Word and phonological awareness in preliterate children: The effect of a second language

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Abstract

It has often been suggested that bilingual children might have enhanced metalinguistic awareness, as compared to monolingual children. In this paper, the evidence for such a stance was reviewed. In contrast to most previous thinking, it is suggested here that if metalinguistic awareness were enhanced at all by exposure to a second language, it might be the process of learning a second language that draws children's attention to their knowledge about language. Accordingly, a group of preliterate second-language learners was compared with monolinguals and bilinguals on word and phonological awareness tasks. It was found that, for the most part, there were no significant differences among linguistic groups on the performance of these tasks. However, a trend of low performance by the bilingual children was observed. This suggests that if the learning of a second language enhances metalinguistic awareness, these tasks might not be the most appropriate measures.

Précis

La littérature à propos de l'acquisition du langage des enfants bilingues suggère que la conscience metalinguistique chez ceux-ci serait plus développée que chez les enfants monolingues. L'evidence pour une telle position est examinee dans ce papier. Par opposition à la plupart des opinions précedentes, l'auteur suggère que si la conscience métalinguistique allait développer plus vite grâce à l'apprentissage d'une deuxième langue, peut-être serait-ce le processus d'apprendre cette deuxieme langue qui attirerait l'attention des enfants à leur connaissance linguistique. Par conséquent, la conscience phonologique et la conscience de la parole des enfants qui apprenaient une deuxième langue furent compares à celles des enfants monolingues et à celles des enfants bilingues. Aucun enfant ne savait ni lire ni écrire. Les resultats montrèrent peu de différences au niveau de l'execution de ces tâches entre les groupes linguistiques. Cependant, les enfants bilingues manifestèrent une faible tendance à faire pire que les autres enfants. Ceci suggère que si l'apprentissage d'une deuxième langue fait développer la conscience métalinguistique, il est possible que ces tâches ne soient pas les meilleures mesures de celle-ci.

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Word and phonological awareness in preliterate children: The effect of a second language

Within a relatively short period of time, usually the first few years of life, children learn how to produce and understand language. In some cases, children learn two (or more) languages and are able to use both languages with remarkable facility and fluency. Children who acquire two languages simultaneously face a unique language-learning situation: they must learn not only the syntax, vocabulary, morphology and phonology of both languages, but they must also learn in which circumstances and with which people it is appropriate to use a particular language.

It has often been remarked in case studies of young bilingual children that they show a remarkable ability to switch between languages according to the stronger language of their interlocuter. Children as young as two and a half seem to be able to use their two languages in a socially sensitive way. For example, Arnberg (1981) reported longitudinal data of children acquiring Swedish and English simultaneously in which she noted that one girl, Kajsa, spoke only in English to the researcher who had only addressed the child in English, although the researcher was herself bilingual. Kajsa even translated one of her mother's Swedish utterances for the researcher! Another child in this same study, Linnea, reportedly insisted that her parents speak only one language or the other, without mixing lexical items in the two languages.

Volterra and Taeschner (1978) remarked that two sisters who grew up speaking Italian and German used more words from the

stronger language of the addressee as early as three years old. One of the girls, Lisa, even became quite upset when people tried to speak with her in a language that they did not habitually use. Her reaction suggests that she understood somehow that she could use two distinct linguistic systems. Bergman (1976) reported that her Spanish-English bilingual daughter tended to speak to people in their stronger language and answer questions in the same language in which the question was posed. Evidence for this sensitivity was seen as early as two years of age. In his case study of his daughter, Hildegaard, who was learning both German and English simultaneously, Leopold (1949) remarks that Hildegaard commented on language and asked for translations as early as three years of age. Slobin (1978) reported that his daughter, Heida, whose first language was English but who had been exposed to several other languages from an early age, remarked on other people's accents, made up rhyming words spontaneously, and asked for translation equivalents in various languages (including her native English!) when she was three and a half years old.

Bilingual children's apparent early sensitivity to differentiation of their two languages has led some researchers to suggest that these children are more aware of language as a symbolic system than are children who only acquire one language (Leopold, 1949). That is, since bilingual children have access to more than one way to say the same thing, they are aware that language is separate from the concepts being expressed. This awareness about language, metalinguistic awareness, may occur in order for children to acquire two distinct linguistic codes or as a result of acquiring two languages.

The study presented here will examine these possibilities and attempt to give a more elaborate theoretical framework for the development of metalinguistic awareness in bilingual children. Before elaborating the details of the hypothesis I will propose, I will briefly examine the work on metalinguistic awareness first in monolingual children and then in bilingual children.

Metalinguistic awareness in monolingual children

Metalinguistic awareness is generally defined as the ability to reflect on and/or manipulate language as an entity separate from the meaning the language is being used to convey (Bowey, 1988; Cummins, 1979; Pratt & Grieve, 1984). Examples of metalinguistic awareness might include the ability to make judgements about the grammaticality of sentences, the knowledge that a word is separate from its referent, and the ability to segment words into individual sounds (Birdsong, 1989). There is, however, some controversy as to what constitutes an operational definition of metalinguistic awareness. Clark (1978) included spontaneous speech error repairs and spontaneous play with words as examples of metalinguistic awareness. Tunmer and Herriman (1984) object to the inclusion of spontaneous language manipulation in young children as evidence of metalinguistic awareness, because they claim that conscious knowledge about the formal structures of language is a necessary component of metalinguistic awareness. They argue that if conscious knowledge were not included in the definition then it would be difficult to differentiate the skill of using language as opposed to the skill of reflecting on language (Pratt & Grieve, 1984; Tunmer &

Herriman, 1984). Other researchers have argued that "awareness" of language does not necessarily have to be consciously accessible for children to reflect on or manipulate the formal aspects of language (Bowey, 1988; Karmiloff-Smith, 1986). For this reason, Bowey (1988) proposed the use of the term "metalinguistic functioning", which would include all instances of manipulation of linguistic form, regardless of the level of consciousness required. This allows the inclusion of behavior that might be considered metalinguistic (such as spontaneous play with sounds), without having to define what consciousness is or how it might play a role in metalinguistic awareness. As will be seen below, the nature of metalinguistic awareness seems to change gradually until children learn to read. In this paper, I will use the term "metalinguistic awareness" with the sense Bowey had in mind and thus avoid operationalizing conscious awareness.

The term "metalinguistic awareness" applies to the awareness of all units of language: phonology, words, syntax and pragmatics (Tunmer & Herriman, 1984). It is generally assumed that the ability to reflect on or manipulate language at each of these levels of linguistic analysis is a more or less unitary cognitive ability (Nesdale & Tunmer, 1984), or that the development of one level depends on the development of the others (Tunmer & Bowey, 1984). Correlations have been found between syntactic and phonological awareness in school age children (Bowey & Patel, 1988; Hakes, 1980; Tunmer, Herriman, & Nesdale, 1988), but little further research has been done to confirm these suggested relationships between different kinds of metalinguistic awareness.

Metalinguistic awareness at all levels of linguistic analysis involves the ability to separate linguistic form from function. In everyday use, the functional aspects of language tend to be more salient than the formal ones (see Slobin, 1979). So, people will often remember the meaning of a story they have heard, rather than the exact words used to tell the story (Cohen, 1986). Because of this, the formal aspects of language are often said to be transparent in normal everyday usage (Cummins, 1979). Metalinguistic awareness involves overcoming the "transparency" of the formal aspects of language and focusing attention on the form, mostly or completely independently of function (Cummins, 1979; 1987). This has led at least one linguist to call metalinguistic awareness an "artificial" analysis (Abercrombie, 1965, p. 88).

While metalinguistic awareness may be artificial in the sense that it seems to be an ability separate from everyday functional language use, many children have been shown to be able to focus on form independently of function, sometimes spontaneously (e.g., Slobin, 1978) and often in connection with learning to read (Liberman, Shankweiler, Liberman, Fowler, & Fischer, 1977). Metalinguistic awareness or, more specifically, phonological awareness has received a good deal of attention recently due to its connection with reading ability. It is thought that there is a critical connection between literacy and phonological awareness, but the nature and the direction of this connection is much debated (Adams, 1990; Morais, Cary, Alegria, & Bertelson, 1979; Morais, Content, Bertelson, Cary, & Kolinsky, 1988; Stanovich, Cunningham, & Cramer, 1984). On the one hand, it has been suggested that phonological

awareness is a prerequisite for learning to read (Liberman et al., 1977; Stanovich, Cunningham, & Cramer, 1984). On the other hand, it is possible that learning to read causes phonological awareness to develop (Morais, et al., 1988). A third possibility is that it is present at some level before reading begins and there is reciprocal causation between the two (Perfetti, Beck, Bell, & Hughes, 1987).

Although the exact relationship between beginning reading skills and metalinguistic awareness cannot be stated definitively, it is beyond a doubt that literate children can manipulate language in a different way and perhaps better than preliterate children. While some researchers claim to have found evidence of limited metalinguistic awareness in preliterate children (Bradley & Bryant, 1983; Bryant, MacLean, & Bradley, 1990; Fox & Routh, 1976; Smith & Tager-Flusberg, 1982), others have found no evidence at all (Bruce, 1964; de Villiers & de Villiers, 1973; Hakes, 1980). Once children have acquired reading skills, their ability to perform metalinguistic tasks improves remarkably (see Adams, 1990; Bowey, 1988).

Up to this point, I have confined my remarks largely to metalinguistic awareness as a whole. This study will be concerned specifically with word awareness and phonological awareness in preliterate monolingual and bilingual children so a section will be devoted to each. In each of the following sections, I will briefly examine the kinds of operationalizations which have been used and the course of development of the two kinds of metalinguistic awareness.

Word awareness.

Bowey and Tunmer (1984) suggest that there are three components to word awareness: knowledge of the metalinguistic term "word", the ability to segment speech into words, and the ability to separate word from referent. Bowey (1988) points out that even preschool children use the term "word", but that they do not seem to reach an adult-like understanding of the term until after a few years of school. Downing and Oliver (1974, as cited in Bowey, 1988) found that preschool children fail to respond appropriately when asked to identify words. It would be inappropriate then to ask preschool children to define the word "word". Also, in designing metalinguistic tasks for preschool children, it is important to use the word "word" carefully, in such a way that an adult-like understanding is not essential to performing the task (see Bowey, 1988).

Another measure of word awareness is the ability to count words. Preliterate children seem to be able to count content words fairly reliably. Chaney (1989) found that preschool children could segment speech into content words, although they did not seem to count functor words as "words". Bialystok (1986) found that even four-year olds were able to count words to some extent, although the ability to do so seemed to improve remarkably once the children were in school. Tunmer, Bowey, and Grieve (1983) reached much the same conclusion when they asked children to indicate they knew how many words were in a given utterance. They found that children younger than six tended to count syllabic stress as "words", rather than the abstract "words" corresponding to the mature

concept. In English, syllabic stress is a fairly good indicator of a word, so it is perhaps not surprising that children's early concept of a word seems to be based on syllabic stress.

The results of studies on monolinguals' understanding of the word-referent relationship are mixed. Piaget (1926) and Vygotsky (1962) reported that children seem to go through a stage of confusing word with referent, or word magic. Feldman and Shen (1971) also found some evidence for this hypothesis, although there were some methodological problems with their study (see Bowey, 1988). Rosenblum and Pinker (1983) found no evidence to support the idea that preschool children go through a phase of word magic. It may be that the concept of word magic is the result of the methodology used by the researchers, and is not actually a stage of children's development. Word-referent studies will be reviewed in more depth in the section on metalinguistic awareness in bilinguals.

To sum up the work on word awareness in preschool children, there is some evidence that they have some understanding of the concept of "word". This concept does not, however, resemble that of adults until children have been in school and developed some ability to read (Bialystok, 1986; Kolinsky, Cary, & Morais, 1987; Rozin, Bressman, & Taft, 1974).

Phonological awareness.

Phonological awareness is the ability to reflect on and/or manipulate the phonological units of a language, such as syllables, phonemes, onsets/rimes, tones in tonal languages, handshape in sign languages, etc. In practice, most research has been done on the relationship between phonological awareness and learning to read an

alphabet, so only syllables, phonemes, and onsets/rimes have been studied in depth. Operationalizations of phonological awareness have included the ability to rhyme spontaneously (Clark, 1978), to segment words into sounds or syllables, to delete a sound or sounds from a word, to blend individual sounds to make a word, to provide a rhyming word on command, and others (Adams, 1990; Content, Kolinsky, Morais, & Bertelson, 1986; Cossu, Shankweiler, Liberman, Katz, & Tola, 1988; Fox & Routh, 1976; Liberman, Shankweiler, Liberman, Fowler, & Fischer, 1977; Nesdale, Herriman, & Tunmer, 1984; Olofsson & Lundberg, 1985; Zhurova, 1973).

In general, there seems to be a rather sudden emergence of children's ability to reflect on and manipulate phonemic units at about the age when children learn to read an alphabet (Mann, 1986; Nesdale, Herriman, & Tunmer, 1984). Before this age, children may show some signs of spontaneously segmenting speech into sublexical units (Clark, 1978; Slobin, 1978; Weir, 1962), but their ability to do so on command seems to rely to a large extent on training (Content et al., 1984; Fox & Routh, 1976; 1984; Olofsson & Lundberg, 1985; Zhurova, 1973). Because there does seem to be some signs of phonological awareness in preschool children, Perfetti, Beck, Bell, and Hughes (1987) suggested that there might be a reciprocal relationship between the development of phonological awareness and learning to read-- children must be able to reflect on the phonological units of a language in order to learn to read and that this ability is in turn enhanced with the acquisition of reading skills. Bowey and Francis (1991) suggested that the unit of analysis (i.e., onset, rime or phoneme) could be the basis for this reciprocal

relationship: before children learn to read they have an understanding of onsets and rimes and that after they have started to learn to read, they gain knowledge about the individual phonemes which make up words. Onsets are the initial consonant or consonants of a syllable and rimes are the vowel (nucleus) of the syllable as well as any other consonant or consonants at the end of the syllable (coda) (Treiman, 1983; 1985; Treiman & Zukowski, 1986). So, for example, in the word "splash", "spl-" would be the onset and "-ash" the rime. Adams (1990), in an extensive review of the research on phonological awareness, suggested that the ability to segment words into onsets and rimes might develop before the ability to segment words into their individual phonemes. This hypothesis would account for the consistent finding that preschool children are often able to understand and play with rhyme and alliteration (Bradley & Bryant, 1983; Clark, 1978; Zhurova, 1973), while their understanding that words can be divided into individual sounds develops only with training or exposure to the alphabetic concept (Nesdale, Herriman, & Tunmer, 1984; Read, 1971; Read, Zhang, Nie, & Ding, 1986; Rozin & Gleitman, 1977).

In short, it seems that preliterate children often develop some phonological awareness, probably on the basis of onsets and rimes. It is with exposure to reading an alphabet that children become aware of the phonemic units of the language.

Metalinguistic awareness in bilingual children

Over the last fifty years or so, psychologists and linguists have expressed a wide variety of opinions on the development of

metalinguistic awareness in bilingual children. Most of the work with bilingual children has been done independently of the research on metalinguistic awareness in connection with learning to read. Opinions expressed about bilinguals' metalinguistic awareness have ranged from bilingual children developing an early awareness of language as a symbol system to bilingual children developing metalinguistic awareness no earlier than monolingual children. Recently, researchers have recognized that bilingual children are not a homogeneous group and have tried to identify the conditions under which bilingual children might develop an earlier awareness of language, if they do at all.

The following discussion will touch on some of the theoretical reasons researchers have thought there might be differences between bilingual and monolingual children in terms of metalinguistic awareness and on the evidence for or against these views. Experimental studies have been concerned mostly with word awareness and syntactic awareness in bilingual children (see Diaz, 1985). While drawing on all studies of metalinguistic awareness in bilingual children, the focus here is on word awareness and, where possible, phonological awareness. For a more thorough consideration of syntactic awareness in bilingual children, see Bowey (1988). I will conclude this section by pointing out the theoretical and pragmatic difficulties in interpreting this body of literature in a coherent way.

Because his daughter was able to use her two languages in a socially sensitive way, Leopold (1949) suggested that bilingual children might have enhanced awareness of language at an early age. Leopold thought that bilingual children would be forced to separate

word from referent at a young age, since they had at least two words for every referent. Accordingly, bilingual children's language development would not only be unimpaired compared to monolingual children's, but they would also have the added ability to think about language in an objective manner.

The idea that children go through a stage in which they mix word with referent (or "word magic") comes from Piaget (1926). He put forth the idea that children develop knowledge about language in three stages. In the first stage, thought about language is characterized by syncretism-- the name of something comes from the thing itself and is a property or attribute of the thing. According to Piaget, some children in this first stage even seem to confuse the object with the thought of the object, or they cannot distinguish between sign and referent (see chapter 1 of Piaget, 1926). This stage is generally characteristic of children about six or seven years of age. In the second and third stages, children learn that the name is an arbitrary sound, agreed upon by humans earlier in history. It is in the third stage (which was supposed to occur at about the age of ten or eleven) that children could be said to be aware of words as symbols. While never explicitly saying so, Piaget implies that bilingual children should have an enhanced awareness of language, at perhaps an earlier age or stage of development than monolinguals.

It is not clear that any children, monolingual or bilingual, pass through a stage of word magic. Indeed, few researchers in the field of bilingual language acquisition would agree with Piaget's theorizing in its purest form-- monolingual children have been shown to be able to manipulate words as symbolic units in some ways at a much

younger age than Piaget suggested (Bowey, 1986; Chaney, 1989). Piaget's reasoning is based on results obtained using the clinical method of inquiry, namely by asking children questions about names of things (such as "where do names come from?" and "could the sun be called the moon?"). This method does not provide sufficient evidence to conclude that children do not know the difference between words and referents; the answers to such questions tend to reflect the assumptions in the kinds of questions asked. Although young children may not be able to say explicitly that words are different from objects, they may know in some way that the two are different (see Vygotsky, 1962, for further and more thorough criticism of Piaget's method; see Hofstadter, 1979, for a philosophical treatment of the way answers reflect the kinds of questions posed).

Curiously, while Piaget's theorizing might have been discredited in this instance, many researchers have continued to use the sun/moon task (Bialystok, 1988; Ianco-Worrall, 1972) or similar name manipulation tasks, presumably taken from Piaget (1926) or from Vygotsky (1962; see Bowey, 1988). For example, Ianco-Worrall (1972) looked at word awareness in Afrikaans-English bilinguals, aged 4-6 years and 7-9 years, and in monolinguals of the same ages. She found that bilingual children were more likely to agree that, in principle, names of things could be exchanged. It is important to note the addition of "in principle" to the questions asked of the children-- children might correctly answer that names cannot be switched because they think names are socially agreed upon and they could not be switched without causing confusion. She does not, however, justify why she thinks monolingual or bilingual children

might go through a stage of "word magic". Her conclusion that bilinguals develop awareness earlier than monolinguals might depend on the task used to measure word awareness. It is certainly possible that bilingual children have had more experience in talking explicitly about language than have monolingual children (see Bialystok, 1988).

While some of the earlier work in this area seemed to rely on assumptions made in Piagetian theory, the idea that bilingual children might develop enhanced metalinguistic awareness has been expressed within other theoretical frameworks. Ben-Zeev (1977a), for example, said that bilingual children may avoid interference between their two languages through awareness of their two languages. Since interference must be avoided from quite a young age, bilingual children would come to an early awareness of language as a formal structure. This could mean either that awareness of language results from learning two languages or that it influences the learning of two distinct languages. This view attempts to explain why children simultaneously exposed to two languages learn two distinct linguistic codes, rather than one language system combining the rules of both.

A number of studies have found limited support for the idea that bilingual children develop an early awareness of the formal properties of language in connection with learning to differentiate their two linguistic codes. For example, Feldman and Shen (1971) examined the ability of lower class children to switch the names of things and predicted that the bilinguals would have an advantage over monolingual children. The children were aged four, five and six

years, with mean age of five. Bilinguals did significantly better on the name-switching task than monolinguals.

Ben-Zeev (1972) examined children's ability to exchange labels in sentences. Her subjects were Hebrew -English bilingual children from both the United States and Israel and two monolingual groups, one English-speaking from the United States and the other Hebrew-speaking from Israel. She hypothesized that the bilingual children would be better at symbol substitution, or replacing one word with another in a sentence, than monolinguals, the former having attained a certain level of linguistic awareness in order to resolve the conflict between their two languages. The results of this study indicated that bilingual children were superior at symbol substitution and displayed more cognitive flexibility in general.

Not all studies, however, show that bilinguals are more metalinguistically aware than monolinguals. Ben-Zeev (1977b) reported a study of Spanish-English bilingual children which failed to find significant differences between bilinguals and monolinguals on syntactic awareness. She suggested that the lack of difference between monolinguals and bilinguals in this study was due to the low socio-ecomomic status of the bilingual group and the lack of pride in their language. This contrasts with Feldman and Shen's (1971) finding that differences in word awareness could be found between bilingual and monolingual lower class children. Nevertheless, the evidence for bilingual children becoming aware of the formal properties of language in connection with separating their two languages is circumstantial at best-- it may be that bilingual children use their two languages as distinct codes for some time

before becoming aware of them (see Genesee, 1988). In short, given the contradictory findings, it is difficult to say conclusively that there is a causal relationship between the development of metalinguistic awareness in bilingual children and the separation of their two linguistic codes.

In order to explain these contradictory findings, Cummins (1979; 1987) posited the developmental interdependence hypothesis whereby a certain threshold of linguistic development in a child's first language is necessary in order for cognitive benefits to be seen. According to this hypothesis, enhanced metalinguistic awareness would be seen only in bilingual children who knew both their languages well. Bilingual children who had not developed a certain threshold proficiency in either one or both of their languages would not display any enhanced cognitive abilities. In support of this idea, Cummins (1977) found that third- and sixth-grade Irish-English bilinguals were better than their monolingual counterparts at identifying the arbitrary nature of names. Similarly, Bialystok (1988) found that in first-grade children who received their education in English, but spoke some Italian at home, the level of Italian proficiency correlated significantly with the ability to judge words and define the concept "word".

Not all studies of balanced bilinguals have supported this idea. Cummins (1977) failed to find significant differences in an arbitrariness of language task between first- and third-grade children in an Albertan Ukrainian-English bilingual program. The results of a class inclusion task showed that bilinguals seemed to have a more analytic approach to language than did either the

monolinguals or the nonfluent bilinguals. Cummins concluded that, although this study failed to find differences between bilinguals and monolinguals on metalinguistic awareness, bilingualism does promote an analytic approach to linguistic material. He added that because the nonfluent bilingual group performed similarly to the monolingual group, an analytic orientation is the result of fluent bilingualism and not the language learning experience per se.

In contrast, Hakuta (1987) reported that metalinguistic awareness (syntactic awareness, in particular) seemed to be particularly enhanced in school age children who were in the process of acquiring a second language, rather than in fluently bilingual children. Similarly, Rubin and Tyler (1989) found that grade one students who were beginning to acquire French in an immersion program scored higher on a phonological awareness task than monolingual English children. These studies suggest it is the language-learning process which draws attention to language as a symbolic system, rather than balanced bilingualism.

To better define the criteria for enhanced metalinguistic awareness in bilinguals, Bialystok (1988) further refined the criteria which might be necessary for early development of metalinguistic awareness in bilingual children. She hypothesized that bilingual children will perform differently than monolingual children on metalinguistic awareness tasks as a function of two factors: 1) the level of bilingualism the child has attained, and 2) the extent to which the task requires control of linguistic processing and analysis of linguistic knowledge. She suggests that bilingual children might be better at tasks that require an emphasis on control of linguistic

processing, or the ability to direct attention to the processing of language. She adds that fully bilingual children (i.e., equally proficient in two languages) might also have enhanced performance on tasks that require analyzed linguistic knowledge, or the organization of the knowledge about language (see Bialystok, 1988; 1990; in press; for further details on analysis and control). She thought that bilingual children probably have more experience with the arbitrary nature of the word-referent relationship and would have had more opportunity to analyze their languages in ways other than simply using language for communication. These experiences would lead to early metalinguistic awareness, provided that the bilingual children were equally proficient in both languages.

In support of her idea, Bialystok (1988) found that French-English bilingual children and anglophones who had been educated in French for two years performed better on the sun/moon task than did a group of monolingual English children. The fully bilingual group was also better than both other groups at a task which required them to define the term "word". She concluded that bilingual children were much better at some metalinguistic tasks than monolinguals. The partially bilingual group did not perform like either group consistently.

In sharp contrast to all previous hypotheses, Rosenblum and Pinker (1983) thought that bilingual children might not necessarily perform better than monolinguals on metalinguistic awareness tasks. They argued that it is possible that even monolingual preschoolers do not believe that a word is an intrinsic part of the object and so bilinguals do not come to an earlier awareness. They point out that

monolinguals must also learn more than one name for a given object (e.g., a dog could be called "dog", "German shepherd", "animal", or "Rover") and so will not be any more subject to word magic than bilingual children. These researchers also point out that it is important to make sure that children understand the experimental situation of the word magic tasks, in particular the use of counterfactuals. Their subjects were English monolingual and Hebrew-English bilingual preschool children. The results indicated that the children had little trouble understanding counterfactuals. On the name manipulation task, both groups scored equally well and were not subject to word magic. Bilingual children tended to offer more reasons for their choices and referred more often to the context of the game as justification of their choices while monolinguals referred more often to attributes of the objects. The authors conclude that there is little evidence that preschool children are affected by word magic. There are, however, differences between the kinds of reasons bilinguals and monolinguals offer to justify the arbitrary relationship between word and referent.

Criticism of studies on bilingual children.

The results of the studies discussed above are very difficult to interpret as a whole because of definitional, methodological and theoretical issues. First of all, there is little agreement as to how "bilingualism" should be defined and how it should be measured. Cummins (1979) has pointed out that the cognitive benefits of bilingualism seem to be seen only when children have reached a certain threshold in their two languages. According to this view, it would be essential to have subjects who had learned both

languages to a certain (unspecified) degree. Given this view, it is odd that in his study, Cummins (1977) found evidence both supporting and not supporting the bilingual advantage in metalinguistic awareness. How bilingualism was assessed may have affected the results of some of the studies. Ben-Zeev (1972; 1977) used translation ability as a measure of bilingualism; Ianco-Worrall (1972) relied exclusively on mothers' reports to determine bilingualism; and Bialystok (1988) and Rosenblum and Pinker (1983) used relative performance on the PPVT in two languages to determine bilingualism. The variety of ways of measuring bilingualism makes it difficult to compare results across studies. Moreover, many of the studies use only one measure of bilingualism, which may not be sufficient evidence of children's language proficiency (see Snow, 1991). It is preferable to have converging evidence of bilingualism, as in the Feldman and Shen (1971) study where both teachers' reports and performance on a simple language task were used.

Additional methodological problems in these studies include the lack of appropriate controls for extraneous variables, the lack of consideration for reading ability, and the lack of justification for the measures of metalinguistic awareness chosen. In many of these studies, the experimenters failed to control for extraneous variables, such as SES, IQ, sex, and ethnicity. Feldman and Shen (1971), for example, did not control for IQ or ethnicity (see Bowey, 1988, for more detailed and critical review of the controls provided in these studies). In many cases, the age range of a particular "group" of children covers the age when many children begin to read. None of these studies considers the possibility that learning to read or

knowing how to read may play a role in metalinguistic awareness. Bialystok (1988), Cummins (1977), and Rubin and Tyler (1989) all examined children who were in school and whose metalinguistic skills might have been enhanced or at least changed by experience with the written language. In many of the other studies, it is not possible to determine what role reading ability may have played because the ages of the children in these studies ranged from preschool to school-age (e.g., Ben-Zeev, 1972; 1977; Ianco-Worrall, 1972).

Some studies have used measurements of word awareness with insufficient justification as to why bilingual children ought to be better at those particular tasks. For example, Ianco-Worrall (1972) fails to explain why she thinks children might go through a stage of "word magic". As Rosenblum and Pinker (1983) pointed out, all children have a number of names for the same object so it is unclear why merely knowing more than one name for an object allows children greater ease of manipulation of labels. Bialystok (1988) found differences in children's ability to perform the Piagetian sun/moon task if different words (i.e. cat/dog) were used. This finding might call into question what exactly the sun/moon task measures, if results similar to Piaget's can only be obtained when the names of heavenly bodies are used.

Lastly, many researchers fail to explain the theoretical reasons bilingual children might perform better on metalinguistic awareness tasks. Hakuta (1987), for example, simply states that many studies have found enhanced metalinguistic awareness in bilingual children without suggesting why this might be so from a theoretical stance.

The reliance on Piagetian concepts of stages and, in particular, word magic would require further justification, given the evidence against such a stage.

In sum, taken as a whole, it is difficult to form conclusions from the extant literature on metalinguistic awareness in bilingual children. Evidence has been found both for and against most hypotheses-- metalinguistic awareness has sometimes been found to be enhanced in balanced bilinguals and it has sometimes been found to be enhanced in children in the process of acquiring a second language. In the next section, I will attempt to provide a more solid conceptualization of the relationship of bilingualism to metalinguistic awareness.

The relationship between degree of bilingualism and metalinguistic awareness

In this section I will argue that in order to adequately test the hypothesis that metalinguistic awareness is enhanced in bilingual children, it is necessary to compare fully proficient bilingual children with children in the process of learning a second language, as well as with monolinguals. I will also suggest that because learning to read seems to change the nature of metalinguistic awareness, it is important to examine metalinguistic awareness in preliterate children.

Metalinguistic awareness as an attentive process

A number of researchers have remarked that metalinguistic awareness is the ability to attend to the formal aspects of language,

or "to redirect attention from the meaning of language to some of its formal aspects" (Torneús, 1984, p.1346; see also Bialystok, 1986, 1988, 1990; Tunmer & Herriman, 1984). This view emphasizes that metalinguistic awareness is an attentive process whereby children become able to attend in a controlled way to the formal properties of language, rather than simply using their knowledge about language. Certainly, from the time they begin to use language, children seem to understand in some way (probably implicitly) that language is a symbol system. Indeed, Macnamara (1988; Macnamara & Reyes, in press) has argued convincingly that it would be impossible for children to learn language at all if they did not understand something about language (such as what a "word" is or grammatical categories). This is tacit knowledge about language may form the basis of metalinguistic awareness later in development.

Attentive processes in general have been thought to be of at least two kinds: controlled and automatic. Controlled attention is generally thought to be time-consuming and to use up limited memory resources (Shiffrin, 1988; Shiffrin & Schneider, 1977). Unless there is a reason for sustaining controlled attention, processing is usually deployed in an automatic fashion. The automatization of some processes allows people to perform more than one task at a time, while only "paying attention" to a few of them (see for example Doost & Turvey, 1971, Spelke, Hirst, & Neisser, 1976). Automatic processing is relatively fast, does not require access to working memory, and does not interfere with controlled processing (see also Cohen, 1986; Shiffrin, 1988).

Thus, controlled attention to one's knowledge about language in the form of metalinguistic awareness tasks is an effortful process (see Bialystok, 1986, 1990), as are all tasks which require controlled attention (Kahneman, 1973). There is no reason for children to deploy controlled attention unless they are encouraged to do so or unless it is useful in some other way. For example, children might attend to their knowledge about language when encouraged to play language games, such as reciting nursery rhymes or inventing play languages (Adams, 1990; Bradley & Bryant, 1983; Clark, 1978; Slobin, 1978; Weir, 1962; 1966; see also Sherzer, 1982). They might also pay attention to the symbolic nature of language when explicitly asked to do so. It has been shown repeatedly that when preschool children are trained on some metalinguistic tasks (but not on tasks that require manipulation at the level of individual phonemes), performance on the task often improves (Content, Kolinsky, Morais, & Bertelson, 1986; Zhurova, 1973). This is not surprising in light of suggestions by some psychologists in the field of attention that people actively pay attention to that which they are told to or choose to attend to (e.g., Neisser, 1976). Children might also pay attention to their knowledge about language when they learn to read. Indeed, certain approaches to teaching reading focus children's attention on the relationship between speech sounds and written symbols (see Adams, 1990).

It seems unlikely, then, that either monolingual children or children who have been using two languages since the time they were very young would actively attend to their knowledge about language before they learn to read. The youngest bilingual children

in the word awareness studies reviewed above were four years old. By this age, most children are already using language quite proficiently and thus will have no need to attend to language as a symbolic system. Their focus of attention would most likely be on the meaning of the language, rather than on the form. While it is possible that young bilingual children mix their two languages, they seem to learn quite early to use their languages as separate systems (see Genesee, 1988). Once bilingual children have separated their languages, there is no reason to think that they would need controlled access to their linguistic knowledge, any more than monolingual children. The results of Rosenblum and Pinker (1983) confirm this idea.

On the other hand, children who are in the process of learning a second language might find it necessary to attend in a controlled way to their knowledge about language (see also Vygotsky, 1962). There is some empirical support for this idea. As noted earlier, Hakuta (1987) found that among school-age children, those who had been exposed to a second-language but who had not attained equal proficiency in both languages were better at syntactic awareness tasks than balanced bilingual children. Rubin and Tyler (1989) found that English-dominant first-graders in French immersion were better at phonological awareness tasks than monolingual English first-graders.

Not all evidence supports the idea that the process of learning a second language might enhance metalinguistic awareness. Some school-age children in the process of learning a second language have been found to perform equally well or worse on metalinguistic

awareness tasks as compared to balanced bilinguals or monolinguals (e.g., Bialystok, 1988; Cummins, 1977). Presumably, these children were already able to read. Given the importance of reading ability in the development of metalinguistic awareness, it would be necessary to examine metalinguistic awareness in preliterate children to test this theory adequately.

The role of reading in the development of metalinguistic awareness

Before children learn to read an alphabetic script, their knowledge about language does not correspond exactly to that of an adult. For example, preliterate children seem to limit the meaning of "word" to content words (Bialystok, 1986; Chaney, 1989; see also Rozin, Bressman, & Taft, 1974). Research on the relationship between reading and phonological awareness has shown that children develop phonological awareness in the order: syllable, rime, onset, phoneme (Treiman & Zukowski, 1986). By the time children are three years old, they are able to indicate that they know how many syllables are in a word (Birdsong, 1989). By the age of four, many children are quite good at rhyming tasks, although there is still some variation (Smith & Tager-Flusberg, 1982; Stanovich, et al., 1984). It is only after they have learned to read an alphabet that children develop explicit knowledge about individual phonemes (Bowey & Francis, 1991; Perfetti, et al., 1987; Walley, in press; see also Mann, 1986).

Children who know how to read may have a graphemic representation of language which may override their previous representation of language (Walley, in press). Therefore, in studying

the relationship between metalinguistic awareness and language acquisition, it is important to study metalinguistic awareness uncontaminated by experience with written language.

This study

The present study examined word and phonological awareness in preliterate children belonging to three linguistic groups: a monolingual group, a bilingual group, and a group of children who were in the process of learning a second language. Second-language learners might need to control their attention to the symbolic nature of language more than monolingual or bilingual children, whose attention to such knowledge might be automatized. Thus, it was expected that second-language learners might perform better at metalinguistic awareness tasks than either other group.

The subjects in this study were all about four-years old. This age group was chosen because other studies have shown that most children in North America do not learn to read before the age of five (see Adams, 1990). Nonetheless, the children in this study were screened for reading ability.

This study focused specifically on word and phonological awareness for two reasons. First, knowledge about words and phonology (particularly rimes and onsets) might be particularly important in learning language (see Fowler, 1991; Macnamara, 1988; Slobin, 1973; Walley, in press). Secondly, phonological awareness and, to a lesser extent, word awareness are known to be important in the process of learning to read. By examining these aspects of metalinguistic awareness in pre-readers, it was possible to contribute

to a better understanding of factors that might influence the development of metalinguistic awareness prior to learning to read.

Several criteria were used in choosing the metalinguistic awareness tasks. First, they had to be age-appropriate (see Gleitman, Gleitman, & Shipley, 1972), that is, they must rely on cognitive capabilities that most four-year olds possess. The tasks also had to result in some variation in performance in the children, thus being neither too easy nor too difficult for the majority of the children. Lastly, since no one task can be said to be a pure measure of phonological or word awareness (see Stanovich et al., 1984; Yopp, 1988), several tasks were chosen to reflect each component of metalinguistic awareness in question: word, onset, and rime. Because each component of metalinguistic awareness was examined using more than one task, it was also therefore possible to gain further knowledge about how different kinds of tasks reflect metalinguistic awareness in preliterate children.

Accordingly, three tasks were chosen to measure each aspect of metalinguistic awareness of interest in this study: word, rime, and onset awareness. Some of the tasks were selected on the grounds that, judging by the literature, they are representative of either word or phonological awareness, such as a word judgement task in which children were asked to judge whether certain phonological sequences were "words". Similarly, rime and onset judgement tasks, or deciding whether or not two words rhyme or start with the same sound, were included because they reflect phonological awareness and are appropriate for children of this age. Rime judgement is not a good

predictor of reading ability, probably because many five-year olds can perform this task at ceiling (Stanovich, et al., 1984).

Selection of some of the tasks used in this study also considered the connection between metalinguistic awareness and learning to read. Knowledge of word boundaries has been shown to be predictive of reading ability (Evans, Taylor, & Blum, 1979, as cited in Tunmer, Bowey, & Grieve, 1983). Thus a word segmentation task was included as a measure of word awareness. This task used only content words, since preschoolers' concept of what a "word" is seems to correspond to content words (Bialystok, 1986; Chaney, 1989). Rime and onset selection tasks as well as rime and onset oddity tasks are predictive of reading and therefore were also included (Adams, 1990; Bradley & Bryant, 1983).

An additional word awareness task was used even though its relationship to learning to read is not known, namely a name manipulation task. This task, which requires children to change the labels of objects, was included so as to allow comparison with other studies on word magic in bilingual children, which have used this task extensively (e.g., Ianco-Worrall, 1972; Rosenblum & Pinker, 1983). This task was devised in the context of testing children's general linguistic knowledge (as opposed to that part of linguistic knowledge specific to reading ability). The use of different word and phonological awareness tasks allows for examination of the generalizability of metalinguistic awareness skills.

To sum up, the purpose of this study was to examine the hypothesis that children will become more aware of the formal aspects of language in a situation which draws their attention to the

language itself, such as second-language learning. It was expected that bilingual and monolingual children would perform similarly on word and phonological awareness tasks, while second-language learners would perform better at these tasks than both other groups.

Method

Subjects

There were three groups of children: a monolingual English group, a proficiently bilingual French-English group (hereafter "bilinguals"), and a group of anglophone children who were learning French ("second-language learners"). There were a total of 39 subjects, 13 in each group. The children were on average 4:3 (that is, 4 years and three months), ranging from 3:11 to 4:11. Gender was fairly equally distributed in each group. All children came from middle-class neighborhoods in various parts of Montreal and were enrolled in preschool programs.

The monolingual children ranged in age from 3:11 to 4:11, with a mean age of 4:4. This group was comprised of five girls and eight boys. Each monolingual child had two English-speaking parents and was enrolled in an English preschool. Because these children grew up in Montreal, it is likely that they knew a few words in French or at least had some concept of what French is, but the monolinguals' French skills were not tested.

The bilingual children ranged in age from 3:11 to 4:10, with a mean age of 4:4. There were six girls and seven boys in this group. The bilingual children had had frequent exposure to both French and English at home for longer than two years, most often because they

had one anglophone parent and one francophone parent. Information concerning the languages used at home was provided by preschool teachers and directors as well as from a home language background questionnaire. In order to be included in this group, children also had to have a relative balance on the Peabody Picture Vocabulary Test (Revised) in English and in French. Their average score on the English PPVT-R was 35.85 and their average score on the French PPVT was 30.00. A t-test showed that there was no significant difference between these scores, $t(24)=1.850$, $p>.05$. In addition, each bilingual child was interviewed by adult native speakers of French and English. Any child who could not pass as a native speaker in the opinion of the adult interviewer was eliminated from the study.

The second-language learners ranged in age from 3:11 to 4:11, with a mean age of 4:5. There were five girls and eight boys in this group. The second-language learners were native speakers of English who had had less than one year of exposure to French, but more than three months. Their exposure to French was usually in French-immersion preschools. They were expected to perform better on the English PPVT than on the French version and this proved to be the case-- they scored an average of 47.77 on the English PPVT and an average of 11.29 on the French PPVT. A t-test showed that the difference between these two scores is significant, $t(24)= 74.73$, $p.<.01$. As with the bilingual children, each second-language learner was interviewed in both French and English by an adult native speaker of the language to determine if they could pass as native speakers. In every case, these children could pass as native speakers

in English. It was often not possible to get them to speak in French to the French-speaking interviewer, attesting to their relatively low vocabulary in French, so it was not possible to get an impression of their productive abilities in French.

Sixty permission slips attached to letters explaining the purpose of this study were sent home to parents in eight different Montreal nursery schools. Permission was received to include forty-nine children in this study. Three subjects went through the first session of testing and then either changed schools or went on holiday for over a month: these circumstances made it impossible to test them in the second session, and thus they were not included in the final analyses. Forty-six subjects were administered tests in both sessions. Seven other subjects were not included in the final analysis for various reasons: three subjects were found to be younger than three years and eleven months , three subjects were found to have had exposure to a second or third language other than French or English, and one monolingual subject was dropped because she could read three words on the reading task. This was the only subject who could read any words.

Materials

A letter was sent home to the children's parents to ask their permission for their children to participate in the study. A questionnaire was attached which contained questions about language use in the home, parental education, and family income. See Appendix I for the questionnaire. The rest of the materials can

be divided into control measures, word awareness tasks, and phonological awareness tasks.

Control measures. The following measures were used to control extraneous variables in the study.

Oral vocabulary: The Peabody Picture Vocabulary Test (Revised) (Dunn & Dunn, 1981) was used to measure the children's oral vocabulary. This was used in conjunction with impressionistic data on children's productive language use to have a rough estimate of the children's verbal proficiency. The PPVT was administered in English to all children and the French version (Dunn, Dunn, & Whalen, 1990) was administered to the bilingual and second-language learning groups on a separate occasion and by a different native French-speaking experimenter.

Nonverbal intelligence: Raven's Coloured Progressive Matrices (RPM), Sets A, AB, and B, was administered to all children, in order to control for nonverbal intelligence (see Bowey, 1988).

Volubility: Rosenblum and Pinker (1983) suggest that some children might perform better than others on word awareness tasks simply because they talk more and hence stumble accidentally on the right answer. As this might be true of the word manipulation task, the volubility test from Rosenblum and Pinker (1983) was used. Children were asked to name five common objects (airplane, ball, car, tree, snake). Then they were asked two questions: "Which one do you like best?" and "Which of these two are most alike?". The content words (i.e., nouns, adjectives, verbs, and adverbs; but not pronouns, demonstratives, exclamations, or stative verbs) used in

response to these questions were counted in order to assess volubility (taken from Rosenblum & Pinker, 1983, p.776).

In response to the two questions posed, many children did not provide a verbal answer, but merely pointed to an object or objects. So, unlike Rosenblum and Pinker, two more questions were asked of the children to clarify their responses to the first two questions: "Why is that one the one you like best?" and "Why do you think those two are the most alike?". Although many children did not seem to understand the question about which two were the most alike, no clarification was made of that question and, as a follow-up question, children were asked, "Why do you think that one is the most alike?".

The first five volubility tests were recorded on a Sanyo mini-cassette recorder hidden from the children's view and transcriptions were made from the tape by the interviewer as soon after the session as possible. Notes were also kept of the exchanges. It was noted that no additional information was obtained from the taped sessions and all subsequent volubility counts were determined from notes alone.

Reading ability: In order to screen children for reading ability, the Clay reading test (as taken from Bowey, personal communication). This test, modified slightly to make it more natural for prereaders, following Bowey and Francis (1991), is particularly sensitive to emerging reading abilities (Bowey & Francis, 1991). In the test, children are shown pictures of familiar contexts which include words (e.g., a stop sign, a sign for McDonald's, etc.) and are encouraged to guess what the words might be. The children were

then asked to identify 20 letters; both the correct name of the letter and the sound associated with the letter were accepted as correct responses. Next, children were asked to identify the numbers 1 through 10, presented in random order. The last part of the reading test was a list of 48 common words that children were encouraged to read or sound out. If a child could not read any words correctly or did not show any ability to sound out words on the first eight words, the test was shortened so as not to frustrate the child. See Appendix II for the details of this reading test.

In order for sounding-out to be indicative of reading ability, a child had to sound out every letter in a word. Only one monolingual child reached this criterion and was eliminated from the study. One second-language learner sounded out the first letter of every word, but ignored the following letters, even with encouragement. She was not eliminated from the study.

Word Awareness Tasks. The children were given three word awareness tasks: word segmentation, name manipulation, and word judgement. Bowey (1988) has pointed out that preschoolers might not understand the term "word", so the instructions were made detailed enough and the tasks presented in such an order so that an adult-like understanding of the term "word" was not necessary in order to perform these tasks (see Tunmer, Bowey, & Grieve, 1983).

In the first task, word segmentation, children were asked to segment speech into words. They were given a number of two- and three-word word lists consisting solely of content words, for a total of 36 items. The word lists were composed of adjectives, nouns, or

phrases. See Table 1 for examples of word strings used in this task. All the words were chosen from popular children's books (such as Bread and Jam for Francis by Russell Hoban). In all but the phrases, noun or adjective combinations which might be expected to occur together frequently were avoided (e.g., "tree house" or "pretty little"). It was thought that children might think of these combinations as one word; this idea was tested by including phrases in the task. As in Tunmer, Bowey, and Grieve (1983), the number of syllables in each word string was varied so as to be either congruent or incongruent with the number of words. Children were asked to tap the table with a colored plastic chip for every word in the word list (see also Bialystok, 1986). Two practice trials with feedback were provided; this was thought to be enough to explain to children how to

Table 1.

Examples of word strings from word segmentation task.

	String length	
String type	2 words	3 words
Syllabic congruence		
Adjective	red sweet	dark old nice
Noun	book egg	chair game star
Phrase	long hair	wise old man
Syllabic incongruence		
Adjective	little pretty	yellow tall funny
Noun	potato bell	cookie rabbit school
Phrase	scary lion	little green engine

do the task, without actually *teaching* them how to do it, a concern raised by Tunmer, Herriman, and Nesdale (1988). See Appendix III for the word lists and instructions given to children.

Children were also given the traditional name manipulation task. Bowey (1988) has criticized these tasks because children's performance seems to depend largely on whether or not they have understood the task. Specifically, Rosenblum and Pinker (1983) argue that it is essential that children understand counterfactuals in order to perform tasks involving "word magic". Therefore, children's ability to understand counterfactuals was tested as in Rosenblum and Pinker (1983) by having children answer questions about a counterfactual scene with a puppet (see Appendix IV). It was expected that the children would have little trouble with understanding counterfactuals.

Next, the name manipulation test was administered; there were three parts to this task. In the first part, the children were asked if, in principle, the names of two objects could be changed, either to a nonword (i.e., "If you and I were going to make up a language that no one had ever heard before, could we call this table a shig?") or to a real word (i.e., "If you and I were going to make up a language that no one had ever heard before, could we call this snake a book?"). The number of children who agreed or disagreed to the changing of labels were compared across groups. The children were also asked to justify their responses.

In the second part of this task, the children were asked to manipulate objects with changed labels (the new label being a real word this time) and then to answer questions about the attributes of

the object (e.g., "Does this *boat* [really a toy duck] walk or does it sail?"). The number of correct responses was counted and compared across group.

Lastly, to see if name manipulation was generalizable, the children were asked to change the name of an object (a car was called a "*bear*") and then asked what a second similar but not identical car would be called. The number of children who answered correctly was counted and compared across groups. See Appendix V for the details of instructions to the children.

In all cases in which justification of a name manipulation was required, the justification was typed either as describing the attributes of the object or as referring to the social context of the experiment. The number of each kind of justification was compared across linguistic group. It was expected that there would be no difference between the groups in their ability to change labels, but that their might be a difference between groups in the reasons they provided to justify their responses. Rosenblum and Pinker (1983) found that bilinguals tended to give more reasons referring to social context than monolinguals who referred more often to the attributes of the objects.

In the last word awareness task, the children were asked to identify whether or not certain words are indeed words (following Smith & Tager-Flusberg, 1982). The children were introduced to a puppet who only liked real words and got upset when people said things that were not really words. Then they were asked to choose from a list of 12 words and 12 nonwords which ones were indeed words. Half the nonwords follow the phonological rules of English

(such as "gesh"), while the other half used sounds or combinations of sounds which are not part of most English dialects. Half the real words were content words (such as "red"), while half the words were function words (like "who"). It was expected that the bilinguals and the second-language learners might agree more readily that the nonwords that followed the phonological rules of English might be acceptable as "words", while the monolinguals would accept words that they knew (i.e., real words). No other differences were expected between the groups. It was also expected that, as a whole, the children would be less likely to accept function words as "words" than content words. Bialystok (1986) found that preschool children are less likely than are school age children to count function words as "words". This task, which allows children to decide what "word" means, was presented last so that the children would not think that they could invent their own meaning for the term in the other tasks! See Appendix VI for the details of this task.

Phonological Awareness Tasks.

Bowey and Francis (1991) suggest that phonological awareness tasks which tap knowledge about onsets and rimes (see Treiman, 1983) might be the most appropriate for preschoolers. They suggested that children's ability to manipulate onsets and rimes might precede the development of their ability to manipulate individual phonemes. Also, it may be that knowledge of these phonological units is important in learning a second language-- the ability to detect onsets and rimes in the language to be learned might facilitate memory storage of new words (see Walley, in press).

Accordingly, three tasks were administered which tested the children's concept of rhyme and of alliteration of onsets.

The first task was a rime judgement task in which the children were asked to judge if two words rhyme and respond either "yes" or "no". In this task, the children were introduced to a puppet named Jed who only likes words that rhyme with his name. Five of the words presented rhymed with "Jed", and five did not. It was expected that children would perform well on the task-- Stanovich, Cunningham and Cramer (1984) found that rhyme judgement is one of the easiest phonological awareness tasks for six-year olds. Smith and Tager-Flusberg (1982) found that four-year olds made 79% correct judgements on this task. Accordingly, it was expected that children would perform this task well, although probably not at ceiling. See Appendix VII for a detailed description of this task.

The children were also asked to do a similar but not identical onset judgement task, in which they were presented with 10 sets of two words and asked if the two words started with the same sound. Five sets of words did start with the same sound, while five did not. These words (all content words) were chosen so as to sample a number of onsets which occur in English. The words were put together so that no two words together might form part of a grammatical utterance (e.g., "little fox"). See Appendix VII for more details on this task.

The second phonological awareness task was a rime selection task, in which children were asked to choose the one word out of three possible ones that rhymed with a provided word. So, for example, the children were shown a picture of a fox and asked which

word rhymed with fox: box, star, or pail. There were nine items, with the position of the rhyming word counterbalanced across items. The cards were shuffled before each presentation so as to present the items in a more or less random order. The onset selection task was designed the same way-- the children were asked to choose the the one word out of three possible ones that started with the same sound as a provided word. For example, the children were shown a picture of a nest and asked which word started with the same sound: leg, nose, or hat. The pictures were all hand-drawn sketches and were meant to facilitate memory for the words. See Appendix VIII for further details of this task.

The third phonological awareness task was the Bradley and Bryant (1983) rime oddity and onset oddity tasks. Bradley, MacLean, and Crossland (1989) found that this was an appropriate task for four-year olds. In this task, the children were presented with three words composed of consonant-vowel-consonant triads, and were asked to choose the "odd" word out. In the rime oddity task, the vowel is kept the same in all three words and only the odd word can be identified by having a different rime from the other two words (as in "fan cat hat"). In the onset oddity task, the vowel was again kept constant in all three words and the odd word differs from the other two by the onset (as in "box rod rock"). See Appendix IX for stimuli used. The word lists were taken directly from Bowey and Patel (1988, p.381). It was expected that this task would be the most difficult of the phonological awareness tasks for the four-year olds to perform.

Procedure

Once permission was obtained for the children to participate in this study, they were given two testing sessions, separated by about a week. All testing was done individually in the child's school. In the first session, the children were screened for participation in the study. The following tests were administered in the first session: the volubility test, the informal chat in English, the Raven's, the English PPVT, and the reading screening test. This was the end of the session for the monolinguals. The order of presentation of the Raven's and the English PPVT was counterbalanced across children.

There was a short additional session for the bilinguals and the second-language learners given by a native French-speaking experimenter. This experimenter spoke informally with the children in French, determining if the children could pass as native speakers of the language. Any bilingual child who could not pass the impressionistic test was eliminated from the study. On this occasion, the children were also given the French PPVT.

In the second session, all the metalinguistic awareness tasks were administered. It was thought that children's performance on these tasks might improve simply by being exposed to them, so the tasks were counterbalanced according to kind, resulting in six orders of presentation: onset/rime/word, onset/word/rime, rime/onset/word, rime/word/onset, word/onset/rime, or word/rime/onset. Within each group of metalinguistic awareness tasks, the tasks were presented in the same order. Within the block of word awareness tasks, the word segmentation task was presented

first, then the name manipulation task, and finally the word judgement task.

The phonological awareness tasks were presented to the children in blocks of either rime tasks or onset tasks. The block of rime tasks and the block of onset tasks were each preceded by a brief explanation of what rhyme or alliteration was (see Appendix X). Within the block of rime awareness tasks, rime judgement was presented first, then rime selection, and then rime oddity. This order corresponded roughly to the degree of difficulty of these tasks, as found by other experimenters (see above). Within the block of onset awareness tasks, onset judgement was presented first, then onset selection, and then onset oddity. Little research has been done to compare onset awareness tasks, but it was thought that since the onset awareness tasks mirrored the rime awareness tasks in terms of cognitive demands, the order of difficulty would probably be the same.

Results

A number of statistical analyses were performed on the data and are described here. First, the control measures (e.g., oral vocabulary, nonverbal intelligence, etc.) were analyzed to ensure that any differences between groups on metalinguistic awareness tasks would not be due to differences on the control variables. Then, the word awareness tasks were examined for possible differences between linguistic groups; the name manipulation task was analyzed separately because the scoring of that task did not yield a single

overall score. Next, the phonological awareness tasks were analyzed for possible differences between linguistic groups. Lastly, a number of analyses were performed to examine the relationship of the metalinguistic awareness tasks to each other and the generalizability of the concept of metalinguistic awareness.

Control measures

Separate one-way between-subjects analyses of variances examining the effect of linguistic group (monolingual [MON], bilingual [BIL], and second-language learner [SLL]) were performed on each of the control measures in the study. Table 2 summarizes the mean scores for each group on each of these tests and indicates the tests on which significant differences at groups were obtained.

Table 2.

Mean performance of control measures according to linguistic group.

	MON	SLL	BIL	F-value	p-value
PPVT - English	52.92	47.77	35.85	4.229	.02
PPVT - French	---	11.29	30.00	17.142	.01
RPM	12.85	12.62	12.46	.055	.95
Volubility	9.62	12.92	10.08	1.362	.27
Reading-letters (20)	7.92	10.92	7.85	1.306	.28
Reading-nmbr.(10)	6.00	7.15	4.31	2.303	.12

On the English PPVT, the BIL children scored significantly lower than the MON children, using Scheffé's method for multiple comparisons (α=4.02, $p < .10$; see Note p.66). There were no significant differences between the MON and the SLL, or between the SLL and the BIL. On the French PPVT, the BIL scored significantly higher than the SLL. In addition, a separate one-way ANOVA showed that for SLL the scores on the English PPVT were significantly higher than their scores on the French PPVT, $F(1,24)=74.73$, $p<.01$. There was no significant difference for the BIL between their performance on the English PPVT and on the French PPVT, $F(1,24)=1.85$, $p>.05$.

This pattern of results is to be expected. Bilingual children often have lower vocabulary scores than do monolingual children in any one language (see Bialystok, 1988)-- the bilingual children were nevertheless relatively balanced in terms of their receptive vocabulary in English and French. The second-language learners were only beginning to learn French so their vocabulary in French was significantly lower than their vocabulary in English, as expected.

There were no significant differences between the groups on Raven's Coloured Progressive Matrices, on the volubility task, or on their ability to name letters or numbers. This means that any differences between the groups on the metalinguistic awareness tasks probably cannot be attributed to differences on these variables.

Word Awareness Tasks

Separate one-way between-subjects analyses of variance examining the effect of linguistic group were performed on the word

Table 3.

Mean correct on word segmentation and word judgement tasks, according to linguistic group. Mean percent correct are presented in parentheses.

	MON	SLL	BIL	F-value	p-value
Segmen-	27.39	29.46	24.23	1.349	.27
tation(36)	(76.07%)	(81.84%)	(67.31%)		
Judge-	15.85	15.08	12.54	3.455	.04
ment(24)	(66.04%)	(62.83%)	(53.50%)		

segmentation and the word judgement data. Table 3 summarizes the results of these analyses. The percentage correct scores are given in parentheses in order to facilitate comparison between the two tasks; there were 36 items on the word segmentation task and 24 on the word judgement task.

There was no significant difference between the linguistic groups on the word segmentation task. In general, the children performed well on the word segmentation task. Their scores are comparable to those of the four-year olds in the Tunmer, Bowey, and Grieve (1983) study. In order to determine the specific factors determining performance on the word segmentation task, a separate ANOVA with one between-group variable (linguistic group) and three within-group variables-- word type (noun, adjective, or phrase), syllable congruency (congruent or incongruent), and length of word string (2 words or 3 words)-- was performed. There was a significant interaction between linguistic group and length of word string, $F(2,36)=4.40$, $p<.05$; owing to the monolinguals' performing significantly better on the 2-word items than on the 3-word items,

$F(1,36)=20.26$, $p<.01$. The mean score of the monolinguals on the 2-word items was 87% correct and their mean score on the 3-word items was 67% correct. There were no other effects that reached significance on this task.

On the word judgement task, a significant difference was found between linguistic groups: the monolinguals had significantly more correct judgements (both accepting real words and rejecting nonwords) than the bilinguals, using Scheffé's method for multiple comparisons, $\alpha=3.15$, $p<.10$ (see Note p.66). It was thought that this difference might be due to bilinguals judging phonologically legal words as real words simply because their vocabulary in English was not as extensive as the monolinguals'. Accordingly, a separate two-way ANOVA, with word type (i.e., content words, function words, phonologically legal nonwords or phonologically illegal nonwords) as the within-subjects variable and linguistic group as the between-subjects variable was performed. This analysis revealed no significant differences between linguistic groups according to kinds of words. The bilingual group scored numerically lower on every word type than either the monolingual or the second-language learner group, but this difference did not reach statistical significance. To see the effect of vocabulary in English on this task, an analysis of covariance with the scores on the PPVT as the covariate was performed on the data from this task. The results showed that with the PPVT scores partialled out, there was still an overall significant difference among groups, $F(2, 35)= 28.77$, $p<.05$. Thus, the explanation for the low scores of these bilingual children

does not seem to lie in their knowledge of English vocabulary or in the kinds of words they are asked to judge.

Name manipulation task. There were no significant differences between the groups on the counterfactual task, as revealed by a separate one-way ANOVA: $F(2,36)=.45$, $p>.05$. All groups answered on average approximately half of the 3 questions correctly: monolinguals scored an average of 1.3, second-language learners scored 1.6, and bilinguals scored 1.4. The counterfactual test was administered in order to control for children's abilities to deal with counterfactuals. A finding of no statistically significant difference on this test indicates that any differences on the name manipulation task probably cannot be attributed to differences on the ability to deal with counterfactuals.

The scores on the counterfactual test are surprising in light of the results of Rosenblum and Pinker (1983) who found that only two children out of 26 had trouble with one question on this counterfactual task. This difference may be due to the age of the children-- while the children in the study by Rosenblum and Pinker (1983) were only slightly older than these children, scores on the counterfactual test in this study were found to correlate significantly with age, $r(37)=.388$, $p<.05$.

Table 4 shows the number of children who agreed that, in principle, the labels of objects could be changed. It was originally thought that children would answer these questions in a consistent manner. In fact, the children's answers to one question about changed labels were not necessarily consistent with their answers to the other question (see Table 4). Accordingly, a χ^2 analysis on the

Table 4.

Number of children agreeing that the labels of objects can, in principle, be changed to a nonsense word and another real word. Inconsistent responses mean that the children answered the two questions differently.

	MON	SLL	BIL
Consistent			
Yes	4	11	4
No	5	0	7
Inconsistent	4	2	2

number of children who answered the questions consistently revealed a significant difference among the groups, χ^2 (2)= 10.9, $p<.01$. A χ^2 analysis on the number of children who gave consistent or inconsistent answers still showed a significant difference among the groups, χ^2 (6)= 12.7, $p<.05$. The second-language learners agreed most frequently and most consistently that labels of objects could be changed. The monolingual and bilingual children were less likely to agree that the labels of objects could be changed and they were less consistent in their answers.

All children were able to manipulate the objects with changed labels, regardless of whether the new label was a nonword or a real word. This finding is consistent with Rosenblum and Pinker (1983) who found that children had no difficulty in manipulating an object after the experimenter and the subject had agreed to call it by a name other than its usual one.

The children were also asked to exchange the names of two objects and then answer questions about the attributes of the objects. Table 5 shows the numbers of correct answers about the attributes

Table 5.

Number of correct answers to questions about the attributes of objects with changed labels, according to linguistic group.

	MON	SLL	BIL
Correct	35	42	36
Incorrect	17	10	16

of objects with changed labels for each linguistic group, regardless of consistency of their answers. A χ^2 analysis showed no significant difference among the groups, $\chi^2(2) = 2.8$, $p > .05$.

In the case which children were asked to generalize the name "bear" from one car to another similar but not identical car, most children answered incorrectly, saying "car". Table 6 shows the number of correct and incorrect generalizations made. The new names children gave were a train, a jeep, a truck, a puzzle, and a boat. There was no significant difference among the groups, $\chi^2(4) = 3.9$, $p > .05$.

Two kinds of answers to the questions about why labels could be changed were included in the analysis of children's justifications for name manipulations: those that referred to an object's attributes

Table 6.

Number of children who generalized the changed label of an object, according to linguistic group.

	MON	SLL	BIL
Bear *	4	1	2
Car	8	8	10
New name	1	3	1

*= correct answer

(such as, "Because boats can't walk." or "Because it looks like a chair.") and those that referred to the experimental, situational, or personal context (such as, "Because no one's looking!" or "People wouldn't like that [changing the label]. When people would write on it [the book], other people would say no."). Three categories of responses were excluded from the analysis: (1) references to the object's name (such as, "That's a snake. It's not a book."); (2) nonsense answers (such as, "No. We can put the chair in ears. And now the cars can walk [demonstrates]." or "That's a chair because it says, 'Whoa! The chair!'"); and (3) "I don't know". This analysis follows Rosenblum and Pinker (1983). The children were not necessarily consistent in the kinds of reason they gave to justify name changes. Table 7 shows the number of responses children gave, according to the kind of justification.

A χ^2 analysis on the justifications of interest showed a significant difference among the groups, $\chi^2(2) = 7.1$, $p<.05$. Most of

Table 7.

The number of responses given to justify name manipulation, according to linguistic group and kind of response.

	MON	SLL	BIL
Included			
Attributes	16	8	8
Context	9	15	2
Excluded			
Name	20	17	22
Nonsense	6	3	12
Don't know	5	5	8

the answers given by the monolinguals and by the bilinguals referred to the attributes of the object, while the second-language learners referred most often to the social or experimental context. This finding is in contrast with that of Rosenblum and Pinker (1983); they found that bilinguals gave significantly more justifications referring to the context than did monolinguals.

In sum, the second-language learners agreed more readily and more consistently than the other groups that the names of objects can be changed. They tended to refer to the social or experimental context to justify these name manipulations, while bilinguals and monolinguals tended to refer more often to the attributes of the objects. There were no other differences among the groups.

Phonological Awareness Tasks

A separate analysis of variance was performed for each phonological awareness task to test for differences between linguistic groups. The results of these analyses are summarized in Table 8. The analyses of these tasks were performed on the raw scores, but percentages are presented to facilitate comparison between tasks. It is also important to note here that the tasks have different rates of chance performance-- for the judgement tasks, chance performance would have been 50% and for the selection and oddity tasks, chance performance would have been 33%.

There was a significant difference between groups on the rime selection task. This difference was due to the second-language learners scoring significantly higher than the bilinguals, determined by Scheffé's procedure for multiple comparisons, α=4.19, $p<.10$ (see

Table 8.

Percentage correct on each phonological awareness task according to linguistic group. The number of items on each task is in parentheses.

	MON	SLL	BIL	F-value	p-value
Judgemt.					
Rime(10)	62.3%	71.4%	51.5%	4.198	.02
Onset(10)	54.6%	60.8%	55.4%	.433	.65
Selection					
Rime(9)	65.8%	59.8%	39.3%	3.401	.04
Onset(9)	50.4%	51.3%	48.7%	.051	.95
Oddity					
Rime(9)	37.6%	46.2%	30.8%	2.273	.12
Onset(9)	34.2%	37.6%	29.9%	.508	.61

Note, p.66). There was also a significant difference between groups on the rime judgement task. This difference was due to the monolinguals scoring significantly higher than the bilinguals, determined by Scheffe's procedure for multiple comparisons, α=3.09, $p<.10$ (see Note, p.66). There were no other significant differences between groups on the phonological awareness tasks.

Task analyses

Although this study was not designed specifically to examine the nature of metalinguistic awareness in preliterate children, it is nonetheless possible to shed some light on this issue by examining correlations among the various tasks that were used. Of particular interest was whether word and phonological awareness are best thought of as manifestations of the same underlying metalinguistic awareness, or whether they might best be considered distinct.

First, Pearson product-moment correlations were calculated among the various metalinguistic awareness tasks; they are summarized in Table 9. The most striking feature of the correlation matrix is the lack of a pattern of significant correlations. The dark rectangle in Table 9 indicates the correlations between the word awareness tasks and the phonological awareness tasks. There are a few correlations that reach significance, but the overall pattern of results suggests that performance on word awareness tasks is distinct from performance on phonological awareness tasks in children this age. This suggests that word and phonological awareness do *not* constitute a single, unitary ability. If word and phonological awareness tasks were to be considered manifestations of the same underlying awareness, the correlations among the tasks should correlate highly and consistently-- this is not the case.

Table 9.

Correlation coefficients between metalinguistic awareness measures in this study.

	WS	WJ	RJ	RS	RO	OJ	OS	OO
WS	1							
WJ	.289	1						
RJ	.229	.481*	1					
RS	.380*	.382*	.540*	1				
RO	.036	.089	.282	.189	1			
OJ	.210	.207	.185	.344*	.359*	1		
OS	.210	.202	.222	.387*	.287	.311*	1	
OO	.360*	.111	.213	.176	.471*	.493*	.141	1

*=p<.05

WS= word segmentation; WJ= word judgement; RJ= rime judgement; RS= rime selection; RO= rime oddity; OJ= onset judgement; OS= onset selection; OO= onset oddity.

Even if metalinguistic awareness as a whole were not a unitary ability, it would still be possible to think of word and phonological awareness as distinct, unitary abilities in and of themselves. That is, it might be that word awareness tasks all reflect the same underlying word awareness and that phonological awareness tasks might all reflect the same underlying phonological awareness. If this were the case, one would expect the correlations between word awareness tasks to be high and the correlations between phonological awareness tasks to be high. Again, this was not the case. There were only two word awareness tasks included in these analyses because the name manipulation task did not yield a single score. The correlation between the word segmentation task and the word judgement task approached, but did not reach significance, $r(37)=.289$, $p<.10$. This finding suggests that these two word awareness tasks are measuring somewhat distinct abilities, rather than simply word awareness per se.

Similarly, there was little evidence of a unitary phonological awareness. The dashed rectangle in Table 9 shows the correlations that would be expected to be consistently high if phonological awareness were to be considered to be a distinct ability. The two triangles indicate the correlations within rime and onset awareness tasks separately. Although there are some significant correlations between tasks, the correlations are not consistent enough to conclude with certainty that either rime or onset awareness tasks reflect the same underlying awareness. It is, however, possible that task demands make these tasks impure measures of the underlying metalinguistic awareness. Regardless of the conclusion, this

evidence, as well as other evidence from multiple-task studies (Stanovich et al., 1984; Yopp, 1988), suggests that it is important to choose metalinguistic awareness tasks carefully when doing research in this field.

Thus, from these analyses, it seems that performance on phonological and word awareness tasks does not depend on the linguistic unit in question. To examine whether performance depended on task demands, regardless of linguistic features, a factor analysis was performed on scores that were calculated to reflect task demands. The scores from the oddity tasks were combined for this analysis because the tasks were of the same design and the children's scores on these two tasks correlated highly. Similarly, the scores from the rime and onset selection tasks were combined, because they were of the same design and because they were highly correlated. The scores from the judgement tasks (word, rime, and onset) were combined since they were thought to require the same kind of manipulation (i.e., judgement); word judgement correlated significantly with rime judgement and highly (although not significantly) with onset judgement. Word segmentation was included by itself since no other task required segmentation and it did not correlate with many other tasks. Standardized *z*-scores were used in the factor analysis because the tasks were measured on different scales. The rotated orthogonal transformation solution can be found in Table 10. Two factors were identified by the analysis; Factor 1 accounted for 42% of the original variance and Factor 2 accounted for 21%. The oddity tasks load highly on Factor 2, while all other variables load highly on Factor 1, but not Factor 2. This

Table 10.

Factor loadings for orthogonal transformation factor analysis on oddity tasks (rime and onset), judgement tasks (rime, onset, word), selection tasks (rime and onset), and word segmentation.

	Factor 1	Factor 2
Oddity tasks	.159	.974
Judgement tasks	.761	.305
Selection tasks	.790	.171
Word segmentation	.767	.017

suggests that the ability to perform oddity tasks is distinct from the abilities to perform the other metalinguistic awareness tasks.

This factor analysis is based on a very number of subjects (39), so the results may be unstable. Nonetheless, it is interesting to note that the oddity tasks seem to be distinct from the other metalinguistic awareness tasks in this analysis. Of the tasks chosen for this study, the oddity tasks have been found to be the most predictive of reading ability (see Bradley & Bryant, 1983). Thus, this factor analysis might be evidence that metalinguistic awareness as relevant to learning to read is somehow distinct from other manifestations of metalinguistic awareness (e.g., judgement, selection). While the indications in this study are that metalinguistic awareness is not a unitary ability, this clearly ought to be examined further. It seems that, in studying metalinguistic awareness, both in relation to early reading abilities and to language learning, it is necessary to choose metalinguistic awareness tasks carefully. Children's ability to perform these tasks might differ greatly according to the linguistic unit (e.g., word, syllable, onset, rime,

phoneme) in question and according to the cognitive abilities required to perform a task (see also Bialystok, 1986, 1988, 1990).

Discussion

This study differed from most other studies in this field in two important respects. First, most earlier studies of metalinguistic awareness in bilingual children were fraught with methodological problems. This study took into account many extraneous variables (such as age, sex, SES, etc.) that could have affected the results of previous studies. Most importantly, unlike most previous studies, the possible effects of reading ability were controlled, so that the children's performance on the metalinguistic awareness tasks could not be attributed to their familiarity with alphabetic writing.

Moreover, other studies have provided no or weak rationale for the choice of metalinguistic awareness tasks and for the belief that bilinguals might reach an earlier awareness of the formal structure of language than monolinguals. In comparison with most previous work on this issue, the present study hypothesized that if any linguistic group were to have enhanced metalinguistic awareness, it would probably be second-language learners. This hypothesis was based on the idea that attention to linguistic form engenders metalinguistic awareness, and drew on current research related to attentional processes. It was suggested that children might attend to the structural aspects of language during the process of acquiring language. Once children are using language fluently, they would no longer need to attend to their knowledge about the structure of

language and could use this knowledge automatically. Thus, both monolingual children and children who were raised speaking two languages might be expected to perform equally well on metalinguistic awareness tasks. In contrast, second-language learners might be expected to attend actively to their knowledge about language, and thus perform better than either monolinguals or bilinguals on metalinguistic awareness tasks.

Indeed, consistent with the hypothesis concerning bilinguals, it was found that there were generally no differences between their performance on word or the phonological awareness tasks and the performance of monolinguals. In fact, where there were significant differences (e.g., on the word judgement task), it was the bilinguals who tended to score the lowest on most tasks. This finding is consistent with the findings of Rosenblum and Pinker (1983), but contrasts with the findings of many other researchers (e.g., Ben-Zeev, 1972; 1977a; Cummins, 1979,1987; Ianco-Worrall, 1972).

At the same time, in contrast to the expected results, this study found that the second-language learners' performance on the word or the phonological awareness tasks was generally not significantly better than that of either other linguistic group. While there were some exceptions to the lack of differences between groups, the general trend of the data was in this direction. This finding is partially consistent with Bialystok (1988) and with Cummins (1979); both who might have predicted that the second-language learners would perform no better than the monolinguals. However, both of these researchers suggest that bilingual children might have enhanced metalinguistic awareness; no support was found in this

study for a bilingual advantage on these tasks. This finding also runs counter to the predictions and previous findings of those researchers who might have predicted an advantage for the second-language learners (e.g., Diaz, 1985; Hakuta, 1987)

There are a number of possible explanations for this finding. One possibility is that second language-learning does not enhance metalinguistic awareness in any measurable way beyond what is expected when one or two languages are acquired, if care is taken to control for all possible sources of extraneous influences and if care is taken in the selection of tasks. That is, it is possible that experience with a second language facilitates the development of a particular vocabulary, enabling children to talk explicitly about language, while not necessarily enhancing metalinguistic awareness, as it is measured in these tasks. The possible role of metalinguistic awareness with respect to language development in general will be discussed below. This explanation would clarify why bilingual children in case studies (e.g., Leopold, 1949; Slobin, 1978) seem to show a remarkable sensitivity to linguistic form and yet young bilingual children do not perform better than monolingual children on metalinguistic awareness tasks in well-controlled studies. The ability to talk about linguistic form (seen in case studies of bilingual children) may be independent of the ability to perform metalinguistic awareness tasks.

Alternatively, it is possible that the kinds of metalinguistic awareness relevant to language-learning are different from the kinds of metalinguistic awareness that have been found to be relevant to learning to read. In other words, it may be that the way knowledge about language is manifested when learning a language may be

markedly different from the way knowledge about language is manifested when children learn to read. Many of the tasks chosen for this study were developed in the framework of research on the relationship of metalinguistic awareness to learning to read. On the one task devised solely for use within the domain of research on child language, the name manipulation task, the second-language learners agreed more often and more consistently than children from either other group that the labels of objects could be changed. Further study will be needed to clarify how cognitive abilities might contribute separately to language learning and to learning to read (see Bialystok, 1988, 1990, in press).

Another possible interpretation of the present results of this study is that metalinguistic awareness may be enhanced only in ways relevant to the language being learned. In this study, the second-language learners were dominant in English and were learning French. All metalinguistic awareness tasks were devised on English words following English rules of phonology. This was done because all the children were proficient in English and the second-language learners were not proficient enough in French to test their ability to redirect their attention from meaning of simple words (since they did not know the meanings of very many words in French) to the formal properties of the language. Awareness of rimes might not be a very useful tool in the acquisition of French because French is a syllable-based language, with many open syllables (i.e., syllables ending in vowels; see Celdrán, 1984). Thus, many words rhyme in French and so rhyme might not be as useful as a distinguishing characteristic of words as it is in English. Awareness

of onsets, however, would probably be a useful way to distinguish words in French. It is interesting, then, that the second-language learners did perform better than either monolinguals or bilinguals on the onset selection task. Because they did not score higher than monolinguals or bilinguals on the other onset awareness tasks, however, this can only be seen as an interesting direction to follow in further research, and not as conclusive evidence.

Another possibility is that it is language development in general that plays an important role in the development of metalinguistic awareness, and the impact of second-language learning is unimportant. Walley (in press) has suggested that phonological awareness might develop out of the process of language acquisition-- namely, young children acquire the ability to segment words phonemically in order to facilitate storage in memory. The ability to segment words phonemically probably occurs when the children have acquired a small pool of vocabulary items (approximately 50 words) and need to acquire more. The first vocabulary items are memorized holistically by children, but this strategy soon begins to tax the limits of memory and children learn to segment words into smaller units. This segmentation ability, Walley says, is at an implicit level and becomes explicit when children learn to read. If this were true, it could be that the children in this study were all at the same stage in their general linguistic development and that any differences associated with second-language learning are unrelated to metalinguistic awareness. It would be interesting to examine this idea further in order to pinpoint the role language development plays in the development of

metalinguistic awareness (see also Bowey & Patel, 1988; Clark, 1978; Smith & Tager-Flusberg, 1982).

Before closing, there is one limitation of this study, as in all studies of bilingual children, to note-- the linguistic group to which a child belongs was not randomly assigned. Many factors contribute to the specific language or languages a child learns and how well he or she might learn them. While many extraneous variables (such as sex and SES) have been accounted for in this study, it is simply impossible to control for all the possible variables which might contribute to the language-learning context (such as, the political or social value put on the language in the community or within the family; see Hakuta, 1986).

This study tested the idea that children with different amounts of exposure to a second language might have enhanced metalinguistic awareness. It was found, contrary to the expectations of most researchers, that children's exposure to a second language did not generally seem to affect their performance on word or phonological awareness tasks. Where there were differences, bilingual children seemed to score consistently lower than monolingual children (and sometimes second-language learners).

While the sample size of this study was small (although comparable to other studies in the field; e.g., Rosenblum & Pinker, 1983), an ideal subject pool was chosen in looking at differences according to knowledge of a second language. Not only were the children preliterate, and thus little affected by graphemic representations of language, but also the second-language learners were young enough so that as adults they will be considered to be

early bilinguals (Hakuta, 1986). Some of the questions raised by this study, such as the importance of language development in the development of metalinguistic awareness and the importance of different cognitive abilities in the performance of metalinguistic awareness tasks, might best be tested in a similar way.

Note

Scheffe's test for multiple comparisons is considered to be more conservative than many other tests applied on an a posteriori basis. Thus, it is not uncommon to consider the .10 level of significance, rather than .05 (see Ferguson, 1981).

Appendices

Appendix I.

Questionnaire to Parents (French and English versions)

The following questionnaire was sent home to parents of all monolingual children and second-language learners.

Please take a few moments to fill out this questionnaire. The information will be used as background information, to help in the statistical analyses of the results. All answers will be kept confidential.

1. Name of child: _____
2. Child's date of birth: _____
3. Child's first language: _____

Does your child speak any other language than the one mentioned above? _____ Yes _____ No

If yes, please specify what language, in what context (e.g. visits to grandparents, at home, etc.), how often (e.g. everyday, once a year), and with whom this other language is used:

4. Please circle the letter corresponding the closest to your total family's annual income:
   a. less than $10,000
   b. $10,000 to $19,000
   c. $20,000 to $29,000
   d. $30,000 to $39,000
   e. $40,000 to $49,000
   f. $50,000 to $59,000
   g. more than $60,000

5. Please circle the letter corresponding the closest to the highest level of education attained by the child's mother (if the mother lives with the child):
   a. high school
   b. CEGEP
   c. some university courses
   d. university degree
   e. post-graduate

6. Please circle the letter corresponding the closest to the highest level of education attained by the child's father (if the father lives with the child):
   a. high school
   b. CEGEP
   c. some university courses
   d. university degree
   e. post-graduate

7. If mother works outside of the home, what is her occupation? (please be specific): _____

8. If father works outside of the home, what is his occupation? (please be specific): _____

The English questionnaire as well as the following French questionnaire were sent home to the parents of the bilingual children. Parents could thus respond in the language of their choice.

Veuillez prendre quelques minutes pour remplir ce questionnaire. Toutes reponses seront gardees anonymes et strictement confidentielles.

1. Nom de l'enfant: _____
2. Date de naissance: _____
3. Langue(s) maternelle(s): _____
4. Est-ce que votre enfant parle une langue autre que celle(s) mentionee(s) ci-dessus? _____ Oui _____ Non

Si oui, veuillez préciser quelle langue, dans quelle contexte cette langue est utilisée (e.g. visites aux grand-parents, a la maison, etc.), avec quelle fréquence (e.g. tous les jours, une fois par mois), avec qui et depuis quand cette langue est utilisee.

5. Veuillez indiquer le niveau d'enseignement le plus haut atteint par la mere de l'enfant (si la mere habite avec l'enfant):
   a. secondaire V
   b. CEGEP
   c. quelques cours universitaires
   d. un brevet universitaire
   e. autre (spécifiez)_____

6. Veuillez indiquer le niveau d'enseignement le plus haut atteint par le pere de l'enfant (si le pere habite avec l'enfant):
   a. secondaire V
   b. CEGEP
   c. quelques cours universitaires
   d. un brevet universitaire
   e. autre (specifiez)_____

7. Si la mere travaille hors de la maison, quelle est sa profession?
   _____

8. Si le pere travaille hors de la maison, quelle est sa profession?
   _____

9. Veuillez indiquer le revenu annuel total de votre famille (approximativement):
   a. moins de $10.000
   b. $10.000 à $19.000
   c. $20.000 a $29.000
   d. $30.000 a $39.000
   e. $40.000 a $49.000
   f. $50.000 a $59.000
   g. plus de $60.000

Appendix II.

Clay Reading Test with Modifications

First, children were shown hand-drawn pictures of familiar items with words (a telephone booth, a Coke bottle, a stop sign, a McDonald's sign, and an exit sign). Children were told, "I bet you know how to read a little bit. I have some pictures here that have some writing in them. I want to see if you can guess what any of the writing says." This section of the test was not scored; it was designed to encourage children to guess as much as possible. Verbal encouragement was given throughout the test, regardless of the correctness of the answer.

Secondly, children were asked to identify 20 letters. They were told, "I want you to tell me the names of these letters." The experimenter pointed to the first letter, X, and asked, "What's the name of this letter?" If the child failed to respond, then the experimenter said, "That's an X." and then did not provide feedback for any other of the letters. The first letter was scored as correct only if the child responded correctly, either before or after the experimenter's prompting. Both the correct sound and the correct name of the letters were counted as correct responses. The letters were presented five to a page in the following order:

X, B, S, i, C
Z, K, m, T, P
u, r, G, Y, I
n, a, j, h, r

Next, children were asked to identify 10 numbers. They were asked, "See if you can tell me the names of these." Answers in French or English were counted as correct. The numbers were presented five to a page in the following order:

7, 1, 3, 6, 8
5, 2, 9, 4, 10

Lastly, the children were asked to do the Clay Ready-to-Read test. They were shown some words and asked, "I want you to look at these and tell me if you think you know what any of them say. It doesn't matter if you're not sure. Just guess and see if you know what any of them are." The experimenter pointed to the first word, the, and said, "Do you know what this word is?" If the child made no attempt to answer, the experimenter told the child the correct answer. This was scored as correct only if the child correctly identified the word, before or after experimenter feedback. Words

were scored correctly only if the word was correctly identified or if the word was sounded out in its entirety. The words were arranged four to a page, as follows:

the, I, mother, are
here, me, shouted, am
with, car, children, help
not, too, meet, away
said, and, to, will
look, he, up, like
in, where, Mr, going
big, go, let, on
is, father, come, for
a, you, at, school
went, get, we, they
ready, this, boys, please.

This test was taken from Bowey (personal communication, 1991).

Appendix III.

Word lists for word segmentation task

String type	String length: Two words	Three words
Syllable congruence		
Adjectives	red sweet	dark old nice
	mad white	fine brown clean
	small sad	pink sick sweet
Nouns	book egg	hand bed lunch
	house moon	chair game star
	snack tree	school door hat
Phrases	long hair	wise old man
	your shoe	big red dog
	blue eyes	good strong arm
Syllable incongruence		
Adjectives	little pretty	yellow tall funny
	slow dirty	happy purple dirty
	afraid ready	different yucky black
Nouns	elephant sugar	foot Mommy morning
	potato bell	jacket milk telephone
	chair dinner	cookie rabbit school
Phrases	silly joke	little green engine
	scary lion	funny yellow truck
	nice picture	tall pretty flower

Instructions to subjects:

Today we're going to play a tapping game. I'm going to say some words and then I'm going to tap once for every word. Listen carefully and I'll show you how to play the game. [The experimenter then demonstated the first training triad. "ducks tractors horse".] "Ducks". [The experimenter tapped once.] I tapped one time for "ducks" because there was only one word, "ducks". "Ducks tractors". [The experimenter tapped twice.] I tapped two times for "ducks tractors" because there were two words, "ducks" and "tractors". I tapped one time for "ducks" and one time for "tractors". "Ducks tractors horse". [The experimenter tapped three times.] I tapped words, "ducks", "tractors", and "horse". I tapped one time for "ducks",

one time for "tractors", and one time for "horse". See the way the game is played? For every word I say I give a tap. Now I want you to do it. Say "ducks" and tap it. Good. Now say "ducks tractors" and tap it. Good. Say "ducks tractors horse" and tap it. [If the child made an error on any string, corrective feedback was provided and the item repeated. If the child made another error, manual feedback was given, with the experimenter guiding the child's taps while saying the word string]. Now let's do those again to make sure you can play the game. This time I'll mix them up to see if I can trick you. [The items were presented again but in a different order. The entire procedure described above was then repeated with a new training triad, "apples kite clowns". Upon completion of the second training triad, the child was presented with the 36 test items, but no feedback was given.] OK. Now, we'll play the real game. I'll say some words, but I won't tap them because you know how to play the game yourself. So, you say the words after me and tap them as you say them. OK? (taken from Tunmer, Bowey, & Grieve, 1983, p. 574).

Appendix IV.

Counterfactual Test

The experimenter put on a blue-haired puppet and explained that "Mr. Blue" was from a "faraway country, where everyone has blue hair [turns puppet around to show its blue hair], walks on their hands [demonstrates], and rides tricycles to work." The experimenter then offered the puppet to the child, who then assumed the role of Mr. Blue. The experimenter prompted the child to have Mr. Blue repeat his story in the first person. At this point the experimenter ceased prompting and asked the child three questions: "Is your hair the color of the earth or of the sky?" (correct answer: sky); "When you go for a walk, do you put your shoes on the part of your body that has fingers or that has toes?" (correct answer: fingers); and "Do the grown-ups ride to work on something that has three wheels or that has four wheels?" (correct answer: three). The order of mention of the two alternatives in each question was counterbalanced across children. (Rosenblum & Pinker, 1983, p.776).

Appendix V.

Name Manipulation Task

The name manipulation task consisted of three parts: 1) hypothetical questions as to the viability of changing names and manipulation of objects with changed names, 2) questions about the attributes of objects with changed names, and 3) questions about the generalizability of changed names. This task was adapted freely from Rosenlum & Pinker (1983) and Smith & Tager-Flusberg (1982).
1) Instructions to subjects: If you and I were going to make up a new language that no one had ever heard before, could we call this table a shig? [The experimenter put the toy table in front of the child. The experimenter asked the child to justify the response by asking "Why?" or "Why not?" where appropriate]. How about this snake? Could we call this snake a book? [The experimenter put the snake in front of the child and asked for justification of the response as above]. Now, let's pretend that this table is a shig. Can you please hand me the shig? Now put the shig next to the frog. Why can we call this table a shig now? Now let's pretend that this snake is a book. Can you please hand me the book? Now put the book next to the owl. Why can we call this frog a book now?

2) Now we're going to call this cow a boat. [Experimenter referred to cow]. Does this "boat" have legs or a smokestack? Does this "boat" walk or does it sail? Why can we call this cow a boat now?

Now we're going to call this ball a chair. [Experimenter referred to ball]. Is this chair for sitting or for bouncing? Is this chair round or is it flat? Why can we call this ball a chair now?

3) Now we're going to call this car a "bear". Can you please hand me the bear? Now put the bear next to the frog. Does this "bear" have wheels or legs? Does this "bear" drive or eat? Why can we call this a "bear" now? If this is a "bear", what's this? [The experimenter picks up another similar but not identical car].

Appendix VI.

Description of Word Judgment Task

Instructions to subjects: This is a puppet named Polly. She doesn't know how to be silly. When people make up words that sound like words but are really just silly, then Polly gets upset. Watch. Polly, is "food" a word? [Polly nods and claps hands]. Yes. "Food" is a word. Polly likes that. Let's try another one. How about "glump"? Is "glump" a word? [Polly hangs her head, shaking it sadly]. No. "Glump" isn't a word. How about "of"? Is "of" a word? [The experimenter waits for child to answer, responding with feedback]. Yes. "Of" is a word. [Polly nods and claps hands]. Let's try another one. How about "plink"? Is "plink" a word? [The experimenter waits for child to answer]. No. "Plink" isn't a word. [Polly hangs her head, shaking it sadly].

At this point, the test items are given in random order. The experimenter did not give children the correct answer after the administration of the test items. Polly was made to respond according to what the child answered. The test content words were: book, chair, mouth, push, play, and swim. The test function words were: from, the, who, at, by, and while. The test nonwords following the phonological rules of English were: pim, pleck, lod, drin, ab, and gesh. The test nonwords which violated the phonological rules of English were: [ftaet], [ngll], [vrahm], [yehp], [uhzh], and [hotsk]. Some test and practice items were taken from Smith & Tager-Flusberg (1982, p. 455).

Appendix VII.

Description of Rime and Onset Judgment Tasks

Description of Rime Judgment Task:

Following Smith & Tager-Flusberg (1982, p.454), children will be introduced to a puppet named Jed.
Instructions to subjects: Do you see this puppet? This puppet's name is Jed. He only likes words that rhyme with his name. Can you think of any words that rhyme with Jed? How about Ted? Jed and Ted rhyme. [The experimenter makes Jed clap his hands and say "Yeah"]. See? Jed likes that word because it rhymes. Let's try another word. How about top? Does top rhyme with Jed? [The experimenter waits for the child to answer, regardless of answer the instructions continue in the same way]. No. Top doesn't rhyme with Jed. [The experimenter makes Jed shake his head and say "No way."]. How about cup? Does cup rhyme with Jed? No. Cup doesn't rhyme with Jed. [Jed shakes his head and says "No way."]. Here's another word. How about led. Does led rhyme with Jed? Yes. Led rhymes with Jed. [Jed claps his hands and says "Yeah".]

Without transition, the 10 test items are presented in the same way to the children. The one difference between examples and test items was that no feedback is given by the experimenter. Jed responded either "No way" or "Yeah" depending on the answer the child gave, not the correct response.

Test items were: bed, head, red, shed, dead, bill, hold, rat, shin, and duck. They were presented in random order to the children.

Description of Onset Judgment Task:

Instructions to subjects: Now we're going to play a game about the beginnings of words. I'm going to tell you two words and you'll tell me if they start with the same sound. Like "fish fancy". Do they start with the same sound. [The experimenter provided corrective feedback on this trial, as with all practice trials, repeating the words with emphasis on the first sounds]. Good. Let's try another one. How about "dog candy"? Do they start with the same sound? Let's try one more. How about "silly sad"? Do they start with the same sound? How about "ship milk"?

The test items were then given to the children in random order and without feedback. The test items which had the same onset

were: "tent tummy", "clap clean", "leg lamp", "duck dish", "truck trip", "nest nose", and "winter won". The test items which had different onsets were: "pear hill", "snake cat", "fan little", "bone sky", "table brown", "mouse soap", and "shed zebra".

Appendix VIII.

Description of Rime and Onset Selection Tasks

Rime Selection Task:

Instructions to subjects: Now we're going to play another rhyming game. I'm going to show you a picture of something, like a fish [the experimenter put the card with the fish in front of child] and then I'm going to show you three more pictures. Your job is to pick out the picture with the name of something that rhymes with the first thing. So, we had a fish here [the experimenter pointed to the fish picture from a card with pictures of the three choices] and now we have a hat [the experimenter pointed out the hat picture], a bear [the experimenter pointed out the bear], and a dish [the experimenter put down the dish card]. So now we have hat, bear, and dish [the experimenter pointed to each picture in turn]. Which word rhymes with fish? [The experimenter provided corrective feedback. The same procedure was repeated for the second practice item. After the two practice items, the test items were presented in random order with no corrective feedback to the child. The experimenter always named each card in putting it on the table, in order to make sure the child knew what the picture was supposed to represent.]

Practice items: fish/ hat bear dish
chair/ pear lake key

Test items: nose/ goat rose tail
sky/ bat rope fly
toy/ boy coat mouse
hill/ sun pill cake
wing/ bee soap ring
tree/ key moon cat
tip/ bee ship car
note/ dog chair coat
fox/ box star nose

This task was freely adapted from Stanovich, Cunningham & Cramer (1984, p. 179) and Curtiss (1977, pp.57-59).

Onset Selection Task:

Instructions to subjects: Now we're going to play a game with the beginnings of words. I'm going to show you a picture of something, like a bell [the experimenter placed the card with the bell in front of the child]. Then I'm going to show you three more pictures. Your job is to choose which word starts with the same sound as the first word. So, here are the three pictures. Here's a nose [the experimenter pointed to the picture of the nose], a cat [the experimenter pointed to the picture of the cat], and a boat [the experimenter pointed to the picture of the boat]. So now we have nose, cat, and boat [the experimenter points to each card in turn]. Which word starts with the same sound as bell? [The experimenter provided the child with corrective feedback and then presented the child with the second practice item, following the same procedure as above. Then the test items were presented to the child in random order, this time with no corrective feedback.]

Practice items: bell/ nose cat boat
star/ pup stick rat

Test items: milk/ mouse cup book
pear/ sky mouth pail
fan/ hill fish dog
bone/ ball wing toy
truck/ cow lamp tree
duck/ bat nail dish
tent/ clock toy mouth
snake/ snail train note
nest/ leg nose hat

This task was adapted freely from Stanovich, Cunningham, & Cramer (1984, p. 180).

Appendix IX.

Description of Rime and Onset Oddity Tasks

Taken from Bowey & Patel (1988, p.381)

Set 1 (Rime oddity):
Practice items: fan hat cat
hop doll top
Test items: sun won rub
peg hen leg
sit pin win
map cap jam
fox cot hot
fill pig hill
meat weed feed
pack back sad
rug cat hug

Set 2 (Onset oddity):
Practice items: box rod rock
lick lip miss
Test items: bun rug bus
pin pig hill
tap ham hat
peg pet bell
flow sky flea
dog doll mop
seed deep seat
food room roof
snow clay claw

Instructions to subjects (rime oddity task):

Now we're going to play another rhyming game. I'm going to tell you three words and you tell me the word that doesn't belong. Here are three words: "fan hat cat". Can you tell me which word doesn't rhyme with the others? [If child answered incorrectly, corrective feedback was given. Once that trial was correctly answered, the same procedure was followed for the second example]. Now we're going to play the real game because you know how to play. [No corrective feedback was provided for the test items] (adapted from Bryant, Maclean, & Bradley, 1990, p.241).

Instructions to subjects (onset oddity task):

Now we're going to play a game with the sounds at the beginning of words. So, this time, when I tell you three words, you tell me which one doesn't start with the same sound. Like "box rod rock". Which one starts with a different sound? [As above, if child made an error, corrective feedback was provided. The second trial string was then presented, following the same procedure]. Good. Now, we're going to play the game. [No corrective feedback was provided for the test items].

Appendix X.

Explanation of Rime and Onset to Children

Introduction to rime awareness tasks: Do you know the nursery rhyme "Jack and Jill"? It goes, "Jack and Jill went up the..." [The experimenter waited for the child to complete the phrase. If the child failed to respond, the experimenter provided the completing word]. Hill. Yes, hill. Jill hill. They sound the same, they rhyme. Can you tell me another word that sounds like "hill", another word that rhymes with "hill"? How about "fill"? Fill rhymes with hill. [Children were encouraged to think of words that rhymed]. Now we're going to play some games about words that sound the same, about words that rhyme (adapted from Bryant, Maclean, & Bradley, 1990, p.241).

Introduction to onset awareness tasks: Now we're going to play some games with words that start with the same sound. Have you ever noticed that some words start with the same sound? Like when you say "Peter Piper picked a peck of pickled peppers", you're saying a lot of words that start with the same sound. "P-p-peter" and "P-p-piper" start with the same sound. Can you hear the same sound at the beginning of those words? Can you think of another words that start with the same sound as "Peter" and "piper"? How about "pickle". "Pickle" starts with the same sound as "Peter" and "piper". [Children were encouraged to think of other words that started with the same sound]. Now we're going to play some games with words that start with the same sound.

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