the bilinguals did outperform the monolinguals. Moreover, they also exhibited a greater tendency to segment according to the notion of the meaningful unit.

A second possibility is that the bilinguals' performance was negatively affected by their lower English performance. While proficiency was not correlated to performance on the PPVT for the entire combined sample, the two were very strongly related within the bilingual group itself. The ranking for the two scores was identical; i.e., the child who scored highest on the PPVT also scored highest on the word segmentation task, while the child who scored the second highest on one scored the second highest on the other, etc.

There are a number of possible explanations for this relationship between language proficiency and the task. One is that some of the bilingual children were unfamiliar with some of the items in the task. This explanation seems very unlikely considering the simplicity of the vocabulary and the relative fluency of the children in English. Another is that proficiency, as measured by knowledge of vocabulary, is a factor in the development of the concept of word as a unit of speech. The logical extension of this argument would be that the development of the notion of the word is the product of the number of words a child has acquired. However, it is important to note that a bilingual child's vocabulary in one language is but one part of his/her entire vocabulary. When the vocabulary in both languages is considered, then the bilingual will have a total vocabulary equal to or possibly superior to a monolingual (Romaine, 1989). Yet another possibility is that the same language learning capacity that results in higher

linguistic proficiency is also related to metalinguistic development. The cognitive abilities underpinning this capacity could be possibly the executive control and analytical functions found in Bialystok and Ryan (1985). One final possibility is that it is just exactly this development of metalinguistic awareness functions which is responsible for the acquisition of proficiency. If this is the case, then higher levels of linguistic awareness are responsible for higher levels of language learning. There is no indication of which of these two latter explanations is the more valid. If we view the literature, the former would seem to have the majority of support, but this is more a function of assumption than evidence. There is also some evidence in the other direction. For example, Thomas (1988) found that higher levels of metalinguisitic awareness (as a result of formal language instruction) may be related to acquisition of a second or third language.[3]

Yet another explanation for the results of the word segmentation task would be that the task lent itself to the effects of negative transfer from the bilinguals' other language, particularly due to differing stress and juncture phenomena. However, the task had been examined by an expert in Romance languages, and such differences that exist between French and English should not have affected the scores on the individual questions.

One final explanation for the small difference between the two groups is the small sample size and the great individual differences in performance within these groups. For example, the top scorer by far was a single monolingual who, besides being the oldest in the group, was one of the few who knew how to read. As was noted in Chapter 2, both age and formal education are very important factors in metalinguistic development. The latter also implies literacy, which by its very nature should promote metalinguistic ability. Thus, it is not

[3]Although the subjects in Thomas' study were college students, this brings up the interesting point of just how active the child is in his/her own acquisition of language. While the answer lies beyond the scope of this work, we have seen from our data in Chapter 1 that the child is not a passive learner.

surprising that this particular monolingual child should score so well. In fact, her word segmentation score was 6 (35%) higher than the next highest scoring monolingual. This naturally raises the general mean score of the entire group.

Even though there was no significant difference between the two groups, it is important to note that, despite their apparent disadvantage in terms of language proficiency, the scores of the bilinguals as a group on the word segmentation task were still slightly higher as a group than those of the monolinguals. Indeed, two of them posted the second and third highest scores of the entire sample and three of them were in the top seven.[4] Even more interesting than the overall scores of the two groups are the group differences in the strategy profiles of the individual subjects. It must be cautioned that there are real control problems involved in this series of analyses, particularly in the area of stress versus meaningful unit. Nevertheless, the response profiles reveal telling parameters on which the monolinguals and bilinguals differ. There appears to be a greater tendency for bilinguals to view words in terms of meaningful units; i.e., to have an internal representation of a concept of a meaningful unit separate from the syllable or even acoustic cues. On the other hand, even though the only children who relied primarily on a syllable segmentation strategy were monolinguals, a slight majority of the monolingual children also displayed a predominantly meaningful unit strategy. Moreover, both monolingual and bilingual children exhibited similar tendencies to use stress as a secondary strategy, and the bilingual children, like the monolingual children, used syllable strategies. However, whereas syllable strategies remained secondary or just below primary for the bilinguals, for four of the monolinguals it was a primary strategy. Thus, the difference appears to be one of degree. Such differences in degree would be expected if the development of the notion of words (meaningful units) is an acquisitional progression. The

[4]As noted in Chapter 4, the total would be four of seven if the child who had been exposed to Chinese as a very young child were to be included in the bilingual group.

bilinguals' general preference for the meaningful unit strategy, therefore, suggests that they have, as a group, developed this earlier than the monolinguals. This early development, as we have seen, is nurtured by the acquisition context.

Tumner et al. (1983) see the development of the conceptual unit of the word as being reflected by a developmental progression of syllable to stress to unbound morpheme segmentation strategies. However, the notion of a continuum is in itself sightly suspect. If there were such a progression from a syllable to a stress to a morpheme strategy, we would expect to find an intermediary stage where the child was moving from a syllable to a stress strategy. This progressive change in strategies should result in some children having any one of three strategy profiles: a primary syllable and secondary stress strategy; a primary stress strategy and a secondary syllable strategy; or a mixed strategy where both syllable and stress strategies are equally evident. However, in this study there was no such evidence of an intermediary stage. The children exhibited only syllable/meaningful-unit strategies or stress/meaningful-unit strategies. Not one child had a mix of syllable and stress as his/her primary and secondary strategies. Therefore, there is no cross-sectional indication of a movement from a stress to a syllable strategy, and there is no evidence of any three stage developmental progression.

6.1.4 The Role of Balance and Multilingualism

As can be seen from the high correlations between language proficiency and word segmentation scores, language proficiency appears to be a factor in bilingual children's performance on the metalinguistic tasks. This is not surprising considering that both first language ability and the degree of bilingualism have been found to be closely related to metalinguistic ability in other studies. This is particularly true for the grammatical judgement and correction tasks. As the bilingual children in this study are cases of simultaneous acquisition, they are

fairly fluent in at least English and French. However, there is no denying that the levels of proficiency in English and French will differ from child to child. Unfortunately, since there is no quantitative measure of French ability, it is very difficult to evaluate to just how much of a factor in the children's performance the degree of bilingualism is. Nevertheless, in light of the high correlation between the bilinguals' English ability and their performance on the word segmentation task, it seems very likely that the degree of bilingualism does indeed play a significant role in metalinguistic development. The question is just what this role is.

A number of researchers have found the degree of bilingualism to be a significant factor in performance on metalinguistic tasks (Bialystok, 1986b, 1988; Diaz, 1985; Hakuta, 1987; Galambos & Hakuta, 1988). However, the degree and the nature of this relationship varies from study to study and from task to task. For example, Hakuta (1987) and Galambos and Hakuta (1988), have found proficiency level in the first language to be more important, particularly when the task is in that language. Nevertheless, there seems to be a strong case for some relationship between the bilingual's proficiency in both of his/her languages and metalinguistic ability. Such findings are consistent with much of the research done in the past 30 years on the cognitive effects of bilingualism (for reviews see Lemmon & Goggin, 1989; Schinke-Llano, 1989). Inconsistencies in this research led Cummins (1979) to posit a "threshold hypothesis", whereby bilingualism only resulted in cognitive benefits when a certain threshold of proficiency was crossed. Otherwise a form of 'semi-lingualism'[5] could result, which could negatively effect cognitive development. Diaz (1985) found this to be important for low proficiency bilingual children. Both these notions are of interest when we examine the trilinguals in the group.

[5]'Semi-lingualism' is a state of limited proficiency in both the first and second language, whereby the individual suffers a general linguistic deficiency.

In terms of their English ability, the two trilinguals were the least proficient members of the bilingual group. Although it was not quantitatively measured, they were also rated as being less than completely fluent in French. This raises several possible explanations for their relatively low scores on the metalinguistic tasks as compared to the others. The first explanation is that we accept some version of the threshold hypothesis and say that their performance was a function of their lack of proficiency restraining the development of the metalinguistic advantage their multilingualism should give them. Another, somewhat related explanation, is that their multilingualism led to more linguistic interference (transfer effects) during the task, thereby affecting their performance. Yet another, is to view the trilinguals' performance as simply a product of low proficiency in the language of the task; i.e., they did not perform the tasks well because they were not as familiar as the others with the language in which the tasks were given. There is no evidence for outrightly rejecting any of these, and the answer as to which explanation is more plausible can only be provided by further research.

6.2 Limitations of the Study

There were a number of serious limitations to this study. First and foremost was the small sample size, in particular that of the bilingual group. The small number of subjects makes any generalization of the results to larger populations rather tentative. In some aspects this was a blessing, however, as it allowed intensive analysis of the responses of each individual child, which, in turn, raised a number of interesting theoretical questions.

Another limitation of the study was the lack of standardized testing in the other language of the bilinguals. It would have been very helpful to have had some objective measure of proficiency in both languages so that a profile of the degree of balance could have been made for each of the bilingual subjects. Such a

measure would have been particularly valuable in seeing whether the differences between members of the bilingual group on certain tasks were simply a function of their proficiency in the testing language, English, or whether these differences were more likely a function of the true degree of bilingualism, as measured by their proficiency in both languages. For the same reasons, it would have also been helpful if similar tasks could have been done in French by both the bilingual group and a monolingual French control group.

A third limitation was the absence of any non-verbal measure of intelligence for the children in both groups. This would have functioned as a non-linguistic control for the general intelligence of the two groups. The only measure in the study which would at all classify as an intelligence test was the PPVT, but in its modified form, it too had lost that function.

A fourth limitation was the failure to systematically determine the presence or absence of literacy in the children. Although this has not been done in most of studies of the effects of bilingualism on metalinguistic awareness, in view of the seemingly strong correlation between formal schooling and metalinguistic abilities found in some studies, it ought to have been included in some manner in the study design. This issue could have been addressed by including a question on the language-use questionnaire sent to the parents.

A fifth shortcoming of the study was the inherent bias of the interview format used in the grammatical explanation task. We are faced with a bit of a dilemma here. On the one hand, if the tester restricts himself/herself to using a fixed format of a few questions, and asks no additional questions when there is not an immediate answer, then some children might not get the chance to express what they actually know and can do. On the other hand, if the interviews are not rigidly structured, then there is no guarantee that the tester will not do a better job interviewing one subject than the other. He/she might even confuse the subject. I would tend to lean to the freer interview format, simply since it

results in the collection of more data. The following exchanges (1-2) demonstrate just how important it is to pursue the child's answers.

(1) T - She dressed myself every day.
S - I say: 'She dressed *me* every day.'
T - Why is yours better?
S - Cause I said it the right way.
.....
T - Why is mine the wrong way?
.....
T - You're right. It's wrong. Can you tell me what's wrong?
S - About the dressy part.
T - What's wrong about the dressy part?
S - Because you said, 'She dressed me every day.'
T - I said: 'She dressed myself.'
S - ..... So how could she dressed *your*self.

(2) T - We go to school in Monday
S - *In* Monday?
T - That's what I said.
S - We go to school *on* Monday.
T - How is that better. I said, 'We .... Monday.'
What was wrong with that?
S - You said, 'We go to school *in* Monday and I said,
on Monday.
T - Why is yours better?
S - Because I said, '*on* Monday.'
T - What's the matter with ' in Monday.'
S - Because '*in* Monday' would have to go inside Monday
and how could you do that? It's up in the air.

A sixth possible limitation was the lack of any reliability procedures for the classification of the responses to the grammatical awareness tasks. Although clear criteria were consistantly applied, there is always room for misclassification and inconsistancy if there is no second scorer.

A seventh aspect of the study which bears some critical examination is the procedure used for presenting the word segmentation task. The primary flaw here was in the presentation of the strings which were to be segmented. The

strings were presented orally to each child. It was apparent as one listened to the tapes, however, that the same string was not always spoken in exactly the same manner to different children. Even when repeating the same string to the same child, there were often small phonetic differences, whether in the intonation or in the metrics. This alternation is extremely difficult to avoid. It would take a great deal of awareness and concentration to accomplish this, particularly since the tester is constantly interacting with the child. One possible way to avoid this is to use audio tapes to present the strings, but then the problem of the alienating nature of the technology arises. The testing environment is already foreign to such young children, and such obtrusive use of a tape recorder would only make it more so. Nevertheless, if one wants to standardize the input from the tester, this is the only way to accomplish it.

Another limitation of the study was the unclarity as to what exactly constitutes a stress strategy. As this has been discussed in some detail in section 4.4.1, it will be just mentioned briefly here. The notion of stress is not as clear as one might expect. Stress is a function of pitch, length, and loudness. Emphasis on either one of the first two in particular can lead to differing perceptions. Thus, it is possible for stress to be analyzed either in terms of accent or in metrics, or even in a mixture thereof. There is no guarantee in a particular context that the child is following a particular strategy. In addition, there is the difficulty of deciding whether the child is following a phrasal (tonic) stress strategy or some other strategy (e.g., when the child taps only once for a phrase). Since the task was not constructed to in any way control for these metrical factors, the designation 'stress' and 'stress strategy' are inherently ambiguous.

One final limitation of the study was the use of a single task to measure the awareness of the word as a unit of language. Although the segmentation task is the most common task used for this purpose, it could be supplemented by other tasks, such as a form of word recognition task. A strong correlation between

such tasks would give much more credence to any findings. However, there is also a detriment to using a task battery. The research literature strongly indicates that different tasks often tap or measure different abilities (e.g., Bialystok, 1986a; Galambos & Hakuta, 1988). Therefore, the attempt to obtain a stronger indicator of a certain ability through a number of tasks may obscure more than it reveals.

Chapter 7

Conclusion

7.1 Summary of Original Theory

Metalinguistic abilities are present in children from an early age. This is borne out both by the examination of naturally occurring metalinguistic behaviour presented in Chapter 3 and by the results of the empirical study presented in Chapters 4 and 5. However, different metalinguistic abilities manifest at different times in different children, as can be seen by the wide range of individual scores on the various tasks. It has been argued strongly in this study that the child's acquisition environment is one factor that is responsible for such differences. In particular we have examined the effects of very early exposure to more than one language on the development of metalinguistic awareness. Language acquisition is not only a function of certain universal developmental and language acquisition principles, but also a function of context. In other words, the language a child uses is dependent on the input it receives. This extends to some degree to higher linguistic functions such as metalinguistic knowledge or ability. The bilingual acquisition context presents the child with an extra set of contrasts which accelerate the ability to separate form from meaning and the realization of the arbitrariness of language. This is strengthened through the activities of translation and code-switching (including language mixing). The former further weakens the notion of the indivisibility of form and referent and highlights differences in structure, while the latter promotes the development of the monitoring function which allows the child to monitor not only the external

effects of his speech, but also his own utterances. This monitoring function can be seen in cognitive terms as a control processing function which directs thought. It is this control processor which many cognitively oriented researchers see as the basis of metalinguistic ability. This ability seems to extend mainly to the child's seeing language as a formal system and his/her being able to apply this perspective in approaching linguistic activities or tasks, such as symbol substitution and separating form from meaning. However, it does not extend to so called higher metalinguistic functions such as the explication of ungrammaticality. This seems to be much more the product of learned knowledge or of a logical function requiring the juxtaposition and analysis of concepts. There is indeed nothing particular to the bilingual acquisition environment which would especially stimulate the development of such a faculty, an observation which finds some support in the results of this study.

7.2 Conclusions and Implications

A number of researchers have proposed that bilingualism results in the development of a more formal approach to language. The results of this study, however, suggest that it is important to redefine exactly what is meant by a 'formal approach to language'. It appears to be less of a matter of 'contrastive linguistics' than one of functional or pragmatic differentiation. If it were true that the constant practise of a form of contrastive analysis by the bilingual promotes the development of the objectification of language, then it would be expected that bilingual children would have a greater degree of grammatical awareness than monolinguals. However, the bilingual children in this study exhibited significantly fewer formal responses on the grammatical awareness tasks than the monolinguals. Furthermore, such an assumption is not to be drawn from the bilingual acquisition environment. Rather it would be more appropriate to speak

of the bilingual acquisition environment fostering an appreciation of the relation between form and meaning. This means not only that bilingual children develop an early appreciation of the arbitrary nature of linguistic forms, but also that they learn that not just forms, but entire systems vary according to the conversational context. This is the principle behind the code-switching which is a part of the bilingual's linguistic environment.

The monolingual superiority on the grammatical awareness tasks indicates that the bilingual environment is not one that promotes the development of the analytical processes required in the application and explanation of linguistic rules. It is, however, one that facilitates the development of the understanding of language per se as a communicative tool. And it is the understanding of the functional basis and formal flexibility of language that allows the bilingual to separate form and meaning according to context.

A likely extension of this is that the presence of two forms for every referent would stimulate the development of a clear concept of language's primary unit of meaning, the unbound morpheme. This is suggested in the present study by the bilinguals' greater propensity to segment phrases into words on the basis of meaningful units, even though their performance on the task was not significantly better than that of the monolinguals.

It seems that different tasks do indeed require different metalinguistic abilities. The two grammatical awareness tasks do seem to tap some of the same abilities, although the explanation task was far more difficult, presumably because it required greater degrees of analysis and explicit knowledge. There is, however, no strong relationship between these tasks and the word segmentation task. Thus, it would seem that the latter task requires different abilities than the others. These differences are congruent with a cognitive model which allows for differential cognitive abilities, such as that proposed by Bialystok and Ryan (1985). The word segmentation task can be seen as more of a function of cog-

nitive control, of 'extraction', while grammatical correction and explanation are more functions of varying degrees and levels of analysis.

Of particular significance is the correlation of linguistic proficiency or ability to metalinguistic ability. This study supports others that have found linguistic ability in the test language to be strongly correlated to grammatical awareness, in particular the grammatical correction task. The nature of the relationship between these two abilities cannot be categorically defined, but it seems that linguistic and metalinguistic ability are closely linked. For the bilinguals at least, this general relationship between linguistic and metalinguistic ability also appears to hold for the word segmentation task.

The strong correlation for the bilinguals between proficiency and performance on all the segmentation task indicates the importance of balance in bilingual development. The significant point is that metalinguistic awareness - or at least certain forms of it - is in all likelihood not merely influenced by exposure to two languages, but also by how well, and possibly even in what form, they are acquired. This sort of linguistic/metalinguistic interdependence falls within the general theoretical framework presented by Cummins' (1979) deficit and interdependence hypotheses, and is of particular relevance considering the generally poorer performance of the trilinguals as compared to the other members of the bilingual group. It is also of some relevance when we consider the strong influence of such acquisition factors as biliteracy and formal schooling on metalinguistic and linguistic development.

The true significance of this study lies not in the answers it provides, for there are only indications, but rather in the questions it raises. Although it has suggested that different abilities are related to the performance on different tasks, the exact nature of those abilities remains a matter of inference and conjecture. Similarly, while there appears to be a strong relationship between metalinguistic ability and linguistic ability, we are still left speculating as to

just what the nature of this relationship is. For instance, it is not clear why the bilinguals had so many fewer responses on the grammatical explanation task than the monolinguals while the differences in the grammatical correction task were not so marked. Nor is it completely clear why linguistic proficiency had such a strong correlation to performance on the segmentation task for the bilinguals, but not so for the monolinguals.

One of the truly fascinating questions raised by this study is what the role of stress and intonation are in language acquisition and in the development of linguistic categories. It seems that different children follow not only different segmental strategies, but also different metrical strategies in separating the speech stream into units or chunks. And this raises a further question as to the importance of prosodic input in not only the development, but also the later accessing of phonological representations of lexical units. For words or morphemes to be isolated and extracted from the stream of speech, a certain recognizable phonological structure must be developed in the mind of the child. Prosodic information will not only be a part of that representation, but prosodic cues will be crucial in developing and identifying it. Similarly, just what is the role of stress in the development and identification of conceptual linguistic categories, such as the word? The absence of an intermediate stress-syllable strategy in any of the children in this study calls into question the development of the concept of word being a progression from syllable to stress to unbound morpheme, but it does not exclude it completely.

Yet other questions have been raised concerning methodology, particularly data collection. In light of the above-mentioned prosodic factors, should not all segmentation tasks be presented via recordings, even at the danger of further alienating the child in the experimental setting? Is it better to use rigidly structured tasks and interview settings to elicit grammatical corrections or explanations, or is it better to use freer, more spontaneous and open-ended procedures?

7.3 Directions for Further Research

The theoretical questions and ambiguities mentioned above give a number of possible directions for fruitful research. The most salient of these is the need for longitudinal empirical studies on the development of metalinguistic abilities in young children. Although there are great difficulties involved in obtaining data from very young children, it is only through longitudinal studies which simultaneously measure the cognitive, linguistic, and metalinguistic development of the same groups of children (monolingual or bilingual) that we may receive some answers to the 'chicken before the egg' problems presented by the relationship between these three variables. There is no guarantee that such studies will in themselves lead to a clear understanding of the causal relationships between cognitive, linguistic and metalinguistic abilities, but they offer the most promising approach to the problem.

Whether longitudinal or cross-sectional, there is a need for more large-scale comparisons of bilingual and monolingual metalinguistic development. Such studies should not only look at the superiority of one group or the other, but should concentrate on how they differ; i.e., not only the performance of the two groups should be examined, but also their approach to the task and differences in the strategies they employ.

There is not only a need for more monolingual/bilingual comparisons, but also for more examination of differences between different types of bilinguals. One very important parameter requiring study is the effects of simultaneous versus subsequent acquisition; e.g., whether there would be any difference between children exposed to two languages from birth and those who learn their second language in kindergarten immersion or day-care. Another interesting parameter to be explored is whether metalinguistic development varies in bilinguals of different ethno-linguistic backgrounds (e.g., Chinese/English as com-

pared to French/English). A related area of investigation is whether bilinguals of completely different language families (e.g., Punjabi/Bengali versus Cantonese/Mandarin) exhibit differences in the development of certain metalinguistic skills.

Another related research direction is the effects of multilingualism as compared to simple bilingualism on linguistic and metalinguistic development. The two trilinguals in this study displayed markedly different responses than the bilinguals, but the sample size is far too small to draw any conclusions. It would be enlightening to see if there were any systematic differences in a larger sample.

There is also a need to examine the premise which has emerged in this study that a bilingual acquisition environment promotes a certain pragmatic, context-sensitive flexibility of the use and comprehension of linguistic form. This study could proceed on several levels: first, the theoretical, with clearer definition of exactly what is entailed in this pragmatic approach to formal diversity and what its linguistic and metalinguistic ramifications are; second, on the discourse level, more intensive studies of code-switching behaviour and contextually-bound acquisition in very young children acquiring language in bilingual settings; and third, empirical investigations of the performance of bilinguals as compared to monolinguals on tasks requiring flexibility and arbitrary usage of linguistic form in various contexts.

One final, but theoretically promising, direction for future research is the investigation of the role and development of prosody in language acquisition and the development of linguistic categories. One interesting research question here would be the relative importance of pitch and metrical weight in the extraction of units of speech, as well as the acquisition of lexical items (on the linguistic level). Another would be a crosslinguistic comparison of the development and role of such extraction processes in different languages, and their ultimate effect on the

development of the concepts of linguistic units, such as the word, for children acquiring different languages. In terms of one of the specific research questions of this study, one final question which could be addressed is whether, for children acquiring so called stress-timed languages, there is a conceptual progression towards the development of the concept of word, and whether the approach toward this really does vary for larger monolingual and bilingual populations.

In closing, it is useful to reflect on one concept which came to the fore when examining word segmentation strategies. Perhaps it is fundamentally wrong to speak of differences in abilities at all. Whatever differences which may be found between different linguistic groups, or between bilinguals and monolinguals, might be classified as differences in approaches to language, rather than actual differences in metalinguistic abilities. This is truly a point to be deliberated, no matter what direction of research one takes.

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Appendix A

Word Segmentation Task

Instructions

Now, we're going to play a game, the two of us. Do you know what a word is? IF YES: Can you give me a word? Say a word.

IF YES OR NO: A word is something you say, like 'boat'. 'Boat' is a word. Or something like 'in'. 'In' is a word, too. So are things we say like 'small' or 'fast' or 'camera'. Now, I'm going to say something and you have to tell me what the words are. I'll say it, and then you say it and tap on the table with the hammer for each word. Like if I say 'black' you will tap once (tap with hammer on table) because 'black' is a word. If I say 'black sheep', you will tap 2 times, once for 'black' (tap), and once for 'sheep' (tap), because 'black' is a word and 'sheep' is a word, too. Now when I say 'black sheep' can you do it. Let's try. 'Black sheep' (let the child repeat and tap. If right, query: " what words did I say?" If wrong, repeat the words and tap them out oneself.). Ok. Let's try some more before we start.

OTHER EXAMPLES:

1. fast
2. very fast
3. very fast horse

4. a very fast horse
5. table
6. the table
7. under the table
8. go outside
9. Go to school.
10. He is home.
11. Is he home?
12. Is Michelle going?

So now, let's begin the game.

Test Items

1. that cowboy
2. a good teacher
3. a doctor
4. kindergarten
5. My daddy
6. a blackboard
7. that pretty dress
8. Which picture?

9. on paper
10. an open door
11. by morning
12. at the store
13. in the sandbox
14. the engineer
15. I ate dinner.
16. ugly picture
17. his new neighbour
18. Is he coming?
19. a watermelon
20. a carpenter
21. beautiful bird
22. airplanes fly fast
23. That girl wants more.
24. smaller than dad
25. What do you see?
26. Have you seen mom?
27. Eat more pineapple.

Appendix B

Grammatical Correction Task

This task will follow the word segmentation task. It will be carried out through interaction with a puppet.

Instructions

Now, this is my friend Prince Whatsmyname (point to the puppet). Now Prince Whatsmyname has a problem. He wants to know if we can help him. Would you like to try? Should we? Now prince, what's the problem.

PRINCE: I keep saying things and my father says that they don't sound right. He says that the way I say them is silly, wrong. He says that I should say them like a grown-up, like he does.

What do you mean "wrong", "funny".

PRINCE: Well, I say: *two shoe*, and he tells me that's wrong. It should be *two shoes.* Or I say: *Him is a boy* and my father says I should say... now what was it; I can't remember. Can you help me?
(Repeats sentence. If child can't help, I help.)
Oh thank you. You know there are more things that I say wrong that I don't know how to say the right way. Maybe you can help me. Can you?..... Please?

What do you think _____? Should we help? If you don't want to, you don't have to. But it sure would be nice if you could.

Okay. Lets start. (to child) Now, remember, you can stop the game and go back to the classroom anytime you want to.

PRINCE: Ready?

(After each sentence is corrected, PRINCE asks: *How is that better than what I said?*)

Test Items

1. John drinks milks.

2. The dress are very nice.

3. Them often come to dinner.

4. Jean played a long time tomorrow.

5. She dressed myself every day.

6. We go to school in Monday.

Appendix C

Language Use Questionnaire

The filling out of this questionnaire is completely voluntary. Should you for any reason not wish to fill out any part of it, please feel free to do so. You are under no obligation whatsoever. Any questions which are not applicable should be left unanswered.

I. Please put a cross (x) in the space before the most appropriate answer to each question. For example:

What is the main language used in the home?

( ) English (×) French ( ) Other (please specify:_____)

Please Begin.

1. What language(s) does the mother speak?

   ( ) English ( ) French ( ) Other (please specify_____)

2. What language(s) does the father speak?

   ( ) English ( ) French ( ) Other (please specify_____)

3. Which languages does your child speak?

   ( ) English ( ) French ( ) Other (please specify_____)

4. Which languages does your child understand?

   ( ) English ( )French ( ) Other (please specify_____)

5. What is the main language used in the home?

   ( ) English ( )French ( ) Other (please specify_____)

6. What is your child's dominant (best) language?

   ( ) English ( )French ( ) Other (please specify_____)

7. What is your child's 2nd best language?

   ( ) English ( ) French ( ) Other (please specify_____)

8. What is your child's 3rd best language?

   (Answer only if the child has regularly been exposed to 3 languages)

   ( ) English ( ) French ( ) Other (please specify_____)

9. At what age was your child regularly exposed to English?

   ( ) from birth ( ) age 1 ( ) age 2 ( ) age 3 ( ) age 4

10. At what age was your child regularly exposed to French?

    ( ) from birth ( ) age 1 ( ) age 2 ( ) age 3 ( ) age 4

11. At what age was your child regularly exposed to the other (3rd.) language?

    ( ) from birth ( ) age 1 ( ) age 2 ( ) age 3 ( ) age 4

12. How do you rate your child's English ability?

    ( ) excellent ( ) good ( ) average ( ) fair ( ) poor

13. How do you rate your child's French ability?

    ( ) excellent ( ) good ( ) average ( ) fair ( ) poor

14. How do you rate your child's ability in the other language?

    ( ) excellent ( ) good ( ) average ( ) fair ( ) poor

15. How often does the mother speak to the child in English?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

16. How often does the father speak to the child in English?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

17. If there is another/other caregiver(s), how often do they speak to the child in English?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

18. How often does the mother speak to the child in French?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

19. How often does the father speak to the child in French?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

20. If there is another/other caregiver(s), how often do they speak to the child in French?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

21. How often does the mother speak to the child in the other language?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

22. How often does the father speak to the child in the other language?

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

23. If there is another/other caregiver(s), how often do they speak to the child in the other language

    ( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

24. How often do the child's brothers/sisters speak English with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

25. How often do the child's brothers/sisters speak French with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

26. How often do the child's brothers/sisters speak the other language with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

27. How often do other family members (uncles, grandparents...etc.) speak English with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

28. How often do other family members (uncles, grandparents...etc.) speak French with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

29. How often do other family members (uncles, grandparents...etc.) speak the other language with him/her?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

30. How often do the parents speak English with each other in the home?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

31. How often do the parents speak French with each other in the home?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

32. How often do the parents speak a third language with each other in the home?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

33. How often do the parents mix the two languages when they speak with each other in the home?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

34. How often does the mother mix the two languages when she speaks to the child?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

35. How often does the father mix the two languages when he speaks to the child?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

36. Outside of the family and school, how often does the child hear and speak English?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

37. Outside of the family and school, how often does the child hear and speak French?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

38. Outside of the family and school, how often does the child hear and speak the other language?

( ) always ( ) often ( ) sometimes ( ) seldom ( ) never

Please note once again that the following information is completely voluntary.

It is included because it is important for the validity of the study.

Please write the answers to the following questions in the space provided after each question.

39. What is the profession of the mother? _____

40. What is the profession of the father? _____

41. What is the mother's level of education? _____
(e.g., secondary school, high school graduation, college, university, etc.)

42. What is the father's level of education? _____

Vita

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