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ABSTRACT

A two-year study is reported of the transfer of two literacy skills, narrative comprehension and learning from text, from elementary school children's first language (Spanish) to their second (English). For each skill, the primary research question was the degree to which the students' first language (L1) performance was predictive of their second language (L2) performance. Subjects were from bilingual education programs in two southern California school districts, in kindergarten through sixth grade. Comparison groups of monolingual English-speaking students were used. Students answered comprehension questions about modified versions of Aesop's fables. General results indicate that for both skills, use of previously acquired knowledge is about the same for L1 and L2. This is limited only by the child's code breaking skills for L2, in listening comprehension for younger subjects, and in reading comprehension for older children. Once the basic parsing skills are acquired, the higher order comprehension processes are similar, whether material is presented in L1 or L2. Comparisons with monolingual English-speaking students indicate no negative effect of dealing with both Spanish and English in school. There was some indication that bilingual students with training in Spanish as a second language were slightly more proficient in English than their monolingual counterparts. In addition, English performance of the students of English as a second language equaled that of their monolingual counterparts by the fourth grade, and L1 performance of the two groups was equivalent at all levels. Pedagogical implications are discussed. (MSE)

FINAL REPORT

ACQUISITION OF LITERACY SKILLS IN FIRST AND SECOND LANGUAGES: KNOWLEDGE UTILIZATION IN UNDERSTANDING

NIE-G-81125

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ABSTRACT

The acquisition of literacy skills by elementary school students involves two primary components. One component involves those skills necessary to determine the identity of the words in the message. A second component involves those skills necessary to convert the words into a meaningful message. This second component is the one on which this project focussed. Specifically, in order for a message to be meaningful, the individual words in that message must have meaning and the collective meaning of the string of words must be determined. The process of getting meaning is heavily reliant on the knowledge that an individual brings to the task and on how that knowledge is used. An important issue for students learning a second language is the utilization of knowledge acquired in a first language when a message in a second language is to be comprehended.

During the two year period of this project, we conducted empirical research designed to ameliorate the scarcity of basic research on the acquisition of cognitive/academic literacy skills and the developmental time course of this process for individuals whose first language is not English. We concentrated our efforts on two types of literacy skills that are integral to the process of schooling: narrative comprehension and learning from text. For both of these the primary question was the degree to which the performance in a student's primary language (L1) was predictive of that student's performance in the second language (L2). Students who were participating in bilingual education programs in two school districts in southern California were the subjects of the experimental work. L1 was Spanish for all of the students who had been classified as non-English proficient upon entrance to school. Grades kindergarten through sixth were represented in the sample. A small number of first, second and fifth graders who were enrolled in the bilingual program were studying Spanish as a second language (SSL). In addition to these two-language students, comparison

groups of monolingual English students were also included in the experimental work, thus providing the basis for a variety of additional comparisons of literacy skills.

The specific literacy skills that we assessed varied with the grade levels of the students, however all students recalled and answered comprehension questions on the presented material. The younger students listened to the presented material whereas the older students read it. Narrative comprehension was assessed through the use of modified versions of Aesop's fables. Learning from text skills were assessed through the use of descriptive, informational passages. Students in bilingual programs worked with some texts in Spanish and others of comparable structure but different content in English. Monolingual students worked only with English language texts.

The general results of both the narrative comprehension and learning from text studies indicate that the use of previously acquired knowledge is similar in both L1 and L2. When students have available the appropriate background information, this knowledge is brought to bear in about equal degrees for input in either L1 or in L2. The use of this knowledge is limited by the degree to which a child has mastered code breaking skills for L2. When students are just beginning English as a second language (ESL) or SSL, auditory parsing skills are not sufficient for the identification of the individual words. Thus, using knowledge to determine the collective meaning of the individual words cannot proceed. Similarly, during the initial phases of English reading, knowledge of the orthography is a prerequisite to the identification of the individual words and to the construction of the collective meaning. However, once basic parsing skills have been acquired, higher order comprehension processes are similar, regardles of whether the material is presented in L1 or in L2. Comparisons with the performance of monolingual English students indicated no negative effects of

dealing with both Spanish and English in school. There was some indication that the SSL students were slightly more proficient in English than their monolingual English peers. Furthermore, performance of the ESL students in English was equivalent to that of the monolingual English students by fourth grade and performance in L1 (Spanish for the ESL students, English for the monolinguals and SSL students) was equivalent at each grade level.

There are two important educational implications of the results of this project. With respect to assessment of language proficiency, the different comprehension measures yield different estimates of the level of proficiency in L2, as well as in L1. Generally speaking, questions lead to an earlier estimate of proficiency than do recall tasks. Thus, the type of measure used to determine a student's level of proficiency must be carefully chosen to reflect the range of activities that the student will be asked to perform in L2. Second, there is a clear and positive relationship between language proficiency in L1 and language proficiency in L2: after an initial acquisition phase of the parsing rules for L2, comprehension performances in L1 and L2 reflect similar levels of literacy. The world knowledge that a student acquires through L1 can be applied to understanding new information that is received in either L1 or L2. Thus, continuing with L1 instruction concurrent with initial acquisition phases of L2 is a sound instuctional practice.

I. INTRODUCTION AND OVERVIEW

A primary goal of the educational enterprise is to foster the attainment of literacy. The concept and definition of literacy is context sensitive and changes with the demands of the societal context of education (Resnick & Resnick, 1977). In addition, the educational system serves a heterogeneous population, comprised of many cultural groups and subgroups. In response to demands for equality of educational opportunity, bilingual education programs emerged as a means of facilitating English language literacy in minority language populations. These programs have been developed and evaluated and sometimes disbanded in the absence of empirical research that addresses the developmental time course of the acquisition of cognitive/academic literacy skills for individuals whose first language is not English (Krashen, Long & Scarcella, 1979).

The experimental work that we conducted addressed a general question regarding first and second language literacy skills in one minority language population, native Spanish speakers. The question was the nature of the circumstances under which individuals could utilize information already acquired and in memory in the process of understanding new, incoming information in more than one language (Dornic, 1979). We viewed this question as one of primary importance since literacy skills involve the ability to appropriately access and utilize old knowledge in trying to learn and remember new information. Understanding oral language and written text involves an interaction between what an individual already knows about the world and the new information in the language input. Thus prior knowledge plays an important role in the acquisition of new information about the world (e. g., Brown, 1975; Tyler & Voss, 1982; Voss, Vesonder, & Spilich, 1980).

Of particular concern in minority language populations is the degree to which knowledge that can be used with the first language (L1) is also used with

the second language (L2). The reverse is also of concern, especially in school aged populations. It is important to understand whether information that was initially acquired through one of the languages is available for subsequent communications in only one language or in either language. The issue of knowledge utilization was investigated in two types of instructional contexts. The first context was narrative comprehension. This investigation comprised a major portion of our efforts on this project and constitutes Section II of this report. The second instructional context was a content-area or reading-to-learn task. This work is described in Section III of this report.

II. NARRATIVE COMPREHENSION IN FIRST AND SECOND LANGUAGES: UNDERSTANDING FABLES PRESENTED IN SPANISH AND ENGLISH

A large amount of research points to the importance of the narrative in the lives of children. The narrative form originated in the oral tradition, prior to the invention of writing systems. Narratives were a primary mechanism for preserving and transmitting the history of a culture. A relatively fixed structure for the narrative developed, probably to make such tales easier to remember. As writing systems evolved, the functions of narratives broadened to include entertainment as well as the communication of societal values and mores. As with the evolution of man in general, narratives have an early place of importance in the development of a child. Along with conversation and dialogue, narrative stories are among the first types of organized language to which the child is exposed. Many three and four year olds also attempt to produce their own narratives and often do it very well.

Children's experiences with narratives lead to the acquisition of knowledge of the typical form of these stories and to familiarity with the sorts of situations, events and themes comprising the content (e.g., Mandler & Johnson, 1977; Poulsen, Kintsch, Kintsch & Premack, 1979). These outcomes are important components in the development of literacy and in beginning reading instruction. Often, the first written language children see is dialogue and this is quickly followed by short, narrative stories. The process of comprehending these stories, in part, depends on using previously acquired knowledge to encode the message and to later retrieve it. Knowledge of narrative content and form may be particularly important in children's ability to produce organized language, whether in oral or written form (Stein & Trabasso, 1982).

For the monolingual English speaker, knowledge acquired through oral language experiences prior to school entrance has been in English and there is no issue of the applicability of these experiences to written English. Barring some type of cognitive and/or language disability, the child uses this knowledge base in the classroom. For the native Spanish speaker, knowledge acquired through oral language experiences prior to school entrance has generally been in Spanish. A significant amount of research has addressed the question of whether bilinguals have language-specific knowledge systems or a common system (e.g., Caramazza & Brones, 1979, 1980; Kintsch, 1970; Lopez & Young, 1974). While the evidence appears to favor the common system interpretation, (Dornic, 1979; Macnamara, 1967; McCormack, 1977), we feel this is a problematic empirical issue. Rather, the important issues concern the circumstances under which previously acquired knowledge is used in dealing with new language input, whether Spanish or English. Our project examined children's understanding of narratives, the degree to which knowledge available in the child's first language is used in understanding second language input, and the relationship between knowledge utilization in two languages as children become bilingual and acquire age-appropriate literacy skills. In this research, we used a particular type of narrative text to examine these questions: Aesop's fables.

This type of narrative has at least three characteristics that make it a good starting place. Aesop's fables are part of the literary tradition of both Spanish and English cultures (Bravo-Villasante, 1973; Childcraft, 1973) and are therefore familiar to each culture. By familiar to each culture, we mean that there are commerically available collections of these fables in both English and Spanish, for example Fábulas Bilingües (Sánchez-

Davis, 1975). In addition, two of the California state-adopted Spanish language reading curricula include fables among the reading selections (e.g. Amato & López del Bosque, 1977; Schmitt, 1978). Note however, that the fables included in these reading texts are not the same as the particular fables that were used in the present research. Furthermore, educational researchers have used narratives in the assessment of language proficiency in bilingual and monolingual children (e.g., Cohen, 1975; John, Horner & Berney, 1970; Lambert & Macnamara, 1969). In fact, some of the most widely used language assessment instruments use story recall or story telling tasks (e.g., Language Assessment Scales, 1977; Bilingual Inventory of Natural Language, 1974). However, the scoring and interpretation of performance on these instruments does not reflect current empirical work on narrative comprehension and its development. The results and conclusions regarding language proficiency may be confounded with differences in structural characteristics of the presented stories and are difficult to interpret, given the lack of basic, descriptive developmental data on story recall by non-native English speakers in first and second languages. Finally, a number of systems have been developed for describing the organizational structure of this type of narrative (e.g., Johnson & Mandler, 1980; Rumelhart, 1977; Stein & Glenn, 1979; Wilensky, 1980).

The project consisted of a series of four experiments that used the same materials and basic design. The four experiments differed with respect to the age of the subjects, the specific details of how the fables were presented, and how the student's responses were recorded. However, the same general questions were investigated in each experiment. This present report describes trends that we observed in the comprehension of fables across the age range from kindergarten through fifth grade. Specifically, the report focuses on the relationship

between an individual's performance in the first and in the second language and how that relationship changes as facility in the second language, and sometimes in the first, increases. Our global index of increased language facility was age, or grade in school. As will be demonstrated below, this global index was reasonable in the present research, although it might not be reasonable under other circumstances.

We had several hypotheses regarding possible relationships between performance in first and second languages: no relationship, such that performance in the first language does not predict performance in the second language; an inverse relationship such that as performance in the second language improves, performance in the first language declines; a direct relationship, such that as performance in the first language improves, performance in the second language also improves. We expected that if knowledge acquired through the first language was available when children were were asked to deal with first or second language input, then we would find evidence for the direct relationship. There was also the possibility that the type of relationship between first and second language performance would be different at different age or grade levels.

In addition, we examined different types of comprehension performance, which assessed different aspects of understanding (see Goldman, in press). Literal levels of comprehension were assessed by a story recall or re-telling task. Inferential levels of comprehension were assessed by a series of questions that asked why the story characters performed certain actions in the fables. A more general level of inference was examined by asking the children to decide what moral or lesson the fable illustrated. These different measures of comprehension are isomorphic to the variety of tasks that children are asked to perform during regular instruction and when they take achievement tests. Since the re-telling task requires the greatest production component, we

expected to find the largest age and first versus second language differences in this task. On the character-motive question, we also expected developmental but not first versus second language differences since the answers to these questions are in large part based on a child's social cognitive development. If such knowledge is accessible for input in both languages, then no first versus second language differences would be expected but developmental differences would be. We expected the "moral" question to show the largest developmental differences, although not necessarily first versus second language differences, because the understanding of a moral involves being able to generalize from the literal level of the presented text (Kintsch & van Dijk, 1978).

Method

Materials and Design

Two examples of two different content structures were used as the presentation fables. The different content structures were derived from original Aesop's fables and were modified to achieve experimental control over length, vocabulary and sentence structure. The two content structures differ in terms of the underlying constituent (Johnson & Mandler, 1980), problem solving (Rumelhart, 1977) or goal (Wilensky, 1980) structures. In developing the presentation versions of the fables, we worked with one example of each content structure in Spanish and one in English. This was done to minimize biases in translating the materials. A sample of content structure is shown in Table 1. In this structure, there are three behavioral episodes, each consisting of a beginning, reaction, development and outcome. The beginning sets up the problem of the episode; the reaction typically relates goals and emotional responses to the problem; the development relates attempts to deal with the problem; and the outcome gives information about the result of the attempts. The fable shown in

Table 1

Sample Fables Used in the Research

Content Structure$_1$: "The Ant and the Dove"

Story Categories		Statements in Text
Setting	1	Once there was an ant who was walking along.
Beginning Event	2	Suddenly, she stopped.
	3	"I'm thirsty," said the ant.
Complex Reaction	4	"Why don't you get a drink of water from the river?"
	5	said a dove who was sitting in a nearby tree.
	6	"The river is close by.
	7	Just be careful you don't fall in."
Development	8	The ant went quickly to the river
	9	and began to drink.
Outcome	10	Suddenly, the wind blew the ant into the water.
Beginning Event	11	"Help!" cried the ant.
	12	"I'm drowning."
Complex Reaction	13	The dove heard the cry
	14	and went quickly to save the ant.
Development	15	The dove broke a branch from the tree with her beak.
	16	Then, the dove flew over the river with the branch
	17	and dropped it to the ant.
Outcome	18	The ant climbed onto the branch
	19	and floated to shore.
Beginning Event	20	Not long after, the ant saw a hunter.
	21	The hunter was setting a trap.
Complex Reaction	22	He hid the trap
	23	so he could catch the dove.
Development	24	The dove was flying toward the trap.
	25	So, the ant bit the hunter's ankle as hard as she could.
Outcome	26	The hunter let out a loud scream, "Ouch!"
	27	The dove heard the hunter
	28	and flew away.

La Estructura del Contenido$_1$: La Paloma y la Hormiga

Categorías del Cuento		Oraciones del Texto
Escena	1	Una vez había una hormiga que iba caminando.
Primer acontecimiento	2	De pronto, se paró.
	3	"Tengo sed," dijo la hormiga.
Reacción compleja	4	"¿Por qué no bebes un poco de agua del arroyo?"
	5	dijo una paloma que estaba en una rama de un árbol.
	6	"El arroyo está cerca.
	7	Pero cuidado no te caigas en él."
Desarrollo	8	La hormiga fue al río
	9	y comenzó a beber.
Resultado	10	De repente un viento aventó a la hormiga al agua.
Primer acontecimiento	11	"¡Ayúdenme!" gritó la hormiga.
	12	"¡Me ahogo!"
Reacción compleja	13	La paloma oyó el grito
	14	y fue pronto a salver a la hormiga.
Desarrollo	15	La paloma quebró una ramita del árbol con el pico.
	16	Después, la paloma voló sobre el arroyo con la ramita
	17	y la dejó caer junto a la hormiga.
Resultado	18	La hormiga se subió a la ramita
	19	y flotó hasta la orilla.
Primer acontecimiento	20	Poco después, la hormiga vió a un cazador.
	21	El cazador estaba preparando una trampa.
Reacción compleja	22	Él escondió la trampa
	23	para coger a la paloma.
Desarrollo	24	La paloma comenzó a volar hacia la trampa.
	25	Así que la hormiga mordió el tobillo del cazador tan fuerte como pudo.
Resultado	26	"¡Ay!" gritó el cazador.
	27	La paloma oyó al cazador
	28	y salió volando.

Table 1 Continued

Content Structure$_2$: "The Lion and the Squirrel"

Story Categories		Statements in Text
Setting	1	Once there was a lion who was asleep.
Beginning Event	2	A little squirrel began running up and down on him.
Complex Reaction	3	This made the lion wake up.
	4	The lion placed his huge fist on the little squirrel
	5	and opened his big jaws
Development	6	to swallow him.
	7	"Please, Mr. Lion," cried the squirrel.
	8	"Let me go this time.
Outcome	9	Someday, I will help you."
	10	The lion laughed.
	11	"I am King of the beasts," said the lion.
	12	"I am the strongest in the forest," he said.
	13	"But I will let you go.
	14	I will have no trouble catching you again," he laughed.
	15	The lion lifted his fist
	16	and the squirrel ran away.
Beginning Event	17	A few days later, some hunters came to the forest.
Simple Reaction	18	They wanted to catch a lion for the zoo.
Development	19	The hunters set a trap
Outcome	20	and they caught the lion.
	21	They tied the lion to a tree
	22	while they went
Beginning Event	23	to find a truck to carry the lion.
Development	24	The little squirrel was watching this from a tree.
	25	As soon as the hunters left.
	26	the squirrel ran down the tree
Outcome	27	and chewed the ropes that held the lion
	28	until the lion was free.

La Estructura del Contenido$_2$: El León y la Ardilla

Categorías del Cuento		Oraciones del Texto
Escena	1	Una vez había un león que estaba dormido.
Primer acontecimiento	2	Una ardillita empezó a correr sobre él.
Reacción compleja	3	Esto pronto despertó al león.
	4	El león puso su gran pata sobre la ardillita
	5	y abrió la boca
Desarrollo	6	para comérsela.
	7	"Por favor, Don León," pidió la ardillita
	8	"Déjame ir esta vez.
Resultado	9	Algún día le ayudaré."
	10	El león se rió.
	11	"Yo soy el rey de la selva," dijo el león.
	12	"Soy el mas fuerte de la selva.
	13	Pero, ta dejaré ir.
	14	No tendré problema en volverte a coger," dijo mientras se reía.
	15	El león levantó la pata
	16	y la ardillita corrió.
Primer aconta.	17	Unos días después unos cazadores vinieron a la selva.
Reacción simple	18	Querían coger un león para el zoológico.
Desarrollo	19	Los cazadores pusieron una trampa
Resultado	20	y cogieron al león.
	21	Amarraron al león a un árbol
	22	mientras fueron
Primer aconte.	23	a buscar una jaula para cargar al león.
Desarrollo	24	La ardillita estaba viendo esto desde un árbol.
	25	Tan pronto como se fueron los cazadores.
	26	la ardilla bajó del árbol
Resultado	27	y empezó a mascar la cuerda que detenía al león
	28	hasta que el león se escapó.

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Table 1 involves three characters; two of these, the ant and the dove, interact in all 3 episodes in a cooperative way. The dove first helps the ant meet his goal of getting a drink, and then helps save the ant from drowning. In the third episode, when the ant sees that the dove is in trouble, the ant acts to help the dove. This fable illustrates the moral "One good turn deserves another." Note that this tagline moral was not presented with the stories.

An example of content structure$_2$, is shown in the lower portion of Table 1. This fable again consisted of three episodes and three characters. However, in the second structure, the first two episodes involve goal-conflict and its resolution. A squirrel wakes up a lion; the lion is about to eat the squirrel and the squirrel must bargain his way out of the situation. He does so, promising to help the lion someday, even though he is so much smaller than the lion. In the third episode, the lion is in trouble and the squirrel does act to help him out of it. This fable illustrates the moral "Little friends may prove great friends." Unlike the first structure, there is a more explicit obligation to help in the third episode.

The four stories each contained equivalent numbers of statements. These are numbered 1 through 28 in Table 1. The stories were also approximately equal in terms of the number of propositions (Kintsch, 1974) in each story. Vocabulary in Spanish and English versions was chosen so that concepts familiar to kindergarten-level children in each language were used. Pilot testing indicated that some of the lexical items from the original fables (e.g., agarrar) were unfamiliar and we therefore substituted more generic words (e.g., coger).[1] Pilot testing also indicated that we needed to limit the use of pronouns in order to avoid confusion over the appropriate antecedents. Where pronouns were used, the gender of the English pronouns matched the gender of the respective

Spanish pronouns. This was done to maximize comparability in materials across the two language versions.

The eight presentation stories (4 in Spanish and 4 in English) were tape recorded by a bilingual, native Spanish speaker. The pronunciation and intonation on the tape recordings was therefore consistent with that of the bilingual program students who participated in the research. A native English speaker recorded the four English stories for presentation to the native English speaking, monolingual children who participated in the research. The rate at which the stories were recorded and the total listening time was equivalent across the two tape recordings of the English language materials. The Spanish language recordings played about 15 to 20 seconds longer than the English. The tape recorded materials were used with the kindergarten through third grade students and with two groups of fifth grade students. The fourth and fifth grade students read the materials, which had been typed on 8 1/2 x 11 inch sheets of paper, one presentation story per page.

Each of the bilingual program participants received four different stories. One of each content structure type was presented in Spanish and one in English. For example, one subject received "The Ant and The Dove," "El Enano y El Raton," "The Wolf and The Rooster," and "El Leon y la Ardilla." Monolingual English students also received four different stories, two examples of each structure type in English. Latin-square counterbalancing procedures were used with each age group of subjects to ensure that each structure x input language appeared equally often across subjects. In addition, order of languages (Spanish first or English first) was counterbalanced so that effects due to input language were not confounded with practice or fatique effects. As will be seen in the description of the subject population, the varying numbers of subjects led to unequal numbers of subjects in the various groups receiving the specific

material sets. However, caution was taken to equalize the numbers of subjects assigned to each material set to as great a degree as was feasible. For example, if there were 13 children in a group, then of the 4 sets of presentation materials, set 1 was presented to 4 subjects and sets 2, 3, and 4 were presented to 3 subjects each.

The resulting design was a split-plot fractional factorial design. Between-subjects factors were grade and for the bilingual program participants, first language (Spanish or English). Within-subjects factors were input language and content structure for the bilingual program participants and only content structure for the monolingual students. Dependent measures were amount of presented information that was recalled, number of correctly answered why questions and type of response to the lesson question.

Subjects

Children from kindergarten through sixth grade participated in the study. The sixth graders were drawn from combination classes consisting of fifth and sixth graders and this group will be referred to as fifth/sixth graders. Originally, the different age groups were conceptualized as constituting three experiments: Experiment 1 involved primary level elementary school children (kindergarten, first and second grades); Experiment 2 involved middle-elementary levels (third and fourth grades); Experiment 3 involved upper-elementary levels (fifth/sixth grades). However, for purposes of presenting the general trends observed across the entire elementary range we will present the subject information, as well as the results, for each grade level and ignore the traditional demarcations by experiments. Accordingly, subject information is given below for each age group. Note further that the language characteristics and tasks performed by each group are also described in these sections. Table 2 provides a

Table 2

Subject Groups and Tasks

Grade			Group Description	Task
K	21	13	ESL; Spanish first language	Listen/Retell
		8	Monolingual English; No Spanish Instruction; Reading at level	
1	44	16	ESL; Reading in Spanish at level	Listen/Retell
		12	SSL; Reading in English at level	
		16	Monolingual English; No Spanish Instruction; Reading at level	
2	28	10	ESL; Reading in Spanish at level	Listen/Retell
		10	SSL; Reading in English at level	
		8	Monolingual English; No Spanish Instruction; Reading at level	
3	30	10	ESL; Reading in Spanish at level; Readiness for English reading	Listen/Retell
		10	Reading in English; Exited from bilingual classroom after first or second grade	
		10	Monolingual English; No Spanish Instruction; Reading at level in English	
4	20	12	Began Reading in Spanish; Reading in English 1 yr.	Read/Retell
		8	Monolingual English	
5-6th	68	12	Began Reading in Spanish; Reading at level in Spanish and English	Read/Write
		8	ESL; Reading in Spanish at 3rd-4th level; 1 yr. in program	Listen/Write
		8	SSL; Reading in English at level	
		40	Monolingual English; Reading in English at level	Read/Write

schematic of the subject groups, numbers in each group and the tasks performed by each group.

Kindergarten. A total of 21 kindergarten students participated in the research. For 13, Spanish is the primary language. They were receiving English-as-a-Second-Language (ESL) instruction, with other classroom activities conducted in Spanish. Their scores on the Language Facility Test (Dailey, 1965, rev. 1980) were zone 2 or 3 in Spanish and they were at-level in the reading curriculum. The mean age for this group was 6 years. These children listened to 4 different stories, one of each content structure in Spanish and one of each in English. For the other 8 children, English is the primary language and they are in a traditional monolingual classroom. The mean age for this group was 6 years, 2 months. Each of the subjects was reading at grade level. This was determined by the book in the curriculum in which they were working in conjunction with teacher judgments as to the child's level. These children listened to four stories in English, two of each content structure. All the kindergarteners' responses were oral and tape recorded.

First Grade. A total of 44 first graders participated in the research. The sample consisted of three groups of subjects. Sixteen were children who began reading in Spanish and were receiving ESL. Twelve were children who began reading in English and were receiving Spanish-as-a-Second-Language (SSL). The third group consisted of twelve monolingual English speakers who were in traditional classrooms. All first grade subjects were reading in books appropriate to mid-year one. The mean age of the ESL group was 6 years, 11 months; of the SSL group, 6 years, 9 months; and of the monolingual English group, 6 years, 10 months. As with the kindergarten group, the ESL and SSL groups listened to two stories in Spanish and two others in English, whereas the monolingual students listened to four in English. Responses were oral and recorded on audiotape.

Second Grade. A total of 28 second graders participated in the research. The sample consisted of three groups comparable to those in the first grade sample; and each group was in a reading book appropriate to mid-grade 2 level. There were 10 subjects in the ESL group (Mean age = 8 years, 3 months) and 10 subjects in the SSL group (Mean age = 8 years). There were 8 students in the monolingual English group, mean age = 7 years, 10 months. The ESL and SSL students again listened to Spanish and English stories and the monolingual English only to English stories. Responses were oral and tape recorded.

Third Grade. Thirty third grade students participated. There were three groups of 10 students each. The first group had begun reading in Spanish and were receiving ESL instruction. They had had one month of after-school instruction in readiness for English reading but had not yet begun to read in English. The classroom from which these students were drawn was receiving Title VII funding. All of the children had been enrolled in the bilingual program for a minimum of two years (average enrollment was three years and maximum was 4 years). Each of these students was reading at level in Spanish. The mean age of this group was 9 years, 2 months. A second group of third graders had begun reading in Spanish but had been exited from the bilingual program during first or second grade and were in monolingual English classrooms at the time of testing. This group will be referred to as the "early transition" group. There were 10 children in this group and all were reading third grade level English readers. The mean age of this group was 9 years, 3 months. Both of these groups of children heard two Spanish stories and two other English stories. Responses were again oral and tape recorded. The third group also consisted of 10 subjects. These 10 were students who had never participated in a bilingual program. Although some may have spoken Spanish as a first language, they had been classified as fluent English speakers upon entrance to school and placed in

monolingual English classrooms. These children had received no instruction in Spanish and were reading at level in English. The mean age of this group was 9 years, 1 month. This group received four stories, all in English.

Fourth Grade. A total of 20 fourth graders participated. Twelve were in a Title VII bilingual classroom and had been in a bilingual program an average of three years. The mean age of this group was 10 years, 5 months. At the time of testing all twelve were reading in Spanish and in English. In Spanish reading, all 12 were at level. In English reading, six students who had transitioned to English one year earlier, i.e., during Spring of third grade, were reading in English at end-of-third-beginning-of-fourth-grade level. The other six students had begun reading English at the beginning of fourth grade and were reading at end-of-second-grade level in English. Both levels are considered "good" to "satisfactory" by the district's bilingual program, given the length of time since transition to English reading. These twelve students read two stories in Spanish and two others in English. The second group of fourth graders consisted of 8 children in a traditional monolingual English classroom who had never been enrolled in a bilingual program. These children were reading at level in English. The mean age of this group was 10 years, 2 months. These children read four stories in English. For all subjects, responses were oral and tape recorded.

Fifth/Sixth Graders. A total of 68 fifth/sixth graders participated. There were four groups, with 28 bilingual program participants and 40 monolingual English speakers. The monolingual English students were reading at grade level in English and had never received instruction in Spanish. The mean age of this group was 11 years, 4 months. The bilingual program participants reflected three types of students. Twelve had begun reading in Spanish and at the time of testing were reading at level in both Spanish and English. They had

been in the bilingual program an average of 5 years and had received ESL instruction until transitioning to English reading during end of third or beginning of fourth grade. The mean age of this group was 11 years, 2 months. This group read two stories in Spanish and two in English and wrote their responses in booklets provided by the experimenters. This group will be referred to as bilingual readers. The second group of bilingual program participants was comprise of 8 native English speakers who had been enrolled in the SSL component of the bilingual program for approximately 5 years. They could understand oral Spanish but had had no experience reading Spanish. These students were reading at-level in English. The mean age of this group was 11 years, 3 months. The third group of bilingual program participants consisted of 8 children who had been in the bilingual program for approximately 1 year, were reading at third-fourth grade level in Spanish and were receiving ESL instruction. These children had recently entered the school and were classified as nonfluent English speakers at the time of enrollment. The mean age of this group was 11 years, 2 months. The SSL and ESL groups listened to the stories, since they could not have read them in both languages, and then wrote their responses. The fifth/sixth grade groups were asked to summarize each story in addition to recalling it. Half of the students wrote their summaries prior to writing the recalls and half did the recalls first.

The first, second and fifth/sixth grade students in the SSL component consisted of Anglos and Mexican-Americans whose parents had requested placement in a bilingual program. The third and fourth graders were drawn from a different school than the students in the other grades. The population in the school from which the third and fourth graders were drawn is predominantly Mexican-American. However, as described above, the third and fourth graders in the monolingual English groups had been classified as English proficient upon

entrance to school and had never participated in a bilingual program. Note that at each grade level, monolingual and bilingual program students were sampled from the same school. Thus, any demographic differences between the schools does not affect within grade comparisons of students in the two types of instructional settings.

Procedure

The general procedure was similar for each grade level. A practice story was presented, which was used to illustrate the retelling, why question and lesson question tasks. Then the appropriate first story was presented. Following presentation the student either counted backward for 30 secs (kindergarten through fourth grade students) or worked on multiplication problems for 30 secs (fifth/sixth grade students). Then they retold the just-presented story; this was followed by the why questions on character motives. Finally, they were asked to state the lesson that the story teaches. Then the next story was presented.

The kindergarten through fourth grade students were tested individually either by a bilingual experimenter or by a monolingual one, depending on the group to which the subject belonged. The fifth/sixth grade bilingual program participants were tested in groups of three or four students by a bilingual experimenter. The monolingual English fifth/sixth graders were tested in two groups of approximately 20 students each by a monolingual English experimenter. All testing was conducted during April and May of the school year.

An important procedural feature of the experiments was the following: Each child who was presented with stories in both Spanish and English was told that the responses could be in either Spanish or English -- it was up to the child. This was true whether or not the story was presented in Spanish or English. The rationale for this procedure was that we were interested in what they had

understood and in what the children remembered and therefore did not want the response measures confounded with production skills in a particular language. Furthermore, both written and oral instructions for the response tasks were presented in the appropriate language. For example, all responses were elicited using Spanish with those students who were currently enrolled in ESL components of bilingual programs and in English for those in SSL components. For the ESL and SSL fifth/sixth graders, the written instructions and the questions were in Spanish or English respectively. Furthermore, the small-group testing format allowed the experimenter to clarify any aspect of the task that was not clear to the children.

Scoring

Three dependent measures were derived from the data, corresponding to the three tasks, namely story recall, why questions and the lesson question. Each subject's responses were scored by two independent judges. Interjudge reliability was above 90% and disagreements were resolved in discussion.

Recall Protocol Scoring. Each statement in a subject's recall was compared to the presented text and credit was based on meaning preserving recall of particular text statements. In some cases one statement in the protocol summarized over two or more presented statements. In these cases, credit was given for both presented statements. The following example from the texts shown in Table 1 illustrates the scoring:

Presented Statements: 11. "Help!" cried the ant. 12. "I'm drowning."

Protocol Statements: a. The ant cried for help. b. She was drowning.

This subject received credit for meaning preserving recall of presented statements 11 and 12. The protocol statement in c below received credit for a summary of the information presented in 11 and 12:

c. The drowning ant needed help.

Each subject received a score for number of statements recalled or summarized across on each text in each input language condition. Maximum score was 28. Note further that in scoring, substitute character names were accepted if the subject used that term throughout the protocol. For example, a number of the younger subjects called the dove a duck (pato en vez de paloma). If duck was used throughout the retelling in place of dove, the discrepancy between exact memory for the character identity was ignored in the recall scoring. A second common example of this occurred in one of the other stories in which a dwarf (enano) was one of the main characters. Many subjects substituted man (hombre) and this was accepted in the scoring as meaning preserving of dwarf.[2]

Why question scoring. For each presented text, four why questions were asked. These questions asked the children to give reasons for the actions of the various characters in the story. Number-of-correct-answer scores were derived from this measure. We accepted more than one specific answer as correct. The criterion for correct was based on plausible answers given the story content. For example, for the question Why did the ant go to the river? both to get a drink and she was thirsty were credited as correct. In contrast she wanted to swim or the river was along the way were scored as incorrect. As with the recall scores, each subject received a score (range 0 to 4) on each of the individual texts. For the monolingual subjects who received two examples of each structure, the data were the average of the scores on the two examples of each structure.

Lesson question scoring. Responses to the question What lesson does the story teach? were classified into those representing abstractions from the story and those that did not. By abstractions, we mean generalized statements

conveying a moral or general principle illustrated by the story. These types of responses are not necessarily a direct result of exact memory for the presented information. A moral represents a generalization from the concrete activities depicted in the story. It is not content specific and it is not tied to particular events or characters in the story (see discussions in Goldman, in press; Stein, in press). As an example You should help others is a response that generalizes from the ant and dove story whereas The ant bit the hunter is a response that does not generalize but relates a specific event in the story. From the classification, we derived the proportion of responses in each subject group that generalized from the presented story. For the bilinguals, proportions were examined by input language of the story.

Results and Discussion

Recall

Preliminary analyses were conducted on the recall measure in order to determine whether there were effects due to structure, story order and input language order. Analyses of variance were conducted separately on the kindergarten data, the first/second grade data, third grade data, fourth grade data, and fifth/sixth grade data. The results of these analyses showed that there were no structure differences in any grade, no effects due to story order or input language order and that these factors did not interact with the factors of conceptual interest. The following presentation of the data represents aggregation across these factors. Thus, mean recall scores for the children who dealt with stories presented in both Spanish and English reflect the mean recall across the $structure_1$ and $structure_2$ stories presented in Spanish and the $structure_1$ and $structure_2$ stories presented in English. The mean recall data for the monolinguals is mean recall across four stories presented in English.

Table 3

Means and Standard Deviations

for Recall of the Fables

Bilingual Groups	Input Language	
	Spanish	English
Kindergarten (n=13)	6.35 (4.25)	1.96 (2.72)
First Grade (n=16)	11.9 (4.26)	9.7 (5.55)
Second Grade (n=10)	12.15 (3.73)	9.95 (5.71)
Third Grade (n=10)	14.2 (3.17)	11.85 (4.06)
Fourth Grade (n=12)	18.08 (2.33)	16.96 (2.59)
Fifth/Sixth Grade (n=12)	17.34 (2.93)	18.17 (1.71)
One-Two Years in Bilingual Program		
Third Grade (n=10)	8.8 (6.53)	15.2 (2.41)
Fifth/Sixth Grade (n=8)	17.56 (3.39)	13.44 (6.59)
SSL Groups		
First Grade (n=12)	2.13 (1.46)	12.42 (5.46)
Second Grade (n=10)	.8 (2.08)	16.15 (4.47)
Fifth/Sixth Grade (n=8)	13.13 (3.7)	16.56 (2.32)

Monolingual	English Input
Kindergarten (n=8)	4.06 (3.16)
First Grade (n=16)	9.66 (4.86)
Second Grade (n=8)	12.31 (3.25)
Third Grade (n=10)	15.53 (2.1)
Fourth Grade (n=8)	16.31 (2.27)
Fifth/Sixth Grade (n=40)	17.53 (3.09)

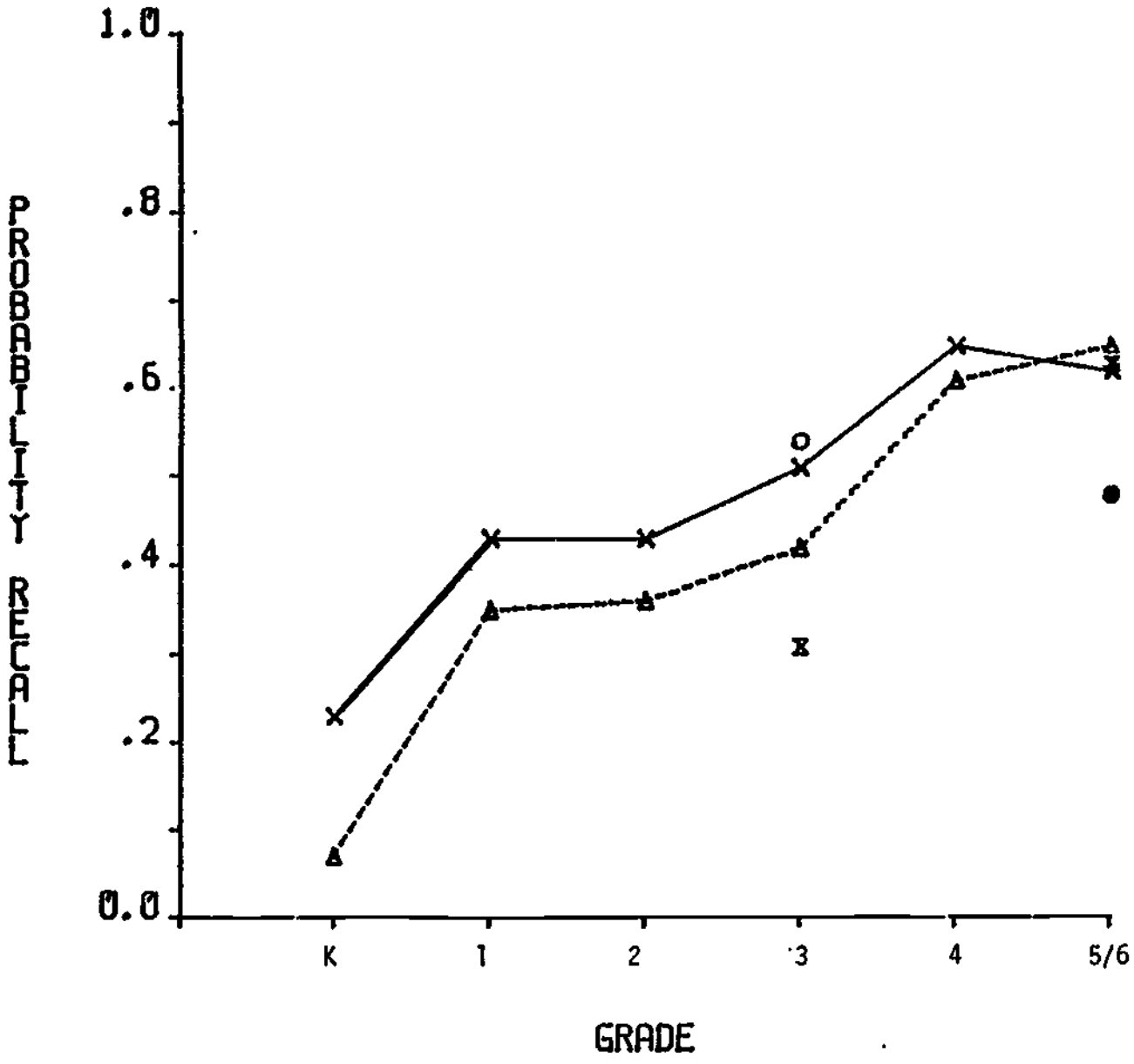


Figure 1. Probability of recall after Spanish (x-----x) and after English (Δ-----Δ) input for the bilingual groups for whom Spanish is the first language.

The mean recall scores are given in Table 3 for each group. Standard deviations are shown in parentheses. The amount of information recalled is assumed to reflect the use of various types of knowledge both in the encoding and retrieval phases of the task. Story memory depends on both content specific knowledge and on general story structure knowledge (see Stein & Goldman, 1981 for discussion). The relationship between performance in first and second languages was taken as an index of the degree to which a child transferred knowledge available for story comprehension in the first language to the comprehension of stories that were presented in the second language. This definition of knowledge utilization in two languages takes into account differences in proficiency on this task in the first language by essentially using subjects as their own controls. Correlation regression analyses allow the examination of this variability in first language proficiency.

Overall trends in the recall data. The mean recall scores shown in Table 3 have been converted to probability of recall scores and graphed in Figure 1 for easier comprehension of the overall trends in the recall data. Figure 1 shows the data for bilingual program participants who began read ing in Spanish and receiving ESL. These students have essentially been in a two-language situation since entrance to school. Henceforth, students with these characteristics will be referred to as bilinguals. The data are shown for both Spanish input and English input for each grade level. For each language, recall performance generally increased from kindergarten to 5/6 grade level. Statistical tests on grades differences in mean recall indicated that Kindergarten students performed significantly less well than first graders, when the text was presented in Spanish, t (27) = 5.55, $p < .01$, and when the text was presented in English, t (27) = 4.45, $p < .01$.[3] The performance levels of the first, second and third graders were not significantly different in either

language, although there was a general increase over these three grades. Fourth graders' performance with Spanish input was significantly better than that of the third graders', t (20) = 3.15, $p < .01$. The same pattern of significance was found in English, where third graders' performance (mean = 11.85) was not as high as the fourth graders' (mean = 16.96; t (20) = 3.41, $p < .01$). Differences in level of performance between fourth and fifth/sixth graders in each input language were not significant. Thus, following either Spanish or English input, the recall data of the bilinguals indicate the following trend across grades: K < 1 = 2 = 3 < 4 = 5/6.

Comparisons within each of these grade levels indicated that story comprehension, as measured by level of recall, was equivalent after Spanish input and English input for each group of children except for the kindergarteners. For these children, Spanish input (mean = 6.35) led to higher recall than English (mean = 1.96), F (1, 12) = 9.53, $p < .01$.

These recall results must be understood with respect to the language that the children used when recalling the stories. In kindergarten, 12 of the 13 children in this group responded in Spanish regardless of the input language of the stories. The other student matched the language of output to the language of input, responding in English after English input and in Spanish after Spanish input. In first grade, 11 of 16 always responded in Spanish, 3 matched input and output language and 2 responded in English. A similar distribution was observed in the second grade bilinguals, where 7 of the 10 consistently produced in Spanish, 2 matched input and output languages and 1 consistently produced in English. Among the third grade bilinguals there was a trend away from consistent responding in Spanish: 50% of the students matched input and output languages and 50% responded in Spanish after both Spanish and English input. By fourth grade, matching input and output languages was the dominant pattern, with

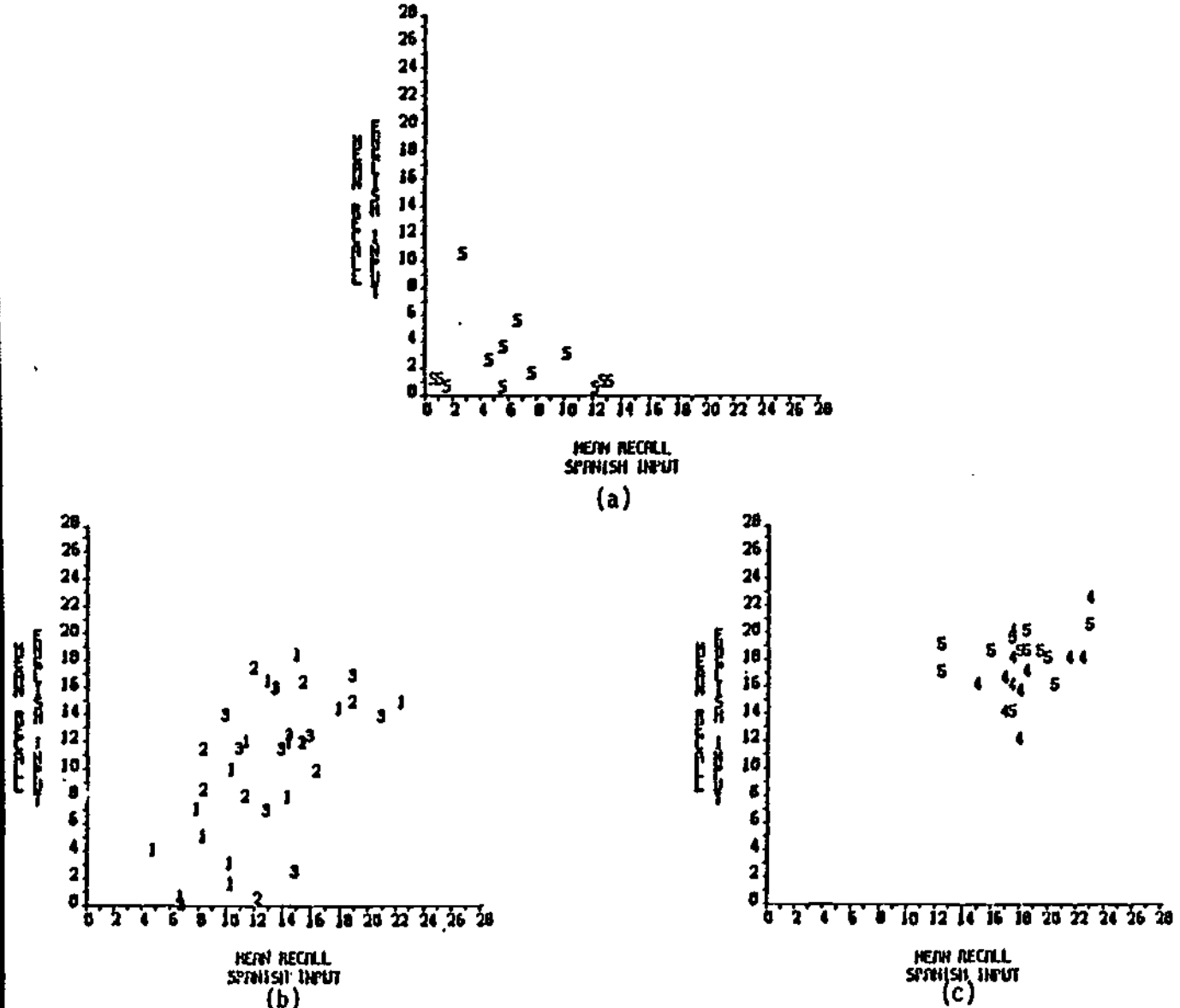


Figure 2. Relationship between recall after Spanish input and recall after English input for kindergarten bilingual students (a); for first, second, and third grade bilingual students (b); and for fourth and fifth/sixth grade bilingual readers (c).

75% (9 of the 12 students) performing in the manner. The other three responded in Spanish. In the fifth/sixth graders, there was an interesting shift toward responding in English: 50% of the students matched input and output language, 5 of the 12 responded in English after both Spanish and English input and 1 student responded consistently in Spanish. Examination of the recall levels associated with the language of production distributions indicated no systematic relationship between level of recall and language of production.

In addition to examining the relationship between recall after first and second language input at the group level, we examined the relationship on an individual subject level. As discussed in the introduction, a primary concern was the nature of the relationship between first and second language proficiency. Of particular interest to us in the analysis of individual differences within grades was the degree to which a child's performance with Spanish was indicative of performance with English. Our expectation was that over the course of acquisition, the relationship would increase. In terms of the correlational analyses applied to the data, this type of relationship would be manifested in increasing positive correlations between first and second language performance as grade in school increased. We therefore computed correlations between recall performance after Spanish input and after English input as well as examining the scatterplots for these correlations.

The expectation of an increased relationship between recall of Spanish and English input was, in general, supported by the data. Figure 2 shows the scatterplots and correlation coefficients for bilingual students. Panel 2(a) gives the scatterplot for the kindergarten children. The correlation, $r = -.22$, $df = 11$, is not significantly different from zero. Thus, for students in this grade, performance after Spanish input is not related to performance after English input. Panel 2(b) shows the scatterplot for bilingual first, second and third

graders. The overall correlation, r = .58, df = 34 is significant $t(34) = 4.15$, $p < .01$. Those students who are at the lower end of the distribution after Spanish input are also at the lower end of the distribution after English input and vice versa. Finally, panel 2(c) gives the scatterplot for the fourth and fifth/sixth grade bilingual students. As with the previous group, on an individual basis, performance after Spanish input is predictive of performance after English input. The correlation coefficient for this group of subjects, r = .3, df = 22 is, however, not significant due to the restricted range of recall performance after both Spanish and English input.

The conclusion for these groups of bilingual program participants is that at the group and at the individual level, skills involved in story comprehension and retelling appear to be transferred to comprehension of English, the second language of the students in this group. It is also important to note however, that not until fourth grade were the majority of children choosing to produce in English when English had been the language of the story. The reasons for this may have to do with individual students' perceptions of their own proficiency in English. That the kindergarten, first and second graders tended to prefer production in their first language suggests that their perception of the effort involved in "translating" English input to Spanish output was less than their perception of the effort involved in producing in English. We did stress to them that we wanted to know everything they remembered and that they could produce in either language. This may have been a unique occasion for them. Be that as it may, it is clear from these data that from first grade on, comprehension of English input fables was equivalent to the comprehension of fables presented in Spanish, when comprehension is measured by the amount of information recalled.

Prior to discussing the performance of children whose first language is English, a discussion of the two other groups of children for whom Spanish is the first language sheds further light on the relationship between comprehension of first and second language input. The second panel in Table 3 gives the mean recall performance for third grade students who had transitioned to English-only classrooms during first or second grade and for fifth/sixth grade level students who had been enrolled at the school site for only 1 or 2 years. The issues of interest are somewhat different in the two cases. For the fifth/sixth graders, who had been receiving ESL for only about a year, performance in Spanish would be expected to be comparable to that of the fourth and fifth/sixth grade groups previously discussed. This is the case, as the mean of 17.56 indicates. This mean is represented as the darkened triangle in Figure 1. With respect to comprehension of English input, two predictions may be made: (1) if there is little transfer of skills that are manifest with Spanish to English then performance with English input would be expected to be at a level comparable to the first/second graders. This prediction is based on the equivalence of time in ESL programs; (2) If transfer plays a role in the performance of these students with English input, then comprehension of the fables presented in English would be expected to be more consistent with their general developmental level in Spanish. The data indicate more support for the second prediction than for the first: mean recall with English input (13.44, indicated by the darkened circle in Figure 1), is significantly below that of the fifth/sixth grade bilingual stu dents, $\underline{t}$ (18) = 2.25, $\underline{p} < .05$, but is equivalent to that of the fourth grade bilingual group, $\underline{t}$ (18) = 1.61, $\underline{p} > .05$. The language of production data indicate a preference similar to that observed in the bilingual kindergarten, first and second graders: All 8 students in this fifth/sixth group consistently produced in Spanish after either Spanish or English input. Thus, in terms of pro-

duction, but not in terms of comprehension, our first prediction finds more support. For these students one to two years of ESL instruction leads to recall performance after English input that is (1) significantly above that of the younger first and second grade children; and (2) more comparable to their performance level after Spanish. Our conclusion for these students is that there is indeed transfer of knowledge across first and second languages.

The second group of students who had had one to two years of a bilingual program were third graders. Their performance in two languages indicates that exiting from the bilingual classroom prior to third grade led to a transitory benefit to English language comprehension and a negative effect on Spanish language comprehension. These data points are shown in Figure 1 as the open circle and the X. These early transition students did significantly better on English input (mean = 15.2) than their third grade bilingual counterparts who had not yet transitioned to English (mean = 11.85), t (18) = 2.39, $p < .05$. However, the performance of the bilingual group after Spanish input (mean = 14.2) was significantly better than the performance of the early transition group (mean = 8.8), t (18) = 2.23, $p < .05$. Furthermore, the superiority of the early transition group with English appears to be a temporary phenomenon: by fourth grade the bilingual group's performance after English (mean = 16.96) is equivalent to the performance of the third grade early transition group after English input. Note further than the performance levels of the fourth grade bilinguals are equivalent after Spanish and English input. Thus, there is no evidence that transitioning to English "early" leads to the superior and/or faster development of this type of comprehension skill. It does appear to lead to poorer skills with the first language, Spanish.

The overall group trends for recall also indicated transfer of prior knowledge across language input for those students who were learning Spanish as

a second language. The third panel of Table 3 gives the mean recall data. For the first graders, recall after first language input, English, was equivalent to the performance of the bilingual classroom first graders after input in their first language, Spanish (12.42 versus 11.9, t (24) = .26). The English-input performance of the SSL second graders (mean = 16.15) was significantly above that of their ESL peers in the same classroom (12.15, t (18) = 2.06, $p < .05$) and was equivalent to the level of performance demonstrated by the fifth/sixth grade SSL students (mean = 16.56). At the same time, performance after second language input, Spanish, was significantly below that of English in these SSL first and second grades. In first grade, recall after English input (mean = 12.42) was significantly better than after Spanish (mean = 2.13), t (10) = 5.52, $p < .01$; in second grade, recall after English (mean = 16.15) was superior to that after Spanish (mean = .8), t (8) = 9.33, $p < .01$. By fifth/sixth grade, performance after English (mean = 16.52) and after Spanish (mean = 13.13) input was equivalent, t (6) = 1.65, $p > .05$. Note further that none of these children produced in Spanish, even in the fifth/sixth grade sample.

The group mean data for students dealing with two languages during elementary school indicate that there is transfer of prior knowledge of story content and structure across input languages, although there is a prerequisite to being able to use this type of knowledge: basic decoding skills in the second language must be mastered. By decoding we are referring to both auditory and visual input. Our interpretation of the pattern of similarities and differences in recall performance after input in the two languages is that initial learning of the second language is concentrated on building up necessary auditory parsing skills. Once these have been mastered, comprehension of these fables proceeds similarly in first and second languages. That is, developmental changes in patterns of recall that are characteristic of first language understanding are also

characteristic of developmental changes in second language understanding. For students in ESL components of bilingual programs, it appears to take one to two years to master basic auditory skills; for those in the SSL component of the bilingual program that we studied, it appears to take three or four years. This is probably due to the amount of instructional time devoted to developing Spanish language skills in native English speakers: 30 minutes per day, when there is time. Far more instructional time is spent on developing English language skills in students whose first language is Spanish.

It is also important to examine the relationship between performance of those children dealing with two languages during elementary school and those dealing with only one, namely English. Critics of bilingual education sometimes argue that dealing with two languages in elementary school leads to slower acquisition of both languages. Proponents of bilingual education have argued that dealing with two languages may have beneficial effects on general language proficiency because a dual-language environment leads to a greater awareness of language properties. Although our research addresses only a limited set of skills, the ability to comprehend fables, a comparison of the data from the bilingual program participants with the data from the monolingual kindergarten through fifth/sixth grade students indicates no negative effect of dealing with two languages. The recall performance of the monolingual students is shown in Figure 3.

Overall age trends in the monolingual data indicate a trend similar to that observed in the bilingual students. Kindergarten students' performance (mean = 4.06) was significantly below that of first (mean = 9.66) and second (12.31) graders, t's > 2.84, $p < .01$. Performance of the first and second graders did not differ. Performance levels of fourth (mean = 16.31) and fifth/sixth graders (17.53) were equivalent. The one difference between the pattern obtained with

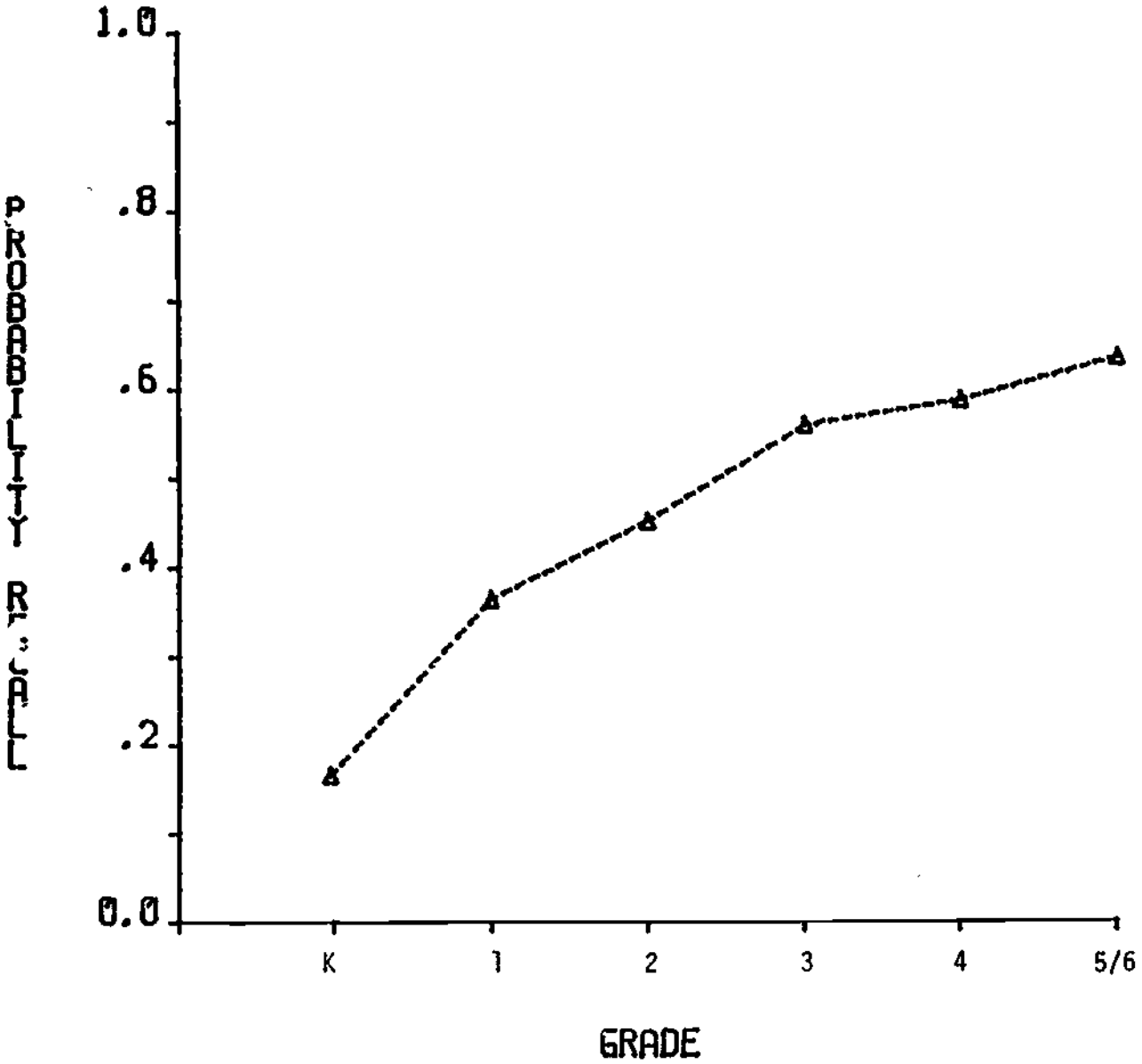


Figure 3. Probability of recall after English input for monolingual groups.

these monolingual students and the pattern obtained with the bilingual groups was in the third grade. The third grade monolingual students performance was equivalent to that of the fourth and fifth/sixth graders while the performance of the third grade bilinguals was equivalent to that of the first and second graders. However, if comparisons of first language performance are made (Spanish for the ESL students and English for the monolingual students), no significant differences in level of recall performance are found at any grade. Figure 4 depicts these data.

The story recall data indicate that proficiency in the first language proceeds at about the same rate for students enrolled in monolingual programs and for those involved in bilingual program components in which ESL is stressed. Furthermore, comparison of the SSL groups with the monolingual groups suggests that the SSL students are doing a bit better than their monolingual classroom grade peers. This may indicate a positive effect of exposure to two languages; however the self-selection and voluntary participation of the SSL students may be responsible. That is, these students may have generally better language proficiency than their monolingual peers, although as noted in the introduction, all children in these samples were reading at-level for their grade. Third grade seems to be the only grade during which skills associated with recalling fables differ. However, as noted above, these differences are transitory. This does not rule out the possibility that examination of other language skills would yield a different conclusion. The data from the summarization task that was administered to the fifth/sixth graders is informative on this point.

Summaries

The performance on the summarization task replicated the recall task findings in that there were no differences due to the language of input. The data

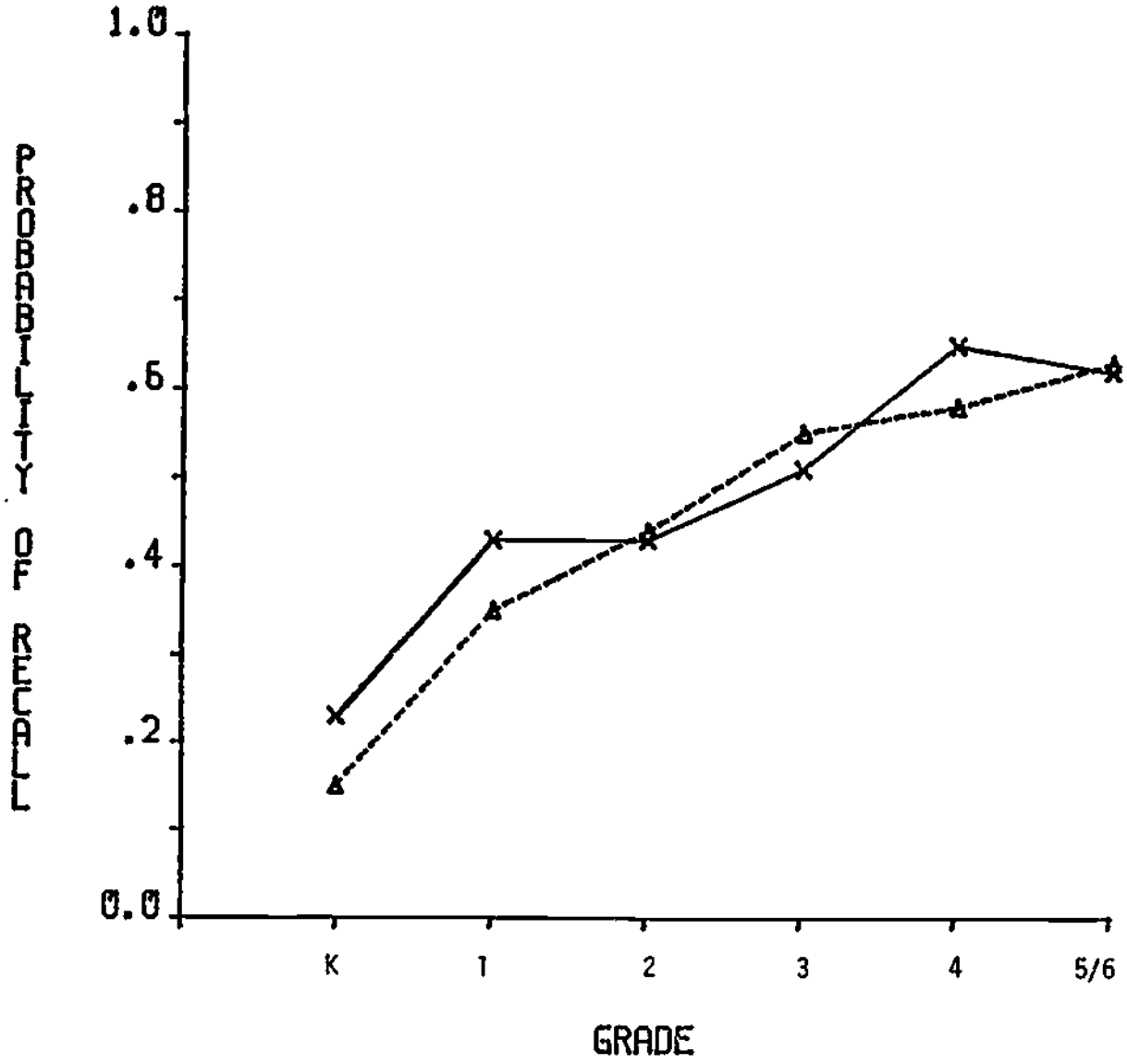


Figure 4. Probability of recall after first language input: Spanish (x-----x) input for bilingual groups; English (Δ-----Δ) input for monolingual groups.

are given in Table 4. For each of the groups that were dealing with two languages summaries were shorter than recalls of the fables. This is exactly the expected relationship between a summary versus a recall of a fable. Within each group and for both Spanish and English input, there was a mean decrease of approximately 2 statements. Examination of the individual summaries indicated that students tended to delete from the summaries some statements that had appeared in the recalls. This deletion operation is one of the most common ways in which students construct summaries (Brown & Day, 1983). The summaries of the monolingual English fifth/sixth students were also shorter than their recalls. However, for these students there was a more substantial shortening of the number of statements in the summaries as compared with the recall protocols. These students deleted but in addition used statements in the summaries that permitted them to capture the gist of an entire episode in one statement. This type of behavior is a more sophisticated summarization behavior than deletion (Hahn & Goldman, 1983). However, this type of summarization activity typically is dependent on classroom instruction and demonstration of how to generate sentences that encompass large sections of text. It is a skill that is often not observed in the summaries of older, community college students (Brown & Day, 1983).

Thus, our interpretation of the difference between the monolingual and bilingual program participants relates to differences in the classroom curricula, rather than to differences associated with Spanish or English language skills. This interpretation is supported by the fact that neither the SSL nor the Bilingual fifth/sixth graders used different summarization actions in the two languages. The procedures they have for constructing summaries are more limited than the procedures of the monolingual students; however, the procedures do not differ as a function of the language of the text that is being sum-

Table 4

Comparison of Recall versus Summary Tasks:

Mean Number of Fable Statements Included in the Recall or Summary

Group		Input Language: Spanish	Input Language: English
Fifth/Sixth Grade Bilingual	Recall	17.34	18.17
	Summary	15.21	16.75
Fifth/Sixth Grade SSL	Recall	13.13	16.56
	Summary	11.75	13.38
Fifth/Sixth Grade--One to two years in Bilingual program	Recall	17.56	13.44
	Summary	13.63	10.13
Fifth/Sixth Grade Monolintual	Recall		17.53
	Summary		4.06

marize:. Our two question tasks provide additional data pertinent to broadening our conclusions regarding acquisition of comprehension skills and the difference between measures of comprehension that appear to require direct classroom instruction as compared with those measures that are less reliant on instruction.

Why Questions

The why questions asked the children to explain the various actions of the story characters. Correct responding to these questions involves using both the information in the text and prior knowledge about people's motives for particular behaviors. This type of prior knowledge is social interpersonal knowledge. In comparison with the recall task, the why question task has a decreased language production demand. Mean number of correct answers to the why questions are given in Table 5. Standard deviations are given in parentheses. There were no differences associated with content structure and the means are computed across content structure, with maximum correct = 4.

For each grade level within each group of subjects, performance on the why questions was higher than the recall levels. This is not surprising given the decreased production component. A second important point relates to performance in two languages. Among the bilingual groups, performance for both Spanish and English inputs was equivalent in each grade. Furthermore, by first grade, performance after second language input, English, was 70% or better. Among the SSL students, both first and second graders showed poorer performance in their second language, Spanish, than in English, although the difference was significant only for the second graders, t (8) = 9.59, $p < .01$. Replicating the pattern with recall, SSL students in fifth/sixth grade showed equivalent levels of performance after Spanish and English input. For the two groups of students whose first language is Spanish and who had had 1 to 2 years of ESL, there were

Table 5

Mean Number Correct on Why Questions

Bilingual Groups	Spanish	English
Kindergarten	1.92 (1.19)	1.15 (.72)
First Grade	3.0 (.77)	2.78 (1.05)
Second Grade	3.15 (.71)	3.2 (.75)
Third Grade	3.4 (.62)	3.35 (.55)
Fourth Grade	3.71 (.25)	3.83 (.31)
Fifth/Sixth Grade	3.92 (.04)	3.92 (.04)
SSL Groups		
First Grade	1.83 (1.05)	3.21 (.78)
Second Grade	2.25 (.34)	3.75 (.34)
Fifth/Sixth Grade	3.5 (.66)	3.94 (.17)
One-Two Years in Bilingual Program		
Third Grade	2.9 (1.14)	3.85 (.23)
Fifth/Sixth Grade	3.88 (.22)	3.56 (.39)
Monolinguals		
Kindergarten		2.78 (1.05)
First Grade		3.2 (.79)
Second Grade		3.44 (.51)
Third Grade		3.7 (.29)
Fourth Grade		3.8 (.21)
Fifth/Sixth Grade		3.93 (.21)

no Spanish-English input differences on the why questions for the fifth/sixth graders. The early transition third graders performed better after English input than after Spanish, t (8) = 2.46, $p < .05$. Among the monolingual students, there was a small range in performance from kindergarten (mean = 2.78) to fifth/sixth grade (mean = 3.93). Comparisons between the bilingual and monolinqual groups after first languge input indicated no significant differences at any grade level.

In part, this pattern of results reflects ceiling effects for these types of questions. By around first grade, most children had little difficulty giving an appropriate response to the questions about characters motives. Our interpretation of the low difficulty level of these questions is that social interpersonal knowledge is sufficient to answer these questions when the motives presented in the story correspond to typical motives for actions that children have frequently encountered. That was the case with the actions depicted in these fables. The high levels of performance on these questions are more important from the perspective of language assessment than from what they tell us regarding the development of comprehension skills. Specifically, if a language assessment instrument contains a large number of these types of questions, our data indicate that children will be able to demonstrate proficiency in the second language at an earlier grade level than if a recall measure is used. Based only on the why question data, our conclusion would be that by first grade, bilingual students understand 70% of the story when presented in English. However, based on the recall data, we would conclude that it is not until fourth grade that comprehension of the story is relatively good (better than 60% of the information).

What does emerge from both the why question and recall data is that differences between understanding after first and second language input are minimal

and follow the same general developmental time course once basic parsing skills in two languages have been learned. Furthermore, it is also the case that recall and question measures are correlated: children with little or no recall also could not answer the why questions. These relationships are reflected in significant correlations, shown in Figure 5. Only the kindergarten, first and second grade bilingual groups are shown since there was insufficient variance in the question data in the older groups for correlations to be meaningful. After either Spanish or English input, the scatterplots in Figure 5 indicate that there is a direct relationship between probability of recall and probability of correct answers on the why questions.

Thus, limits on comprehension of the fables are related to prior knowledge and the limits are similar whether the input is in first or second language. The final task we administered provides information regarding the generalizability of this conclusion when a student is asked to abstract a lesson or moral from the text.

Responses to the Lesson Question

The patterns of responding to the lesson question reflect trends similar to those observed in the recall and why question data. Responses to the lesson question were classified into those that generalized from the specific events in the text and those that did not. The data in Figure 6 give the proportion of responses that generalized from the story for each grade level in the bilingual and in the monolingual samples. Generally, responses that generalized reflected an attempt to relate the story to a moral convention or prescription on appropriate behavior whereas responses that did not generalize typically reported some specific event from the story.

The bilingual students' data are shown in panel 6(a). With respect to differences associated with input language, the proportion of responses that

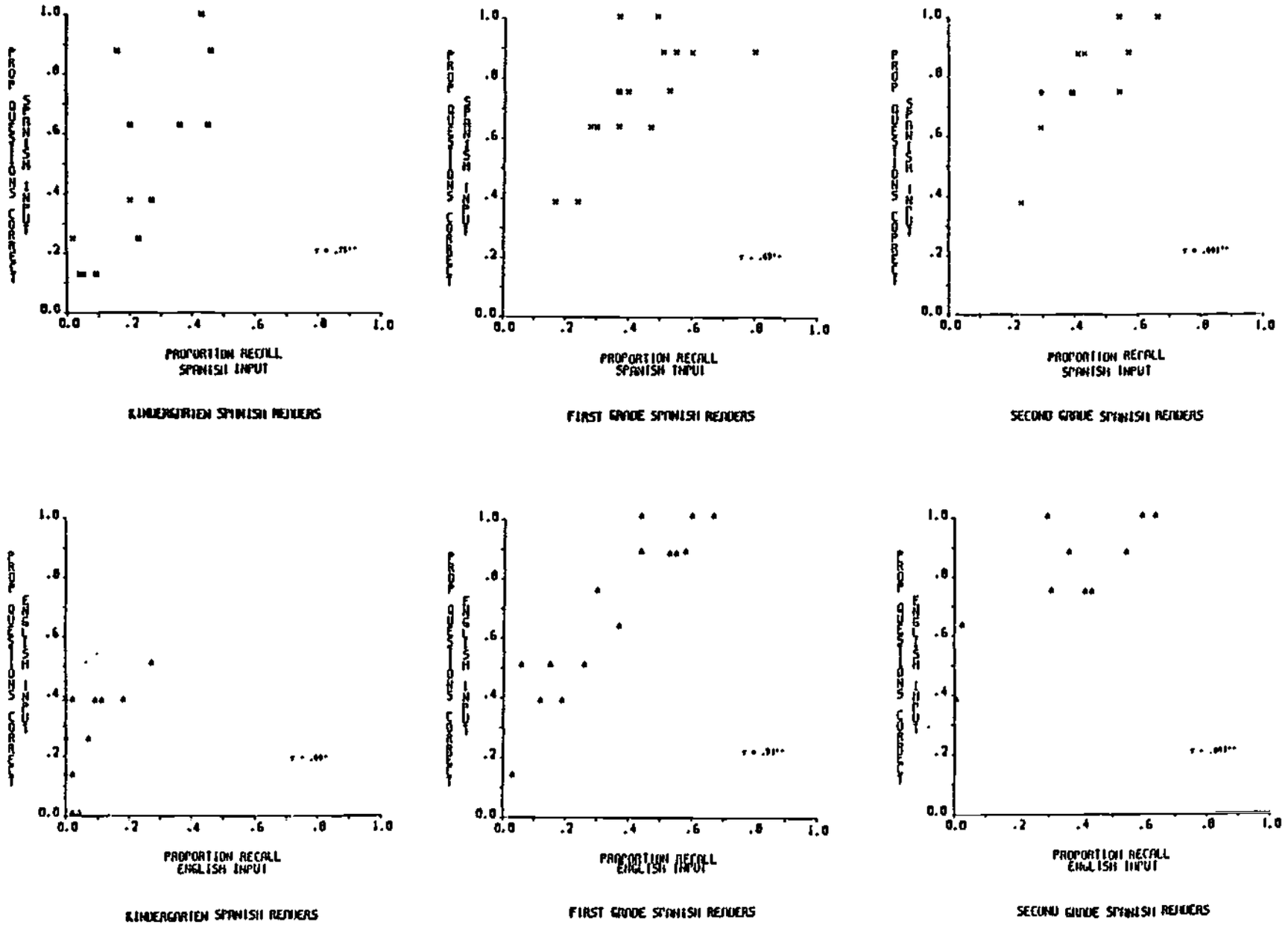
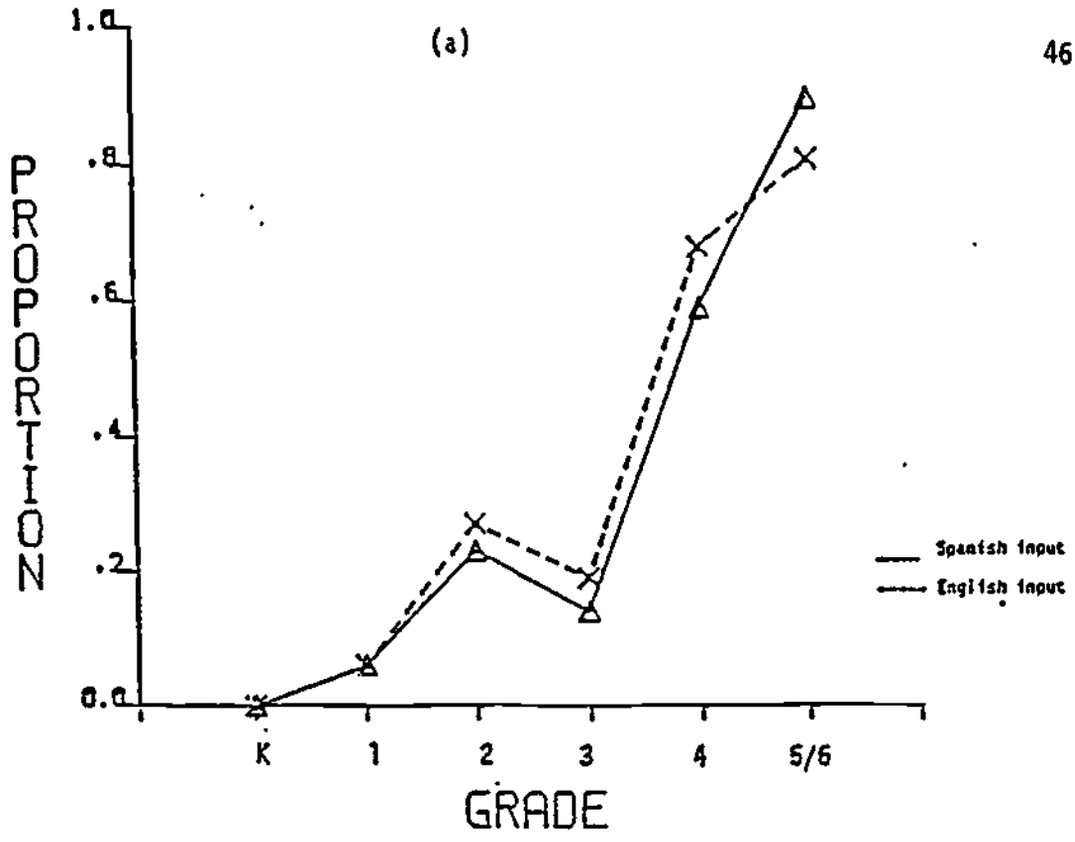


Figure 5. Relationships between recall and why question performance for the kindergarten, first and second grade bilingual groups.



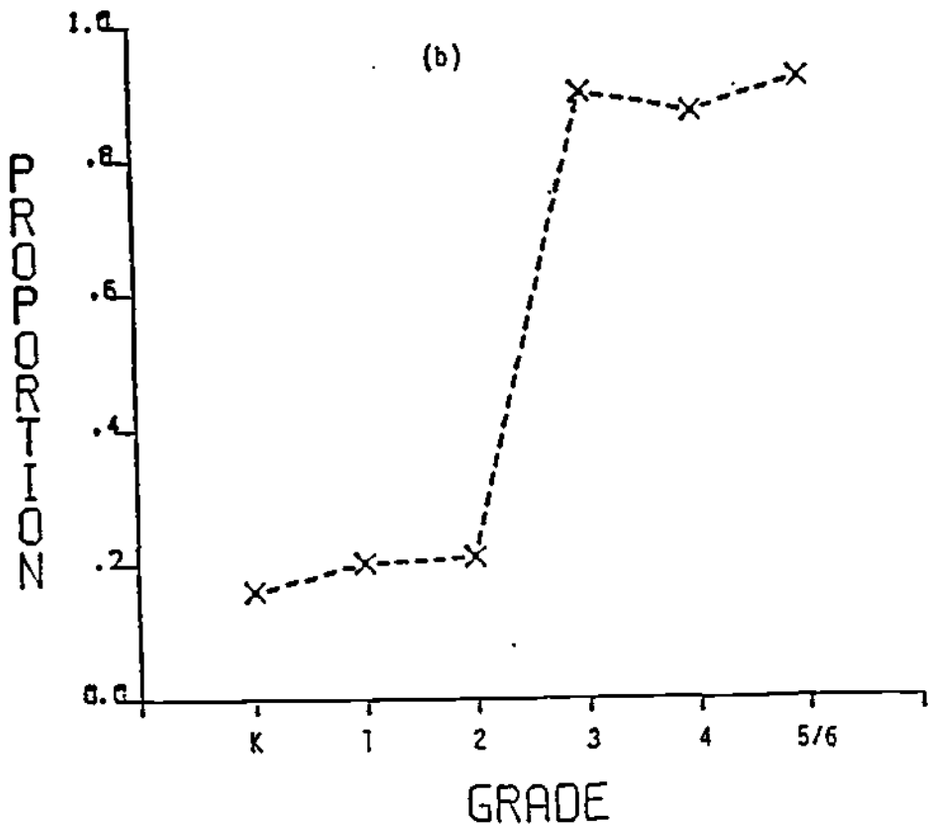


Figure 6. Proportion of responses to the lesson question that generalized from the fables for the bilingual groups (a) and for the monolingual groups (b).

generalized from the fables did not differ at any grade level. The developmental trend indicated by the data is that not until fourth grade do the majority of responses generalize: kindergarten, first, second and third graders tended to give responses that "stuck to the presented facts"; significantly more often, fourth, and fifth/sixth graders gave responses such as Help your friends; Little people can help big people; One good turn deserves another; and You should always keep your promises. In comparison with the monolingual students, the developmental trend was similar. These data are shown in 6(b). The one discrepancy between the monolingual and bilingual groups was in the third grade: Third grade monolingual students responded like the older monolingual grades, whereas third grade bilingual students responded like the younger grades.

The difference in the third grade between the monolingual and bilingual students may reflect allocation of classroom instructional time. Teachers in the monolingual classrooms may cover question like these at an earlier grade level than those in the bilingual classrooms, i.e, third grade level as compared to fourth grade level. However, as with the recall differences between early transition third graders and bilingual third graders, the differences in responses to the lesson question are transitory: Bilingual and monolingual fourth graders report similar proportions of responses that generalize from the presented fables z's < 1.96, $p > .05$. Our interpretation of these data is similar to our interpretation of the fifth/sixth grade summarization data: answering the lesson question with a generalization from the story may be a skill that requires some type of instruction, either of a formal nature in the classroom setting or of an informal nature in the home/parental setting. In contrast, the type of understanding measured by the recall and why que tions may be based on knowledge and skills that are acquired without direct instruction, i.e., incidentally.

General Conclusions and Implications

Our findings indicate that knowledge used to guide fable comprehension in a first language is also used to guide fable comprehension in a second language. This conclusion applies to the three types of comprehension tasks investigated in this research: retelling fables, responding to questions about the motives of characters and extracting a lesson from the fable. The conclusion is applicable to children learning English as a second language and to children learning Spanish as a second language. The pattern of developmental differences in the relationship between performance after each language input demonstrates an important constraint on comprehension of the second language: the comprehender must have mastered basic auditory parsing and coding skills to demonstrate listening comprehension and basic orthographic parsing and coding skills to demonstrate reading comprehension.

Our results also clearly show that students who are learning two languages in elementary school perform at levels equivalent to those of children learning one language, i.e., English. The lesson question results do indicate that some types of instructional activities occur during different grades in monolingual and bilingual classrooms. However, the differences between performance levels on the lesson question, as well as the differences in the recall data for the third graders, were transitory in the sense that these differences were no longer present among fourth graders. Thus, differences in proficiency that are probably related to specific curricular objectives did not persist for more than one grade.

This research bears on two important issues pertinent to the assessment of second language proficiency. The first issue concerns the measure of proficiency that is used. Our recall task shows that proficiency in the second language is acquired very gradually over a three or four year period whereas the

why question data suggested more rapid acquisition of proficiency. The nature of the comprehension demands of the assessment instruments employed in language proficiency testing must be carefully considered in terms of the following questions: To what types of learning activities are the assessment tasks relevant? At what developmental level would proficiency on the particular assessment task be expected in a child's first language?

We would also encourage the use of assessment tasks that require varying degrees of language production. This recommendation is related to the second issue that our research addresses. It is extremely important in language proficiency assessment to carefully delineate the language skill that is supposed to be measured by a particular task. This is particularly true with respect to the assessment of comprehension as compared with production in a second language. Our data on the language of production indicate that comprehension of a second language precedes production capabilities in the second language. If assessment instruments require children to match input and output languages then the results reflect neither comprehension nor production skills. The combined demands of remembering what was in the text and organizing it for second language production place demands on processing resources that may far exceed the demands of comprehension separate from production. Thus, we strongly encourage independent assessments of comprehension and production. As with written production (e.g., Brice-Heath, 1981), proficiency in oral production is undoubtedly governed by contextual factors, including children's perceptions of the purpose of the language output and the expectations of the audience.

We have found clear indications that there is a direct relationship between proficiency in the first language and proficiency in the second language. Among individuals, performance levels in the first language were positively correlated with performance levels in the other language. This was the case for both the

recall and why question tasks. We believe that these data reinforce the instructional practice of using the primary language as the language of instruction while a second language is introduced. Our speculation is that information that becomes part of a child's knowledge base, regardless of the language of input, can be transferred to a second language during comprehension and other learning activities. The degree to which transfer occurs will depend on the child having prerequisite parsing and vocabulary entries for the second language. However, once parsing skills and concept tags are acquired, our expectation is that knowledge of relationships among concepts within any content domain would be transferred to second language input situations. The major experimental effort in the second year of the project examined this expectation for content-area learning skills. The amount of new information acquired from texts whose function is to provide new information were presented to third and fourth grade Spanish/English bilingual students and to third and fourth grade monolingual English students. Learning was measured by the amount of facts that children could recall from the texts.

III. LEARNING FROM TEXT: COMPREHENSION OF INFORMATIONAL PASSAGES BY THIRD AND FOURTH GRADE SPANISH/ENGLISH SPEAKERS

Academic success is largely measured by a student's ability to increase his/her knowledge base through reading content-area materials. Despite the importance of reading-to-learn, little is known about the factors that influence comprehension of expository text (Spiro & Taylor, 1980). Expository text is defined here as text whose primary function is to provide new information about a particular topic. To distinguish our use of this type of text from other, somewhat different uses of the term expository, we will refer to the type of text we are using as informational text. One reason that little is known about the factors that affect comprehension of informational text is that most comprehension work has been conducted with narrative or story materials.

Even less is known about the processing skills of Spanish-language background students in the public schools. These students who are typically exposed to a dual language environment and/or who utilize both languages to some degree bring some unique skills to the reading comprehension task. No study has attempted to conduct a systematic comparison of comprehension performance of this type of student utilizing informational texts in Spanish and English.

The purpose of this study was to examine the comprehension of informational text by limited-English proficient students in third and fourth grades who were enrolled in Spanish/English bilingual education programs. Specifically, the study was designed to address two questions:

1. Whether access to two languages affects the amount of information learned from informational texts presented in Spanish or in English; and

2. Whether informal as compared to formal linguistic expression, manifested by formal and informal voice mechanisms embedded in the texts, influences the amount or quality of the information learned from the text.

Spiro and Taylor (1980) have suggested that the form of linguistic linguistic expression is a potentially important factor affecting learning from informational text. Forms of linguistic expression are related to the level of vocabulary, the range of sentence constructions (e.g., active versus passive) and the degree and type of figurative language that appears in texts. Figurative language, such as metaphor, analogy and personification, is often used to stress or embellish information which may be conveyed literally and explicitly elsewhere in the text. In elementary school readers and in content-area textbooks (e.g., science, social studies, etc.) examples of analogy and personification are frequently found. Often the style of presenting information in these books is informal and directed to the young reader by the second person pronoun "you". Rubin (1980) refers to this medium-related dimension as "involvement." Many times the text may contain contractions, reflecting more of an informal, oral language approach. Examples of this form of linguistic expression can be found in The Bookmark Reading Program, books 3 & 4, published by Harcourt, Brace & Javanovich, 1974; in The Story of California, Social Studies book 4, American Heritage Publishing Company, 1971; and in Spanish Reading Keys, book 3, The Economy Company, 1977.

None of the teachers' manuals for the previously cited textbooks, and only a few sources in the empirical comprehension literature offer a rationale for this informal approach to presenting content-area material. There are two general possibilities regarding the effects of the use of informal linguistic expression in content-area materials:

1. The texts may be easier to understand and learn from because there is a better match between oral language and "written down" language in informal as compared with formal texts.
2. The informality of the text may make learning from the text harder because the discourse function (to inform) is masked by the informal linguistic expression.

Our research investigated these two possibilities. In addition, we examined interactions between formal versus informal linguistic expression and reading proficiency in English when English is the second language. We hypothesized that informal expression might be more beneficial to ESL students than to monolingual English students since the "closeness" to oral language might be more important for ESL students than any potential "interference" effects created by the function-masking described in #2 above.

Learning from text was examined for the topic of vanishing animals. This topic was chosen after careful inspection of the third and fourth grade curricula in the school from which the subjects were to be drawn. The topic and the four specific animals that our passages described were selected for their unfamiliarity to the children. Thus, we hoped to control for differences in prior knowledge. In contrast to the narrative comprehension research, in which we were interested in transfer or use of prior knowledge in two languages, in the learning from text study we examined acquisition of new information in a situation where there would be almost no topic-specific information already in long term memory. The focus was therefore on the amount of new information that could be acquired from comparable texts presented in Spanish as compared to English.

Method

Materials and Design

Materials consisted of two versions (formal/informal voice) in two languages (Spanish/English) of the same four expository texts on vanishing animals: the aye-aye, the chinchilla, the quetzal, and the vicuña. The texts were adapted from Animals in Danger, Childcraft Annual (1974), written for grades three to six. The original English passages were modified for comparability across the four texts and were subsequently translated to Spanish. The information in each text is organized into six short paragraphs in all versions of the texts. Each text contained seven categories of information and 28-29 facts per text. Samples of the Aye-Aye text are given in Table 6 for the Spanish language and in Table 7 for the English language.

The formal version of the set of texts presents information in the 3rd person form without any direct reference to a particular reading audience. No attempt is made to personally involve the reader. Contractions are not generallly used. This particular approach is similar to that found in some content-area textbooks (e.g., Elementary Science Study, McGraw-Hill, 1971; California, A History, Social Studies 4, Harr Wagner Publishing Co, 1965; and Imagenes, Santillana Publishing Co, 1979).

The informal versions of the texts made many direct references to its reader, utilized contractions, and included humor and personification. The informal version was developed by taking the formal version and embedding 4 types of informal mechanisms:

1. Deliberate attempts to involve the reader by addressing him/her in the second person pronoun. "you", e.g., "Can you imagine...," and "If you were a...".

Table 6

Sample Informational Texts, Spanish

Voz formal:

EL AYE-AYE

1. Hay un animal
2. que alguna gente cree que trae mala suerte.
3. Está en gran peligro de ser destruído.
4. Ese animal es el aye-aye.
5. El aye-aye es un animal extraño
6. como del tamaño de un gato.
7. Pertenece a la misma familia a que pertenecen los changos.
8. Algunas veces el aye-aye hace un ruido
9. que suena como "ay-ay."
10. Por éso, le dieron ese nombre.
11. El aye-aye vive en los árboles
12. en una isla grande
13. cerca de la costa de África.
14. Se puede encontrar solo
15. en los árboles de los bosques.
16. El aye-aye se parece a un mapache.
17. Tiene una cola ancha y peluda
18. y unos dientes muy fuertes.
19. El aye-aye tiene unas manos curiosas.
20. El dedo medio de cada mano es mucho más largo
21. y delgado que los otros.
22. El aye-aye es nocturno.
23. Duerme durante el día
24. y sale en la noche.
25. Luego brinca de rama a rama
26. buscando comida.
27. Con sus dientes hace unos agujeritos en los troncos de los árboles.
28. Después mete el dedo dentro y saca unos guzanitos
29. que se come.
30. Para beber, mete el dedo largo en el agua,
31. lo saca de lado, pasándolo por la boca.
32. Los aye-ayes son casi extintos.
33. Porque casi todos los bosques donde ellos viven
34. han sido destruídos.
35. Mucha gente trata de matar a los aye-ayes
36. cuando los ven
37. porque creen que los aye-ayes traen mala suerte.
38. Por esta razón, el aye-aye está en gran peligro.
39. Sólo quedan como unos 50 aye-ayitos en el mundo.
40. Es posible que los aye-ayes no sobrevivan mucho más.

Voz informal:

TIE AYE-AYE

1. ¿Puedes imaginár como fuera
2. si niños de 8 a 10 años fueran considerados mala suerte?
3. Siempre estarías en peligro.
4. Hay un animal
5. que alguna gente cree que trae mala suerte.
6. Está en gran peligro de ser destruído.
7. Ese animal es el aye-aye.
8. El aye-aye es un animal extraño
9. como del tamaño de un gato.
10. Pertenece a la misma familia a que pertenecen los changos.
11. Algunas veces el aye-aye hace un ruido
12. que suena como "ay-ay."
13. Por éso, le dieron ese nombre.
14. ¡Qué suerte que tu no tienes que vivir solo!
15. Vives en una casa con tu familia.
16. El aye-aye vive en árboles
17. en una isla grande,
18. cerca de la costa de África.
19. Se puede encontrar solo
20. en los árboles de los bosques.
21. El aye-aye se parece a un mapache.
22. Tiene una cola ancha y peluda
23. y unos dientes muy fuertes.
24. El aye-aye tiene unas manos curiosas.
25. El dedo medio de cada mano es mucho más largo
26. y delgado que los otros.
27. Tu trabajas y juegas durante el día.
28. y duermes por la noche.
29. El aye-aye hace el opuesto.
30. El es nocturno.
31. Duerme durante el día.
32. y sale en la noche.
33. Luego brinca de rama a rama
34. buscando comida.
35. Con sus dientes, hace unos agujeritos en los troncos de los árboles.
36. Después mete el dedo dentro y saca unos guzanitos
37. que se come.
38. Para beber, no necesita un vaso como tu.
39. El aye-aye mete el dedo largo en el agua
40. ¡lo saca de lado, pasándolo por la boca!
41. Los aye-ayes son casi extintos
42. porque casi todos los bosques donde ellos viven
43. han sido destuídos.
44. Mucha gente trata de matar a los aye-ayes
45. cuando los ven
46. porque creen que los aye-ayes traen mala suerte.
47. Por esta razón, el aye-aye está en gran peligro.
48. ¡Qué triste será para el aye-aye!
49. Sólo quedan como unos 50 aye-ayitos en el mundo.
50. Es posible que los aye-ayes no sobrevivan mucho más.

Table 7

Sample Informational Texts, English

Formal voice:

THE AYE-AYE

There is an animal
that some people believe brings bad luck.
It is in great danger of being destroyed.
That animal is the aye-aye.
The aye-aye is a strange animal
about the size of a cat.
It belongs to the same family as the monkey.
Sometimes the aye-aye makes a noise
that sounds like "aye-aye."
That is how it was named.
The aye-aye lives in trees
on a large island
off the coast of Africa.
It can be found alone
among the trees in the forest.
The aye-aye looks like a raccoon.
It has a wide bushy tail
and very strong teeth.
The aye-aye has strange-looking hands.
The middle finger on each hand is much longer
and thinner than the other fingers.
The aye-aye is nocturnal.
It sleeps during the day,
and comes out at night.
Then it jumps from branch to branch
looking for food.
With its teeth, it makes tiny holes in tree trunks.
Then it reaches in and pulls out little caterpillars
that it eats.
To drink, it dips one long finger into water
and it pulls the finger sideways through its mouth!
The aye-ayes are almost extinct
because almost all the forests where they live
have been cut down.
Many people also try to kill aye-ayes
when they see them
because they believe that aye-ayes bring bad luck.
So the aye-aye is in bad trouble.
There are only about 50 little aye-ayes left in the whole world.
The aye-ayes may not be able to survive much longer.

Informal voice:

THE AYE-AYE

Can you imagine how it would be
If 8 to 10 year-olds were considered bad luck?
You would always be in danger.
There's an animal
that some people believe brings bad luck.
It's in great danger of being destroyed.
That animal is the aye-aye.
The aye-aye is a strange animal
about the size of a cat.
It belongs to the same family as the monkey.
Sometimes the aye-aye makes a noise
that sounds like "aye-aye."
That's how it was named.
You're lucky you don't have to live alone.
You live in a house with your family.
The aye-aye lives in trees
on a large island
off the coast of Africa.
It can be found alone
among the trees in the forest.
The aye-aye looks like a raccoon.
It has a wide bushy tail
and very strong teeth.
The aye-aye has strange-looking hands.
The middle finger on each hand is much longer
and thinner than the other fingers.
You work or play during the day,
and sleep at night.
The aye-aye does the opposite.
It is nocturnal.
It sleeps during the day,
and comes out at night.
Then it jumps from branch to branch
looking for food.
With its teeth, it makes tiny holes in tree trunks.
Then it reaches in and pulls out little caterpillars
that it eats.
To drink, it doesn't need a glass like you.
The aye-aye dips one long finger into water
and pulls the finger sideways through its mouth!
The aye-ayes are almost extinct
because nearly all the forests where they live
have been cut down.
Many people also try to kill aye-ayes
when they see them
because they believe that aye-ayes bring bad luck.
So the aye-aye is in bad trouble.
How sad it must be for the aye-aye!
There are only about 50 little aye-ayes left in the whole world.
The aye-ayes may not be able to survive much longer.

2. Use of humor/personification of animals, e.g., "Chinchillas don't use coats."
3. Comparison of the reader's attributes/characteristics with the animal's attributes/characteristics, e.g., "You work and play during the day; chinchillas sleep during the day."
4. Use of contractions, e.g., "can't", "you're".

There were five informal mechanisms in each of the informal passages, distributed throughout the text. As a consequence, the informal versions were slightly longer than the formal versions, although the two versions contained the same number of informational units or facts. For each text, a reproduction of the photograph of the animal was prepared.

Latin-square counterbalancing procedures were used to generate four topic orders and four condition (language x version) orders for the bilingual students. Each bilingual student read four different texts: Spanish, Formal; Spanish, Informal; English, Formal; and English, Informal. The monolingual English groups also read four texts, 2 formal English and 2 informal English.

The design, excluding the factors introduced by counterbalancing procedures, was a mixed design with repeated measures for both the bilingual and monolingual samples. For the bilingual sample, there was one between-subjects factor (Grade) and there were two within-subject factors: language of input (Spanish or English) and version (formal or informal). For the monolingual sample, Grade (3 or 4) was the between-subjects factor and version the within factor.

Subjects

Eighty-eight students from third and fourth grade classes in a Ventura County Public school in southern California participated in the study. The school had just completed 4 years of ESEA Title VII funding and is currently

supporting the bilingual program with state and local funds.

Third Grade Participants. There were 40 students in the third grade group. These third graders were divided into the following three groups:

1. Bilingual Spanish readers: There were 16 students in this group, 6 males and 10 females, with a mean age of 8.8 years. The students selected for inclusion in this group had been in the bilingual program for three years. They had begun their formal reading instruction in Spanish and had continued with Spanish as the primary medium for reading. Students in this group were either at or above grade level in Spanish, based on the reading book they were using, or were at grade level bsed on scores from the Spanish California Test of Basic Skills (CTBS), administered at the end of 2nd grade. When the testing began, 4 of these students had had one month of formal instruction in transitioning to English reading whereas the others had not yet begun this instruction.
2. Bilingual, English-transitioned readers: There were 8 students in this group, 4 males and 4 females, with a mean age of 8.5 years. These students had been participants in the bilingual program for three years, although not all of them had begun reading in Spanish. Four students were classified as fluent English speakers when they enrolled in school and had begun formal reading instruction in English; four students were transitioned to English reading by the end of first grade. None of these students had had formal Spanish reading instruction in either second or third grades. These students were at or above grade level based on the reading section of their achievement test scores and were in English readers at-grade level.

3. Monolingual English readers: There were 16 students in this group, 10 males and 6 females, with a mean age of 8.8 years. All of these students had been classified as fluent English proficient (FEP) upon entrance to school. Both Anglos and Chicanos comprise this group. These students had begun formal reading instruction in English and have received no instruction in Spanish, oral language or reading. None of these students were ever enrolled in a bilingual program. All were at grade level in reading, according to the level of their reading book and/or achievement test scores. This group of third graders received only English language versions of the texts.

Fourth Grade. There were a total of 48 fourth grade students. These were divided in to two groups: Bilingual readers and Momolingual English readers. Descritiopns of the characteristics of each group are given below.

1. Bilingual Readers: Thirty-two bilingual readers, 22 female and 10 male, with a mean age of 10.3 years, participated in the study. The majority of the students in this group have been enrolled in a bilingual program for a minimum of three years and a maximum of four years. All stuoents in this group had received some formal instruction in both Spanish and English reading, or were identified by their teachers as possessing some level of biliteracy. (This means of identification was verified by administering an informal reading inventory in the child's weaker language. The students were asked to read a paragraph from a third grade text and then answer some comprehension questions.) Students selected for this group were at grade level in reading in their dominant language and at least at 2nd grade level in their weaker language, according to the following criteria:

a. Were at grade level on the Spanish CTBS reading section and/or 4th grade Spanish reading texts with a minimum of 2nd grade reading level in English or

b. Were at grade level on the English CTBS in reading and/or were reading 4th grade English language texts, with a minimum of 2nd grade reading levels in Spanish.

2. Monolingual English readers: Sixteen students participated in this group, 10 males and 6 females, with a mean age of 10.4 years. All of these students had been classified as fluent English proficient (FEP) upon entrance to school. Both Anglos and Mexican-Americans comprised this group. These students had begun formal reading instruction in English and had continued instruction only in that language. These students were either at grade level based on their reading achievement test scores or were using 4th grade level reading books.

Procedure and Tasks

The main task for all subjects was a two-part reading-to-learn activity. The first part consisted of a free recall of the text, immediately following the reading of each text. The second part consisted of seven general probe questions, one per category of information, e.g., "How did the aye-aye get its name?". These questions were used to determine whether non-recalled information had in fact been learned but had not been accessed and produced during the free recall task.

Each subject was tested individually. They were instructed to read each passage so that they could retell it to the experimenter after the reading. They were also informed of the probed questions to follow the recall. These tasks were demonstrated with a sample passage. Instructions and questions were given

in the student's dominant language, which was determined at the beginning of the session and by previous conversations with the child's teacher. Bilingual students were told that they could answer in the language of their choice, regardless of the input language of the text.

Prior to the presentation of the typed versions of each text, the child was shown the picture of the animal about which they were next going to read. They were asked whether they had ever seen or knew anything about that animal. If they reported yes, they were asked to tell about it. Not one subject was able to provide any correct information about any of the four vanishing animals. After the student had finished reading the text, the picture was removed so as not to confuse visual clues with recall.

Immediately following the reading of each text, the child was asked to count backwards from 20 in order to eliminate immediate, short-term memory effects. They were then instructed to retell what ever information they could from the passage. The experimenter was limited to the following prompts during recall: "And then?", "Can you think of anything else?", and "You told me...". The probe questions were asked immediately following the conclusion of the recall for the text. The next text was then presented. Each student's recall and responses to the questions were tape recorded.

An additional task was administered to the third grade Bilingual Spanish readers and to the Bilingual English transitioned readers approximately two weeks after completion of the reading tasks. This task was a listening activity. The Bilingual Spanish readers were re-presented with the two English texts which they had read earlier. These were presented via audiotape. Recall and probe question data were again collected. The Bilingual English-transitioned readers were re-presented with the two Spanish texts that they had read and again recall and probe question tasks were conducted. The rationale for this "add-on" task

was that we were interested in knowing the degree to which these students could understand oral presentation of content-area material after three years of ESL instruction. The findings from this task are important because the kind of information contained in these texts is consistent with what is taught orally and with what might be presented in a traditional English-only class. Thus, for those students who did not appear to be able to read and learn from content-area texts presented in English, we investigated their ability to listen and learn from the same text.

Scoring

The recall protocols and probe question responses were scored for the number of presented facts that were mentioned. The number of presented facts was not identical to the number of presented statements, which are shown in Tables 6 and 7, because some presented statements actually repeat the same fact. Accordingly, each text was analyzed to determine the number of unique facts in the text. For example, in the Aye-Aye text shown in Table 7, lines 2 and and 37 convey the same unique fact, namely that some people believe that aye-ayes bring bad luck. In scoring, this fact was counted as one fact. Other information was analyzed similarly. The total number of facts in the formal and informal versions of each text topic was the same, although not each topic had the same number of facts. The Aye-Aye topic texts contained 27 facts, and the Chinchilla, Vicuña and Quetzal topic texts each contained 28 facts. Proportion of information given was the measure used in the analyses and was determined by comparing the number of facts given to the total number of facts that could have been given for a particular text topic, i.e., 27 or 28.

The transcribed protocols were scored for the number and identity of the presented facts. For example, the following is the recall protocol of one third grade student:

The aye-aye is as big as a cat. People think that he brings bad luck.

This protocol contains two facts, the first presented in line 6 of the text shown in the left hand portion of Table 7, and the second presented in line 2 repeated in line 37 of this same sample text. This student's score was therefore 2 out of 27 or .07 (7%) of the presented information. A student who included 10 unique facts about the Aye-Aye would have received a score of 10/27 or .37 (37%).

The probe question responses were scored in the same manner, i. e., for the number and identity of the presented fact. Again, the number of facts mentioned in responding to the probe questions was compared to the number of facts that could have been given in response to that question and proportion of information scores were derived for each text.

Results and Discussion

The proportions of facts recalled were submitted to Analyses of Variance. Among the third graders, one analysis was performed on the data from the bilingual and transition groups in which Group was the Between-subjects factor and language and version were the Within-subjects variables. There were no main effects, neither of group, version nor language. There was a significant interaction of language by group, F (1,22) = 17.53, $p < .01$. The means for this interaction are shown in Table 8. After reading, the third grade bilingual students recalled more facts if the input language was Spanish (Mean = .17) than if the input language was English (Mean = .06). The reverse was true for the third grade transition students: more was recalled after English input (Mean = .22) than after Spanish input (Mean = .11). The Fourth grade bilinguals, whose data is also shown in Table 8, recalled exactly the same amount of information after

Table 8

Mean Proportion of Facts Recalled from Informational Texts

	Input Language	
Group	Spanish	English
Third Grade Bilinguals	.17	.06
Third Grade Transition	.11	.22
Fourth Grade Bilinguals	.23	.23
Third Grade Monolinguals		.21
Fourth Grade Monolinguals		.28

Spanish input as after English input, Mean = .23. Version made no difference for this group either. Thus, replicating the effects observed in the fable study. the third grade bilingual program participants recall more after Spanish; however, by fourth grade and after only 8 to 9 months of instruction in English reading, the amount of information recalled was the same regardless of language of input. The data for the monolingual students were analyzed in one analysis in which grade was a between-subjects factor and version a within-subjects factor. Grade was significant, $F(1,30) = 4.25$, $p < .05$, whereas version was not. As indicated in Table 8, fourth graders recalled more than third graders.

Comparison of the fourth grade monolinguals and the fourth grade bilinguals indicated that the amount of information recalled after English input was equivalent, t (46) = 1.28, $p > .05$. Furthermore, first language performance of the third graders indicated that the recall of the bilinguals after Spanish (Mean = .17) was equivalent to the recall of the monolinguals after English input (Mean = .21). The proportions of facts remembered as assessed by the probe questions were analyzed in the same manner as the recall data. The obtained pattern of results and significant effects was the same as in the recall task. The means are shown in Table 9.

Thus, for students who have not yet begun reading in English, the amount of information that is learned is greater with L1 (Spanish) materials. However, performance after English input is no longer different from that after Spanish once students have had two-thirds of a year of English reading instruction, as is the case with the fourth grade bilingual students. The data indicate that reading content area materials in L2 (English) is a sufficiently difficult task for the third graders that comprehension and memory for the information is below that for L1 materials. A final issue we pursued was to assess the listening comprehension of these students. The amount of information recalled by the third

Table 9

Mean Proportion of Facts Reported in Probe Questions

Group	Spanish	English
Third Grade Bilinguals	.19	.08
Third Grade Transition	.10	.21
Fourth Grade Bilinguals	.24	.22
Third Grade Monolinguals		.24
Fourth Grade Monolinguals		.28

grade bilingual students after listening to English materials (Mean = .13) was significantly greater than after reading (Mean = .06), F (1, 15) = 15.96, p < .01. Similarly, the third grade transition students performed better with Spanish materials they listened to (Mean = .18) than with those they read (Mean = .11), F (1,7) = 10.2, p < .02.

The data indicate that reading to learn in content areas is limited by orthographic decoding. Once these skills have become sufficiently automatized, there are no differences in the amount that is learned from Spanish (L1) and English (L2) input. Sufficient automatization appears to occur in about 8 to 9 months, at least for the sorts of materials used in the present study. The degree to which this conclusion generalizes over other classroom materials in the content areas remains an open question. However, as we found for the narratives, the limits on comprehension of L2 appear to reside in being able to identify the individual words that are in the incoming message. Transfer of comprehension skills that are available for use with L1 to L2 do not appear to be the problem. We note however, that there was a great deal of variability in the L1 comprehension and learning skills for both monolingual English and bilingual students. These variations within a language group call for instruction that is adaptive to the particular skill level of the individual.

Footnotes

1. This research was conducted in Southern California. In this region, the word coger is commonly used and the word agarrar is less common. Whereas under certain circumstances coger may have taboo sexual connotations this term is frequently used in everyday discourse by both the teachers and children who participated in the research.
2. Copies of the protocols may be obtained by writing to the first author.
3. T-tests have been used to test for significance of mean differences between groups. A two-tailed significance criterion was adopted, which requires greater t values than the one-tailed for acceptable levels of significance. The use of individual t-tests in this fashion is a less stringent procedure than multi-factor analysis of variance and therefore makes it easier to conclude that there is a significant difference among means. In the context of the present work, especially when comparisons between performance with Spanish as compared to English input are discussed, the use of the t-test can be justified on the grounds that it biases toward finding a difference.

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APPENDIX

Dissemination of Project Information

The following is a list of papers and presentations that have been used to disseminate the findings of this project:

Goldman, S. R., Reyes, M., and Varnhagen, C. (in press) Understanding fables in first and second languages. National Association for Bilingual Education Journal.

Goldman, S. R., Reyes, M., and Varnhagen, C. (in press) Applying first-language skills to second-language comprehension: Narrative comprehension by Spanish-English speakers. Bilingual Education Paper Series, Vol. 6 #12. Los Angeles, CA: Evaluation, Dissemination and Assessment Center, California State University.

Goldman, S. R. and Reyes, M. (1983) Use of prior knowledge in understanding fables in first and second languages. Paper presented at the annual meetings of the American Educational Research Association, Montreal, Canada. (This paper has been submitted to ERIC for inclusion in the data base of the Clearinghouse on Tests, Measurement and Evaluation.)

Goldman, S. R., Reyes, M. and Varnhagen, C. (1983) Utilization of knowledge acquired through first language in comprehending a second language: Narrative comprehension by Spanish-English speakers. Paper presented at the Twelfth Annual International Bilingual Bicultural Education Conference of the National Association for Bilingual Education, Washington, D. C. (This paper has been submitted to ERIC for inclusion in the data base of the Clearinghouse on Language and Linguistics.)

Reyes, M. and Goldman, S. R. (1984) Comprehension of Content Area Passages: A Study of Spanish/English Elementary School Readers. Submitted to the program committee of the Thirteenth Annual International Bilingual Bicultural Education Conference of the National Association for Bilingual Education.

Reyes, M. (1983) Learning from Content Area Passages. Presentation sponsored by Funds for the Improvement of Post Secondary Education (FIPSE) program, University of California, Santa Barbara.

A project abstract was also sent to the Clearinghouse on Bilingual Education. In addition, numerous reprint requests have been received and the appropriate paper sent in response. Copies of the in press journal article were sent to school personnel of the school districts from which the sample was drawn.