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7 Translation skill and metalinguistic awareness in bilinguals[1]

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Scholars and educators have studied the effects of bilingualism on cognitive and linguistic abilities for almost a century. The question has generally focused on how a child with more than one language mentally organizes language, and on the repercussions of bilingualism on cognitive and linguistic development. Both these questions grew out of what might be called the monolingual-norm assumption: the belief that monolingualism is the cognitive-linguistic norm and that the child's cognitive system is fragile and designed to cope with only one language. The monolingual-norm assumption gave rise to the negative myths surrounding bilingualism: bilingualism has been blamed for cognitive, social, and emotional damage to children (see Hakuta, 1986, for review).

Recent research, however, does not support the view that simply speaking two languages taxes either the cognitive or the linguistic system. Studies of *balanced bilinguals* (bilinguals who have roughly equivalent abilities in the two languages) have suggested that bilingualism has a positive effect on cognitive development, especially under certain conditions of additive bilingualism where both languages are supported academically and emotionally by both the community and the society at large. The influence of the environment plays a large role in determining whether the bilingual situation will be *additive* or *subtractive* (Lambert, 1975). Subtractive bilingualism occurs when the mother tongue is a low-status minority language that is rapidly being replaced by the high-status majority (and second) language. There is evidence that suggests that minority-language Hispanic students in the United States show positive cognitive gains from bilingualism while they are becoming bilingual; that is, while they are receiving academic support from Spanish and learning English (Hakuta, 1988). The majority of studies on bilingualism to date have focused on comparing bilinguals to monolinguals, and most measures used have been derived from and for monolingual samples. Bilingual performance is thus directly compared to monolingual performance – bilinguals may be *handicapped* or *cognitively enhanced*, depending on how they measure up to their monolingual counterparts. Such a design assumes that the cognitive-linguistic experience of

the two populations is comparable. Bilinguals, however, differ from monolinguals in a very major way: the bilingual child experiences the world through two languages – two languages which are used in alternation. For the bilingual, linguistic experience is spread over two languages: experience is encoded in either of two languages and can be expressed in both languages, and information representation can be switched between the languages. The most explicit process in which this occurs is in translation, the topic of this chapter. Although the professional translation literature distinguishes between translation and interpretation, where translation refers to the written modality and interpretation generally refers to the oral modality, we use the term translation to refer to all modes of reformulating a message from one language (the source language) into another language (the target language).

For many bilingual children throughout the world, translation is an everyday activity, a part of their lives as bilinguals (Grosjean, 1982). Yet translation is a poorly understood phenomenon. In this chapter, we will first provide a review of literature and concepts relevant to the study of translation ability. We will then report two studies that investigate translation ability among language-minority Puerto Rican children in the United States.

Theoretical perspectives on translation

The empirical literature on translation is sparse; for translation by children it is barren. The majority of the literature on child translation comes either from anecdotal evidence by linguists (for example, Leopold, 1939–1949) and other scholars, or from indirect evidence from studies in which translation was observed or used as a research technique, but not directly studied (see Harley, 1986; Paivio, Clark, & Lambert, 1979; Swain, 1972; Swain, Naiman, & Dumas, 1974). Although the linguistic nature of translation is often discussed in the more recent translation literature, we have found little empirical study of translation as a linguistic skill, from either a linguistic, a psycholinguistic, or a sociolinguistic perspective.

Several reasons for this paucity of research may be cited. One reason is the lack of theoretical and methodological coherence in the still young science of translation (Harris, 1977, 1980; Nida, 1976; Seleskovitch, 1976; Wilss, 1976, 1982). Wilss (1982) notes that the *applied science of translation* is younger yet, while Vinay (1975) noted that the heading *translation theory* is more often than not an indication of a discussion of translation problems, and not one of theoretical formulation. Another reason is that until recently, child bilingualism has been viewed with a wary eye – especially when the children are from minority language and lower socioeconomic status (S.E.S.) families. The greater issue here has been on keeping the languages separate and reaching proficiency in the majority

language, rather than on the benefits and advantages of knowing two languages. Whether the focus has been on minority-language students or middle-class children, the emphasis both in education and in research has been on the process of second-language acquisition. Further, translation – used since Roman times to teach a second language – fell out of fashion in the postwar era. Together, this blacklisting of translation in foreign-language education and the focus on second-language acquisition contributed to the lack of interest in translation as a bilingual skill. Yet, clearly, all bilinguals are able to translate at some level. To what extent the nature of their translation resembles that of trained interpreters is an open question – mainly because so little is known about the natural translation ability of bilinguals.

Recent theories of translation (Nida, 1976; Pergnier, 1984; Seleskovitch, 1976; Seleskovitch & Lederer, 1984; Wilss, 1982) have emphasized the communicative aspect of translation. The fact that it is possible to communicate meaning in the absence of correct sentence structure has been overlooked, probably because these theories have focused on professional adult translators and translation. The oldest, and, until recently, the most prevalent model of translation is a two-stage model. Ljudskanov's (1969) two-stage model of translation is typical of this approach: the first stage is the analysis of the source-language text, and the second stage is the synthesis of the information into a target-language text. However, Seleskovitch (1976, 1978) argues that this binary model does not capture the communicative dimension of the translation, and adds a third intervening step: the comprehension of the meaning. At the level of the reformulation, however, she makes no distinction between the communicative demands and the metalinguistic demands of the task. It is possible that Seleskovitch does not distinguish between these two demands because her work is both inspired by and focused on professional translation, a domain where linguistic sophistication is a given. A professional translator is more likely to miss the intent of the speaker if not familiar with the subject matter than to use the wrong syntax (Seleskovitch, 1976).

Bilingualism and natural translation

Brian Harris has argued that the empirical study of translation should include, even begin with, the study of translation by naive translators and, in particular, naive child translators – bilingual children without any special training in translation (see Harris, 1977, 1980; Harris & Sherwood, 1978). Harris adopted the term *natural translation* to refer to this type of translation, a type which he contrasted with professional translation as carried out by highly trained and sophisticated translators. Natural translation refers to the cognitive skills involved, not to the translation situation. That

is, natural translation is produced by a child (or adult) who has received no formal training in translation and is relying on a set of natural linguistic skills. Harris and Sherwood (1978) propose that all children can translate in all cultures, in all languages and registers, throughout history and from the time the individual starts to acquire a second language. To support this claim, they cite a number of findings, including the early age at which natural translation is found; the prevalence of spontaneous translation in young children; the small exposure to language that older children need before starting to translate, and the lack of correlation, in children, between the ability to translate and instruction in translation. Natural translation is thus a necessary concomitant to bilingualism, just as the ability to communicate comes with being the speaker of any language. Translation is not a learned skill, such as learning a foreign language in school, but, rather, it is a skill which is developed from a natural and existing base, similar to the development that occurs in mother-tongue language abilities. Although Harris (1977, 1980) remarks that natural translation can be improved under guidance just like any other natural skill, he does not take a clear stand on the issue of individual differences.

Translation is typically viewed as a valuable skill that is available only to the highly trained and linguistically sophisticated bilinguals who come out of interpreter and translator training school. It is not a skill that is generally considered to be within the repertoire of just any bilingual, much less children, much less minority-language children. Yet studies have found that children can both interpret and translate materials that are within their comprehension and vocabulary (Hakuta *et al.*, 1988; Hakuta & Malakoff, 1987; Harris, 1980). Shannon (1987) has documented children interpreting for adults in medical, legal, and administrative situations. These findings generally support Harris' claim about natural translation ability.

Translation and context

More recently, the importance of contextual meaning in the translation process and the link between the comprehension of meaning and the translation has been stressed in the translation literature. In an early linguistic formulation of translation, Catford (1965) argued that translation theory must necessarily draw upon a theory of meaning. Processing the text for translation requires taking into account the full context of the text (Ballard, 1984; Mininni, 1981; Nida, 1976; Seleskovitch, 1976; Seleskovitch & Lederer, 1984). A number of authors have further suggested that the processes involved in the comprehension of text can be better understood through translation and interpretation (Mininni, 1981; Nida, 1976;

Seleskovitch, 1976). It is assumed within this literature that a deeper comprehension of the text as a whole should improve the quality of the translation (Mininni, 1981; Pergnier, 1978; Seleskovitch, 1978).

There is still little empirical basis on which to base such a claim (Mininni, 1981). The theoretical link between translation and comprehension finds its roots, probably, in Catford's theory of meaning (Catford, 1965). Catford argues that meaning in a text can be analyzed at many different levels or units. There are the meanings of the individual words, of the phrases, and of clauses that constitute the sentence; there are the meanings of the individual sentences that constitute a passage, and there is the meaning of the passage as a whole. Catford (1965) argues that below the level of the sentence, equivalence of meaning between two languages cannot be established at the same level: a word in one language may require a phrase in the other, a clause in one language may require only a phrase in the other. It is only at the sentence level that the meaning of a source-language unit (the sentence) may be entirely captured in an equivalent target-language unit (another sentence). Translation "implies the substitution or replacement of textual material in one language by equivalent textual material in another language" (Catford, 1965, p. 20).

These levels of meanings may be thought of as *windows* through which the source-language text is processed: the size of the window determines how much of the text is used to process the meaning for translation. In word-for-word translations, the focus is primarily on the meaning of the individual words that constitute the sentence. If the focus is exclusively on the words, the meaning of the target-language text may be quite different from that of the source-language text: for example, *Me gusta el perro pequeño* in Spanish produces *Me pleases the dog little* instead of *I like the little dog*. If the window size is larger, individual phrases or clauses may be translated sequentially, each with an appropriate syntax, but with the whole lacking a coherent sentence structure or meaning. This may be particularly true in the case of idiomatic expressions, which take their meaning, in part, from their use within the entire sentence. Written translation is said to offer the particular temptation of "translating and then understanding" (Seleskovitch, 1976).

Two languages are rarely so similar that a translation equivalent is a word-for-word or phrase-for-phrase transposition from one language to the other. Between even closely related languages there are more or less subtle differences in syntax and idiomatic expressions. Hence, there is generally a certain amount of syntactic and lexical restructuring that must be done in reformulating the original source-language meaning in the target-language sentence structure. Sensitivity to specific differences between the two language systems should result in fewer literal translation errors when moving between the two languages. It is sensitivity to specific language

differences that permits the use of translation strategies: certain structures are automatically given a red flag that warns the translator to beware.

Code-switching and translation

Code-switching is the use of two (or more) languages in alternation within a single discourse, sentence, or constituent (Poplack, 1979). It is a bilingual mode of communication that is frequently and extensively used in amongst members of bilingual communities (Gumperz, 1982; Pedraza, 1978; Poplack, 1979; Zentella, 1981). Code-switching, like translation, should be considered a bilingual language skill. However, the goals, uses, and demands of code-switching differ from those of translation. Translation typically involves replacing an utterance in the source language with an *equivalent* utterance in the target language to enhance communication to *monolingual* speakers of the target language. Translation aims to reproduce as closely as possible in the target language the meaning of an utterance (or text) in the source language. Code-switching, on the other hand, is used to enhance or complement communication to *bilingual* speakers. It does not seek to reproduce what has already been said, but to enhance what is being said. Code-switching takes advantage of a larger bilingual vocabulary, playing on subtle differences between the two languages in connotative, denotative, or sociolinguistic meaning. Thus, while translation takes advantage of similarities across two languages, code-switching takes advantage of the differences.

As a sociolinguistic strategy, code-switching is used for signaling group boundaries, conveying emphasis, role playing, and establishing sociocultural identity. It is also used to redefine an interaction (Scotton & Ury, 1977), to signal the level of intimacy (Asuncio-Kibdem, 1981) or emotional charge (Marcos & Alpert, 1976; Marcos & Urcuyo, 1979). Code-switching may also be used when a particular word or phrase has a more specific denotative or connotative meaning in the other language. Finally, a code switch may be used when a word is more salient in the other language or unknown in the current language. Poplack (1979) found bilingual ability to be a good predictor of the type of code switch produced: speakers with the greatest bilingual ability were more likely to produce intrasentential switches, a more complex type of code switch.

Code-switching and translation have been viewed in a very different light, particularly when used by children: the former is treated as evidence of an absence of linguistic differentiation (Bergman, 1976; Lindholm & Padilla, 1978) while translation is seen as evidence of linguistic separation (Bergman, 1976; Lindholm & Padilla, 1978; Swain & Werch, 1975). This argument assumes that code-switching is not a conscious activity, that the switch is not intentional, and that the child is not aware of the linguistic switch. Weinreich (1953) regarded code-switching in adults as evidence

of a lack of control in maintaining linguistic separation. Within U.S. circles, the phenomenon of code-switching has also been considered evidence of the disintegration of Hispanic language and culture, and among educators, as a deviation from some bilingual "norm" (see Poplack, 1979, for discussion).

Studies of code-switching, however, suggest quite the opposite: code-switching is both rule-governed and function-specific, and not evidence of linguistic interference (Chan, Chau, & Hoosain, 1983; Grosjean, 1982; Poplack, 1979; Sridhar & Sridhar, 1980). The point where the language switch occurs, which may be at the word, phrase, or sentence level, is specified by a set of rules; in particular, the word at the switch point must be an appropriate syntactic structure in both languages (Lindholm & Padilla, 1978; Poplack, 1979). Poplack (1979) found that there were virtually no ungrammatical combinations of the two languages in close to two thousand switches produced by bilingual adults; this was true regardless of the bilingual ability of the speaker.

Studies of child code-switching suggest that children's usage does not differ greatly from that of adults (Genesee, 1987; Lindholm & Padilla, 1978). Children appear to make more switches that are unacceptable to bilingual speakers than do adult code-switchers; however, monolingual children also make more grammatical errors than adult monolinguals. In a study of eighteen Spanish–English bilingual children between the ages of two and six, Lindholm and Padilla (1978) found that the switches served both sociolinguistic and communicative strategies. The children used lexical switches more often than phrasal switches; the most common switch occurred for a single noun. The switches conformed to rules dictating number agreement and the use of functors; most errors occurred for article agreement. That children make use of rule-governed code-switching is evidence not only of linguistic separation, but also of children's knowledge of the differences and similarities across languages. It is suggestive of a sophisticated metalinguistic awareness.

Metalinguistic awareness

At the most general level, metalinguistic awareness may be defined as an awareness of the underlying linguistic nature of language use. Metalinguistic awareness allows the individual to step back from the comprehension or production of an utterance in order to consider the linguistic form and structure underlying the meaning of the utterance. Cazden (1976) defines the construct as "the ability to make language forms opaque and attend to them in and for themselves" (p. 603). A metalinguistic task, in the most general sense, is one which requires the individual to think

about the linguistic nature of the message: to attend to and reflect on the structural features of language. Tunmer and Herriman (1984) note that:

> to be metalinguistically aware is to begin to appreciate that the stream of speech, beginning with the acoustic signal and ending with the speaker's intended meaning, can be looked at with the mind's eye and taken apart. The extent to which this appreciation must be conscious is one of the many tangles in the web. (1984, p. 12)

Bialystok and Ryan (1985) point out that the traditional conceptualization of metalinguistic skill as a unique linguistic ability has proved less than useful. They argue that the term metalinguistic should be applied "not to a specific mental accomplishment but rather to a set of problems which share certain features. The theoretical issue, then, is to determine what cognitive skills underlie the solutions to this set of problems" (1985, pp. 230–231). Metalinguistic awareness is treated not as a unique ability, but as the ability to successfully approach and solve certain types of problems. In this sense, it is both an awareness and a skill: the problem is metalinguistic and the skill is recognizing the nature and demands of the problem.

Vygotsky (1962) suggested that bilingualism facilitates certain types of language awareness, a finding that has since been supported by a number of researchers (e.g. Ben-Zeev, 1977; Bialystok, 1988; Galambos & Hakuta, 1988; Ianco-Worrall, 1972; Peal & Lambert, 1962). Studies of middle-class children suggested that bilingualism leads to increased levels of metalinguistic awareness at an earlier age: for example, bilingual children were aware of the arbitrary relationship of names and objects at a younger age than monolingual children (Ianco-Worrall, 1972). A similar bilingual advantage, however, has generally not been found in children who are non-proficient in their second language or children who are from minority-language groups.

Metalinguistic awareness and translation skill

Metalinguistic awareness and bilingual proficiency are separate but related linguistic skills: for a given metalinguistic level, there can be a range of bilingual proficiencies, and for a given bilingual repertoire there can be a range in metalinguistic awareness. In the case of elementary- and middle-school bilingual children, the two skills are likely to be correlated. The correlation between these skills is in part the result of the influence of academic experience on both skills: language skills are an important part of elementary- and middle-school curricula. Children who have a more developed sense of metalinguistic awareness are likely also to have more developed language skills in general; this appears to be particularly true

for written-language skills. Cummins (this volume) argues that these metalinguistic and written-language skills are also shared across both languages.

Translation proficiency might be thought of as the product of an interplay between metalinguistic maturity and bilingual proficiency. A third factor, translation strategies, would enhance performance, but not beyond an *optimal-level limit* determined by the two linguistic factors. The concept of an optimal-level limit was proposed by Fischer and Pipp (1984). Their model characterizes the acquisition of skills by a series of stage-defining optimal-level limits – the upper limit of performance under optimal conditions of support, experience, and feedback. Within the stage defined by each limit, there is room for individual variation in performance when children are left to their own devices.

A translation strategy is a learned strategy that helps improve performance; for example, when going from Spanish to English, a simple strategy might be "always start by reversing the order of the adjective and noun." However, since the adjective can also precede the noun in Spanish, this strategy will induce the translator into error unless it is accompanied by an understanding of the semantic differences for word order in Spanish (bilingual proficiency) and a sensitivity to and monitoring of the resulting English word order and meaning (metalinguistic skill). Thus, the translation strategy cannot raise performance beyond an upper limit of performance determined by the interplay of metalinguistic skill and bilingual proficiency. However, within this limit, it can enhance performance. Adult bilinguals, because of their more developed linguistic abilities and metalinguistic awareness, have a greater range of strategies available to them – use of a dictionary, paraphrase, knowledge of morphological rules, reliance on cognates are a few examples.

A two-level model of the translation process

Translation requires the manipulating of language at two levels: it must apprehend and convey the meaning of the source language text; and it must formulate an appropriate target-language sentence structure in which to embed this meaning. Natural translation involves four processes: comprehension of the vocabulary of the original source-language text; comprehension of the meaning of the original source-language message; reformulation of the message in the target-language; and judgment of the adequacy of the target-language text. In the complete translation process, reformulation and judgment must operate at the levels of both meaning and structure. The translator must both reformulate the meaning into the target language and insert that meaning into an appropriate target-language sentence structure. That is, the translator must evaluate both the equivalence of the

meaning of the source-language and target-language texts and evaluate the appropriateness of the sentence structure used to convey the meaning.

From this two-level perspective, translation is a composite of communicative and metalinguistic skills – skills that are "translinguistic," in the sense that they are not particular to any one language. The ability to grasp the meaning of an utterance and to convey that meaning to another person is certainly a communicative skill; this is true whether the conveying of meaning is within a language or across languages (see Brumfit, 1984; Catford, 1965; Mininni, 1981; Steiner, 1975; Wilss, 1982). The evaluation of the target-language sentence, both in terms of the meaning it conveys and the sentence structure in which that meaning is embedded, requires the ability to recognize language as a tool and as a rule-governed system. The translator must evaluate his or her use of the tool, that is, whether he or she has successfully conveyed the message, and his or her abidance by the rules of the target-language system, that is, whether he or she has embedded the meaning in a correct sentence structure. It is this necessity to reflect on language and language use across two languages that makes translation a metalinguistic skill, *par excellence* (Carroll, 1978; Flesch, 1972; Fuchs, 1982).

In natural translation, linguistic sophistication and explicit knowledge of contrastive linguistics is generally not the norm, especially among grade-school children. Although children of this age can speak two (or more) languages correctly, they do not yet have a conscious awareness of the specific differences between language systems. Despite the absence of such linguistic knowledge, children are able to communicate meaning; although the meaning may be embedded in poor sentence structure. For example, as we will show in our studies, we found that elementary-school students were generally able to communicate the meaning of the source-language text despite errors in target-language syntax and some literal translation errors.

Translation and paraphrase

Paraphrase is particularly relevant to the study of translation because of potential parallels with translation. As is the case with translation, paraphrase has been used as a testing tool, but there has been little direct study of the process. A number of authors have argued that it is a part of language competence. For some, it is a measure of the speaker's semantic mastery of the language (Fuchs, 1982; Katz & Fodor, 1963). Gleitman and Gleitman (1970) based their study of language competence on the assumption that paraphrase reflects grammatical competence better than did the traditional classification procedure.

Translation has been called "interlanguage paraphrase," or paraphrase "intralanguage translation." In both, the objective is to take a piece of information and recode the meaning in a different linguistic form – in one case the form is a different language and in the other the form is within the same language (Fuchs, 1982). A number of authors argue that paraphrase is a metalinguistic skill (Flesch, 1972; Fuchs, 1982). Paraphrasing consists in finding the meaning of two compared sequences and showing its equivalence, and this identification constitutes a judgment on the sequences (Fuchs, 1982; Kintsch & Van Dijk, 1978). This argument resembles that made for the link between translation and metalinguistic awareness. It is thus intuitively plausible that paraphrase ability is related to that of translation.

The degree of this relationship is, however, a topic of debate: one school of thought argues that translation and paraphrase are the same process distinguished only by language mode (Fuchs, 1982; Wilss, 1982); the other position argues that the language distinction between intra- and interlingual communication makes a fundamental difference in the process (e.g., Kade, 1968). Kade argues that in translation, L2 units are matched with L1 units, and translation takes place at the level of content. In paraphrasing, on the other hand, a new code in L2 is created; the process thus involves creating a new code within the same language, not simply recoding L2 into L1. Kade, however, ends by blurring the distinction between the two processes, stating that they "rarely appear in their pure form but rather, as a rule, overlap" (p. 17). Mininni (1981) appears to make a similar claim: he offers the "general rule" that the more the contents are assimilated by the translator through an activity of paraphrase, the more adequate the translation will be.

Translation and paraphrase are both metalinguistic tasks that depend on the ability to extract meaning from an utterance and capture the equivalent meaning in another utterance. The vocabulary demands of the two tasks differ, however. Typically, paraphrase requires a large vocabulary within one language, while translation requires only a basic vocabulary in each of two languages. Nonetheless, one would expect that if the vocabulary demands of a paraphrase task were made equivalent to the vocabulary demands within any one language in translation, that performance across both tasks would be correlated. That is, a child who performed well on a translation task would also perform well on a paraphrase task, *if* the within-language vocabulary demands were the same. This claim, however, requires empirical support.

Translation, code-switching, and paraphrase are all tasks that require a knowledge of similarities and differences within the speaker's active vocabulary. All three also demand that the speaker anticipate the audience's knowledge of language. In the case of translation and code-switching, the

vocabulary spans two languages; in the case of paraphrase, only one vocabulary is involved.

Two studies of translation

As the above discussion of translation shows, it is an excitingly rich area of investigation that brings together a number of complex psycholinguistic and sociolinguistic problems. Two recent studies of translation ability we conducted provide empirical support that late elementary-school students are able to produce good written and oral translations, and give glimpses into the properties of this ability. The first study looked at children who were considered to have had some experience in translating, usually for their family. The goal of the study was to investigate the psycholinguistic properties of translation among these "experts." The second study addressed the question of the generality of translation ability among a less selected group of bilingual students. Both of these studies were conducted with Puerto Rican children in New Haven, Connecticut, who are from extremely low socioeconomic backgrounds. The community bilingualism can be characterized as generally subtractive in nature, and has been described in some detail elsewhere (Hakuta, 1988).

Study 1: Properties of translation ability

A broad sweep of translation skills was made in this study, ranging from written translation tasks to on-line measures of word and sentence translation to assess ability in terms of speed.

Subjects Sixteen translators (8 girls, 8 boys) were recruited through a local education advocacy and service agency that offered various adult-education and after-school and summer programs for Hispanic children. The mean age of the subjects was 10.7 years, ranging from nine to twelve years old. Six of the subjects had just completed fourth grade, ten had completed fifth grade. Nine were born in New Haven, seven in Puerto Rico.

All but one subject had been in a bilingual-education program at some point. Ten were in the bilingual program in the year preceding the study, but were about to be placed in English-only classes due to their high English proficiency. Five subjects had been in a bilingual program at some previous point in their educational history, for a mean of 1.8 years.

Mothers were interviewed in Spanish by a native Venezuelan to obtain information on the children's translation activities as well as their general opinions about bilingualism. All mothers reported that their children did some translating; eleven of the children translated regularly for one or both parents. The children who did not translate for their parents translated

for at least one adult (uncle, grandparent, or other adults in the home), as well as for their peers. Many of the children would interpret spontaneously, as well as when asked to do so. In general, mothers thought that their children had been interpreting since third or fourth grade. They reported that the children's services were most often required for visits to the hospital and social services; however, most mothers also said that they needed someone to interpret television programs and telephone conversations.

The mothers overwhelmingly viewed bilingualism as a useful skill and not a source of confusion to children. All the mothers believed that interpreting ability would improve employability, whether on the mainland or in Puerto Rico. Several mothers remarked that a good knowledge of English was becoming indispensable to obtain a good job in Puerto Rico. In general, they saw English as improving employability and Spanish as maintaining contacts with the Hispanic community.

When asked to estimate their children's use of each language in situations at home, in school, and outside the home, the majority of mothers reported that the children used English more than Spanish. Although all but three mothers reported encouraging the use of Spanish over English at home, the only situations in which the children used primarily Spanish were with their mother or another adult family member. None of the children used primarily Spanish with their siblings, although in no case did they use exclusively English.

Measures Language proficiency in both languages was assessed by the Woodcock Language Proficiency Battery (W.L.P.B.), an individually administered standardized proficiency measure with a variety of components, including vocabulary, analogies, reading. In addition, an on-line analogies task was created and administered on a Macintosh computer in each language.

Translation tasks involved words, sentences, and stories as translation stimuli. The tasks were conducted in both source–target directions, that is, going from Spanish to English, and from English to Spanish. Stimuli were chosen to minimize vocabulary complexity, so as not to confound translation ability with vocabulary knowledge. Sentences and stories were constructed in order to provide ample opportunities for grammatical pitfalls that would cause intrusion errors (i.e., errors in which the source-language structure intrudes into the translation).

In addition, sentences were administered in both a straight and an imagery condition. In the imagery condition, after the subject read the source sentence, a "thought" balloon would appear on the screen during which s/he was instructed to make a mental picture of the sentence. Then the source sentence would reappear on the screen, and the subject could pro-

ceed with the translation. It was thought that the imagery condition would expand the "window space" for translation, whereby the meaning of the sentence would be processed to a greater extent and grammatical pitfalls through literal translation would be avoided.

The vocabulary and sentence stimuli were administered on the Macintosh computer to enable measurement of translation time. In these on-line tasks, the experimenter controlled the timing of the stimulus presentation with the mouse. When the subject was ready, the source appeared on the screen accompanied by a tone. The subject was instructed first to read the source, and then to provide the translation. The stimulus remained on the screen throughout the trial. The sessions were tape-recorded to enable assessment of the accuracy of the translation. The story translations were administered in written format.

In addition to the translations, we attempted to assess translation proficiency through a word identification task, in which subjects were simply asked to say whether words appearing on the computer screen were English or Spanish. The words contained no obvious cues as to language, such as accent marks or obvious spelling patterns. We thought of this as a first approximation of measuring access time to the two lexicons. (A number of people have pointed out to us that this task can be successfully executed with knowledge of only one language, i.e., a monolingual English speaker could make decisions in this task based on whether it is an English word or not an English word. Observation of the subjects in the course of the task suggests that this was not the basis for their decisions, but we have since modified the task to include nonsense words to eliminate this possibility.)

Results Several major conclusions emerged from this study. They can be stated in terms of propositions:

Conclusion 1: The subjects were extremely good translators and made few errors in both source–target directions.

Support for this conclusion comes from an assessment of the quality of sentence translations. Each response was coded for whether it was correct (as an adult balanced bilingual would translate it), incorrect (where a word or key concept was omitted in the translation), or wrong (where the translation had more flaws than the omission of a single concept). In coding these responses, morphological errors were ignored, as they did not affect the major meanings of the translations. Percentages of each coding category were computed across the straight translation and imagery conditions of the sentence translations. In the Spanish–English translations, only 2 percent were wrong and 10 percent were incorrect; in the English–Spanish translations, only 1 percent were wrong and 6 percent were incorrect.

Another indicator of the quality of translation is the proportion of two error types in which we took particular interest. A *source-word intrusion error* was defined as one where a word from the source language worked its way into the translation. For example, one subject translated *la proxima semana* as *the proximate week*. A second error type was the *source-word order error* in which the word order of the source language worked its way into the translation. For example, one subject translated *¿Dónde estara mi hermano?* as *Where should be my brother?* Error rates for these two types of errors were extremely low. Going from Spanish to English, only 0.033 source-word intrusion errors and 0.036 source-word order errors occurred per sentence. From English to Spanish, the respective rates were 0.069 and 0.028.

The written translations of stories reveal some intriguing contrasts, although this should not be taken as a direct contrast of modalities between spoken and written responses. Going from Spanish to English, there were 0.048 source-word intrusion errors per sentence, and 0.151 source word-errors per sentence. Going from English to Spanish, the respective proportions were 0.22 and 0.137. The notably higher rates of source errors in this written task suggest that the written modality is considerably more demanding, thereby reducing the window size of processing and causing more source-language-based word-order errors that result from word-for-word translations.

Conclusion 2: The imagery manipulation did not have an effect on whether literal or non-literal translations were made.

Translations were defined as non-literal when the literal order of words and ideas in the source sentence was not preserved, such as through changes in the placement of adverbs or prepositional phrases. It was assumed that forcing subjects to form a mental image of the sentence would lead them to provide more non-literal translations because these superficial features of the target sentence would be diluted with greater focus on the meaning. This manipulation was thought to have an effect on the "window space" of translation. However, the data did not bear out the hypothesis, as can be seen in table 7.1. The proportion of non-literal translations did not vary as a function of the manipulation. This lack of effect, however, may be due to the ineffectiveness of the imagery manipulation, since we observed that subjects found it tedious and tiring to form images continually across a large number of sentences.

Conclusion 3: Translation was more efficient translating into English than translating into Spanish, reflecting English dominance.

Comparison of means for word- and sentence-translation times revealed significantly more efficient translation going from Spanish to English than

Table 7.1 *Percentage of responses that were non-literal or literal translations in different translation directions and conditions*

	Non-literal (%)	Literal (%)
English–Spanish, straight	16	76
English–Spanish, imagery	13	80
Spanish–English, straight	15	75
Spanish–English, imagery	17	68

English to Spanish. For words, there was a mean difference of 0.73 seconds ($t(15) = 1.96$, $p < 0.05$), and for sentences, the mean difference was 0.48 seconds ($t(15) = 2.19$, $p < 0.05$). This asymmetry is attributable to greater English dominance. The dominance is also supported by the results from the time for solving the analogies problems, in which solution times were significantly faster for the English problems than the Spanish problems ($t(15) = 3.23$, $p < 0.01$). The asymmetry is not surprising, considering the subtractive bilingualism that characterizes the community, as well as the emphasis on English language skills in the bilingual programs that have a transitional rather than maintenance policy.

Conclusion 4: For words, translation speed is better predicted by proficiency in the target language than in the source language; the pattern is less clear for the sentence translations.

Regressions were calculated to estimate the power of translation-speed language proficiency in English and Spanish (as measured by the W.L.P.B.) in predicting translation speed for the word and sentence tasks in both directions. As seen in table 7.2, the results are very clear for the word-translation task, where Spanish proficiency predicts 0.19 of the variance in the English–Spanish direction, and English proficiency predicts 0.40 of the variance in the Spanish–English task. The pattern is less clear for the sentence-translation tasks. It is possible that the source-language proficiency comes to play a greater role as the unit of language that needs to be processed gets larger, as it does in going from individual words to sentences.

Conclusion 5: In addition to proficiency in the two languages, there appears to be a translation proficiency, as measured by performance on the word-identification task, that predicts translation speed.

The data support the hypothesis that in addition to proficiency in the two languages, translation skill requires an additional component of accessibility of the two lexicons. As the hierarchical regression results from table 7.2

Table 7.2 *R^2 values obtained through regression predicting translation times for words and sentences on English and Spanish proficiency, and the word-identification (W.I.) task*

	Word translation		Sentence translation	
Predictors	E→S	S→E	E→S	S→E
English proficiency	0.01	0.40	0.21	0.12
Spanish proficiency	0.19	0.00	0.13	0.08
English + Spanish proficiency	0.25	0.44	0.27	0.16
English + Spanish proficiency + W.I.	0.57	0.51	0.55	0.40

indicate, there is a significant increase in R^2 values when the word-identification measure is added to the equation with both English and Spanish proficiencies.

Discussion The results of this first study show that the subjects were very good translators, and reveal various properties of their translation skill. The generally low incidence of source-language intrusion errors provides striking evidence of the separation of the two languages. Evidently, the source-language proficiency matters little in word translation, although it may matter more when it comes to sentence translation. Target-language proficiency seems to be an important factor in translation efficiency. Finally, some evidence was found for translation ability that goes beyond the sum of the two language proficiencies. Indeed, it may well be that translation ability is related to metalinguistic skills, a hypothesis that must be explored in future research.

Study 2: Distribution of translation ability

These initial findings encouraged us to ask whether translation skills are distributed across a less selected group of bilingual children.

Subjects Fifty-two subjects (27 girls, 25 boys) from fourth- and fifth-grade bilingual-education classes were selected on a random basis, the only constraint being that they had sufficient proficiency in the two languages to complete the written story-translation task in both directions, as judged by the teacher. Approximately two-thirds of the students in the bilingual classes met this criterion. There were 24 subjects in fourth grade, 27 in fifth grade, and 1 in sixth grade. Of these, 18 were assigned to mainstream

Table 7.3. *Examples of errors and codes in translation tasks*

Spanish to English	
(S.E.W.1) articles and quantifiers	
en la oscura casa	to *that* dark house
sus grandes pies	*the* big feets
(S.E.W.2) nouns, verbs, adjectives, adverbs	
Los niños jugaban	the *boy* played
en la noche	in the *dark*
(S.E.W.3) source	
Rapidamente el malcriado	Fastly the *malobedient*
la próxima semana	the *proximate* week
(S.E.W.4) prepositions	
en el parque	*on* the park
a la casa	*in* the house
(S.E.I.1A) ungrammatical addition	
El martes	*The other* Tuesday
el pájaro se murió	the bird *it* died
(S.E.I.W.B.) semantic addition	
bebia aqua con su almuerzo las cuatro sillas	he drank water in lunch *with her*
son azules blue	the seats *are round and they* are
(S.E.I.2A) ungrammatical deletion	
Los niños jugaron	The boy (*was*) playing
El vecino ganará el juego	The neighbor (*will*) win the game
(S.E.I.2B) semantic deletion	
en el baño temprano	in the bathroom (*early*)
No encontro papel en la caja	I didn't find paper (*in the box*)
(S.E.M.1) case	
Por la puerta entró	*Him* through the door
Tiene ella un viejo vestido	Has *her* one old dress
(S.E.M.2) agreement	
Empiezan las clases	The class*es* start*s*
Pero entiendo poco	but *he understands* a little bit
(S.E.M.3) part of speech	
oramos por la comida	we *prayer* for the food
porque dice que yo soy tonta	because I'm too dummy
(S.E.T.) tense	
está fria	is gonna be cold
Luego, se vieron	Then they were seeing

Table 7.3. *Cont.*

(S.E.O.) order	
¿Donde estará mi hermano?	Where should *be my brother?*
El bebe triste	That *baby sad*
(S.E.P.) paradigmatic	
sus grandes pies	his big *feets*
crecen rapidamente	grow *fastly*
(S.E.S.) subject	
El termina temprano	*I* finished early
Llamó mi madre	*I* called my mother
English to Spanish	
(E.S.W.1) articles and quantifiers	
To a game tomorrow	*Al* juego mañana
Saw the boy	*Vio* al niño
(E.S.W.2) nouns, verbs, adjectives, adverbs	
Leave a message	Dejar *un papel*
The telephone often rings	El teléfono *casi suena*
(E.S.W.3) source	
We ate ice cream	Comimos *ice cren*
The chicken is ready to eat	El pollo está *redi* para comer
(E.S.W.4) prepositions	
toward the mouse	*sobre* el ratón
wait for me at the table	espérame *en* la mesa
(E.S.I.1A) addition ungrammatical	
You can tell my teacher	Tu puedes decir*le* a mi maestra
I can't study	No puedo *a* estaudiar
(E.S.I.1B) addition semantic	
She saw the word	Ella vio la*s* palabra*s*
Maria will arrive tomorrow	María va a llegar *aquí* mañana
(E.S.I.2A) deletion ungrammatical	
To visit her friends	A visitar (*a*) sus amigos
The door . . . opened	La puerta . . . (*se*) abrió
(E.S.I.2B) deletion semantic	
My neighbor goes to the store to buy fish	Mi vecino va (*a la tienda*) a comprar pescado
The problem was too hard to understand	El problema era muy duro (*para entender*)

Table 7.3. *Cont.*

(E.S.M.1) case	
None	
(E.S.M.2) agreement	
Every day	Todos los *dia*
My friends	M*i* amigo*s*
(E.S.M.3) part of speech	
knew that lesson perfectly	sabía esa lección *muy perfecto*
mother entered quickly	mi mamá entró el cuarto *rápido*
(E.S.T.) tense	
The teacher told him to read	La maestra le dijo que *lea*
The letter is in the envelope	La carta *estaba* en el sobre
(E.S.O.) order	
The new desk	La nueva mesa
The famous actor who we saw	El famoso actor *nosotros vimos que*
(E.S.S.) subject	
Make room for me	*Cogemos un cuarto*
With her friends she played	Con su amigo *jugaron* peñlota
(E.S.P.) paradigmatic	
My sister knew that lesson	Mi hermana *sabió* esa leccion
To stop the drinking	Que *parada* de beber

classrooms for the next year, 29 were scheduled to continue in the bilingual program the following year (information was missing for five subjects).

Measures The story-translation task from study 1 was chosen because it can be group-administered. In order to compare performances on this task in studies 1 and 2, a detailed error analysis was conducted following a coding scheme found in table 7.3. Two independent judges conducted the coding, and when there was disagreement, it was solved by reaching a consensus.

Results A comparison of errors between studies 1 and 2 is presented in table 7.4, along with a test of significance in the difference between the

means on each type of error. In the Spanish–English translation direction, there are only two significant differences, going in opposite directions. Study 1 made fewer semantic-addition errors than study 2, but more part-of-speech errors. The lack of any consistent pattern suggests to us that these significant effects are spurious.

In the English–Spanish translation direction, four significant differences emerge, all showing fewer errors by study 2 subjects. Thus, the less selected subjects provided better English–Spanish translations. This somewhat surprising finding is explained by the fact that all of the study 2 subjects are in bilingual-education classes, where instruction in Spanish is provided, while this was not the case for study 1 subjects. Since the bilingualism of the community is generally subtractive in nature, it is not surprising that those students who are not in the bilingual classes reach a plateau in their Spanish proficiency.

A comparison of the error patterns between the two groups of subjects showed good consistency. The correlation between the two groups of their respective percentage of each error type showed $r = 0.87$ for the Spanish–English translations, and $r = 0.91$ for the English–Spanish translations.

Discussion The results suggest that translation ability is a widespread skill among students in this population. Unfortunately, due to limitations in resources, we could not administer any measures of response latency. However, the error patterns in the written task revealed similarities between the two groups, and the more selected group in study 1 did not enjoy any general advantages in translation ability.

Conclusions

The findings from these studies demonstrate that translation skill is widely found in bilingual children by late elementary school. Bilingual children are able to translate, albeit with flaws, and their translations reflect their understanding of the communicative importance of translation. That is, when the quality of the translation suffers, the errors are usually in sentence structure and not in meaning. Furthermore, translation efficiency and quality appear to vary according to a number of dimensions, including target-language proficiency, processing-window size (as suggested by the difference between the written and oral tasks), and translation proficiency.

Although we have only begun to scratch the surface of the empirical relationships between the different abilities involved in translation, there are already some exciting implications of our research beginning to emerge. The fact that natural translation is an ability to be expected of bilingual children suggests that its use as a tool for both research and language-

Table 7.4 *Comparison of frequencies of error types in the story-translation task across subjects from study 1 and study 2*

	%	M.	S.D.	%	M.	S.D.	*t*
	Spanish to English						
	Study 2 N = 52			Study 1 N = 14			
articles, etc.	14	2.17	3.77	7	0.93	0.62	1.23
nouns, etc.	17	2.62	2.10	22	3	2.83	−0.56
source	2	0.27	0.63	3	0.43	1.34	−0.66
prepositions	9	1.39	1.17	10	1.43	1.28	−0.11
addition ungrammatical	4	0.67	1.26	1	0.14	0.36	1.55
addition semantic	4	0.58	0.87	3	0.36	0.63	2.75**
deletion ungrammatical	2	0.33	0.56	1	0.21	0.43	0.75
deletion semantic	10	1.52	1.58	6	0.86	1.35	1.43
agreement	3	0.46	0.78	3	0.36	0.75	0.43
case	0	0	0	0	0	0	0
part of speech	1	0.08	0.27	5	0.64	0.84	−4.31***
possessive	<1	0.21	0.41	<1	0.21	0.42	0
order	13	1.9	1.9	10	1.36	1.99	0.95
subject	2	0.35	0.48	2	0.29	0.47	0.43
paradigmatic	3	0.46	0.73	4	0.57	0.85	−1.42
tense	16	2.42	2.29	22	3	2.11	−0.85
	English to Spanish						
	Study 2 N = 52			Study 1 N = 16			
articles, etc.	8	1.08	0.84	5	1	0.82	0.33
nouns, etc.	34	4.71	2.48	25	5.15	1.28	−0.69
source	6	0.87	1.01	10	2	1.78	−1.03
prepositions	1	0.19	0.40	3	0.62	0.87	−2.87**
addition ungrammatical	6	0.87	1.21	11	2.31	1.60	−3.89***
addition semantic	6	0.81	1.34	5	1.0	1.26	−0.51
deletion ungrammatical	3	0.39	0.63	5	0.92	1.04	−2.52*
deletion semantic	13	1.85	1.66	19	3.77	1.83	−4.00***
agreement	6	0.77	0.94	3	0.54	0.78	0.88
case	<1	0.02	0.14	0	0	0	0
part of speech	0	0	0	<1	0.08	0.28	0
possessive	0	0	0	0	0	0	0
order	9	1.31	0.98	6	1.23	0.60	0.31
subject	1	0.10	0.30	1	0.15	0.38	−0.56
paradigmatic	1	0.15	0.36	3	0.69	1.12	−3.18**
tense	6	0.81	0.91	4	0.85	0.80	0.16

Notes: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

proficiency assessment is viable, as suggested fifteen years ago by Swain, Dumas, and Naiman (1974), and should be aggressively pursued. For example, we have begun using a task in which subjects provide judgments of the goodness of translations, which we believe taps deeply into metalinguistic skill.

Another exciting extension is in the area of pedagogy. We have worked in a number of classroom settings (e.g., see Shannon, in press) to use translation ability as a psycholinguistic and sociolinguistic hook into amplifying the bilingual skills of students. Translation provides an easy avenue to enhance linguistic awareness and pride in bilingualism, particularly for minority bilingual children whose home language is not valued by the majority culture. In sum, the study of translation provides a superb research "preparation," in which basic psycholinguistic and sociolinguistic issues can be integrated with educational practice.

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