Does bilingualism matter for early literacy?*

ELLEN BIALYSTOK
York University
JANE HERMAN
National Institute of Education, Singapore

In this paper we discuss three areas of development that have been shown to be fundamental to the acquisition of literacy. These areas are experience with stories and book reading, concepts of print, and phonological awareness. In each area, we review the research comparing the development of these skills by bilingual and monolingual children. In all three areas, research has been contradictory regarding whether or not bilingual children differ from their monolingual peers. We attempt to reconcile some of these diverse findings by identifying more specifically the effects that bilingualism has on children's early literacy development.

Most papers reporting the effects of bilingualism on children's cognitive or metalinguistic development begin with the brief history of bilingual time in which we are reminded about the cyclical history of this research. In short, researchers in the 1950s expected to find bilingual deficits, and did, and researchers in the 1960s expected to find bilingual advantages, and did (see, for example, Hakuta, 1986). While there were obvious social, political, and educational contexts for both these expectations, it is too easy to dismiss the outcomes obtained under each as simply biased observations, or the product of methodological factors that favoured one or the other result. When diametrically opposed solutions are offered to the same question, the prudent approach may not be to declare a winner but to create a context in which both solutions offer a different piece of a complex puzzle.

The lesson from the fluctuating positions on the question of the relation between bilingualism and cognition is that there are not likely to be simple answers to complex questions. In the case of research on the outcome of bilingualism, the study of different kinds of subjects solving different kinds of problems under different conditions inevitably led to different results. Understanding those results requires analysis at a much finer level of detail. It would be surprising indeed if bilingualism conferred an influence so broad in scope and so global in mechanism that it stood in some simple relation to a complex process such as cognitive development. These relationships must be examined at a more finely tuned level of analysis: what is it about bilingualism that has what effects on which aspects of cognitive growth? The formulation of the question that compels us to choose between two broad and opposite options, namely, that bilingualism either helps or hinders cognitive growth, is not helpful.

The question of bilingual influences on development may have some of its greatest impact in the development of early literacy skills by young children. Attention to early literacy has become a priority for researchers, educators, and politicians (see Sweet & Anderson, 1993). Moreover, the combination of increased immigration, increased alternative education programmes based on language options, increased efforts to pass heritage languages on to young children, and increased requirements for multilingual competence to navigate the global economy has elevated to a research imperative the understanding of how bilingual children progress in this area. Nonetheless, there is little research specifically addressed to the early development of those skills needed to support literacy for bilingual children, and the research that exists is diverse in its motivation, results, and implications. It is appropriate, then, to attempt to identify some systematic role for bilingualism in the disparate literature on the acquisition of literacy. Therefore, we will consider ways in which questions about the effect of bilingualism on literacy can be formulated so that meaningful relations are discovered.

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Address for correspondence
Department of Psychology, York University, 4700 Keele Street, Toronto, Ontario, M3J 1P3, Canada
E-mail: ellenb@yorku.ca

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Literacy is a broad concept and its acquisition incorporates many aspects of children's experiences, including social, cognitive, and linguistic development. Each of these aspects of literacy has been investigated, virtually always with monolingual children, and each has been demonstrated to be crucial in the child's entry to literacy. A large and growing body of research has certified the significance of each in the nature and degree of children's early competence with written language. Moreover, each of these areas offers the possibility for bilingual children to develop those aspects of preliteracy concepts differently from monolinguals. The social context of literacy rests importantly on children's early experiences with storybook reading. Bilingual children who may hear stories in more than one language, or using more than one writing system, could establish different notions of text from a very early age. Cognitively, children must develop the mental representations suitable for encoding the abstract relation between print and meanings. Bilingual children have different conceptions of the relation between form and meaning in language, and these insights may develop differently as well. Finally, learning to read in an alphabetic language depends on establishing the phonological awareness needed to isolate and attend to the sounds of language. Bilingual children may exploit their knowledge of two sound systems to enhance this development.

Following the research on the effects of bilingualism on cognition, preliteracy development is likely to be an area in which the capricious and apparently conflicting effects of bilingualism play themselves out. We should expect to find a range of influences from bilingualism and must be prepared to entertain explanatory models pitched at the level of complex interactions rather than simple main effects. What is needed is a detailed analysis of the skills being assessed and the children under study if one is ultimately to understand the complexity of these relationships. The traditionally disparate results that have been obtained in studies of the effects of bilingualism on development may be a reflection of an approach that has defined the cognitive implications of bilingualism too simply. A more complete understanding of the relation between these multidimensional constructs will require a more detailed analysis of each and a more elaborate consideration of their interaction.

We shall illustrate this approach by considering the evidence for the development of three types of preliteracy concepts by monolingual and bilingual children. The three areas, story structure, print concepts, and phonological awareness, were chosen to reflect the broader domains of social, cognitive, and linguistic developments. Following this, we will extract some common themes and patterns in the effort to define a general form in which the effect of bilingualism on these background experiences for literacy can be expressed.

Stories: from listening to reading

Over the past fifteen years, numerous studies have examined the way in which reading aloud to preschool children provides a rich opportunity for exposure to the conventions and style of language used in creating stories (e.g., Teale & Sulzby, 1986; Snow & Tabors, 1993). Some of these studies have probed the style of interaction between parents and their preschool children during book reading and found that distinct routines emerge (Ninio & Bruner, 1978; Snow & Ninio, 1986). There is growing evidence that these routines impart far more to the child than simply the explicitly modelled activity of reading and its fundamental procedures.

Purcell-Gates (1988, 1989) examined kindergartners' understanding of the reading register by using a mock reading task in which the children were asked to pretend to read aloud the story of a wordless picture book. She found that children who were read to regularly at home had greater facility with the style of language used in books than did children who were not. The well-read-to children also gave richer "readings" of the wordless picture book by providing more explicit background information and clearer reference to characters and events depicted. In a longitudinal study of low-income mothers during book-reading interactions with their young children, De Temple (1994) found that some mothers included talk about aspects of the story, its characters, and how these related to the child's life, while others either read the text without much comment, or confined their remarks to the mechanics of the reading activity. The degree to which book reading included talk about the book was positively correlated with kindergarten measures of emergent literacy, such as receptive vocabulary and story comprehension.

It seems, then, that by providing experience with the decontextualized style of language found in stories by reading to children equips emergent readers with a set of skills that are just as important to reading development as learning the alphabet and decoding words. But is the course of development in decontextualized language skills different for bilingual children?

Consistent with most research on bilingual children, the answer is both yes and no. Current research suggests that bilingual children's abilities in each language with decontextualized tasks may be deter-

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mined by the nature of the child's exposure to such tasks in that language. If the child's experiences are similar across languages, then the development of those skills in both languages will be like that of a monolingual child. In all other cases, however, the bilingual child's development of decontextualized skills differs in each language because of differences in exposure and experience.

Over the past ten years, some cross-linguistic studies have examined bilingual children's ability in each language on tasks such as giving formal definitions and picture descriptions (e.g., Davidson, Kline & Snow, 1986; Snow, Cancino, Gonzalez & Shriberg, 1989). These studies found that across their two languages, children displayed similar skill with formal definitions and with picture descriptions, even though some children were stronger in one language than in the other. However, these studies were carried out in carefully selected schools with bilingual curricula in which decontextualized skills were explicitly taught in each language. Among children in these schools, Snow (1990) found that for bilinguals in grades 2 through 5, the quality of informal definitions was related to home language use, while skill in formal classroom definitions was not.

In subsequent cross-linguistic research, Wu, De Temple, Herman and Snow (1994) found that children's decontextualized skill with oral and written picture descriptions reflected the emphasis of their school curriculum. Some children provided richer picture descriptions in the written mode than the oral, reflecting their school's emphasis on decontextualized writing over speaking. Wu et al. concluded that second-language learners must have direct experience in the target language with the discourse demands of a specific task if they are to carry it out as effectively in the second language as in the native language.

Herman (1996) presented a mock reading task to bilingual kindergarteners using a wordless picture book (Mayer, 1969). This task was repeated for each language and accompanied by a range of measures of language proficiency assuring equivalent competence in both languages. Nonetheless, children from homes that offered no exposure to the majority language (English) recounted significantly fewer episodes when performing the task in English than in their curricular language (French). There was a weak correlation between the number of episodes and characters included in children's stories and exposure to books in French, the language of school instruction. In contrast, there was a strong positive relationship between exposure to books in English at home and the inclusion of more episodes and characters in the English mock reading. Since children's education was exclusively in French, the only exposure they had to English texts was at home, and this determined the quality of their stories in English. Reading to children in English at home provided them with the ability to tell stories in English, even though conversational proficiency in English was about the same for all the children.

This finding supports the conclusion of Wu et al. that bilingual children need experience with the specific discourse demands of a task in each language to acquire the skill in that language. All of the children in Herman's study were schooled in French, and as part of the regular kindergarten day their teachers read a book aloud to them in French; therefore they were all exposed to story construction in French. Since their curriculum was entirely French-based, their only opportunity for exposure to English books was in the home. This disparity in the children's exposure to books in French and in English may account for the stronger association between books read in the target language at home and performance on the mock reading task in English. These results exemplify a potential limit on the extent of transfer of decontextualized language skill from one language to another.

Herman's findings suggest that the course of development in decontextualized skills related to literacy may be different for bilingual children as a function of specific experiences in each language. While children in schools with a truly bilingual curriculum may be able to transfer all of their decontextualized language skills from the first language to the second language, children in schools where all instruction takes place in one language may be able to carry out certain tasks only in the language of exposure to those tasks, at least at the stage of emergent literacy in kindergarten. This transfer sets out the possibility for a bilingual advantage in development if the conditions are supportive in both languages, but bilingual children could well be deprived of that possibility by the nature of their experience with each language.

Concepts of print

There is a large industry involved in developing standardized tests that are used as diagnostic tools to assess the readiness of preschool children for the formidable task of learning how to read. These tests typically consist of a number of subsections, each devoted to a small aspect of the complex process of reading. Nurss (1979) examined a variety of these tests, extracted from them the major categories of assessment used, and identified the recurring component tests. For example, in the category of reading skill, some of the common skills tested were visual

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discrimination of letters and words, visual memory, letter recognition, auditory discrimination, auditory memory and auditory blending. What the tests typically did not examine, however, were the conceptual aspects of learning to read, such as concepts of word and letter.

There is little doubt that the skills measured on standardized reading readiness tests play an important role in the child's early attempts to learn to read. Nonetheless, it seems equally clear that these component skills themselves are poor predictors of the child's state of readiness to read. They are, in other words, necessary but not sufficient. What is missing in these assessments is an examination of children's concepts of print: what is the purpose of the marks on the page?

A series of studies by Ferreiro (1978, 1983, 1984) focused attention on this important but neglected aspect of preliteracy knowledge. She showed that young children who were able to identify and print letters had little idea about how letters functioned in words. Children frequently believed that the letters were representational objects, somewhat like pictures, and so thought that big things needed to be written in larger letters than small things, that a set of many things needed more letters than a single object, and that people could be properly represented by the first letter of their name. These ideas indicate a lack of understanding of the symbolic function of letters in words. Specifically, children who could identify letters and use them to write simple words did not understand about the relation between letters and sounds that determined what words were written. Many of these children would presumably perform reasonably well on a standardized test of reading readiness because they had basic knowledge of the forms of print; nonetheless they performed poorly when asked about the function served by these printed forms. Without such understanding, however, they would not be able to read new words.

Bialystok (1991) investigated the transition from knowing printed forms as visual objects to understanding their symbolic function. Preliterate children who could recite the alphabet, recognize printed letters, and print their names, were unable to solve two tasks concerning the symbolic function of those letters. In the first, the Moving Word task, a card containing the printed name of an object was placed under a picture of that object and then "accidentally" moved so that it was under a different picture. When the word was under the wrong picture, 65 per cent of the children believed that the word named on the card changed to correspond to the picture it was under. They did not accept that the printed word retained its identity through the printed forms irrespective of a changing pictorial context. In the second, the Word Size task, children were asked to decide which of two words was longer. When the word size conflicted with the object size (for example, *train–caterpillar*), children found the problem difficult. In spite of their formal knowledge of letters and writing conventions, these children failed to understand how the letters function to represent language.

The two tasks assess different aspects of the concept of print and require different skills for their solutions. The Moving Word task addresses understanding of the general symbolic function that written notations represent meanings in conventional ways by virtue of their forms. A written word has an invariant meaning because of the nature of writing. To solve this task, children require selective attention – they need to focus on the written form and ignore other information, no matter how salient or compelling it is. The manipulation in the Moving Word task is to present children with information from two sources, the printed word on the card and the pictured object, and then place them in conflict with each other. In the storybooks with which they are familiar, these sources are perfectly congruent – the text and the picture tell the same story. It is possible that preschool children who follow along as stories are read to them are not really clear about the relationship between the text and the picture in telling the story. However, because there is no conflict, their understanding of the relation between the words and pictures is never challenged.

The Word Size task assesses children's understanding of the alphabetic principle by focusing on the relation between letters and sounds. Although there is some problem of selective attention because children need to choose between object size and word size to arrive at the correct answer, the main requirement is an explicit knowledge of the function of letters in words. Although children were selected for the study if they could properly name the sound made by individual letters, the results of the Word Size task show that these children did not understand the nature of the relation between the letter and its sound. To pass the screening task, children needed only to understand an association between them; to pass the Word Size task children needed to see that the association is symbolic. It is possible to know that "*b*" says /b/ in the same way that children know that dogs have four legs. It is more difficult to understand that each letter in a word is a placeholder for a phonetic value. This is the knowledge that children lacked when they failed the Word Size task.

These tasks require different cognitive processes for their solution. The Moving Word task depends on selective attention, an aspect of control of proces-

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sing described elsewhere (Bialystok, 1993). The Word Size task requires explicit knowledge of formal relations, an aspect of analysis of knowledge (Bialystok, 1993). Previous research has repeatedly shown that bilingual children have an advantage over monolingual children in problems requiring control of processing but no necessary advantage in problems requiring analysis of knowledge (Bialystok, 1988). Analysis of knowledge develops in response to particular experiences or levels of proficiency that may or may not accompany bilingualism. From this perspective, it follows that bilingual children should be more advanced than monolingual children in solving the Moving Word task but specific experience should be necessary for any advantage on the Word Size task to be demonstrated.

This hypothesis was tested by examining two groups of four- and five-year-old bilingual children and a new group of monolinguals solving the Moving Word and Word Size tasks (Bialystok, 1997a). The first group of bilingual children was French–English bilinguals; the second was a similar group of Chinese–English bilinguals. All of the bilingual children were fluent in both languages, had extensive story book experiences in both languages and were familiar with print in both languages. The difference between the two groups is that the French–English bilinguals knew only one writing system, since it is the same for both of their languages, while the Chinese–English bilinguals were learning two completely different systems.

The results of the study confirmed the predictions. On the Moving Word task, both groups of bilingual children performed well above the level achieved by the monolinguals. On the Word Size task, the French–English bilinguals scored exactly the same as the monolinguals, but the Chinese–English bilinguals were different from both of these. The four-year-olds performed at a lower level than all the other children, but the five-year-old Chinese–English bilinguals significantly surpassed all the other children. They were the only group who could successfully connect the number of sounds in a word with the number of letters needed to write it. The experience of needing to learn the principles for two completely different writing systems helped them realize in a more explicit way what the formal structure was for each of these systems. In this case, bilingualism accompanied by biliteracy eventually resulted in more advanced understanding of the symbolic relation between letters and sounds in an alphabetic script.

The younger Chinese–English bilinguals scored lower than all the other children did on the Word Size task. They were trying to understand the principle of writing in two different systems and they were confused by the differences. What was it about the difference between the systems that led to this confusion? Chinese characters are different from the Roman letters used for English and French in two ways: the forms are visually different and they represent a different linguistic feature, namely, morphemes instead of sounds. Either or both of these could have caused the problem for the younger children. To investigate this question, the study was replicated with a group of Hebrew–English bilinguals and a new group of monolingual controls (Bialystok, Shenfild & Codd, in preparation). The Hebrew writing system is different from the English one in only one way, namely, the visual forms are different. Like English, the Hebrew writing system is alphabetic and phonetically records the sounds of speech. The results showed that the four-year-olds performed similarly, and the five-year-old bilinguals were significantly better than the monolinguals. Therefore, the advantage at age five was replicated without the initial disadvantage at age four. Children could cope with visually different letters and eventually profited from applying the alphabetic principle in two different ways.

The differences between the two children in these studies provide an important foundation for understanding how children proceed into literacy. Although all the children performed at about the same level in the screening tasks, they did not have the same comprehension of the basic concepts of print. It is clear that simple knowledge of these principles is not sufficient for reading (or else all the children in the study would be readers), yet the impact of bilingualism on arriving at these insights depended on the experience with print and the relation between the two writing systems. There was an overall and generalized effect of bilingualism in understanding the basic symbolic function of print, but there was no simple advantage in figuring out the principle by which print is able to convey meanings. The effect of bilingualism here was a specific response to the relation between the writing systems.

Phonological awareness

If there is anything like consensus in the literature examining the preparatory skills for reading in an alphabetic script, it is that the development of children's phonological awareness is essential (for overviews, see collections by Brady & Shankweiler, 1991; Gough, Ehri & Treiman, 1992; Rieben & Perfetti, 1991). An early debate about whether these phonological skills preceded and determined literacy (e.g., Bradley & Bryant, 1983; Wagner & Torgesen, 1987) or followed as a consequence of literacy (e.g., Ehri,

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1979; Gattuso, Smith & Treiman, 1991), has largely been resolved into the interactive position (e.g., Morais, Bertelson, Cary & Alegria, 1986). In fact, the solution was proposed by Liberman, Shankweiler, Liberman, Fowler and Fischer (1977) long before the battle positions were drawn, but no-one was listening. There is little dispute now that preschool children who will learn to read an alphabetic script must approach the task with some awareness of sublexical sound segments, such as rhyme, and continue to develop more elaborate phonological concepts, such as phoneme, as a consequence of learning how to decode the print. Adams (1990) presents an important integration of this research and explains how these skills form an essential basis for learning to read.

Unlike the clear results that relate phonological awareness to reading, there is less clarity on the issue of how phonological awareness develops. Why do children begin to notice and enjoy the sound patterns of words and why do some children find them intrinsically more interesting than other children do? Wimmer, Landerl, Linortner and Hummer (1991) explored individual differences in children's development of phonological awareness and found that some children were simply more able to extract these concepts from spoken language than were others. Those who could, whether by spontaneous discovery or by instruction, were more skilled in reading and spelling by the end of first grade than were those for whom the phonological structure of words was difficult to comprehend.

If phonological awareness develops through intrinsic sensitivity to the sounds of language, enhanced perhaps by language games, increased vocabulary, and attention to language, then it is possible that children with two languages during these early formative years will progress more quickly into this understanding. Bilingual children may have more advanced phonological awareness than monolingual children because they have had greater opportunity to participate in the activities which promote that awareness as well as a broader oral experience in the early years.

There are a small number of studies that have examined the development of phonological awareness in bilingual children in terms of the norms set by their monolingual peers. The results, to say the least, are mixed. Rubin and Turner (1989) compared the phonological awareness of English-speaking first-grade children who were either in French immersion or in English programmes. The bilingual group in this case was bilingual in a somewhat narrow or limited way. The children had been attending French immersion programmes since kindergarten where their entire school day was (theoretically) conducted in French, amounting to just over a year of French instruction. Nonetheless, they found an advantage for these children when compared with their peers in the English programme. In another study, Campbell and Sais (1995) examined a small group of preschool Italian–English bilinguals on a battery of phonological awareness tasks. These children typically spoke Italian at home, usually with grandparents, and were educated in English. The bilingual children in this study performed at a higher level than the monolinguals on all tasks with the exception of letter identification. These are promising results for bilinguals, although language and cognitive differences between the groups were not well controlled.

Bruck and Genesee (1993) were concerned that the study by Rubin and Turner (1989) did not properly control for other factors that could have skewed the results in favour of the French immersion children. Hence, they replicated the study but paid careful attention to such factors as children's reading experience and their cognitive and linguistic skills. Furthermore, they tested children twice – once in kindergarten and again in Grade 1. On a large battery of phonological awareness tasks, they found an advantage for bilingual children in kindergarten, but no advantage, in fact, a disadvantage on some tasks, by first grade. Similar results were reported by Yelland, Pollard and Mercuri (1993) who also found that a bilingual advantage in kindergarten disappeared by end of grade 1. Nonetheless, they also examined some aspects of early reading and found that the grade 1 bilinguals maintained an advantage over monolinguals in word recognition.

These studies showed that even limited bilingualism translated into increased sensitivity to sounds, at least for a short time. Presumably by first grade, when children were being taught to read, the attention to sound was required for all of them and the children became more comparable in their abilities. Identifying sounds, however, is only a small part of being aware of the phonological structure of language. Just as children's concepts of print were overestimated by simple knowledge of letters, so too metaphonological awareness could be overestimated by simple identification of sounds. Assessment of phonological awareness should include some measure of children's ability to manipulate sounds as well as identify them.

In a study by Bialystok (1997b), children between five and seven years old who were monolingual or bilingual were asked to solve a difficult problem in phonological awareness. The bilingual children were French–English bilinguals who attended French-language schools but lived in English-speaking com-

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munities. The task asked them to replace the initial sound in one word with the initial sound from another word. For example, the word "cat" could be converted to "mat" by substituting the first sound of "mop" into the target word. The instructions were given in three different conditions. In the Sound condition, children were asked to take away the /k/ sound in "cat" and replace it with the /m/ sound from "mop". In this case, the phonemic segmentation was performed for the child and the child needed only to substitute the new sound and create the solution word, "mat". In the Picture condition, children were shown pictures of the two words, "cat" and "mop" to reduce the burden on working memory. While looking at the pictures, children were asked to take away the first sound in "cat" and replace it with the first sound in "mop". Finally, in the No Cue condition, no aids were provided to assist in the process of replacing the initial sound of the given word.

The results showed a completely different pattern of response for the two groups. In general, the monolinguals performed better than the bilinguals in the conditions that provided cues, but the bilinguals were significantly better in the No Cue condition. Moreover, the monolinguals found the cued conditions reliably easier than the No Cue, but for the bilinguals the three conditions were exactly the same.

One possible explanation is that, just as in the Moving Word task, monolingual children incorporate all the extraneous visual and acoustic information into their responses while the bilinguals focus only on the problem. Although this information was misleading in the Moving Word task, it was facilitating in the phonological task and the monolinguals reaped the benefits of those cues. Again, the difference between the groups is in selective attention, but the consequence of more focused attention is not always consistent. Research in progress that is comparing a group of Spanish–English bilinguals, Chinese–English bilinguals, and monolinguals on some of these tasks shows that most of the advantages found in phonological awareness are confined to the Spanish–English group. The Chinese–English bilingual children perform similarly to the monolinguals. Presumably, the disparity between the sound systems of the two languages is too much to overcome for the benefit of analysing two phonological systems to emerge.

Do bilingual children have an advantage over monolingual children in solving phonological problems that involve the manipulation of phonemes? If so, the implications would be that bilingual children are more prepared for learning to read than are monolingual children who have otherwise similar abilities. Furthermore, these phonological skills that are acquired in the context of one language may have influence beyond that language. In other words, the phonological sensitivity to a specific language that is nurtured by bilingualism may enhance children's language proficiency more broadly. There is some evidence that this may be the case. Durgunoglu, Nagy and Hancin-Bhatt (1993) found that phonological awareness and word recognition in Spanish L1 predicted word recognition in English L2 for beginning readers. In other words, phonological awareness developed in Spanish helped the children learn to read English. It is important to note here that the two languages are based on similar sound systems. What is not clear from this study is how the phonological awareness of these children might have developed had they been monolingual. The other question to investigate is whether such transfer would occur if the two languages were English and Chinese.

Bilingualism: a factor in learning to read?

The three areas of competence surveyed as part of children's preparation for literacy each rests on a different developmental foundation and has a different role in the development of literacy skills. Experience with storybooks is part of the social, cultural, and experiential background that motivates children and interests them in literacy as a communicative skill. The importance for learning to read is that it exposes children to literate forms of language, including explicit attention to reference and anaphora and the logical organization of text. Concept of print is one of the primary cognitive skills that prepare children for the symbolic process of decoding conventional notations into familiar and meaningful language. Phonological awareness is the most important of the metalinguistic skills that are basic to reading. Phonological awareness has repeatedly and independently been shown to underlie access to literacy and to assure progress into fluent reading. Thus, the three areas cover the social, cognitive, and linguistic aspects of a skill that is arguably the most important and multifaceted achievement that children will master in their early school years and perhaps beyond. Does being bilingual change the way children develop these preparatory skills and perhaps influence the acquisition of literacy itself?

Each of the three areas of competence follows a complex path of growth and bears a different link to bilingualism. Bilingual children are better able to produce the story structure and literate vocabulary of a language in which they are read stories. This story proficiency is language-specific – children demonstrate a sophisticated control over the language in

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which they have experienced literacy but no generalized sensitivity to language structure that they apply to all their discourse. Bilingualism on its own has no visible effect on this part of literacy. The sensitivity to language that characterizes most bilingual children is insufficient for the development of a greater awareness of discourse structure that underlies the use of literate forms of language. It could have been otherwise: one could have expected bilingualism to produce greater flexibility in language use that would allow children to develop more advanced forms of discourse. This did not happen. Children learn about the literate forms as they gain proficiency in language, and bilingual children learn these skills separately for each language.

Concepts of print are a key cognitive foundation for learning to read. These concepts include a variety of insights about the meaning of print and its relation to language, and children's understanding of these concepts can be assessed in many ways. Those aspects of print that are based on the functional significance of writing are understood better by bilingual children than by monolinguals. In the Moving Word task, children needed to recognize that the meaning of the word resides exclusively in its written form. If a written word says "dog", then it needs nothing else to make that its meaning; a picture of a cat cannot change the meaning of the written form. This is similar to the ability that bilingual children have shown in attributing meaning to oral forms. For example, bilingual children are better than monolinguals at the sun-moon problem in which they must attribute meaning to spoken forms irrespective of the context: if the names for the "sun" and "moon" are interchanged, then the sky will be dark when the sun is up (Bialystok, 1988). Monolingual children pay attention to the familiar context and answer incorrectly. Thus, for both oral and written language, bilingual children see the distinction between form and meaning and attend correctly to the form as the source of meaning.

In contrast to the advantages shown for aspects of concepts of print that are rooted in the relation between form and meaning, those concepts based more on explicit knowledge of the alphabetic principle yield no general bilingual advantage. In this case, experience with different writing systems promotes these concepts for children under certain conditions that depend on the relation between the two writing systems.

Finally, bilingual children have a small advantage in some measures of phonological awareness, especially in the early stages and on simple tasks, but this advantage is neutralized by the superiority of monolinguals on other phonological awareness problems. Two factors are important in children's development of phonological awareness. The first is the ability to focus on the oral signal independently of the salient meaning. Because selective attention is crucial here, bilingual children show their familiar advantage. Second, the relation between the languages determines whether any accelerating influence will be demonstrated. In this case there are both language-specific effects, as there were for the social and discourse aspects of literacy, and general bilingual effects, as there were for the cognitive aspects of literacy.

In all these areas, bilingual children are not progressing towards literacy at the same rate nor in the same manner as monolingual children, but the differences between the groups are multidimensional. Moreover, the differences are not always to the advantage of bilingual children, as was seen by the younger group of English–Chinese bilinguals solving the Word Size task and the bilingual children solving some conditions of the phonological awareness task. Does this variability mean that there is no systematic relation between learning two languages in childhood and the process of acquiring literacy?

Traditionally, bilingualism has been treated as a single independent variable in research designs. This means that children are categorized and placed into experimental groups based on their use of one or more languages. Some dependent variable, such as cognitive flexibility, metalinguistic development, or acquisition of literacy, is measured and performance is compared across groups. The premise in this kind of research design is that bilingualism is objective, identifiable, and binary. Indeed, the credibility of the research design depends on the reliability and validity of the independent variable. Other independent variables certainly meet these criteria: children are either boys or girls, they are either four or five years old, and they attend one school or another. Bilingualism, however, is not like that.

Because of this experimental paradigm, research on the effect of bilingualism on children's development has tended to seek conclusive decisions on binary questions. Most central has been the issue of whether or not bilingualism affords some identifiable effect, positive or negative, on children's cognition. The fallacy in this question is demonstrated in the literature on children's moving into literacy. The question, put in those simple binary terms, cannot be answered. Each of the three background skills that children must acquire to become literate was affected differently by the child's bilingualism.

This problem in defining bilingualism is part of the reason that research results have been variable and uneven. In the research surveyed above, several di-

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mensions that complexify the definition of bilingualism were identified: the type of experience in the language, the level of proficiency in each language, the relation between the two languages, and the type of writing system employed by each language. Each of these factors alters the nature of the bilingual experience and each was crucial in determining the type of effect that bilingualism had in the mastering of one aspect of literacy. Therefore, we need to reformulate the question to allow a role for different bilingual configurations to exert unique effects. The systematicity that would emerge from this is in understanding how each of these bilingual variations affects development.

Another source of systematicity in the disparate data emerges from a consideration of the cognitive processes implicated in the various components of the preliteracy skills. One means of interpreting task demands is in terms of the processing components of analysis and control (Bialystok, 1993). As discussed earlier, control develops more rapidly in bilingual children than in monolinguals, and as shown by the research reviewed here, helps bilingual children to master those aspects of preliteracy skills requiring selective attention to language and its representational forms.

Finally, the various aspects of preliteracy serve different functions in bringing children to literacy. Some aspects, like phonological awareness, are central to the establishment of the basic skills implicated in reading. The development of these fundamental skills is influenced in some measure by children's bilingualism. Other aspects, like experience with story structure, bear a more indirect relation to reading. Although a strong tradition in listening to stories imparts greater facility in the language of literate text, there is no evidence that it bolsters the underlying skills that are involved in the mechanics of reading. In this sense, the experience of storybook reading is specific to the language of those stories, and bilingualism is largely irrelevant in the impact that will derive from this essential preparatory experience.

The approach we have taken in explaining the variability of bilingualism as a factor in children's development of literacy presents a challenge to future research. To understand bilingual influences, it is necessary to take into account who is being studied, what the task is, and how the task relates to the development of literacy. The first question requires a more complete description of the nature of the child's bilingualism. The second question depends on a task analysis of the skills that relate them to ongoing cognitive processes that are developing at this time. Finally, the third question requires a theoretical description of how literacy is built out of earlier skills and experiences. If we are correct, then further studies will need to include detailed descriptions addressing the variance on each of these dimensions. We must also accept that questions that aim to discover the overall impact of an experience like bilingualism are oversimplifications that mask a richly textured fabric.

References

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Bialystok, E. (1988). Levels of bilingualism and levels of linguistic awareness. *Developmental Psychology*, 24, 560–567.

Bialystok, E. (1991). Letters, sounds, and symbols: Changes in children's understanding of written language. *Applied Psycholinguistics*, 12, 75–89.

Bialystok, E. (1993). Metalinguistic awareness: The development of children's representations of language. In C. Pratt & A. Garton (eds.), *Systems of representation in children: development and use*, pp. 211–233. London: Wiley & Sons.

Bialystok, E. (1997a). Effects of bilingualism and biliteracy on children's emerging concepts of print. *Developmental Psychology*, 33, 429–440.

Bialystok, E. (1997b). *Metalinguistic matters: does bilingualism matter?* Paper presented in symposium, "Entry to literacy by bilingual children", at the biennial meeting of SRCD, Washington, DC.

Bialystok, E., Shenfild, T. & Codd, J. (in preparation). *Effect of writing system on developing concepts of print*. Manuscript in preparation,Y ork University.

Bradley, L. & Bryant, P. E. (1983). Categorizing sounds and learning to read – a causal connection. *Nature*, 301, 419–421.

Brady, S. A. & Shankweiler, D. P. (eds.) (1991). *Phonological processes in literacy: A tribute to Isabelle Y. Liberman.* Hillsdale, NJ: Erlbaum.

Bruck, M. & Genesee, F. (1993). *Phonological awareness in young second language learners.* Unpublished manuscript, McGill University.

Campbell, R. & Sais, E. (1995). Accelerated metalinguistic (phonological) awareness in bilingual children. *British Journal of Developmental Psychology*, 13, 61–68.

Davidson, R. G., Kline, S. B. & Snow, C. E. (1986). Definitions and definite noun phrases: Indicators of children's decontextualized language skills. *Journal of Research in Childhood Education*, 1, 37–47.

De Temple, J. M. (1994). *Book reading styles of low-income mothers with preschoolers and children's later literacy skills.* Unpublished doctoral dissertation, Harvard University.

Durgunoglu, A. Y., Nagy, W. E. & HancinBhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology*, 85, 453–465.

Ehri, L. (1979). Linguistic insight: Threshold of reading

https://doi.org/10.1017/S1366728999000139 Published online by Cambridge University Press

acquisition. In T. G. Waller & G. E. MacKinnon (eds.), *Reading research: Advances in theory and practice*, pp. 63–111. New York: Academic Press.

Ferreiro, E. (1978). What is written in a written sentence? A developmental answer. *Journal of Education*, 160, 25–39.

Ferreiro, E. (1983). The development of literacy: A complex psychological problem. In F. Coulmas & K. Ehlich (eds.), *Writing in Focus*, pp. 277–290. Berlin: Mouton.

Ferreiro, E. (1984). The underlying logic of literacy development. In H. Goelman, A. Oberg & F. Smith (eds.), *Awakening to Literacy*, pp. 154–173. Exeter, NH: Heinemann Educational Books.

Gattuso, B., Smith, L. B. & Treiman, R. (1991). Classifying by dimensions and reading: A comparison of the auditory and visual modalities. *Journal of Experimental Child Psychology*, 51, 139–169.

Gough, P. B., Ehri, L. C. & Treiman, R. (eds.) (1992). *Reading acquisition.* Hillsdale, NJ: Erlbaum.

Hakuta, K. (1986). *Mirror of language: The debate on bilingualism.* New York: Basic Books.

Herman, J. (1996). *''Grenouille, where are you?'' Cross-linguistic transfer in bilingual kindergartners learning to read.* Unpublished doctoral dissertation, Harvard University.

Liberman, I. Y., Shankweiler, D. P., Liberman, A. M., Fowler, C. & Fischer, F. W. (1977). The structure and acquisition of reading: II. The reading process and the acquisition of the alphabetic principle. In A. S. Reber & D. L. Scarborough (eds.), *Toward a psychology of reading*, pp. 207–225. Hillsdale, NJ: Erlbaum.

Mayer, M. (1969). *Frog, Where are You?* New York: Dial Press.

Morais, J., Bertelson, P., Cary, L. & Alegria, J. (1986). Literacy training and speech segmentation. *Cognition*, 24, 45–64.

Ninio, A. & Bruner, J. (1978). The achievement and antecedents of labelling. *Journal of Child Language*, 5, 5–15.

Nurss, J. R. (1979). Assessment of readiness. In T. G. Waller & G. E. MacKinnon (eds.), *Reading research. Advances in theory and practice, Vol. 1*, pp. 31–62. New York: Academic Press.

Purcell-Gates, V. (1988). Lexical and syntactic knowledge of written narrative held by well-read-to kindergartners and second graders. *Research in the Teaching of English*, 22, 128–160.

Purcell-Gates, V. (1989). Written language knowledge held by low-SES, inner city children entering kindergarten. In S. McCormick & J. Zutell (eds.), *Cognitive and social perspectives for literacy research and acquisition*, pp. 95–106. Chicago: National Reading Conference.

Rieben, L. & Perfetti, C. A. (eds.) (1991). *Learning to read: Basic research and its implications.* Hillsdale, NJ: Erlbaum.

Rubin, H. & Turner, A. (1989). Linguistic awareness skills in grade one children in a French immersion setting. *Reading and Writing: An Interdisciplinary Journal*, 1, 73–86.

Snow, C. E. (1990). The development of definitional skill. *Journal of Child Language*, 17, 697–710.

Snow, C. E. & Ninio, A. (1986). The contracts of literacy: What children learn from learning to read books. In W. H. Teale and E. Sulzby (eds.), *Emergent literacy: Writing and reading*, pp. 116–138. Norwood, NJ: Ablex.

Snow, C. E. & Tabors, P. O. (1993). Language skills that relate to literacy development. In B. Spodek and O. Saracho (eds.), *Yearbook in early childhood education*, 4, pp. 116–138. New York: Teachers College Press.

Snow, C. E., Cancino, H., Gonzalez, P. & Shriberg, E. (1989). Giving formal definitions: An oral language correlate of school literacy. In D. Bloome (ed.), *Classrooms and literacy*, pp. 233–249. Norwood, NJ: Ablex.

Sweet, A. P. & Anderson, J. I. (eds.) (1993). *Reading research into the year 2000.* Hillsdale, NJ: Erlbaum.

Teale, W. H. & Sulzby, E. (eds.) (1986). *Emergent literacy: Writing and reading.* Norwood, NJ: Ablex.

Wagner, R. K. & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin*, 101, 192–212.

Wimmer, H., Landerl, K., Linortner, R. & Hummer, P. (1991). The relationship of phonemic awareness to reading acquisition: More consequence than precondition but still important. *Cognition*, 40, 219–249.

Wu, H. S., De Temple, J. M, Herman, J. & Snow, C. E. (1994). L'animal qui fait oink! oink!: Bilingual children's oral and written picture descriptions in English and French under varying conditions. *Discourse Processes*, 18, 141–164.

Yelland, G. W., Pollard, J. & Mercuri, A. (1993). The metalinguistic benefits of limited contact with a second language. *Applied Psycholinguistics*, 14, 423–444.

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