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ABSTRACT

This 2-volume document reports on a longitudinal study of the relationship between bilingualism and cognitive ability. Previous research has suggested that bilingualism might have positive effects on cognitive ability. This study focuses on effects for "non-balanced bilinguals," those who do not have equal levels of proficiency in both languages. Following an extensive review of research on bilingualism, the study is described. Subjects were elementary students in a Spanish-English bilingual program. Cognitive abilities measured included English and Spanish verbal ability, metalinguistic ability, nonlinguistic ability, and social perspective taking. Both cross-sectional and longitudinal analyses showed statistically reliable effects of bilingualism on cognitive abilities, although magnitude and reliability varied over time and grade level. The results in general support the position of a positive relationship between bilingualism and cognitive ability, even in non-balanced bilinguals. The appendix in volume 1 is an annotated bibliography of research on bilingualism and intelligence, while volume 2 consists of 3 appendices: a questionnaire sent to parents of study subjects, a preliminary report of a demographic study of all Hispanic students in New Haven giving statistical data in tables and figures, and measures used in the study including extensive picture tests. (KH)

The Causal Relationship between the Development of Bilingualism, Cognitive Flexibility, and Social-Cognitive Skills in Hispanic Elementary School Children

Final Report

Part C

Research Agenda

Bilingual Education Act
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FINAL REPORT

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NATIONAL INSTITUTE OF EDUCATION
NIE-G-81-0123

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December 31, 1984

VOLUME I: FINDINGS and APPENDIX A

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SUMMARY

The project addressed the question of bilingualism and cognitive ability in bilingual children. The long tradition of research in this area has varied with respect to subject populations, methodology employed, and fundamental questions asked by social scientists. A comprehensive review of the early literature (culminating in an annotated bibliography) revealed that the early work was embedded in the nature/nurture controversy of intelligence that permeated American psychology at the turn of the century Bilingualism as a test-taking factor came to be seen as a trait of the bilingual individual. More recent research with better-endowed middle class populations suggested that bilingualism might have positive effects on cognitive ability. Review of this research, however, suggested several limitations. Group comparisons of bilinguals and monolinguals are confounded with sociological factors that correlate with differential language use. Correlational studies also do not allow inferences about direction of causality. The focus on balanced bilinguals (those with

approximate equal levels of proficiency in both languages) also left unaccounted the cognitive performance of non-balanced bilinguals. Furthermore, studies were not conducted with appropriate blind procedures The present empirical effort aimed at an investigation of the problem in the context of a transitional bilingual education program in the United States, where primarily non-balanced bilinguals are found.

Subjects were elementary school students (K-6) in the Bilingual Program in New Haven, Connecticut. Over the course of three years, a total of 392 subjects participated in the study. Subjects were tested in the fall and spring of each school year. Supplemental data on the home backgrounds of all Hispanic students in the New Haven schools were collected, in order to place the study sample of bilingual program students in the framework of the entire Hispanic population. Analyses revealed that bilingual program students were from a predictably select sector of the population, with greater orientation towards use of Spanish at home. In general, there appears to be a subtractive bilingual situation, with those individuals with increasing use of English showing lesser use of Spanish.

Measures for the study included the following. English and Spanish abilities were measured using respective versions of the Peabody Picture Vocabulary Test, validated against independent measures of oral proficiency in each language on a subset of our sample. Metalinguistic ability for the younger cohorts (K-3) was assessed through their judgments of the grammatical acceptability of Spanish sentences. Metalinguistic ability in older children (Grades 4-6) was measured through a test requiring detection of ambiguous sentences. Nonverbal ability was measured using the Raven's Coloured Progressive Matrices and the spatial relations subtests of Thurstone's Primary Mental Abilities. In the younger cohorts, a measure of

social perspective taking was adapted into Spanish.

Data were analyzed primarily through correlational procedures. English and Spanish abilities showed increasing correlation over time. The effect of bilingualism on the dependent measures was assessed through partial correlations (the correlation between English and the dependent measures, controlling for Spanish and for Age). The effect of verbal ability in Spanish was also assessed by its correlation with the dependent measures, controlling for English and Age. In both our cross-sectional and longitudinal analyses, there were statistically reliable effects of bilingualism on the dependent measures, although the magnitude of the effect and the statistical reliability varied over time and grade level. The most consistent relationship with bilingualism was found in the nonverbal measure of Raven's. Effects also appeared, although more sporadically, on metalinguistic awareness and the measure of social perspective-taking. Spanish showed its most consistent relationship with metalinguistic ability, which was expected since the measure consisted of Spanish sentences. The results in general support the position of a positive relationship between biligualism and cognitive ability even in non-balanced bilinguals. Cause-effect assessments were difficult to make, due to the high rate of mobility in this population. Furthermore, fluctuations in the correlations over time could be due to true changes in the relationship between the measures, or to changes in the reliability of the measures over time. The longitudinal aspect of the study provided solid support for the position of linguistic interdependence. Over time, there was an increasing correlation between English and Spanish, even when controlling for age.

The study suggested several directions for future efforts in this area. First, the results of this study are encouraging of a more

theoretically-driven effort to understand what particular aspects of cognition are affected by bilingualism. Particularly intriguing is why effects of bilingualism might be found not just in the domain of metalinguistic awareness, but in nonverbal abilities as well. In fact, there were more consistent relationships found for the nonverbal than for the verbal measures. It would appear that this phenomenon demands explanation, either at the theoretical or methodological levels. Naturally, the theoretical problems raised here place the present research question solidly in the heart of traditional questions regarding the relationship of language and thought. Second, and related to the first point above, we should move from static accounts of individual cognitive and linguistic ability towards more process-oriented investigations, both at the individual cognitive and social-interactional levels. Third, the meaning of bilingualism to any given individual should be elucidated. In the case of our subjects, in the context of a bilingual program where emphasis is on the acquisition of English, development of English is practically synonymous with the ability to learn in the classroom context. Essentially, this point advocates a clearer articulation of the definition of the bilingual individual.

As a final suggestion, the individuals should be contextualized within a population of bilinguals, as this study began to do through its population survey. We need a better understanding of the dynamic changes occurring in bilingual communities to better understand the subjects we designate as "bilingual." That is to say, the treatment, bilingualism, must be unpacked from both its individual and societal labels.

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CHAPTER ONE

REPORT STRUCTURE

The present document reports on the activities and conclusions of a broad-ranging study of the question of the relationship between bilingualism and cognitive ability. Chapter 2 presents a historical interpretation of the early research (roughly before 1960) on bilingualism and intelligence. An annotated bibliography of much of this literature was produced and is presented in the appendix. Chapter 3 (prepared by Rafael M. Diaz) provides a review of the recent literature that motivated the present empirical effort. Chapter 4 supplies a description of the subject population, and the methods and procedures, followed by results and discussion in Chapter 5. Conclusions and future directiosn for research appear in Chapter 6 and its related appendices.

STAFFING AND ACKNOWLEDGEMENTS

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CHAPTER TWO

THE CONTEXT OF EARLY RESEARCH ON BILINGUALISM AND INTELLIGENCE

Singularly the most common question about bilingualism is its effect on intelligence. George Thompson (1952), in an authoritative American textbook on child psychology, wrote: "There can be no doubt that the child reared in a bilingual environment is handicapped in his language growth. One can debate the issue as to whether speech facility in two languages is worth the consequent retardation in the common language of the realm" (p.367). On the other hand, Canadian researchers Elizabeth Peal and Wallace Lambert in 1962 triumphantly drew a contrasting picture of the bilingual, as "a youngster whose wider experiences in two cultures have given him advantages which a monolingual does not enjoy. Intellectually his experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, a more diversified set of mental abilities.... In contrast, the monolingual appears to have a more unitary structure of intelligence which he must use for all types of intellectual tasks" (p.20). The laymen are rightfully confused over the issue. Scholars have made both claims. Bilingualism is bad, and bilingualism is good.

The primary concern of this chapter will be to look at the literature on good and bad bilingualism with respect to an elusive psychological construct called "intelligence." Since the turn of the century, psychologists have been engaged in the task of developing objective instruments for measuring this construct. The performance of bilinguals on these measures might then be seen as an indicator of whether bilingualism is good or bad.

When you look at the hundreds of studies that compare the performance of bilinguals with monolinguals on various measures of intelligence, a

single major pattern emerges. Most of the studies that talk about negative effects of bilingualism, about the "language handicap" of bilingualism, were conducted in the United States with immigrant groups in the early part of this century. Positive effects of bilingualism appear when children in Canada and Europe are studied, mostly after an influential study by Peal and Lambert (1962).

Although these studies all claim to compare monolinguals with bilinguals, closer inspection reveals different motivations on the part of the researchers. They, the researchers, were working under different sociological circumstances. They differed in what moved them to look at the relationship between bilingualism and intelligence in the first place. And they chose different methodologies that reflected their motivations.

It is difficult to overstate the importance of the zeitgeist, the spirit of the times, under which the scientist works. The onus of understanding this influence is particularly pressing in the case of the social scientist, whose subject matter is so closely connected to his own existence as a member of society. That is why we begin this final report with an emphasis on the historical context of research, for it will illuminate our understanding of current research. We begin by going back some eighty years to absorb the social context in which bilingualism and intelligence was investigated in the United States.

BILINGUALISM AND THE NEW AMERICAN IMMIGRANT

In the early 1900's, many Americans perceived a changing pattern of immigration from Europe. A Congressional commission (the Dillingham Commission) set up in 1907 to investigate the problem reflected this concern. It drew a solid distinction between "old" and "new" immigrants, the temporal boundary being set in the early 1830's. The Commission lauded

the old immigrants from northern Europe, who "entered practically every line of activity in nearly every part of the country." Its contrasting view of the new immigrants from southern and eastern Europe was characterized by historian Maldwyn Jones (1960) as follows:

> "This 'new' immigration had consisted, it declared, largely of unskilled male laborers, a large proportion of whom had come to the United States not as permanent settlers but simply as transients. Almost entirely avoiding agriculture, they had flocked to the industrial centers of the East and Middle West, where they had 'congregated together in sections apart from native Americans and the older immigrants to such an extent that assimiliation [had] been slow'" (178).

This characterization of the new immigrants by the Dillingham Commission fueled the public outcry for the restriction of immigration of southern and eastern Europeans. The Dillingham caricature of the new immigrants became an attribute of these ethnic groups. (Historian Jones [177-182] provides a more convincing interpretation, which was not seen by the Dillingham Commission. The observed differences should have been attributed to the length of time that the immigrant groups had to settle in the new continent. The characterization of the new immigrants is one that applies equally well to the initial wave of new or old immigrants).

Coupled with the characterization of the new immigrants as transient and isolated was the view that these individuals were of inferior intelligence Professor Francis A. Walker (1840-1897), who was president of M. I. T., wrote that

> "[t]hese immigrants are beaten men from beaten races, representing the worst failures in the struggle for existence. ...Europe is allowing its slums and its most stagnant reservoirs

of degraded peasantry to be drained off upon our soil" (quoted in Ayres, 1909: 103).

The creation of a measure of intelligence was instrumental in the movement to restrict the flow of the new immigration (Gould, 1980; Kamin, 1974).

Following Galton (1890), a number of psychologists in the late nineteenth century were searching for objectively administered measures to reflect this most complex of human traits. It would be convenient if all people could be classified along a single dimension, if "intelligence" were a simple, single dimension, like a person's height. Then if some measure of this variable called intelligence could be constructed, the measure would be an indicator of the person's worth, and social decisions could be made (and justified) on this basis. As Francis Galton, father of the eugenics movement, once wrote, "[o]ne of the most important objects of measurement...is to obtain a general knowledge of the capacities of a man by sinking shafts, as it were, at a few critical points. In order to ascertain the best points for the purpose, the sets of measures should be compared with an independent estimate of the man's powers" (1890: 380).

The earliest attempts at finding critical capacities linked to intelligence were made in the area of physical characteristics, such as grip strength, lung capacity, and acuity of hearing, which not surprisingly proved unrelated to mental capacity. The critical contribution was made by Alfred Binet, professor of psychology at the Sorbonne, who was appointed in 1904 by the French government to devise a method of identifying children who would not benefit from instruction in regular classes, but should be segregated for special instruction.

Binet included in the test he devised items that were of some complexity and of varying levels of difficulty. One of Binet's greatest

insights was that items could be arranged with respect to the average age at which children passed them, so that simple observation of a child's performance on these items would permit a general assessment of mental age.

Binet himself was quite atheoretical in his approach to intelligence, being primarily interested in the assessment and remedial aspects of his work. He was vehemently opposed to the idea that what his test was measuring was some fixed entity, unmodifiable through experience. In 1910, H. H. Goddard, who was director of the Vineland School for Feeble-Minded Girls and Boys in New Jersey, translated the Binet test into English for use in the United States, and made it available for use in assessing the intelligence of immigrants. As Leon Kamin (1974) cynically remarks, "it is perhaps as well that Binet died in 1911, before witnessing the uses to which his test was speedily put in the United States" (5).

In one study, Goddard (1917) took the English-language version of the Binet test to Ellis Island. In testing 30 adult Jews through an interpreter, he assessed 25 of them as "feeble-minded." Regarding their performance on a word fluency part of the test, Goddard writes:

> "What shall we say of the fact that only 45 percent can give sixty words in three minutes, when normal children of eleven years sometimes give 200 words in that time! It is hard to find an explanation except lack of intelligence or lack of vocabulary and such a lack of vocabulary in an adult would probably mean lack of intelligence. How could a person live even fifteen years in any environment without learning hundreds of names of which he could certainly think of 60 in three minutes?" (260).

The fact that his test found over three-quarters of this group were feeble-minded did not raise doubts about the validity of the test, since "we are getting now the poorest of each race. This makes them a highly selected

group at the start" (266). Goddard's recommendation, based on this research, was that "if the American public wishes feeble-minded aliens excluded, it must demand that Congress provide the necessary facilities at the ports of entry" (271).

There was an almost immediate explosion of new tests and research following Goddard's lead. (By the 1930's, a bibliographic listing of research studies in testing in America was 251 pages long, and a "bibliography of bibliographies" itself took a full 6 pages [Goodenough, 1946]). Lewis Terman, a professor of psychology at Stanford University, was perhaps the best advocate for the tests. He extended the Binet test to include older children and adults, and refined the method for determining IQ. His revisions of the Binet test (the Stanford-Binet) came to be the prototype of IQ tests, an industry standard against which all new tests had to be compared.

The most immediate historical event that made mass testing possible was the outbreak of World War I, which made a large number of testees available. Professor Robert Yerkes, of Harvard University, in collaboration with Terman and Goddard, persuaded the United States Army to test some 2 million draftees, purportedly to aid in the classification of the new recruits. They constructed two group tests, one intended for those who could read and write English (Alpha), and one for illiterates and "foreigners," who were given instructions in pantomime (Beta). Since the soldiers tested represented a variety of foreign nationalities, it became possible to make group comparisons by racial origin.

Famous among the popularizers of these data was Carl C. Brigham, who synthesized them into a book titled A Study of American Intelligence (1923). Figure 2.1, which is taken from Brigham's concluding chapter,

summarizes the data. On the vertical axis is a scale representing the score on the "Combined Scale," which was a combination of Alpha and Beta (this procedure is suspect, since not every recruit took both tests; its validity was retracted by Brigham himself in 1930, but only after the study had left its mark on the debate over immigration restriction). On the horizontal axis appears length of residence in the United States, grouped by five-year intervals. Looking just at the group of "over 20 years" in residence, Brigham noted that the "foreign born white draft" were no different from the "native born white draft." Of prime interest for Brigham was the drop in the Combined Scale with decreasing years of residence in the United States, to the point where the most recent arrivals differed little from the "negro draft". Brigham provided a straightforward explanation:

> "migrations of the Alpine and Mediterranean races have increased to such an extent in the last thirty or forty years that this blood now constitutes 70% or 75% of the total immigration. The representatives of the Alpine and Mediterranean races in our immigration are intellectually inferior to the representatives of the Nordic race which formerly made up about 50% of our immigration" (197).

Statistical problems in this analysis aside (see Gould, 1980), a major alternative explanation stood in the way of this conclusion. The number of years of residence in the United States is obviously related to increasing knowledge of English and increasing acculturation to Americana (thus enabling a higher percentage of correct responses to questions such as "Why should a married man have his life insured?", Alpha Test 3, Item 13). Is this not a more parsimonious explanation?

Brigham's response to this problem can be seen as the origin of the

so-called issue of the "language handicap of bilinguals" on tests of intelligence. Brigham was an uncompromising hereditarian, who believed in the unmodifiability of native intelligence. Intelligence tests measured native intelligence, and nothing, not even unfamiliarity with the language, could shake this conviction. The issue of language handicap, then, as originally raised, had to do with a measurement issue, of whether persons who happened to be bilingual were stumbled by their lack of control of the language of the test.

In arguing against a language handicap for bilinguals in taking intelligence tests, Brigham separated the groups into the Alpha (for literates) and Beta (for illiterates and foreigners). He showed that the pattern of decreasing scores with recency of immigration held not just for the Alpha test, which might be expected if there were a language handicap, but also for Beta, which presumably did not depend on knowledge of English (p. 102).

Little sympathy did Brigham have for the possibility that attitudes towards testing and other cultural factors might significantly influence the results. To this, he wrote:

> "[I]t is sometimes stated that the examining methods stressed too much the hurry-up attitude frequently called typically American. The adjustment to test conditions is a part of the intelligence test. We have, of course, no other measure of adjustment aside from the total score on the examinations given. If the tests used included some mysterious type of situation that was 'typically American', we are indeed fortunate, for this is America, and the purpose of our inquiry is that of obtaining a measure of the character of our immigration" (96).

Apparently, Brigham assumed that this was part of native intelligence.

Perhaps the most telling evidence of his hereditarian attitude is Brigham's attempt to directly rule out the language handicap by dividing the Nordic group into those of English-speaking birth and non-English speaking birth. When these groups are compared, a clear difference emerges in favor of the English-speaking Nordics. The analysis showing the language handicap is as clear-cut as any of those Brigham reports in his book. But rather than dwell on this obvious contribution of experience to the test scores, Brigham chooses to dismiss it: "there are, of course, cogent historical and sociological reasons accounting for the inferiority of the non-English speaking Nordic group" (171). He then takes the non-English-speaking Nordic group and compares them with the Mediterranean group, where he finds a difference in favor of the Nordics, "a fact which clearly indicates that the underlying cause of the nativity differences we have shown is race, and not language" (174).

Over the years, I have come to appreciate that the difference between hereditarians and environmentalists is one of emphasis. Very few hereditarians will deny any contribution of environment, and few environmentalists deny the relevance of a person's genetic endowment. Rather, the difference lies in their beliefs about the modifiability of a trait (such as "intelligence") through experience.

The hallmark of the struggle in this period between emphasis on experience and emphasis on heredity was the on-going debate between psychologists at the Iowa Child Welfare Station at the University of Iowa (George Stoddard, Beth Wellman) and those at the University of Minnesota (Florence Goodenough) and at Stanford (Terman). The Iowa emphasis is reflected in a textbook by Stoddard and Wellman (1934), in which they acknowledged that "the great bulk of mental ability as measured by tests

comes as a direct inheritance", but emphasize that "the real question concerns the amount of variability which can still be effected by later influence" (170).

The Minnesota/Stanford attitude is best characterized as unforgiving. In a paper with the ironic title, "New evidence on environmental influence on intelligence," Goodenough (1940:329) describes an inbred, "backward mountain community" called Colvin Hollow, where "almost everyone is named Colvin." "Given two centuries of social anemia, during which time all the ablest members of the group have been continuously drained away, leaving only the intellectual and volitional weaklings to interbreed and reproduce their kind, need we seek further for an explanation of the state of educational backwardness and intellectual degeneracy found?"

The question of bilingualism and intelligence must be seen in this context. For hereditarians bilingualism, being itself an experiential factor, was irrelevant to the major focus of study. Eager to show that bilingualism had no causal role in inferior intelligence, they were <u>not</u> the ones to argue that bilingualism would have negative consequences on intellectual development. Rather, it was those researchers with an experiential orientation who considered bilingualism a factor in the poor performance of foreign groups on intelligence tests.

THE HEREDITARIAN AND THE LANGUAGE HANDICAP

Arguing for the genetic inferiority of bilinguals required demonstrating that they did not suffer from a language handicap when their intelligence was being tested. Lewis Terman greatly influenced the literature that ensued through the arguments of his students, who played a central role in this debate.

Terman himself began framing the debate in 1918, when he reported that

a simple vocabulary measure was a good reflection of mental age measured in an IQ test for both monolingual English-speaking children and children of Portugese and Italian immigrant families. After three or four years of school, Terman reported that the vocabulary and mental age scores correlated .86 for the Anglo children, and .84 for foreign children. Terman failed to note the possibility that the high correlation for both groups reflect the fact that both measures reflect amount of knowledge of English.

In 1922, Kimball Young published an influential article in Scientific Monthly, summarizing a set of arguments against the language handicap. In one argument, he held that the inferiority of the foreign children persisted even after the children had had a chance to learn English. In support, he cites a Master's Thesis directed by Terman in which southern European children were followed up over a two-year period, who remained behind American children of northern European stock. "It seems evident that ... low scores result not from the failure to understand, but from the failure to comprehend" (424).

Another form of argument, supported by Young's own dissertation, was that verbal tests (the Army Alpha) are a better predictor of school performance (as judged by grade location relative to the child's age, teachers' estimates, and school grades) than were nonverbal tests (the Army Beta). From this, Young draws the conclusion that "the asserted language handicap under which the foreign children are supposed to labor does not exist, at least so extensively as imagined" (428). Young apparently was reluctant to consider the possibility that school performance is dependent on English skills, which is better measured by the Alpha. As Pintner (1923) wrote, "a teacher's estimate of a child's intelligence will unquestionably be influenced by the child's ability to use the English

langauge, and, of course, all the child's school work is conditioned by his ability to understand and make use of English" (292).

Pintner's words of caution, however, were in the minority. Perhaps the majority opinion is reflected in the review of Young's dissertation that appeared in The Journal of Educational Psychology (1923:255-256):

> "The study sheds a bright light on the question of the part played by the language difficulty in the differences among racial groups, repeatedly found in the intelligence scores. By correlations between the several sorts of data, Mr. Young shows very conclusively that the language factor is by no means as great as is commonly believed, and that the differences in scores [between racial groups] is much more largely one of native intelligence. This constitutes a genuine contribution" (256).

In Young's article, there also appears an appeal to the data from Japanese and Chinese immigrant children, who generally tested better than Italians and Portugese, and almost on a par with Americans. "Surely the language handicap is of greater potency in the Oriental than in the European" (430). In retrospect, this was probably one of the better forms of argument advanced by Young against the language handicap, in fact enjoying a revival among contemporary researchers who argue that it is cultural, not linguistic, differences that matter (Troike, 1981).

Young's arguments notwithstanding, the inevitable evidence for an English language handicap soon began to surface. Pintner (1923), for example, constructed a "Non-Language Test," which he administered along with the National Intelligence Test, a group test derived from the Army Alpha, to foreign-born children. He found that they fell considerably behind national norms on the NIT, but at national norms on the Pintner Non-

Language Test. Margaret Mead (1927) gave the Otis Group Intelligence Scale to 6th to 10th Grade Italian children in Hammonton, New Jersey, where she found steadily increasing IQ scores both as a function of the amount of English spoken at home, and as a function of the length of residence in the United States.

As the hereditarians were beginning to acknowledge the existence of a general language handicap among children of foreign-born parents, heroic efforts were made to show that the handicap nothwithstanding, these children were simply inferior. For example, Virginia Graham (1926) conducted a study of twelve-year-old Chinese children from a public school in San Francisco, who were administered a battery of tests that tapped English skills, including standard verbal measures of intelligence and a reading skills test. In all these measures, Graham found that the American children outperformed the Chinese. Then, in order to equate for English skills, Graham selected children from the two groups who overlapped in their English reading scores. When these two selected groups were compared on the. performance on the other intelligence measures, the Americans were still superior.

With the benefit of hindsight, we now know that the result that Graham obtained is a textbook example of a statistical phenomenon called regression to the mean. Applied to our present problem, if you took extreme groups (the high scorers on the English reading test among the Chinese and the low scorers among the Americans), and compared them on a related measure (knowledge of English as tappped in the other intelligence tests), the average score of the Chinese would be expected to be lower than that of the Americans just on the basis of statistical principles.

Evidence for the language handicap was soon emerging even in Terman's own back yard. Darsie (1926), his own student, administered the Stanford-

Binet to 570 Japanese-American children in California. His results were quite straightforward: "Japanese children as compared with American show a mean retardation of 14.25 months in reading, 12.5 months in language, 1.75 months in arithmetic, and 6.0 months in general information. In spelling they average 2.75 months above American children" (86). The more the skills tapped involved English, the larger the discrepancy between English-speaking and Japanese children (the one exception being spelling, which Darsie dismisses as being due to Japanese "acute visual perception and sustained attention" (33)). On the whole, Darsie was forced to admit that "[t]he foregoing analysis...conclusively establishes the essentially linguistic character of the Binet scale" (59).

In these conclusions, however, are to be found the germs of the hereditarian response to the problem posed by the language handicap. The argument goes full circle: "It must not be overlooked, however, that the existence of a pronounced language handicap may itself be indicative of lack of capacity to master the language adequately" (84). Since children of northern European stock apparently have less difficulty mastering English (while admitting to the closer linguistic affinity), they must be of superior intelligence.

This line of argument was perfected by Florence Goodenough (1926), who summarized data on the persistence of the "foreign" language in the homes of immigrants of different nationalities. She showed a negative relationship between the amount of foreign langauge used in the home and the median IQ of the groups. The less foreign language they used (and the more English), the higher their IQ was. Simple correlations never establish causality (a basic principle of statistical inference, which surely Goodenough knew and probably taught), but Goodenough was willing to

rest her case:

> "This might be considered evidence that the use of a foreign language in the home is one of the chief factors in producing mental retardation as measured by intelligence tests. A more probable explanation is that those nationality groups whose average intellectual ability is inferior do not readily learn the new language" (393).

Thus was created the party line of the hereditarians: The language handicap of foreign children in intelligence tests is minimal, so what the tests indicate is that these children are from inferior genetic stock. Even if the language handicap did impede performance on these tests, that does not belie their validity, because the language handicap is itself a result, rather than a cause, of inferior intelligence. Such were the dark beginnings of the term "language handicap" in the study of the bilingual.

Bilingualism as an Experience

New technologies in an industrial society are shrouded by an aura that makes them quite resistant to critical evaluation. There is no question that intelligence tests in the early 1900's were such an enshrouded technology. American psychologists generally considered intelligence tests to be their ticket of entry into the brotherhood of the natural sciences. If one considers the "hard" sciences to be defined by rigorous methodology, careful measurement, and quantification (rather than the questions one asks), psychometrics certainly provided room for such activities. Owing to the respected position that intelligence testing held among American psychologists, the debate centered almost exclusively on whether differences between individuals and groups on this measure reflected heredity or experience, and not whether the measure itself was adequate and equal for all the individuals tested.

In this context, if you tested bilinguals on a measure of verbal intelligence, and the bilinguals showed inferior performance, you were bound to one of two conclusions. You could conclude, as the hereditarians did, that the bilinguals were genetically inferior. Or you could conclude that bilingualism caused some kind of mental confusion resulting in the poor development of verbal skills. The possibility that the tests were themselves useless for measuring intelligence was not considered.

One of the more perversely humorous examples of this underlying faith in the tests comes from the conclusion that A. J. Mitchell (1937) drew from a very well-intentioned study comparing Mexican children's performance on an English intelligence test and on a Spanish translation of it. He found that there was consistently better performance on the Spanish version, which he regarded as a truer estimate of their intelligence. Rather than conclude that the English test was useless, Mitchell recommends that in the future, "thousands of cases" be tested in both in both languages for each grade, and that a "correction figure" be estimated accurately so that scores could be adjusted from testing conducted in English. No matter what one's motivations were, the psychological researchers in those days were committed to the idea that these tests really measured intelligence.

Within the psychometric tradition, the earliest work in support of the negative effects of the experience of bilingualism, widely cited in the American literature, can be found in the British journals, especially in relation to the Welsh-English bilingual problem in Wales. Frank Smith in 1923 reported in the British Journal of Psychology a study comparing monolingual and bilingual third and seventh graders from the same school. He found that the monolinguals were better in tasks involving dictation, sentence-forming, and composition in English. He also reported a two-year

longitudinal follow-up on similar measures, and found more improvement over time for the monolinguals than the bilinguals. Smith concludes that "Bilingualism may yet be shown to be no intellectual disadvantage in the young; but the tests described in this paper clearly support the view that under present methods it is a positive disadvantage" (281).

The following year, Saer (1924) reported a more systematic study of Welsh-English bilinguals, where the measures included the Stanford-Binet, a test of "dextrality", vocabulary, and composition. Saer divided the subjects into rural and urban samples, and found that there were differences between bilinguals and monolinguals from the rural areas, but not between those from the urban areas. In a second study, Saer found a similar pattern of differences in a comparison of bilingual and monolingual university students from urban and rural areas.

Of prime interest for our purposes is not the result, but the interpretation of the apparent differential effects of bilingualism on children in a rural and urban environments. Saer apparently was oriented toward emotional and "psychodynamic" explanations, and claimed that for the urban bilingual children, "any emotional conflict between the use of Welsh and English that may arise is resolved by the child at an early age" (37). On the other hand, for the rural child, "since the Welsh symbols that are ignored have for him a high affective tone, and since the cathartic influence of play does not operate, for he uses Welsh in play, a conflict must arise between his self-regarding sentiment or positive self-feeling and his negative self-feeling or his instinct for submission" (37).

Among American researchers, Yoshioka (1929) advanced the interpretation that the experience of bilingualism had negative consequences on intellectual development. He conducted a small study of Japanese-American children, to whom he administered English and Japanese

versions of the National Intelligence Test (for which norms were available in English and Japanese). His conclusion was that "bilingualism in young children is a hardship and devoid of apparent advantage, because bilingualism appears to require a certain degree of mental maturation for its successful mastery" (479).

Yoshioka's research was followed up by Madorah Smith (1931, 1939), the most influential proponent of the negative consequences of bilingualism, whose studies were extensively cited in later literature reviews and textbooks (e.g., McCarthy, 1946; Thompson, 1952).

Smith received her doctorate at the Iowa Child Welfare Research Station at the University of Iowa, the center of research oriented toward experiential influences on intelligence. In her dissertation, published in 1926, Smith had pioneered a method of analyzing free speech utterances of young monolingual children. After obtaining her degree, Smith moved to the University of Hawaii, and began applying her method to the speech of bilingual children from the wide variety of language backgrounds represented on the islands. She looked at the speech of children between the ages of 2 to 6 from Japanese, Chinese, Korean, Filipino, Hawaiian, and Portugese backgrounds, and compared them to the Caucasian norms that she had developed in her dissertation in Iowa. When she compared her bilingual samples to her monolingual sample from Iowa on a variety of measures of language, the bilinguals showed inferior performance. Smith concluded that "an important factor in the retardation in speech found in the preschool population is the attempt to make use of two languages" (253). This conclusion, of implicating the bilingual experience rather than the genetic quality of the children who happened to be bilingual, is quite different from the kinds of conclusions the hereditarians would have drawn from the

same data.

Smith continued her crusade against early childhood bilingualism in a study of preschool children of Chinese ancestry in Hawaii, who apparently were English-dominant but spoke some Chinese at home. She translated into Chinese a vocabulary test she had developed in Iowa, and administered both versions to these children. Smith found that the vocabulary scores of these bilingual children in either language was below the monolingual norms, although when the scores from both languages were added together, they were comparable. She concluded that "It would seem unwise to start any but children of superior linguistic ability at a second language unnecessarily during the preschool years" (309).

Smith's line of argument was followed up by Anne Anastasi, professor of psychology at Fordham University, much of whose career has been devoted to argue the "fallacies of 'culture-free' testing and of attempts to assess innate potential" (Anastasi, 1980). In one study (Anastasi & Cordova, 1953), Puerto Rican children (ages 11 to 15) in New York City were given alternate forms of Cattell's Culture Free Test in English or Spanish. The test was of a nonverbal variety, "all items being perceptual or spatial" (5). Anastasi and Cordova found that the language of test administration made no difference. Their subjects performed below the norms in both languages. Anastasi attributed the poor performance to the fact that these children's bilingualism "appears to be of the bifurcated variety, the children's mastery of either language being restricted and inadequate" (13). It is entirely possible to argue that Anastasi's data had no bearing on the problem of bilingualism, since the test itself was non-verbal in nature. Nevertheless, while acknowledging the importance of other factors, she maintained that bilingualism was the villain:

"Among the reasons for [the poor test performance] are the very

low socio-economic level of the Puerto Rican children, their bilingualism which makes them deficient in both languages, their extreme lack of test sophistication, and their poor emotional adjustment to the school situation. In so far as this maladjustment itself appears to have arisen from the children's severe language handicap during their initial school experiences, a solution of the language problem would seem to be a necessary first step for the effective education of migrant Puerto Rican children" (17).

CONCLUSIONS

The history of early research on bilingualism and intelligence in the United States requires recapitulation, for it is convoluted. The backdrop of the initial research was the concern with the new immigration, who performed poorly on tests of intelligence. The hereditarians argued that this poor performance reflected the inferior genetic stock comprising the new immigrants. They attempted to argue against a language handicap in test-taking. The evidence mounted, however, that bilinguals were operating under a handicap. The hereditarians then interpreted this handicap to be the result of innately inferior intelligence. On the other hand, the experientially-oriented psychologists took the language handicap in bilinguals to be the result of experience, the most salient experience being exposure to two languages. The concept of language handicap, which should best be regarded as a variable related to test-taking factors, came to be a trait of the bilingual individual's mind, whether based on experience or on genetic quality. The interested reader is referred to an annotated bibliography of this early literature, compiled by Kenji Hakuta and Leslie Logan, which appears as Appendix A to this final report.

In the next chapter, we turn to the more recent literature on bilingualism and cognition, where apparent positive effects of bilingualism are reported. It is important to bear in mind the historical circumstances of the early research in understanding the way in which it is reported in present-day reviews. It would also be prudent to keep in the back of our minds the likelihood that our contemporary research is similarly influenced by the zeitgeist of our society.

CHAPTER THREE

REVIEW OF THE RECENT LITERATURE

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This chapter reviews the literature on the effects of bilingualism on children's cognitive development. The review focuses on the psychological literature relating bilingualism and second-language learning to children's cognitive performance rather than on formal educational evaluations of existing bilingual education programs. Special attention is given to research showing the cognitive advantages of becoming bilingual, bringing to surface the underlying theoretical models relating children's bilingualism to positive cognitive gains. After all, the rationale for bilingual education rests heavily on he belief that true bilingualism, rather than "semilingualism" or the gradual loss of the first language, is advantageous to children's learning and cognitive development.

BILINGUALISM AND INTELLIGENCE: EARLY STUDIES

Although the previous chapter, from the perspective of intellectual history, has treated the issue of bilingualism and intelligence, and the notion of "language handicap", it is worth discussing the more standard interpretations of this early literature, which we pursue in this section.

Systematic studies on the relationship between bilingualism and intelligence began in the early 1920s, parallel to the flourishing of psychometric tests of intelligence. Because the measurement of intellectual potential was, and still is, heavily dependent on verbal abilities, psychologists and educators were concerned about the validity of such tests for bilingual children. The main concern was that bilingual children would suffer from some kind of language handicap, and this, in

turn, would be an obstacle to a fair assessment of their intellectual abilities and potential.

The overwhelming majority of studies prior to 1962 found, indeed, strong evidence for the so-called "language handicap" in bilingual children (see reviews by Arsenian, 1937; Darcy, 1953, 1963; Macnamara, 1966). When compared to monolinguals, bilingual children appeared inferior on a wide range of linguistic abilities. Among other things, bilinguals were shown to have a poorer vocabulary (Barke & Perry-Williams, 1938; Grabo, 1931; Saer, 1923), deficient articulation (Carrow, 1957), lower standards in written composition, and more grammatical errors (Harris, 1948; Saer, 1923).

Interestingly enough, evidence of a language handicap in bilingual children did not lead to a questioning of the validity of psychometric tests of intelligence for this population. Rather, the consistent findings about the negative effects of bilingualism on children's intelligence. For a long time, children's bilingualism was considered as some kind of social plague (Epstein, 1905), "a hardship devoid of apparent advantage" (Yoshioka, 1929, p. 476). The language handicap of bilinguals was interpreted as a linguistic confusion that deeply affected children's intellectual development and academic performance up to the college years (Saer, 1923). Beliefs about the negative effects of early bilingualism were further confirmed when several studies showed that bilinguals also performed significantly lower than monolingual on tests of nonverbal abilities, such as tests of dextrality (Saer, 1931) and mathematical competence (Carrow, 1957; Manuel, 1935).

Most early studies in this area, however, suffer from a wide range of methodological problems; so much so that at present most investigators in the field regard the findings of early studies as totally unreliable (see

Cummins, 1976). Many early studies, for example, failed to control for group differences in socioeconomic status between bilingual and monolingual samples. As early as 1930 McCarthy pointed out that bilingualism in the United States was seriously confounded with low socioeconomic status. She found that more than half the occurrences of bilingualism in school children could be classified as belonging to families from the unskilled labor occupational group. Along the same lines, Fukuda (1925) alerted researchers to the fact that high-scoring, English-speaking subjects were mostly in the occupational are executive classes; he reported a correlation of .53 between the Whittier socioeconomic) Scale and the Binet IQ for this population. Nevertheless prior to the early 1960s, most studies investigating the effects of bilingualism on children's intelligence did not account for group differences in socioeconomic status.

A second major methodological flaw of early studies is that investigators consistently ignored children's actual degree of bilingualism. An extreme example is a study by Brunner (1929) where degree of bilingualism was determined by the foreigness of parents. Brunner divided his bilingual sample into three categories: (1) both parents born in this country, (2) one parent born here and the other abroad, ad (3) both parents born abroad. The classification was simply assumed to represent children's varied degree of bilingualism. In other studies, the sample's bilingualism was assessed though family names or even place of residence (see Darcy, 1953, for a review). As present investigators have stated repeatedly, it is impossible to ascertain if the bilingual subjects of many studies were indeed bilingual or just monolingual of a minority language.

A few studies, however, were conducted with controls for socioeconomic variables and attempted more refined measures of subjects' bilingualism.

Fritz and Romkin (1934), for example, tested 201 junior high school students in Kansas on the Otis Self-Administering Test of Mental Ability, The New Stanford Achievement Test, and the Sims Socio-Economic Score Card. The sample consisted of two different groups: an "only-English-speaking " group ad a "usually-foreign-speaking" group. As expected, the results showed that the monolingual English-speaking group was at a definite advantage in all achievement and IQ variables, as well as in socioeconomic status. To make the two language groups more comparable, Fritz and Romkin matched 12 children from each group on relevant variables such as sex, age, mental ability, and socioeconomic status. Once again, the results showed that "foreign-speaking" children performed at a lower level than monolinguals on all sections of the achievement test. Although the matched samples were small, and the matching procedure never guarantees that groups are equivalent on all relevant variables, this study shows that the language handicap of bilinguals was evident even when socioeconomic variables were controlled somewhat. The methodological problem remained, however, with the fact that the selection of foreign-speaking subjects does not guarantee that the bilingual sample masters both languages at age-appropriate levels to be considered truly bilingual.

Other studies attempted such strict controls that comparisons between bilingual and monolingual samples on cognitive variables became meaningless. Hill (1935) compared Italian children who heard and spoke only Italian at home with Italian children who heard and spoke only English at home. The sample's degree of bilingualism was ascertained by questionnaires and tests of comprehension of spoken Italian and Italian word meaning. The two groups of children were equated on age, sex, educational environment, mental age, and intelligence quotient. As cold be reasonably expected, the results showed no reliable differences between the

two groups of children in verbal and nonverbal scores.

Arsenian (1937) argued that Hill's (1935) results are basically meaningless, because matching the groups on an IQ measure that is based on both verbal and nonverbal performance guarantees a lack of difference result in verbal and nonverbal abilities. This study, however, is an excellent example of the dilemma faced by both early and present investigators in the field. To date, it is ot clear how to control for group differences between bilingual and monolingual intellectual abilities and at the same time study meaningful group differences in both cognitive and linguistic abilities. One possible solution is to use subjects as their own controls and study cause-effect relationships between degree of bilingualism and cognitive variables using a longitudinal design. Unfortunately, there are very few longitudinal studies that shed light on these cause-effect relationships.

LESSONS FROM FOUR DECADES OF RESEARCH

The severe methodological problems of early studies resulted in few clear facts about the effects of bilingualism on children's intelligence and intellectual development On the other hand, early studies yielded a great deal of wisdom about the complexity of the issues. The first few decades of serious systematic studies in the field have altered researchers to simplistic theories and methodologies regarding the phenomenon of bilingualism and recognize the variables that mediate its effects on children's cognitive development. As early as 1937, Arsenian argued against a unidimensional construct of bilingualism and argued that variations between different bilingual experiences could make a big difference in the types of effects observed in children's cognitive performance. Specifically, Arsenian proposed that for scientific purposes,

bilingual samples should be defined along the following dimensions:

Degree of bilingualism. Bilinguals vary in degree of proficiency in their two languages. Some bilingual children are just beginners in learning the second language, while others have achieved age-appropriate levels of proficiency in both languages. Furthermore, the bilingualism of a given person may vary with time; for example, in some bilingual situations increased competence and mastery of a second language gradually replaces the use and abilities of the first language. The effects of such variations within bilinguals should be the object of scientific investigation rather then simply ignored.

Degree of difference between the two languages. Two languages from different language families vary along more dimensions than two languages within the same language family. Spanish, for example, is closer to other Indo-European languages such as Italian, French, and Rumanian than it is to English or Japanese. It is clear that more cognitive effort is required from a Spanish child to learn the morphology, grammar, and phonetics of English than for the same child to learn Italian. Furthermore, the degree of difference between two languages might represent deeper cultural differences that the child must assimilate and accommodate to achieve proper mastery of the language. In Arsenian's (1937) words: The degree of difference between the two languages of a bilinguist is important from the point of view not only of the learning mechanism, but also fo the thinking process; because the difference between two languages usually denotes a difference in the culture and civilization of the two peoples using them, and hence denotes also a difference in the connotation of words which will influence the direction and the content of thought in the two languages (p. 20).

It should not be surprising, therefore, that the degree of difference

between two languages might mediate the effects of a bilingual experience on children's cognitive development. The effects of this variable must be considered carefully when attempting to generalize from one bilingual experience to another.

Age when learning a second language. Although it is not clear what age is best (or worst) to learn a second language, most likely the experience of becoming bilingual will have different cognitive effects, depending on the learner's age. For example, the experience of infants exposed to two languages simultaneously (Leopold, 1949a, 1949b) seems to be qualitatively different from the experience of a monolingual 6 or 7 year old who is faced with the task of learning a second language to understand the school curriculum. The question regarding the best age to learn a second language is, indeed, an unresolved issue in current research. By the same token, it is not clear if the age of the second-language learner is an important variable mediating the possible positive or negative effects of bilingualism. Those who argue in favor of a critical period hypothesis in language acquisition, and the relative ease of acquiring a language during this period, tend to postulate different cognitive effects of second-language learning depending on whether the learner is within or beyond this critical period (see Lenneberg, 1967; Penfield & Roberts, 1959). Others argue that the introduction of a second language at an early age, when the child has not yet achieved a certain degree of competence in his first language, might be detrimental to the child's cognitive development, while positive cognitive gains should be expected from bilingualism if the second language is introduced after the child has achieved a certain threshold level of competence in his first language (Cummins, 1976).

It is important to note that certain dependent variables in studies of bilingualism and cognition might be particularly sensitive to age effects. For example, several studies have shown that a bilingual's vocabulary in both the first and second language is smaller than the vocabulary of monolinguals (Grabo, 1931; Saer, 1923; Sanchez, 1934). However, on the basis of the data from several other studies, Arsenian (1937) showed that this apparent deficit is closely related to a given age group of bilinguals, and therefore is a temporary effect of second-language learning at a young age. The same effects simply are not found in older bilinguals (Murdoch, Maddow, & Berg, 1928).

Method of learning the second language. Arsenian (1937) insisted that researchers should be attentive to whether the bilingual child had learned the two languages simultaneously or whether the second language had followed the first. Relevant to this dimension is the distinction between acquiring and learning a second language. Briefly stated, second-language acquisition refers to the process of acquiring a second language in a natural environment, outside of formal instruction; second-language learning refers to the process of formal language education where one aspect of the grammar is introduced at a time, and systematic feedback with error correction is provided (McLaughlin, 1978).

There are few empirical findings regarding the cognitive effects of acquiring versus learning a second language. Probably, in most situations, bilinguals both acquire and learn different aspects of the second language. However, there is some scattered evidence that certain features of language acquisition might ease the process of formal second-language learning. In one of the earliest studies in the area, Saer (1923) tested approximately 1,400 children from ages 7 to 12 in five rural and two urban districts in Wales. Saer obtained the following results on the Stanford-Binet scale:

	Urban	Rural
Monolingual	99	96
Bilingual	100	86

According to Saer's data, differences in the performance of bilingual and monolingual children seem to exist only in the rural sections. Saer explained his findings i the following way: For the rural Welsh-speaking children, Welsh is the language of home, play, and Church and, therefore, a language with strong affective connotations. When these children are exposed to a second language at school, a conflict is raided between the child's "self-regarding sentiment or positive self feeling" and his "negative self-feeling or his instinct for submission" (. 77). On the other hand, for the Welsh-speaking child in the urban areas this conflict is played down b the fact that they come in contact and play with English-speaking children at an early age, before a formal learning contact with the second language at school. Although there is no evidence to support Saer's psychodynamic assertions, his data to indeed suggest that opportunities to acquire a second language might mediate the effects of second-language learning on cognitive development. More recent studies show that children who begin bilingual education programs with a fair amount of knowledge of the second language perform significantly better on several cognitive with little or no previous experience in the second language (Diaz & Pakuta, Note 1).

Attitudes toward the second language. Bilingual experiences vary significantly in terms of the social, political, and religious sentiments connected with the first and second languages. As Saer's (1923) conclusions suggested, having to learn a second language might threaten a person's self-esteem when the second language is identified in any way with a colonizing or assimilating force. In such situations. a negative

attitude toward the second language might play a crucial role in determining children's linguistic and academic performance. Arsenian believed, therefore, that when defining a given bilingual situation, researchers must include a detailed description of the national, religious, and political significance of the second language for the bilingual sample involved (see also Fishman, 1977).

Although Arsenian (1937) at an early stage outlined the five dimensions mentioned above, the majority of studies in the field prior to 1962 lacked adequate assessments of the sample's actual degree of bilingualism or proficiency on both languages. Also, as a rule, bilinguals were treated as a homogeneous group with no adequate consideration of the variability on second-language learning or acquisition histories. Furthermore, results from studies of specific bilingual situations were grossly generalized as effects of the universal aspects of bilingualism.

Toward the end of the 1950s, research on the effects of bilingualism showed consistent findings. Monolinguals performed significantly higher than bilinguals on measures of verbal intelligence. Some studies showed that monolinguals were also at an advantage on measures of nonverbal ability, but group differences on this variable were not consistent across studies. On one hand, the findings suggested that at certain stages of second-language learning, bilinguals suffered from a "language handicap." On the other hand, it was not clear of this linguistic disadvantage in bilinguals was a true intellectual deficit of a permanent nature, or just a temporary manifestation of the struggle to cope with two different language systems at a relatively young age.

Further research to clarify there issues seemed extremely important on two counts. First, the question was obviously and directly relevant to educational policy in several countries. Second, the negative findings

contradicted linguists' case studies and theoretical statements regarding the effects of early bilingualism.

The best-known linguistic study of a child's simultaneous acquisition of two languages is Leopold's monumental investigation Hildegard (Leopold, 1939, 1947, 1949a, 1949b). Hildegard lived most of the time in an English-speaking environment, but her father spoke to her in German and her mother in English. As was the case in similar earlier studies (see e.g. Pavlovitch, 1920; Ronjat, 1913), Leopold's study found little interference between Hildegard's two languages, and no evidence at all of any serious linguistic retardation in either language. Hildegard shifted languages with relative ease and developed strategies to use her words appropriately in the context of their respective languages. Leopold (1949b) noted in his last volume that by age 3 both his daughters had an awareness of dealing with two separate languages, and from then on both languages seemed to develop adequately as two independent systems. Furthermore Leopold regarded his daughters' bilingualism as a genuine asset to their mental development. He felt that bilingual children must learn very early to separate the sound of the word from its referent, and this, in turn, forced the child to focus on essentials, on "content instead of form" (p. 188). Leopold's conclusion implies that bilingualism accelerates the development of abstract thinking by freeing the child's thought from the concreteness and "tyranny" of words. Similar claims can be found in the work of Evans (1953) and Vygotsky (1962).

Nevertheless, because the majority of studies before 1962 showed that bilinguals performed lower than monolinguals on linguistic, cognitive, and academic variables, the first four decades of psychological research on the effects of bilingualism were loaded with the notion that bilingualism was

detrimental to children's intelligence and cognitive development. In the early 1960s, however, new experimental procedures and more controlled sample selection procedures led to very different conclusions. Peal and Lambert's study in 1962 marked the turning point.

BILINGUALISM AND PSEUDOBILINGUALISM: PEAL AND LAMBERT (1962)

Aware of the potential advantages of bilingualism for children's cognitive development, Peal and Lambert (1962) attributed the negative findings of early studies to the failure of researchers to differentiate "pseudo-bilinguals" from truly bilingual children. "The pseudo-bilingual knows one language much better than the other, and does not use his second language in communication. The true bilingual masters both at an early age and has facility with both as means of communication" (p. 6). Guided by O'Doherty's (1958) writings, Peal and Lambert believed that while pseudo-bilingualism might be a serious problem that could result in intellectual retardation, genuine bilingualism may be a real asset to children's intellectual development. Because early studies had been lax in their definition of bilingualism and in the assessment of their sample's degree of bilingualism, negative findings could be attributed to a situation of pseudo-bilingualism.

To test their hypotheses, Peal and Lambert (1962) administered several measures of degree of bilingualism to 364 10-year-old children in Canada. Three tests were used to determine whether children were "balanced" bilinguals, that is, equally skilled in French and English, or whether they were monolingual. Children's self-ratings of their ability in the second language were taken into account also. The final sample was composed of 164 subjects: 75 monolinguals and 89 (genuine or balanced) bilinguals. Children in the sample were administered a modified version of the Lavoie-Laurendau (1960) Group Test of General Intelligence, the Raven's Coloured

Progressive Martices, and a French version of selected subtests of the Thurstone and Thurstone (1954) Primary Mental Abilities Test. In addition, several measures of attitudes toward English Canadians, French Canadians, and the self were administered to the subjects.

Contrary to the findings of earlier studies, the results of the Peal and Lambert study showed that bilinguals performed significantly better than monolinguals in most of the cognitive tests and subtests, even when group differences in sex, age, and socioeconomic status were appropriately controlled. Bilingual children performed significantly higher than monolinguals on tests of both verbal and nonverbal abilities; the bilinguals' superiority in nonverbal tests was more clearly evident in those subtests that required mental manipulation and reorganization of visual stimuli, rather than mere perceptual abilities. A factor analysis of test scores indicated that bilinguals were superior to monolinguals in concept formation and in tasks that required a certain mental or symbolic flexibility (the notion of cognitive flexibility will be discussed in detail in a later section). Overall, bilinguals were found to have a more diversified pattern of abilities than their monolingual peers.

Peal and Lambert's (1962) findings must be considered. however, with a certain degree of caution, First, as Macnamara (1964, 1966) pointed out, the process of subject selection might have introduced a bias in favor of the bilingual sample. Peal and Lambert's bilingual sample included only children who scored above a certain determined level in the English Peabody Picture Vocabulary Test, a test commonly used to measure intelligence in monolinguals. It is possible that in a situation like Canada, the intelligence of French-Canadian children might be reflected in a measure English (the second language) vocabulary. Second, on the average, the

bilingual sample belonged to a higher grade than the monolingual sample; perhaps the superiority observed in bilinguals was the result of their having longer exposure to formal education. And third, the frequency distribution of the Raven's test scores was very different for both groups of children; it was negatively skewed for bilinguals, while the opposite was true for monolinguals. In short, the cognitive advantages observed in Peal and Lambert's balanced bilingual sample could have been inflated by several artifacts in their subject selection procedures. As Peal and Lambert admitted,

> A partial explanation of this (the results) may lie in our method of choosing the bilingual sample. Those suffering from a language handicap may unintentionally have been eliminated. We attempted to select bilinguals who were balanced, that is, equally fluent in both languages. However, when the balance measures did not give a clear indication of whether or not a given child was bilingual, more weight was attached to his score on the English vocabulary test. Thus some bilinguals who might be balanced, but whose vocabulary in English and French might be small, would be omitted from our sample. The less intelligent, those who have not acquired as large an English vocabulary, would not be considered bilingual enough for our study.

Nevertheless, Peal and Lambert's (1962) empirical distinction between bilinguals and pseudobilinguals made a significant (and much needed) methodological contribution to the field. Their distinction has forced recent investigators to select their bilingual samples with greater care and to measure the sample's actual knowledge of the two languages. Peal and Lambert's study also alerted researchers to the possible positive and negative effects of bilingualism depending on the bilingual situation involved.

Recently, more attention has been given to descriptions of different types of bilingual experiences that might have different effects on children's cognitive development (see Cummins, 1976). One such situation results in "semilingualism." Semilinguals are children whose second language gradually replaces the native tongue. Therefore, at a given point, these children are neither fluent speakers of the first language nor have mastered the second language with age-appropriate ability. Along these lines, Macnamara (1966) noted that in certain Irish-English bilingual situations in Ireland, competence in the second language was attained at the expense of competence in the first language. Macnamara names this process the "balance effect," which must be carefully distinguished from those situations where children move toward balanced bilingualism, that is, age-appropriate abilities in both languages. Recent studies in Scandinavia (e.g. Hansegard, 1968; Skuttnabb-Kangas, Note 2) have shown that semilingualism has negative emotional, cognitive, linguistic, and scholastic consequences (see Paulston, 1975, for a review of Scandinavian research on semilingualism). When trying to understand the situation of minority bilingual children in the United States, one must look carefully for signs of semilingualism or the balance effect. The main reason is that semilingualism is usually associated with the bilingualism of the poor economic classes. Sociolinguists have often made a sharp distinction between the bilingualism of upper- and lower-class children in terms of "elitist" versus "folk" bilingualism (Fishman, 1967; Paulston, 1975). As a rule, elitist bilingualism is a matter of choice for the educated classes and has not presented any educational problems. On the other hand, folk bilingualism is "the result of ethnic groups in contact and competition within a single state" (Cummins, 1976, p. 19). Folk bilingualism also is

associated with several sociocultural factors, such as negative attitudes and actual discrimination against the use of a minority language, which probably prevent the adequate development of genuine or balanced bilingualism.

COGNITIVE ADVANTAGES OF BALANCED BILINGUALS

Although the Peal and Lambert (1962) study had some serious methodological difficulties, it must be pointed out that their findings regarding the positive effects of balanced bilingualism have been replicated in more recent studies that have carefully assessed the sample's actual knowledge of the two languages. Indeed, when compared to monolinguals, balanced bilingual children show a wide range of advantages in different cognitive tasks. These studies will be carefully reviewed here.

COGNITIVE FLEXIBILITY

Several studies have concluded that bilinguals are more cognitively "flexible" than monolinguals; the construct "cognitive flexibility," however, has never been adequately defined. The notion of flexibility has been loosely used and abused to account for bilinguals' superior performance on a wide range of cognitive tasks. For example, the term was used by Peal and Lambert (1962) to describe bilinguals' performance on tests of general reasoning; by Ben-Zeev (1976,1977a) to describe bilinguals improved attention to structure and detail; by Balkan (1970) to describe performance on perceptual and "set changing" tasks; and by Landry (1974) to describe divergent thinking skills measured by tests of creativity. (See Cummins, 1976, for a discussion of the conceptual confusion underlying the term cognitive flexibility.) Nevertheless, this poorly defined construct is now widely used, and many students and researchers in the field argue that bilinguals are, indeed, more cognitively flexible than monolinguals.

It is important, therefore, to trace the history of the term's usage, as well as to clarify the nature of the tasks where bilingual children seem to perform more "flexibly" than monolinguals.

In the literature on bilingualism and cognitive development, the term cognitive flexibility was used first by Peal and Lambert (1962) to describe bilinguals' performance on measures of general intelligence. Specifically, the term was used to explain a puzzling finding, namely, that bilinguals performed significantly better than monolinguals on several nonverbal tests of intelligence. On the basis of earlier linguistic studies, the superior performance of balanced bilinguals on verbal tests could be explained easily by the linguistic advantages of knowing two different languages, such as the early separation between sound and meaning. However, a similar explanation was not available for the effects of bilingualism on nonverbal abilities. Bilinguals' need to switch languages and a resulting mental flexibility proved to be a logical and attractive explanation . Because bilinguals outranked monolinguals on both verbal and nonverbal tests, an alternative explanation would have been to simply admit the (nonintuitive) conclusion that bilinguals in the study were more intelligent than the monolinguals. Such an explanation, however, would have cast further doubts on Peal and Lambert's sample selection procedures.

After submitting their data to a factor analysis, Peal and Lambert (1962) noted that the nonverbal advantages of balanced bilinguals appeared more clearly on tests requiring some manipulation and reorganization of symbols, rather than on tasks requiring perceptual or spatial abilities. Previous analyses of nonverbal tests of ability (Ahmed, 1954; Anastasi, 1961) suggested that spatial visualization and mental manipulation of visual symbols are independent abilities. Moreover, Ahmed (1954) described

this second ability "as if it consisted of mental flexibility which is involved on the process of mentally reorganizing the elements of a problem situation" (as cited in Peal and Lambert, 1962, p 14; italics added by Peal and Lambert). Peal and Lambert went a step further and cleverly explained the newly discovered flexibility of bilinguals in terms of their habitual language switching.

The second hypothesis is that bilinguals may have developed more flexibility in thinking. Compound bilinguals typically acquire experience on switching from one language to another, possibly trying to solve a problem while thinking in one language, and then, when blocked, switching to the other. This habit, if it were developed, could help them on their performance on tests requiring symbol reorganization since they demand a readiness to drop one hypothesis or concept and try another. (p 14)

Implied in Peal and Lambert's explanation is the assumption that bilingual children would perform verbally the mental manipulation of visual symbols required by nonverbal tests like the Raven's Progressive Matrices. More specifically, their hypothesis involves three basic (and untested) assumptions:

(1) that bilingual children are thinking verbally while performing these nonverbal tasks,

(2) that bilinguals switch from one language to the other while performing these tasks, and

(3) that bilinguals' habit of switching languages while performing these tasks stimulates the ability to more readily discard doubtful hypotheses and formulate new ones to find a correct solution to the problem involved.

In support of their explanatory hypothesis, Peal and Lambert cite the case of a Gaelic-speaking boy of 11 (originally cited on Morrison, 1958),

who had just taken the Raven's Progressive Matrices test. According to Morrison when the boy was asked whether he had done his thinking in Gaelic or in English, the boy replied, "Please, Sir, I tried it in the English first, then I tried in the Gaelic to see would it be easier; but it wasn't so I went back to the English" (p. 280).

Recent research on the Raven's Progressive Matrices suggests that the matrices can be solved by performing either verbal or nonverbal operations on the elements involved (see Hunt, 1974). However, research on children's performance on the Raven's Matrices (Kirby & Das, 1978) suggests that, most likely, children rely visual-spatial strategies when solving the matrices. Kirby and Das found that even the items that are more prone to verbal processing, such as terms requiring some kind of analogical reasoning, are highly correlated with tests of pure spatial abilities in fourth-grade monolinguals.

Although Peal and Lambert's (1962) assumptions are fascinating and suggestive hypotheses in themselves, it is clear that they cannot be taken at face value. This writer is currently investigating bilinguals's use of verbal and spatial strategies when solving problems like those encountered in the Raven test. It is possible that, because of their unique lingistic experience, bilingual children prefer to process information and to solve nonverbal tasks verbally; in fact, some preliminary data analyses suggest that this might be the case. Hopefully, this kind of research will shed some light on bilinguals' superior performance in nonverbal tests. Nevertheless, it is too early to tell whether bilingual and monolingual children to indeed differ in their information-processing strategies. Peal and Lambert's conclusions regarding bilinguals' flexibility, therefore, must be taken with great caution.

One of the most frequently cited studies of bilinguals' cognitive flexibility is a study conducted by Balkan in Switzerland. Balkan (1970) administered several tests of nonverbal abilities that purportedly measured cognitive flexibility. The bilingual group, as expected, performed significantly higher than the control monolingual group in two of these measures. One task, Figures Cachees, similar to the familiar bedded Figures Test, involved the ability to reorganize a percept situation. The other task, Histoires, involved sensitivity to the different meanings of a word. Interestingly, the positive effects of bilingualism on these measures were much stronger for children who had become bilingual before the age of 4. The differences between monolinguals and children who had become bilingual at a later age were in favor of the latter but did not reach statistical significance.

Balkan's study implies, as earlier linguistic studies had suggested, that bilingualism might have the most beneficial cognitive effects for those children who learn their two languages simultaneously. However, to consider bilinguals' superior performance on these very different cognitive tasks a sign of their cognitive flexibility might be stretching things too far. On one hand, because balanced bilinguals have two different words for most referents, it is not surprising that they show a greater sensitivity than monolinguals to the possible different meanings to the possible different meanings of a single word, as shown in the Histoires task. On the other hand, Balkan's study offers no clue as to how or why bilingualism should contribute to a greater ability to reorganize and reconstruct perceptual arrays, as shown in the Figures Cachees task. As Peal and Lambert's (1962) conclusions suggest, the clue might be in bilinguals' tendency to use verbal mediation when performing these visual-spatial tasks.

Ben-Zeev's (1977b) study with Hebrew-English bilingual children provides further evidence of bilinguals' so-called cognitive flexibility. When compared to monolinguals, the bilingual children in this study showed a marked superiority in symbol substitution and verbal transformation tasks The symbol substitution task involved children's ability to substitute words in a sentence according to the experimenter's instructions. In a typical instance, children were asked to substitute the work "I" with the word "spaghetti." children were given correct scores when they were able to say sentences like "Spaghetti am cold," rather than "Spaghetti is cold," or a similar sentence that, although grammatically correct, violated the rules of the game. The verbal transformation task involved the detection of changes in a spoken stimulus that is repeated continuously by a tape loop. Warren and Warren (1966) reported that when a spoken stimulus is presented in such a way, subjects older than 6 years report hearing frequent changes in what they taped voice says. The authors attributed this illusion to the development of a reorganization mechanism that aids the perception of ongoing speech.

The bilingual children in Ben-Zeev's study also outperformed the monolingual group on certain aspects of a matrix transposition task; bilinguals were better at isolating and specifying the underlying dimensions of the matrix. No group differences were found, however, on the rearrangement of figures in the matrix. The two comparison groups also performed similarly on the Raven's Progressive Matrices. It should be noted that the bilinguals in Ben-Zeev's study showed cognitive advantages only in measures that were directly related to linguistic ability and on the verbal aspects of the matrix transformation task.

Ben-Zeev (1977b) noted that throughout the study bilingual children

seemed to approach the cognitive tasks in a truly analytic way. They also seemed more attentive to both the structure and details of the tasks administered, as well as more sensitive to feedback from the tasks and the experimenter. Ben-Zeev explained these improved abilities in terms of bilinguals' confrontation with their two languages. She argued that to avoid linguistic interference, bilinguals must develop a keen awareness of the structural similarities and differences between their two languages as well as a special sensitivity to linguistic feedback from the environment. Supposedly, the more developed analytic strategy toward linguistic structures is transferred to other structures and patterns associated with different cognitive tasks. Ben-Zeev summarized her results as follows: "Two strategies characterized the thinking patterns of the bilinguals in relation to verbal material; readiness to impute structure and readiness to reorganize. The patterns they seek are primarily linguistic, but this process also operates with visual patterns, as in their aptness at isolating the dimensions of a matrix. With visual material the spatial reoganizational skill did not appear, however." (p. 1017).

In conclusion, the nature or meaning of cognitive flexibility is far from being understood; the studies just reviewed, however, suggest that the flexibility noted in bilinguals could stem from language-related abilities such as a precocious use of verbal mediation in solving nonverbal tasks or an early awareness of the conventionality and structural properties of language. The next section will review in greater detail the linguistic and metalinguistic abilities that have been related empirically to the bilingual experience.

LINGUISTIC AND METALINGUISTIC ABILITIES

As mentioned earlier, linguists' case studies (Leopold, 1961; Ronjat, 1913) concluded that early bilingualism was advantageous to children's

cognitive and linguistic development. In particular, Leopold suggested that bilingualism promoted an early separation of the word sound from the word meaning, "a noticeable looseness of the link between the phonetic word and its meaning" (1961, p. 358). Furthermore, Leopold postulated a fascinating connection between the semantic and cognitive development of bilingual children; namely, the separation of sound and meaning leads to an early awareness of the conventionality of words and the arbitrariness of language. This awareness could promote, in turn, more abstract levels of thinking. Vygotsky (1935/1975) saw the cognitive advantages of bilingualism along the same lines; in his own words, bilingualism frees the mind "from the prison of concrete language and phenomena" (as cited in Cummins, 1976, p. 34).

Leopold's observations were tested empirically by Ianco-Worral (1972) in a remarkably well-designed and controlled study of English-Afrikaans bilingual children in South Africa. The bilingual sample consisted of nursery environment, similar to the situation of Leopold's daughter Hildegard. The sample's degree of bilingualism was determined by several measures, including detailed interviews with parents and teachers as well as a direct test of the children's vocabulary in both languages. Two comparable monolingual samples, one English and one Afrikaans, were included in the study.

In a first experiment, children were administered a semantic-phonetic preferences test. The test consisted of eight sets of three words. A typical set was the words cap, can, and hat. Children were asked questions such as: Which word is more like cap, can or hat? Choosing the word can or hat was an indication of the child's phonetic or semantic preference in analyzing word similarities. The capacity to compare words on the basis of

a semantic dimension is regarded as more advanced developmentally than comparing words along a phonetic dimension.

The results of Ianco-Worrall's (1972) experiment showed not only that semantic preferences increased with age, but also that bilinguals outranked monolinguals in choosing words along a semantic rather than a phonetic dimension. As Ianco-Worrall reported, "of the young 4-6 year old bilinguals, 54% consistently chose to interpret similarity between words in terms of the semantic dimension. Of the unilingual groups of the same age, not one Afrikaans speaker and only one English speaker showed similar choice behavior" (p. 1398). Ianco-Worrall concluded that bilingual children who are raised in a one-person, one-language environment reach a stage of semantic development 2 to 3 years earlier than monolingual children.

In a second experiment, using Vygotsky's (1962) interviewing techniques, Ianco-Worrall (1972) asked her subjects to explain the names of different things (e.g., why i a dog called dog?). She also asked children whether or not names of things could be arbitrarily interchanged. For the first question, children's responses were assigned to different categories, such as perceptible attributes, functional attributes, social convention, and so forth. The results of this experiment, however, showed no reliable differences between bilingual and monolingual children in the types of explanations offered. For the second question, the differences favored the bilingual children; bilinguals replied that names of objects could in principle be change, while the opposite was true for monolingual children.

As part of the same experiment, Ianco-Worral played a "game" with her young subjects where the names of objects were actually changed. She then asked questions about the qualities and properties f the newly named objects. For example, "Let us call a dog, cow. Does this cow have horns? Does this cow give milk?" (pp. 1394-1395). The results indicated that

there was no difference between bilinguals and monolinguals in their capacity to separate in play the qualities of objects from their names.

In the study just described, bilinguals exceeded monolinguals in their capacity to analyze the similarity of words along semantic rather than acoustic dimensions. Also, bilingual children seemed more aware than monolinguals of the conventional nature of words and language. This awareness of flexibility with respect to the use of language was also evident in bilinguals' responses to Ben-Zeev's (1977b) symbol substitution task, mentioned above. In another study (Feldman & Shen, 1971), bilingual 5-year-olds were better than their monolingual peers at relabeling objects and expressing relations between objects and expressing relations between objects in simple sentences. Further evidence of the positive effects of bilingualism on verbal and linguistic abilities can be found in the work of Casserly and Edwards (Note 3) and in the reports of the St. Lambert experimental bilingual project in Canada (Lambert & Tucker, 1972; Lambert, Tucker, & D'Anglejan, 1973). Casserly and Edwards reported that first- through third-grade children in bilingual programs showed definite advantages on several psycholinguistic measures when compared to children attending regular school programs. By the same token, bilingual children in the St. lambert project outperformed monolinguals when tested on verbal tests of intelligence.

Several investigators have explored the effects of bilingualism on the development of metalinguistic awareness. Metalinguistic awareness refers to the ability to analyze objectively lingistic output, that is, "to look at language rather than through it to the intended meaning" (Cummins, 1978, p. 127). Indeed, as children develop, they become more capable of looking at language as an objective set of rules, an objective tool for

communication. Because bilingualism induces an early separation of word and referent, it is possible that bilingual children also develop an early capacity to focus on and analyze the structural properties of language. Vygotsky (1935/1975, 1962) suggested that because bilinguals could express the same thought in different languages, a bilingual child would tend to "see his language as one particular system among many, to view it s phenomena under more general categories, and this leads to an 'awareness of his linguistic operations" (1962, p. 110). Similarly, Ben-Zeev (1977b) hypothesized that bilinguals develop an analytic strategy toward language to fight interference between their two languages. Lambert and Tucker (1972) noted that children in the St. Lambert bilingual experiment engaged in some sort of "contrastive linguistics" by comparing similarities and differences between their two languages.

Cummins (1978) investigated the metalinguistic development of third and sixth-grade Irish-English bilinguals. Children in the sample came from homes where both Irish and English were spoken; all children received formal school instruction in Irish. An appropriate monolingual comparison group was selected that was equivalent to the bilingual group on measures of IQ and socioeconomic status. A first task investigated children's awareness of the arbitrariness of language. Similar to the measure used by Ianco-Worrall (1972), children were asked whether names of objects could be interchanged; children were then asked to explain or justify their responses. The results indicated that at both third-and sixth-grade levels bilinguals showed a greater awareness of the arbitrary nature of linguistic reference.

In a second task, children were presented with several contradictory and tautological sentences about some poker chips that were either view of the child or hidden. The sentences varied in two additional dimensions:

true versus false and empirical versus nonempirical. Nonempirical statements refer to sentences that "are true or false by virtue of their linguistic form rather than deriving their truth value from any extra-linguistic state of affairs" (p. 129). The task was chosen as a measure of metalingusitic awareness because previous research had shown that to correctly evaluate contradictions and tautologies, it is necessary to examine language objectively. Although the results for this measure were not clear-cut in favor of the bilinguals, sixth-grade bilingual children showed a marked superiority in correctly evaluating hidden nonempirical sentences. The monolinguals "analyzed linguistic input less closely, being more content to give the obvious 'can't tell' response to the hidden nonempirical items" (p. 133).

In a second experiment with balanced Ukranian-English bilinguals, Cummins (1978) investigated children's metalinguistic awareness using a wide variety of measures including analysis of ambiguous sentences and a class inclusion task. Contrary to previous findings, the bilinguals in this study did not show advantages on the Semantic-Phonetic preference Test or on the arbitrariness of language task. However, "the results of the Class Inclusion and Ambiguities tasks are consistent with previous findings in that they suggest that bilingualism promotes an analytic orientation to linguistic input" (p. 135).

Diaz and Hakuta (Note 1) investigated two different types of metalinguistic awareness; namely, bilingual children's awareness of grammatical errors in their first language and their ability to perceive their two languages at two independent and different language systems. In this study, a group of Spanish-English balanced-bilingual children were compared to a group of Spanish-speaking children who were just beginning to

learn English as a second language at school; therefore, the comparison group could be considered relatively monolingual children who were at beginning stages of of second-language learning. The two groups of children were equivalent intheir Spanish ability, lived in the same neighborhoods, and attended the same kindergarten and first-grade bilingual classes.

The metalinguistic awareness tasks consisted of eight ungrammatical Spanish sentences and eight Spanish sentences with one English word in each (e.g., La teacher esta en la clase or El dog es grade); several correct Spanish sentences were intermixed within each set of wrong sentences. For the first set of sentences, children were asked to give a correct or grammatical version of the sentences presented. The results showed not differences between the two groups of children in their ability to detect grammatical errors in their native language. However, balanced bilinguals showed a greater ability to make grammatical corrections and to detect confusions between their two languages. Contrary to popular belief that early bilingualism causes confusion and interference between the two languages, the balanced-bilingual children in this study showed an awareness of the independence and proper separate usage of their two languages.

CONCEPT FORMATION

By far, the most detailed descriptions of concept formation in childhood are those by Jean Piaget. His theory of cognitive development emphasizes the importance of four different factors in the development of intelligence: maturation, experience, social interaction, and equilibration (Flavell, 1963). Although Piaget's theory implies the existence of stages with a universal invariant sequence in development, his interactionist formulations allow for the role of experience and social interaction in the

acceleration or retardation of different cognitive abilities. Using a Piagetian theoretical framework, and capitalizing on the fact that bilinguals are exposed to unique and complex "two worlds of experience," Liedtke and Nelson (1968) investigated differences between bilinguals and monolinguals on a concept formation task.

Based on tasks similar to those used by Piaget, Inhelder, & Szeminska (1960), Liedtke and Nelson (1968) constructed a test on concepts of linear measurement. The test measured six different aspects of linear measurement: (a) reconstructing relations of distance, (b) conservation of length, (c) conservation of length with change of position, (d) conservation of length with distortion of shape, (e) measurement of length, and (f) subdividing a straight line. The test was administered to English-French bilingual and consisted of children who were exposed to the two languages at home; that is, simultaneous learners of the languages. The monolingual subjects came from monolingual homes and had no functional knowledge of a second language. Subjects' IQs, socioeconomic status, as well as a measure of their kindergarten attendance, were carefully controlled.

Subtests a to d yielded a measure of children's ability to conserve length, while subtests e and f yielded a measure of children's ability to measure length. On both measures, bilinguals performed significantly better than their monolingual counterparts. After such strict experimental controls, the results were clearly in favor of the bilingual children; so much so, in fact, that the authors were carried away in their enthusiasm for bilingual education:

> If bilingualism increases intellectual potential and is beneficial to concept formation (as the study shows), then a

second language should be introduced during the early years when experience and environmental factors are most effective in contributing to the development of intelligence. (p. 231).

In a modest attempt to reconcile Piaget's and Vygotsky's conceptions of thought and language, Bain (1974) examined the effects of bilingualism on "discovery learning" tasks (see Gagne & Brown, 1961, for a detailed description of such tasks). The paradigm of Bain's study was to discover the rules that lead to solution of linear numerical problems such as,

A. 1, 3, 7, 15, 31, _____
B. 1/2, 1, 11/2, 2, 21/2, 3, ----------
C. 1, 2, 4, 8, 16, 32, ----------

Children were presented with two sets of items on 2 different days. On the second day of testing, children were told to "use the rules that you learnt last day to help you solve the problems" (p. 123). The task was chosen because it involved the ability to discover a rule and then use the rule to deduce a certain outcome. Also, a second round of testing with similar items demanded transferring the newly derived rule to novel situations. In Piagetian terms, the task involved concept formation abilities such as classification and generalization of rules.

Bain's sample consisted of French-English balanced bilinguals and a control group of monolingual English speakers. Besides controlling for group differences in variables such as IQ, socioeconomic status, and school grades, Bain controlled for his sample's developmental level of operations. Over a 1-week period, he administered conservation tasks to both bilingual and monolingual children and selected only subjects whose explanations for conserving mass, weight, and volume placed them at the concrete-operational level of thought. Bain's research question could then be reformulated as follows: Do differences in linguistic experience (bilingual vs. monolingual) affect the cognitive performance of children who are at

similar levels of cognitive development? According to Bain, if concrete operational bilingual children perform better than comparable monolinguals on tasks requiring formal operations, then one could conclude that linguistic experiences do indeed affect the development of cognitive structures, and therefore Vygotsky's position would be supported.

Before the test was administered, children were asked to proceed as fast as they could, but to complete one item before going to the next. Two measures of response latency were taken: discovery time, the time it took to complete the second set of items at a later date. Bilinguals completed the first set of items approximately 8 minutes earlier than their monolingual peers (discovery time = 31.25 minutes for bilinguals vs. 39.48 minutes for monolinguals). The difference, however, failed to reach statistical significance ($p = .17$). There were no substantial group differences on the transfer time measure. Unfortunately, the results of this experiment are difficult to interpret for two reasons. First, the sample was rather small, including only 20 children, 10 subjects in each comparison group. Second, Bain does not report whether children responded to the items correctly. Without this information, a faster discovery time could also mean that bilinguals were more impulsive, that is, faster than their monolingual peers at the expense of accurate performance.

Nevertheless, assuming that Bain's (1974) findings are valid, and taken together with Liedtke and Nelson's (1968) results, it seems that balanced bilinguals do enjoy some advantages over monolinguals in concept-formation abilities. In summary, bilinguals demonstrate a greater grasp of linear measurement concepts and a greater facility to discover additive rules in a string of numbers than their monolingual counterparts. More important, the findings from the experiments reviewed in this section give

modest support to Vygotsky's contention that language influences the development of new cognitive structures.

DIVERGENT THINKING SKILLS AND CREATIVITY

With few exceptions, the majority of studies that have investigated the relationship between bilingualism and creative abilities have used the Torrance Tests of Creative Abilities (Torrance 1966a, 1966b) as their dependent variable. Although different definitions f creativity are available (see, e.g., Rothernberg, & Hausman, 1976), it is no surprise that researchers interested in the effects of bilingualism chose Torrance's formulations as their conceptual framework. For Torrance, creativity is closely identified with divergent productions and transformations with the ability to take different perspectives and different approaches to a given problem. Moreover, Torrance strongly believes that creativity can be trained and that it is, therefore, vulnerable to the influence of cultural factors. In fact, so close were his ideas of creativity to the abilities affected by bilingualism, that Torrance himself conducted a large-scale study comparing the creative functioning of bilingual and monolingual children in Singapore (Torrance, Wu, Gowan, & Aliotti, 1970).

Influenced by Guilford's "Structure of the Intellect" model and his concern regarding the measurement of thinking abilities involved in creativity (Guilford, 1967), Torrance developed tests that measured fluency, flexibility, originality, and elaboration, involving both verbal and visual stimuli. Although a detailed description of these abilities is beyond our purposes here, a brief outline of Torrance's test is called for to better understand and interpret the results of the studies to be reviewed. Figural Form A of the test consists of three 10-minute tasks: Picture Construction, Picture Completion, and Repeated Figures (Parallel Lines). The "ideational" form of the rest involves verbal stimuli and

ideas rather than figures. Figural flexibility, for example, would be a measure of the different patterns that a child can create using the same set of lines. Fluency (figural or ideational) refers to the number of associations to a given stimulus expressed in a given amount of time. Usually, six measures can be derived from children's performance on these tests: verbal fluency, flexibility, and originality, as well as figural fluency, flexibility, and originality. A measure of elaboration can also be derived from these tests. However, the criteria for scoring elaboration are not too clear, and investigators shy away from such measure.

Postulating both possible and negative effects of bilingualism on creative functioning, Torrance eta l. (1970) tested 1,063 third- to fifth-grade bilingual and monolingual children in Singapore. The bilingual sample included Chinese-English and Malayan-English speaking children. Torrance and his coworkers hypothesized, on one hand, that bilingualism could have negative effects on fluency and flexibility skills. They believed that bilingualism fostered a competition of associations: that is, older associations could compete with the assimilation of new associations, a kind of "negative transfer" between the two languages. In their words,

> When a child reared during his ealy years in a particular culture learns to speak the language common with that culture, and then enters a school where instruction is in a different language and the practices and ways of thinking of a different culture predominate, one has a good example of this negative transfer. (p. 72).

On the other hand, Torrance et al. expected a positive correlation between bilingualism and originality. They argued that the competition

between the two languages, between old and new association, should facilitate originality, especially if originality was assessed independently of fluency. As expected, the results of the study showed that monolinguals surpassed bilinguals on both measures of fluency and flexibility. In addition, as the authors hypothesized, bilinguals scored higher than monolinguals on both originality and elaboration. However, the group differences in originality, though obviously in favor of the bilinguals, failed to reach statistical significance.

The results of the study just described must be evaluated with a great deal of caution. First, there were not measures of relevant variables such as IQ, socioeconomic status, or children's actual knowledge of the two languages to insure that the two groups differed only in the bilingual versus monolingual dimension. Second, the authors do not specify what criteria they used to include children in the bilingual sample. It should be noted that the bilingual children in this study attended Malaysian-, Chinese-, or English-speaking schools. The children were not attending bilingual education programs where both languages are maintained and equally developed. It is most likely that the sample consisted of semilingual rather than bilingual children; that is, children whose native language was being gradually replaced by exposure and formal instruction in a second language. In fact, the situation of linguistic interference and negative transfer that Torrance and his coworkers described is a more accurate description of semilingualism than of genuine bilingualism. And third, one must be a bit skeptical about the construct "creative functioning" when there is so little relationship between subtests that purportedly measure creativity, especially when trends in subtest performance are so distinctly reversed within the same group of children.

In a somewhat better controlled study, Landry (1974) examined the

creative abilities of children who were learning a foreign language in elementary school. Landry compared children who attended both Foreign Language in the Elementary School (FLES) and regular school programs. To study the effectiveness of the FLES program in promoting creative abilities, Landry eliminated from the sample those children who had a bilingual home background; he tested both first and third graders, monolinguals and second-language learners. As expected, there were no differences between the FLES and non-FLES first graders; Landry explained this finding in terms of first graders' limited exposure to the second language. By the third grade, however, children learning a second language showed significant advantages on all measures of the Torrance test. Stretching the notion of cognitive flexibility produced by learning a second language was conducive to both divergent thinking and originality.

COGNITIVE STYLE

Several investigators have been interested in the influence of bilingualism on children's cognitive style (cf., Duncan & DeAvila, 1979; Ramirez, Castaneda, & Herold, 1974; Ramirez & Price-Williams, 1974). Cognitive style usually refers to "individual variations in modes of perceiving, remembering, and thinking, or as distinctive ways of apprehending, sorting, remembering, transforming and utilizing information" (Kogan, 1971, as cited in Duncan & DeAvila, 1979, p. 21). Involved in the conceptualization of cognitive style is the notion that there is diversity in cognitive performance; diversity, however, is regarded as value-neutral, with no implications of better or worse, bright or dull. Witkin and Goodenough (1977), for example, stress that each pole of the field dependence/independence cognitive styles has adaptive characteristics. It is not surprising, therefore, that minority researchers have made efforts

to understand the effects of bilingualism on cognitive style and have advocated value-neutral formulations of cognitive performance.

Among the many possible dimensions of cognitive style, field dependence/independence has been the most widely studied. Although measures of field dependence/independence are usually simple and straightforward, such as subjects' performance on the familiar Embedded Figures Test, there are almost as many definitions of this construct as there are investigations in the field. Field independence, for example, usually refers to a measure of a subject's ability to overcome the effects of a visually distracting background. Nevertheless, field independence has also been conceptualized as a personality characteristic of assertiveness, as a cognitive restructuring competency, nd as an intellectual and perceptual segregation of the "me" and "not me" (Witkin & Goodenough, 1977; see also Cazden & Leggett, 1981; Duncan & DeAvila, 1979, for reviews of the major formulations and empirical findings on the effects of bilingualism on field-dependent and independent cognitive styles.

Ramirez (1973) argued that achievement and success in U.S. mainstream education are associated with characteristics of the field-independent person. He further claims that the academic failure of Mexican-American children can be attributed mainly to the predominantly field-dependent cognitive style of these children. Some studies (Buriel, 1975; Sanders, Scholz, & Kagan, 1976) have shown, indeed, that Mexican-American children tend to be more field dependent than their Anglo-American counterparts according to their performance on the Portable Rod and Frame Test. To emphasize the positive cognitive and social aspects of this style, Ramirez and Castaneda (1974) substituted the term "field dependence" with "field sensitivity." In the social sphere, for example, field dependence is associated with more sensitivity to social feedback and a more developed

repertoire of interpersonal behaviors.

Following the same line of thought, Ramirez and his coworkers suggested that cognitive style varies with the degree of assimilation to the mainstream culture. Furthermore, they suggest that speaking two languages and belonging to two cultures fosters some kind of "bicognitivity"; that is, "in the same way that the bilingual child switches language codes in response to the demand characteristics of the socio-linguistic situation, so the bicognitive child switches cognitive styles as demanded" (Duncan & DeAvila, 1979, p. 25).

Although these are fascinating theoretical formulations relating bilingualism to cognitive styles, the empirical evidence is rather weak and not convincing. First, the findings are not consistent across studies; in contrast to studies using the Portable Rod and Frame Test, some studies using the Children's Embedded figures Test (CEFT) did not find significant differences between bilinguals' and monolinguals' cognitive styles. In fact, when reviewing such studies, Kagan & Buriel (1977) argued that at this time it is meaningless to describe Mexican-American children as more field dependent than their Anglo-American peers. Second, most of these studies have not measured children's language proficiency in either English or Spanish, so it is difficult to sort out the influence of linguistic variables from the effects of other cultural and socioeconomic variables on cognitive style differences found so far.

To the best of our knowledge, only one study has looked at the relation between bilingualism and field dependence/independence, carefully controlling for the sample's actual degree of bilingualism. Using the Language Assessment Scale, Duncan and DeAvila (1979) assessed the relative linguistic proficiency in English and Spanish in four groups of children of

Hispanic background in grades one and three. The sample included urban and rural Mexican Americans, Puerto Ricans, and Cuban Americans. Through performance on the Language Assessment Scale, and according to their relative proficiency in English and Spanish, children were classified to into five groups ranging from late language learners (poor in both languages) to proficient bilinguals. Of course, the sample included monolinguals of both languages. Field dependence/independence was assessed through two different measures: the CEFT and the Draw-a-Person Test (DAP).

The results of the study showed that proficient bilingual children outperformed the monolingual children on both the CEFT and the DAP test. Proficient (i.e., balanced) bilingual children showed more advanced skills at perceptual disembedding and produced the most articulate or "field-independent" drawings. The investigators also found a positive linear relationship between degree of relative language proficiency in English and Spanish and field independence. It should be noted that in this study children who had not yet achieved an adequate balance between their two languages, that is, the partial and limited bilinguals, performed similarly to the monolingual group; there was no evidence of negative cognitive effects as a result of exposure to a second language. The authors concluded that their results support Cummins' (1976) threshold hypothesis, namely, that a certain level of proficiency in both languages must be obtained before bilingualism can show its positive effects on cognitive variables.

CONCLUSIONS

The recent studies reviewed in this chapter suggest the following: take any group of bilinguals who are approximately equivalent in their abilities in L1 and L2, and compare them with a monolingual group, matched for age, socioeconomic level, and whatever other variables you think might

confound your results. Now, choose a measure of cognitive activity, and administer it to both groups. The bilinguals will do better.

Now, consider an ideal experimental design. You would begin by taking a random sample of individuals, and assign them randomly to either an experimental group or control group, thereby controlling for any background error in sampling. The experimental group is placed in an environment that fosters bilingualism, while the control group remains in a monolingual environment. Once the treatment has had time to take effect, that is, once the subjects in the condition have become balanced biliguals, you administer your dependent measure. Like a good experimentalist, you make sure that the person who administers the dependent measure is blind to the fact of whether the subject being tested is in the treatment or control condition. And, lo and behold, you find a difference in favor of bilinguals. Under this ideal situation, one can reasonably conclude that bilingualism causes increments in that particular dependent measures. You could also go on to speculate about why this result came about, and construe various other experimental conditions to test out your hypotheses.

In what ways is the ideal research design unlike the circumstances under which current studies of bilingualism are conducted? We would point to at least two. First, in the real world, there is no such thing as random assignment to a bilingual or monolingual group. Most often, whether one ends up begin a bilingual or monolingual is determined by sociolinguistic facts that are, as would be true of most sociolinguistic facts, related to a wide range of social variables. What this really means is that there will be a large number of variables that differentiate the bilingual from the monolingual other than the simple one to which much of the difference is usually attributed: that the bilingual speaks two

languages, and the monolingual one. It is possible, of course to match the two groups with respect to some of them, such as ethnicity, or to control them statistically, such as by partialling out the effects of socioeconomic level. But at what point can we be satisfied that all the relevant variables have been controlled for, such that the difference between the two groups can be attributed to the number of languages that the person knows? So the skeptic could argue, "while you have controlled for a,b,c,d,e, and f, you haven't controlled for g." (see MacNab, 1979, for an incisive review of many of these points).

The second way in which the ideal situation is unlike the reality of the studies is more methodological, and has to do with adoption of a blind procedure. In none of the studies reviewed have we seen evidence of attempts by the researchers to keep the identity of the subject blind to the experimenter. If the experimenter is keen on the hypothesis of the study, and in addition knows whether the subject is a bilingual or a monolingual child, one cannot rule out unintended experimenter bias effects (Rosenthal, 1976). In practice, it may be quite difficult to attempt to maintain a blind procedure. Bilingual and monolingual children are most often found in different schools, different neighborhoods, and would probably show some behavioral manifestations of their "linguality". It is, however, an effect that one must bear in mind when interpreting the results of studies using the prototype design.

The methodological problems stemming from the reality of actual bilingual situations lend difficulty to supporting empirically the claim that bilingualism is associated with greater cognitive flexibility. One partial solution to both of the problems outlined above can be achieved in a rarely used design of looking at effects within a bilingual sample (Duncan and DeAvila, 1979; however, they confounded bilingualism with

proficiency level in both languages). If degree of bilingualism can be reliably measured within a sample of children becoming bilingual, and this measure of degree of bilingualism can be shown to be related to cognitive flexibility, then one would have come one step closer to finding a pure relationship between bilingualism and cognitive activity. Using a within-bilingual sample, note that it is also possible to control for experimenter bias. Since the subjects could be selected from the same schools, if the L1 and L2 abilities could be kept blind to the experimenter, it would minimize bias effects.

In addition to the problems mentioned above, there is the implied but untested statement about the direction of causality. As Peal and Lambert put it, "one may ask whether the more intelligent children, as measured by nonverbal intelligence tests, are the ones who become bilingual, or whether bilingualism itself has a favorable effect on nonverbal intelligence" (1962:13). One handle on this problem would be through a longitudinal study where both variables are measured repeatedly over time. We are aware of just one study (in addition to an unpublished study cited by Lambert), by Barik and Swain (1976), in which longitudinal data were available. Barik and Swain compared 32 low achievers with 32 high achievers in a French immersion program in Ottawa over a three-year period (Grades K-3). They report that the high achievers performed better on subtests of analogies and following verbal directions even when initial IQ scores at Time 1 were controlled.

Finally, the studies also fail to address the greater majority of the population of language minority students in the United States, who would under most criteria be classified as non-balanced bilinguals. Cummins (1979) suggested that perhaps the positive effects of bilingualism might be

moderated by a "threshold", where a certain degree of proficiency in the second language is necessary before the effects appear. Further, there is the suggestion that the early studies of non-balanced bilinguals where negative effects were observed could be due to the their unbalanced status. Although these concerns must be seen in light of the assumptions underlying early research that we reviewed in Chapter 2, it is entirely possible that the early stages of bilingualism would be associated with negative consequences on cognitive performance. It is with these concerns that we designed the present empirical effort.

CHAPTER FOUR

METHODS AND PROCEDURES

SUBJECTS

Subjects were from selected bilingual classrooms in the New Haven Public Schools. During the first year of data collection (this period of the study was funded by the National Science Foundation, prior to NIE funding), we began observation of two cohorts of children, one in kindergarten (referred to as Cohort0) and the other in first grade (referred to as Cohort1). This group, referred to collectively as Cohort01, were followed over the following two years. The schema thus far looks as follows:

	YEAR1	YEAR2	YEAR3
COHORT0	K	1	2
COHORT1	1	2	3

In each year, we made two observations for the subjects, once in the fall (f), and once in the spring (s). The schema can be expanded as follows:

	YEAR1		YEAR2		YEAR3	
	Time1	Time2	Time3	Time4	Time5	Time6
COHORT0	Kf	Ks	1f	1s	2f	2s
COHORT1	1f	1s	2f	2s	3f	3s

We found considerable attrition over the years, due to the high mobility of our subject population. Thus, in the fall of both Year2 and Year3 (Time 3 and Time 5), new subjects were added, with the rough aim of maintaining a total Cohort01 sample size of 150 in the fall, with attrition reducing the

number in the spring.

Overall, the number of subjects in the two cohorts over time is summarized in Table 4.1.

During YEAR2, we also added cohorts of fourth and fifth graders (COHORT4 AND COHORT5 respectively, COHORT45 collectively), following the same schedule as COHORT01.

	YEAR1		YEAR2		YEAR3	
	Time1	Time2	Time3	Time4	Time5	Time6
COHORT4	not observed		4f	4s	5f	5s
COHORT5	not observed		5f	5s	6f	6s

These cohorts also saw considerable attrition. The numbers are summarized in Table 4.2.

Two separate data sets were created from these data, one suited for longitudinal analysis and the other for cross-sectional analysis. For the longitudinal analysis, the above structure was preserved. For the cross-sectional analysis, the cohorts were "offset" by one year, such that we grouped subjects by grade (and fall/spring) categories. For example, we created a group of "First Grade Fall" subjects by combining Cohort0 at Time3 and Cohort1 at Time1, and so forth.

Schools for sample selection was chosen by recommendation of Aida Comulada, Supervisor of the Bilingual Program. These were schools with highest concentrations of students in the bilingual classes. Within any given classroom, all students were initially screened through administration of the Spanish PPVT (see Description of Measures, below). Students with low scores on the test (defined as greater than one standard deviation below the group mean) were eliminated from our sample. This

Table 1. Number of Subjects in Cohort 01.

Total Number of Subjects Tested at each Time Period:

T1	T2	T3	T4	T5	T6	TOTAL SUBJECTS
149	124	138	120	150	137	227

Number of Subjects Tested Across Time Periods:

T1	T2	T3	T4	T5	T6	NO. OF SUBJECTS
X						149
X	X					124
X	X	X				98
X	X	X	X			89
X	X	X	X	X		84
X	X	X	X	X	X	78
		X				138
		X	X			120
		X	X	X		112
		X	X	X	X	104
				X		150
				X	X	137

Table 2. Number of Subjects in Cohort 45.

Total Number of Subjects Tested at each Time Period:

T1	T2	T3	T4	T5	T6	TOTAL SUBJECTS
--	--	151	140	150	138	187

Number of Subjects Tested Across Time Periods:

T1	T2	T3	T4	T5	T6	NO. OF SUBJECTS
		X				151
		X	X			140
		X	X	X		115
		X	X	X	X	110
				X		150
				X	X	138

screening was considered important because of considerations related to special education programs (or lack thereof) for bilingual students. In practice, our criteria was successful, in that it eliminated students on the low tail of a negatively skewed distribution. Teachers spontaneously commented on the success we had in identifying students with such difficulties. About 5 percent of the total group screened were eliminated from the sample in this manner.

Program Characteristics

Spanish is the only language for which bilingual services are provided in New Haven. The program uses a "pairing model" instructional system. In this model, an English-speaking teacher is paired with a Spanish-speaking teacher. The pair of teachers is assigned two groups of students, who alternate between them. The most common model is one in which one group of children receives instruction in Spanish in the morning and instruction in English in the afternoon, while the second group receives English in the morning and Spanish in the afternoon.

The Hispanic population in New Haven is primarily from Puerto Rico. A rough estimate of the demographic characteristics of this population can be found in Table 4.3, summarizing the 1980 Census information for Census Tracts roughly corresponding to the schools where from which our samples were drawn.

In the elementary grades, as of October, 1983, there were 1,652 Hispanic pupils in the New Haven Public Schools, comprising 20.1 percent of the entire elementary school body. Of these, roughly 48 percent (794) were in bilingual programs

We collected two sets of data on demographic characteristics of the population. One was a brief home questionnaire sent to the parents of all

TABLE 4.3

Summary of 1980 Census information for "Spanish Origin" classification individuals and households in New Haven, by Tract. Source: Bureau of the Census, 1980 Census of Population and Housing, Census Tracts: New Haven and West Haven, Conn. SMSA (PHC80-2-257).

	Tract 1403	Tract 1404	Tract 1405	Tract 1406	Tract 1423	Tract 1424	Tract 1425
FROM TABLE P-6 (General Characteristics of Spanish Origin Persons: 1980)							
Total Number of Persons	1168	628	1313	1148	998	1077	498
Median Age	17.5	19.3	17.4	17.8	15.7	17.9	17.1
Persons per Household	3.94	3.60	3.78	3.53	4.00	3.88	3.94
Total Families	263	153	309	258	232	256	109
Female Householder, no husband present	118	73	158	150	118	105	43
FROM: TABLE P-20 (Social and Labor Force Characteristics of Spanish Origin Persons: 1980)							
Persons 5-17 yrs.	434	196	496	372	372	389	167
Speak NEL at home	396	172	488	353	348	365	141
% little or no Eng.	19.4	19.8	14.1	20.1	12.4	19.2	6.4
Persons 18+ yrs.	612	320	632	580	450	526	226
Speak NEL at home	593	308	605	564	439	508	194
% little or no Eng.	34.7	33.4	50.1	44.5	45.1	44.9	33.5
Yrs. School Completed							
Persons 25+ yrs.	408	213	445	380	312	386	161
Elem. 0-4 yrs.	86	30	118	132	73	99	19
5-7 yrs.	124	25	125	116	41	96	30
8 yrs.	19	39	40	23	24	61	6
High Sch. 1-3 yrs.	92	23	91	41	71	70	55
4 yrs.	48	34	71	43	74	60	42
College 1-3 yrs.	26	62	-	-	29	-	9
4+ yrs.	13	-	-	25	-	-	-
Residence in 1975							
Persons 5+ yrs.	1232	506	1134	987	867	973	336
Same House	511	41	293	295	79	200	136

(cont'd)

(cont'd)

	Tract 1403	Tract 1404	Tract 1405	Tract 1406	Tract 1423	Tract 1424	Tract 1425
Labor Force Status							
Persons 16+ yrs.	672	349	724	603	477	578	250
In labor force	407	201	292	280	191	275	168
Employed	350	192	243	234	191	257	120
Unemployed	57	9	49	46	-	18	48
FROM TABLE P-21 (Occupation, Income in 1979, and Poverty Status in 1979 of Spanish Origin Persons: 1980)							
Median Household Income	$9893	$8750	$7074	$6497	$5955	$7981	$10481
FROM TABLE H-6 (Occupancy, Utilization, and Financial Characteristics of Housing Units with a Spanish Origin Householder: 1980)							
No. Occupied Housing Units	286	168	347	317	247	279	124
Median occupants	3.93	3.46	3.68	3.32	3.92	3.71	4.04
Median rooms	4.7	4.6	4.5	4.3	4.7	4.6	4.7
Persons per room							
1.00 or less	231	141	264	260	194	226	101
1.01-1.50	47	25	64	45	47	43	21
1.51 or more	8	2	19	12	6	10	2
FROM TABLE H-17 (Structural, Equipment, and Houshold Characteristics of Housing Units with a Householder of Spanish Origin: 1980).							
When Householder Moved into Present Unit							
Renter-occupied housing units	257	135	300	289	217	234	90
No. moved in 1979 to Mar. 1980	124	88	142	131	116	123	24
Structural Characteristics							
No. Occupied Housing Units	296	149	355	335	239	271	105
No vehicles avail.	130	65	190	192	140	133	43
No telephone	115	50	173	170	85	103	18

the subjects who participated in our main study, shown in Appendix B. We had a remarkably high response rate (after some persistence on the part of our research assistants). Out of the total of 219 subjects in Cohort01 over the three years, 166 questionnaires were returned. Of 173 subjects in Cohort45, 132 were returned. In both groups, the return rate corresponded to 76 percent.

The questionnaire responses showed that an overwhelming majority of our subjects used only or mostly Spanish at home. For example, on a 5-point scale ranging from 1:only Spanish to 5:only English, the mean response on language used by the children with adults at home was 1.9 (s=.88) for Cohort01 and 2.06 (s=.94) for Cohort45. Mean length of residence in the mainland United States was 90.1 months for Cohort01 and 117.9 months for Cohort45. These distributions are characterized by positive skew and large standard deviations, indicating that the distribution is concentrated on the low end of the scale. Employment rate is extremely low in this group. Of the respondents, 34 percent of the head of household was employed in Cohort01, 23 percent in Cohort45. The mean number of adults in the household (M=1.6 for Cohort01, s=.8, M=1.5 for Cohort45, s=.8) indicates that a substantial percentage of the households have single parents. Correlations between these home variables and the measures used in this study will be discussed in the results section.

A second set of data on the demographic characteristics of our sample was obtained through a large survey we conducted of the entire Hispanic student body in the New Haven Public Schools. The survey was primarily conducted in order to define our sample (students in the bilingual program) in the framework of the entire Hispanic population (i.e., including those who have never been in bilingual programs, and those who have been mainstreamed). The details of the survey are contained in a report

appearing as Appendix C, suffice it to say that our response rates were extremely good.

Out of the items in the questionnaire, we constructed a combined scale of English and Spanish orientations in the households of the students. (These scales are necessarily negatively correlated, because some of the items appear in both scales with reverse signs.) The distribution of individual subjects for the entire population (elementary school students only) appears on the top panel of Figure 4.1. The panels below divide the respondents in terms of their school program status. As can be readily seen by the naked eye, the bilingual program students are heavily concentrated in the high Spanish, low English end of the distribution. What this implies is obvious. Conclusions drawn about the effects of "bilingualism" in this sample of students in the bilingual program should be tempered by the view that they represent a non-randomly chosen segment of the entire "bilingual" population.

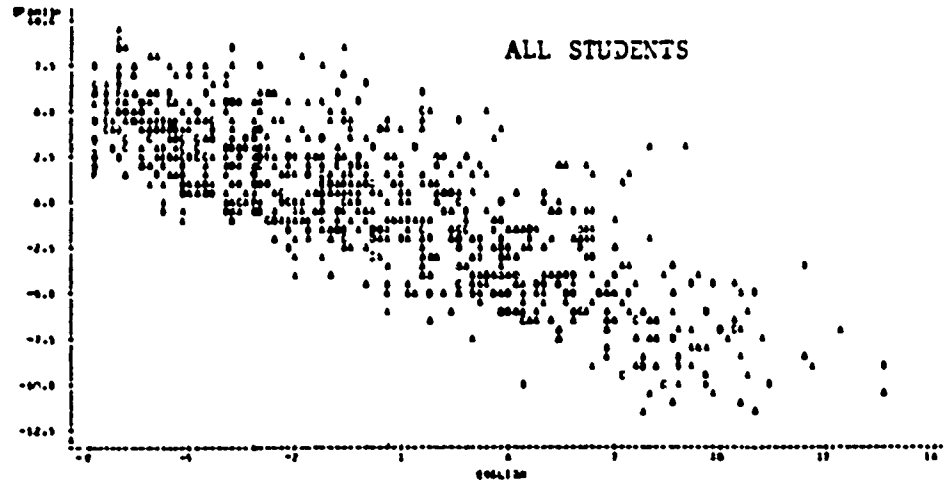
Individual item information is provided in the appendix. It should be pointed out, however, that the English and Spanish combined scales show predictable correlations with a number of other indicators, including length of residence on the mainland, employment, parent educational status, and mobility. We will continue to analyze these data in greater detail in the future.

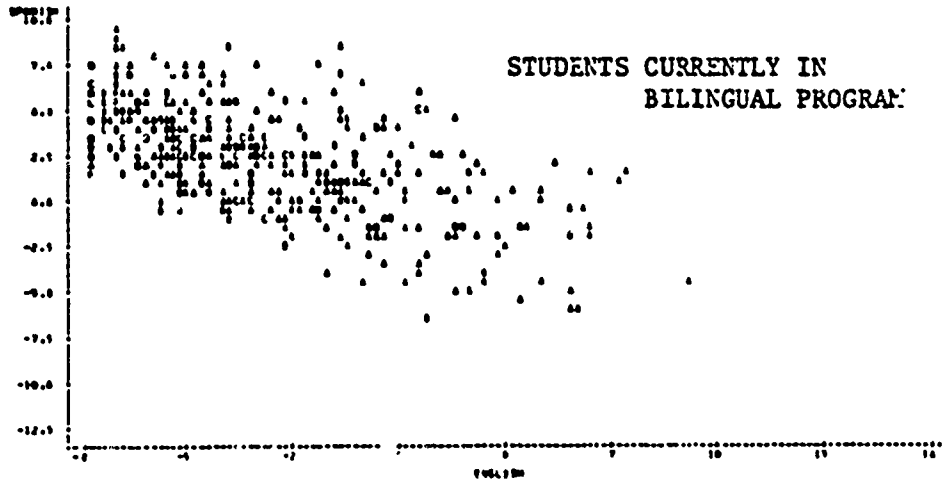
MEASURES

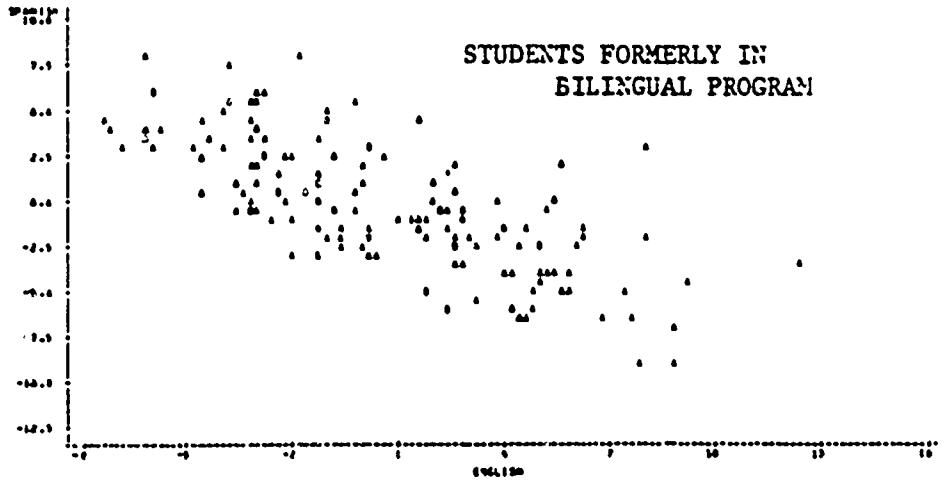
The measures used in the study appear in Appendix D. What follows is a brief description of each.

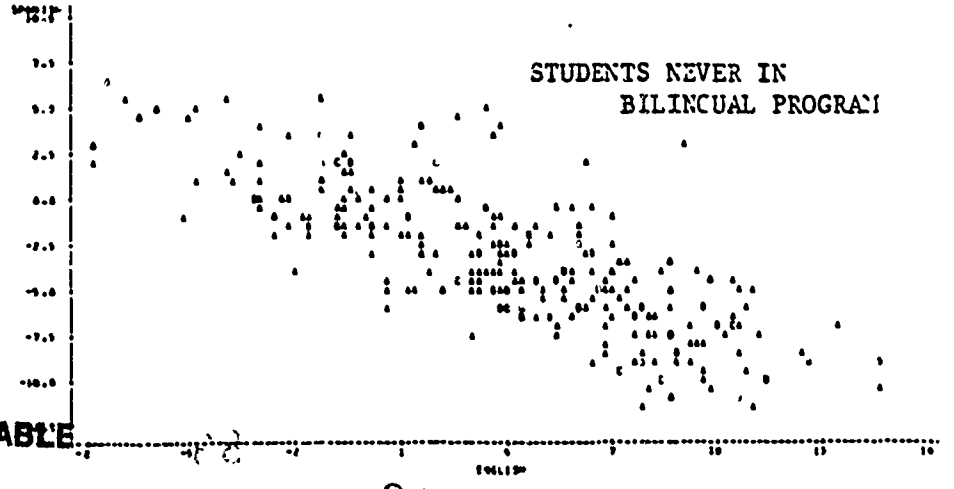
Measures of Bilingualism

Estimates of relative abilities in L1 (Spanish) and L2 (English) were obtained through vocabulary tests. The English Peabody Picture Vocabulary









Test (Dunn, 1966) and a Spanish translation adapted for Puerto Rican students in New York City (Wiener, Simon & Weiss, 1978) were chosen as the principal measures. This decision was based on several considerations.

First, after reviewing a large number of measures of language proficiency deemed appropriate for elementary school children, we none of the measures were judged appropriate for the range of age levels under study. Since the Peabody Picture Vocabulary Test was constructed for use with individuals from age 2;6 through 18;0, we felt that it contained the range of variation to be found in our subjects, for both English and for Spanish. We were highly aware of the inappropriateness of using this test to assign mental age equivalents to our subjects. Rather, we were interested in the test's ability to assign relative abilities in both languages to our subjects.

Second, we had to deal with the practical problem of finding a test that could be administered in a short period of time, since we were testing our subjects individually and any test that took substantial time for administration would reduce the number of subjects that could be included in our study. Since the PPVT could be administered in approximately 20 minutes, we felt that it met these specifications.

Validation of the PPVT Measures

The Spanish and English versions of the PPVT (hereafter SPVT and EPVT, respectively) were validated on independent measures of English and Spanish on a subset of our subjects. In one sub-study, we compared the scores on the PPVT with the Spanish and English versions of the Language Assessment Scales (Duncan & DeAvila, 1981). In another study, we compared them with ratings of story re-tellings in both languages.

Comparison with the Language Assessment Scales

A total of 49 subjects, representative of our entire range of

subjects, were chosen and administered the Language Assessment Scales. We were particularly rigorous in our scoring of the Storytelling Production section of the LAS, which counts towards half the total score on the test. Stories told by the subjects were separately typed on index cards, and they were rated independently (i.e., with codes assigned to the stories, such that the identity of the subject across English and Spanish was kept blind to the raters). Rating was performed by two members of the staff at the Bilingual/Foreign Languages Office (Lisette Berg er-McGowan and Kay Hill), both of them with the full ability to make judgments in both languages. They were asked to agree on a score, rather than to rate them independently.

In general, the results suggest that EPVT and SPVT are measuring similar dimensions as would be measured by the LAS-English and the LAS-Spanish tests. This is suggested by the magnitude of the correlations:

SPVT.LAS-Spanish	r=.552
EPVT.LAS-English	r=.618

However, these correlations should be carefully interpreted because of a very high correlation between the two versions of LAS, whose correlation was .759.

Comparison with Story Re-tellings.

A sub-sample of 40 children in K-1 was randomly selected and given a story-retelling task in the two languages. Both the Spanish and English stories consisted of 14 sentences, each paired with cartoon pictures. The experimenter first read the story to the child while both looked at a picture book, and immediately upon completion asked the child to tell the story cued by the pictures. The child's utterances were tape-recorded and subsequently transcribed. The protocols were then rated on a 5-point scale, "1" being minimal use of the language to "5" being full fluency.

The stories were rated by two independent raters; interrater reliabilities were ♦.96 for English and ♦.89 for Spanish (both reliabilities Spearman-Brown). Mean ratings for both English and Spanish stories were significantly correlated with the corresponding PPVT scores (r=.82 for English, r=.36 for Spanish). The higher English correlation reflects the fact that there was a greater range of English scores in this subsample.

Approximate Norm Values for EPVT and SPVT

Although information on age-equivalent scores should be used with great caution for the EPVT and SPVT, they may serve as useful reference points for some interpretations. The English PPVT norms are published and available in the Manual, and therefore are not repeated in this report. The Spanish norms, however, are not published, and also require some re-interpretation from the original report by Wiener et♦al.

The SPVT measure is the result of a composite of Forms A and B of the English PPVT, based on pilot testing by the authors (Wiener et♦al). They reportedly chose the more appropriate templates for the subject population, and translations were screened for relevance to the population and for culture bias.

The population chosen for creating the norms were students from "public and parochial schols in four of New York City's five boroughs...[where]...schools and agencies were randomly selected from those whose Puerto Rican populations exceeded 15%" (p. 2). Out of these schools, students identified as being "Spanish-speaking [and] of Puerto Rican descent" were randomly selected, representing the entire age spectrum. A total of 2,034 students were tested.

Wiener et♦al report means and standard deviations of "raw scores" for different age groups for their revised test. However, their reported raw

scores are different from the Dunn's original EPVT raw score in a major respect. Apparently, Wiener et al reported the total number correct when all 150 items were administered. However, as anyone familiar with the testing procedure knows, the test protocol calls for stopping testing once a "ceiling" is reached, where ceiling is defined as 6 errors in 8 consecutive trials (each trial has a theoretical chance probability of .25 for guessing, since the testee is required to point to one of four alternative pictures).

Weiner et al's raw scores are then considerably inflated, because they include items that are guessed correctly beyond the ceiling score. We also found, in our own data, that the number of errors made before ceiling is correlated with the raw score (r=.12), which must be taken into account. Assuming that there is a 25 percent guessing rate for all items above ceiling, and assuming that there is an across-the-board correlation of approximately r=.12 between number of errors and raw score, a corrected raw score can be estimated. These values are reported in Table 4.3.

Metalinguistic Awareness

Metalinguistic awareness refers to the ability to objectively analyze linguistic output. We constructed different measures of metalinguistic awareness for our younger and older cohorts.

Cohort 01: AMETA (and AMETNEW)

The present task consisted of seven ungrammatical Spanish sentences with three correct sentences intermixed within the set. The sentences were read aloud, one at a time, and children were asked to decide whether the sentences were correctly said in Spanish or not. Children's responses to each sentence were scored as (1) detects error or (0) failure to detect error. A reliability of alpha=.79 was obtained for this measure using Cronbach's alpha procedures. From Time 3 on, we constructed an additional set of 16 sentences (of which 12 are

TABLE

Estimated raw score equivalents on Spanish Peabody Picture Vocabulary Test reported by Winer et al, if all 150 items had not been administered.

AGE GROUP	TOTAL OUT OF 150 ITEMS	ESTIMATED RAW SCORE
2;6 to 3;0	45.30	36.32
3;1 to 3;6	46.41	37.22
3;7 to 4;0	51.52	41.35
4;1 to 4;6	55.15	44.28
4;7 to 5;0	56.65	45.50
5;1 to 5;6	62.39	50.13
5;7 to 6;0	64.16	51.56
6;1 to 6;6	65.71	52.82
6;7 to 7;0	72.21	58.07
7;1 to 8;0	72.95	58.67
8;1 to 9;0	77.75	62.55
9;1 to 10;0	78.69	63.31
10;1 to 11;0	84.35	67.88
11;1 to 12;0	86.65	69.74
12;1 to 13;0	94.70	76.24
13;1 to 14;0	98.95	79.68
14;1 to 15;0	100.93	81.28
15;1 to 16;0	104.45	84.12
16;1 to 17;0	109.49	88.19
17;1 to 18;0	112.58	90.69

ungrammatical) in order to test psycholinguistic hypotheses about relative difficulties of certain item types. The results of the analysis of items types will appear in a future report, and will not be treated in this report. Suffice it to say that the results of this enhanced measure yield identical results as the original set of items with respect to individual differences; thus only the AMETA results will be referred to in this final report. However, the tables in this report will occasionally show a variable labelled AMETNEW, which refers to this enlarged set of items included as our measure of metalinguistic awareness.

Cohort 01: METACO (and METCONU)

The present measure assessed children's capacity to correct ungrammatical sentences. For those ungrammatical sentences presented in AMET., children were asked to correct them and say the correct version of each sentence in Spanish. Children's corrections of the ungrammatical sentences were scored as (3) syntactic correction, (2) a combination fo syntactic and semantic corrections, (1) semantic correction and (0) no correction offered, on the assumption that correcting ungrammatical sentences on a syntactic rather than a semantic dimension indicates a higher awareness of the structural properties of language. A reliability of alpha=.83 was obtained for this measure. As with AMETA and AMETNEW, the variable appearing as METCONU refers to the enlarged set items constituting our measure of metalinguistic awareness.

Cohort 01: BMETA

The second metalinguistic measure consisted of presenting children seven Spanish sentences that contained one English word in them. Three correct Spanish sentences were randomly inserted within the set. Sentences were read aloud and, for each sentence, children were asked to judge them

as correctly said in Spanish or not. Children's responses to each sentence were scored as (1) detecting bilingual mixing or (0) failure to detect mixed sentence. A reliability of alpha=.86 was obtained for this measure using Cronbach's alpha procedures.

Cohort 45: AMBIGUITY DETECTION

For the older cohort, it was determined that simple detection of ungrammatical sentences would be within most subjects' control. Based on the literature with monolingual children, we decided that detection of ambiguity in sentences would be appropriate for this age range. As in the metalinguistic tasks, we constructed various item types, whose differences we could test, but for the present report, we only report the total score on the entire test.

The protocol for the ambiguity detection task appears in Appendix D. Essentially, subjects heard sentences played over a tape recorder. After each sentence, the subject was asked how many meanings the sentence contained. The subject was then asked to paraphrase the meaning of each sentence. Finally, s/he was shown pictures that depicted the two meanings, and asked whether the sentence could represent the pictures. Thus, the task was scored in three ways: the number of meanings reported by the subject (REPMEAN), the number of meanings produced by the subject (NPROD), and the number of meanings recognized by the subject (NRECOG). A combination of these three scores is reported in the final results (AMBIG).

Nonverbal Measures

Raven's Coloured Progressive Matrices Test

Subjects in all cohorts were tested on the Raven's Coloured Progressive Matrices Test (Raven, 19).

Thurstone's Primary Mental Abilities

The Spatial relations subtests of the Thurstone's Primary Mental

Abilities Test were used. Grade-appropriate tests were used for Cohort01 and Cohort45. The items appear in Appendix D.

Social-Cognitive Measure

Cohort 01: CHANDLER BYSTANDER CARTOONS

The present measure consists of a modified version of Chandler's bystander cartoons, originally devised as an individual differences measure of children's egocentrism. The cartoons measure children's capacity to take the perspective of another person or, more specifically, the ability to separate their knowledge about a story from the knowledge of a bystander introduced in the middle of a story sequence.

Each child in the study were told two stories in a random order with the aid of cartoons. One story, Sandcastle, portrayed a child whose sandcastle was destroyed by a girl riding a tricycle over it. The child then goes home and impulsively destroys his baby brother's card castle. Children in the study were asked to retell the story to the experimenter "from the point of view of the baby brother" or as "the baby saw it." Children were then asked three specific questions: (1) What is the baby thinking now?, (2) Does the baby know why his brother destroyed his card castle? and (3) What does the baby think about his brother breaking his castle? Children's account of the story as well as their answers to the specific questions were scored as (0) egocentric response and (1) nonegocentric response, where egocentric responses reflected children's inability to separate their own knowledge about the story from the bystander's point of view. Similar procedures were followed for the second story.

PROCEDURES

Subjects were tested individually, with the exception of the nonverbal

measures in Cohort45 after Time 3. It was assumed that for the older children, it would be more efficient to administer these measures in small groups of 5 or 6 children without affecting the results. In all other cases, testing was conducted by taking each child individually to a quiet part of the building (in most cases, we were able to use the library or a spare room).

An elaborate testing schedule was created such that different research assistants and testing sessions would not be confounded with specific tests. In all cases, the EPVT and SPVT were administered by different research assistants on different days, such that the status of each subject in terms of his or her degree of bilingualism was kept blind to the testers. The remaining measures were adminstered approximating a counterbalanced order, although uneven number of subjects and practical considerations prevented a true counterbalanced design. However, we are confident that results would not be confounded with test order effects.

With each succeeding testing period, the logistics of locating subjects became horrendous. We were able to locate most of the subjects who remained in the bilingual program through the bilingual office. Students who were mainstreamed were found either by asking the original teachers, or the school principal. We were also able to put to good use the remarkable memory of Luz Minerva Ramos, research assistant to the project, who appeared to the unsuspecting observer to know practically everyone in the Hispanic community in New Haven. By inquiring into her network of friends, she was often able to locate lost subjects when all else failed. Occasionally, it was through her connections with her religious group; at other times, it was neighbors; sometimes, she would simply ask other children she knew. It was amazing.

The EPVT, SPVT, Raven's, and the Spatial tests were scored on the

spot, immediately after test administration. For the metalinguistic tasks and for Chandler's, the sessions were tape recorded and subsequently scored at the office. The data were then transferred to coding sheets, keypunched by professionals with verification, then transferred to the Yale mainframe computer for statistical analyses. After all the data had been collected and coded, a study was conducted on the extent of data entry errors. Using a computer-generated random sampling of cases, we compared the original data with the data set on the mainframe computer. We found less than five in one thousand data entry units to be in error.

CHAPTER FIVE

RESULTS AND DISCUSSION

There are many analyses that we have conducted, all of which cannot be reported here. Of course, given the complexity of the data set, more analyses could be, and will be done before the final results of this study are published. For purposes of this final report, only some representative analyses that reveal what we believe to be the most critical characteristics of the data will be reported. The results to be presented are consistent with all other analyses, including exploratory ones, that we have performed.

Effects of Background Characteristics and Sex on the Measures.

The overall effects of Sex as a variable was assessed by computing the point-biserial correlation, r, which is equivalent to t-tests comparing the means of the two groups. The point-biserial is superior, however, in that it is interpretable like any r as an indicator of effect size.

The combined sample was used, such that effects could be assessed at Fall and Spring for each of the grade levels from K to 6.

In Cohort01, there were 8 time periods, and correlations were computed between sex (dummy coded 0 for girls, 1 for boys) and six measures: EPVT, SPVT, RAVEN, METACO, SPATIAL, and CHANDLER. Overall, there were 9 correlations that were significant beyond .05 chance. For Cohort45, there were six time periods. Correlations were computed with EPVT, SPVT, AMBIG (at 4s, 5s, and 6s), RAVEN, and SPATIAL. There were five correlations beyond chance level. The distribution of these significant correlations can be found in Table 5.1. In interpreting this table, it should be kept in mind that some Type I errors are expected given the large number of correlations. Namely, since there were a total of 75 correlations computed, there should be 75*.05, or about 4 correlations that are expected

Table 5.1

Statistically significant point-biserial correlations between Sex and basic measures of the study. Positive correlations indicate superior performance among boys; negative correlations superior performance among girls.

COHORT 01

	Kf	Ks	1f	1s	2f	2s	3f	3s
EPVT	.26**							
SPVT								
METACO				-.16*	-.21*	-.17*	-.25**	
RAVEN		.21*				.16*		.30**
SPATIAL					.15*			
CHANDLER								

COHORT 4S

	4f	4s	5f	5s	6f	6s
EPVT	.18*	.18*	.17*	.22**	.26**	
SPVT						
AMBIG						
RAVEN						
SPATIAL						

to be significant by chance alone.

The patterns in Cohort01 were relatively predictable. Boys show a slight advantage in Ravens, while girls show slight advantage on the verbal measure of metalinguistic awareness. However, we would argue that these differences, though interesting, are not relevant to the concerns of this study since there are no sex effects on either EPVT or SPVT.

In the case of Cohort45, the only effects appear to be on EPVT, for which boys show superior performance. Interpretation of this correlation is difficult, but may be mediated by the fact that boys are significantly older than girls in this sample. At any rate, however, since Sex does not correlate significantly with the dependent measures, we do not need concern ourselves with sex differences for purposes of this study.

The differences between boys and girls, in terms of mean scores on the EPVT and the SPVT, appear in Figures 5.1 and 5.2 . The samples are from the combined, cross-sectional sample, rather than longitudinal. However, analyses conducted with the longitudinal sample revealed similar effects.

The relationship between the major measures and background characteristics, as obtained through parent questionnaires, can be found in Table 5.2 for Cohort01, Table 5.3 for Cohort45. The measures were taken from Time1 from all subjects available for testing at the time when the questionnaire data were obtained.

For both cohorts, there are substantial relationships between the background measures and EPVT and SPVT. Not surprisingly, amount of English used at home is positively related to EPVT. Similarly, length of residence on the mainland is substantially correlated with EPVT. The negative correlation between SPVT and length of residence on the mainland suggests that the nature of the bilingualism in these subjects is subtractive, since

TABLE 5.2

Partial Correlations between Background Variables and Dependent Measures at Time 1 (controlling for Age)

Cohort 01

	ENGATHOM	MAINLAND	EMPLOY	CROWDING	SEX
EPVT1	0.3712 (n=109) p=0.000	0.3333 (n=111) p=0.000	0.3848 (n=108) p=0.000	-0.2110 (n=111) p=0.012	0.0550 (n=152) p=0.249
SPVT1	-0.1913 (109) P=0.022	-0.2472 (111) P=0.004	-0.1045 (108) P=0.139	0.0256 (111) P=0.394	0.0263 (152) P=0.373
METACO1	-0.0611 (102) P=0.269	-0.0230 (104) P=0.407	0.0123 (101) P=0.451	-0.0618 (103) P=0.266	-0.1408 (143) P=0.046
BMETA1	-0.0090 (106) P=0.463	-0.1149 (109) P=0.115	-0.0705 (105) P=0.235	-0.1455 (108) P=0.065	-0.1986 (148) P=0.007
RAVEN1	0.1012 (106) P=0.149	0.0364 (109) P=0.352	0.0861 (105) P=0.189	-0.0112 (108) P=0.454	-0.0282 (148) P=0.366
SPATIAL1	0.1980 (62) P=0.058	0.1470 (64) P=0.119	0.1561 (61) P=0.111	-0.1857 (64) P=0.068	-0.0439 (89) P=0.340
CHAND1	-0.0217 (99) P=0.415	0.0421 (103) P=0.335	-0.0910 (98) P=0.184	0.2188 (102) P=0.013	0.0449 (137) P=0.300

TABLE 5.3

Partial Correlations between Background Variables and Dependent Measures at Time 3 (controlling for Age)

Cohort 45

	ENGATHOM	MAINLAND	EMPLOY	CROWDING	SEX
EPVT3	0.0760	0.3302	0.0497	-0.3708	0.2372
	(102)	(109)	(113)	(110)	(149)
	P=0.221	P=0.000	P=0.299	P=0.000	P=0.002
SPVT3	-0.2085	-0.3909	0.0742	0.0183	0.0566
	(103)	(110)	(114)	(111)	(151)
	P=0.016	P=0.000	P=0.214	P=0.424	P=0.243
AMBIG4	-0.1291	-0.2714	-0.0445	0.0009	0.0527
	(99)	(106)	(110)	(108)	(141)
	P=0.099	P=0.002	P=0.321	P=0.496	P=0.266
RAVEN3	0.0985	0.1382	0.0523	-0.2237	0.0306
	(103)	(110)	(114)	(111)	(151)
	P=0.159	P=0.073	P=0.288	P=0.009	P=0.354
SPATIAL3	0.0448	0.0880	-0.0111	-0.0610	-0.1239
	(103)	(110)	(114)	(111)	(151)
	P=0.325	P=0.178	P=0.453	P=0.260	P=0.064

those who have been here longer show lower scores on SPVT. Background variables, however, do not correlate consistently with the other cognitive measures of the study.

Cohort Differences

Analyses were conducted to compare the different cohorts when they were at the same grade level. This would be important in order to safely combine cohorts into the combined cross-sectional sample. Figure 5.3 plots the means on the different dependent measures separately for each cohort. In general, one can safely conclude that the cohort differences were not substantial.

Relationships between Measures

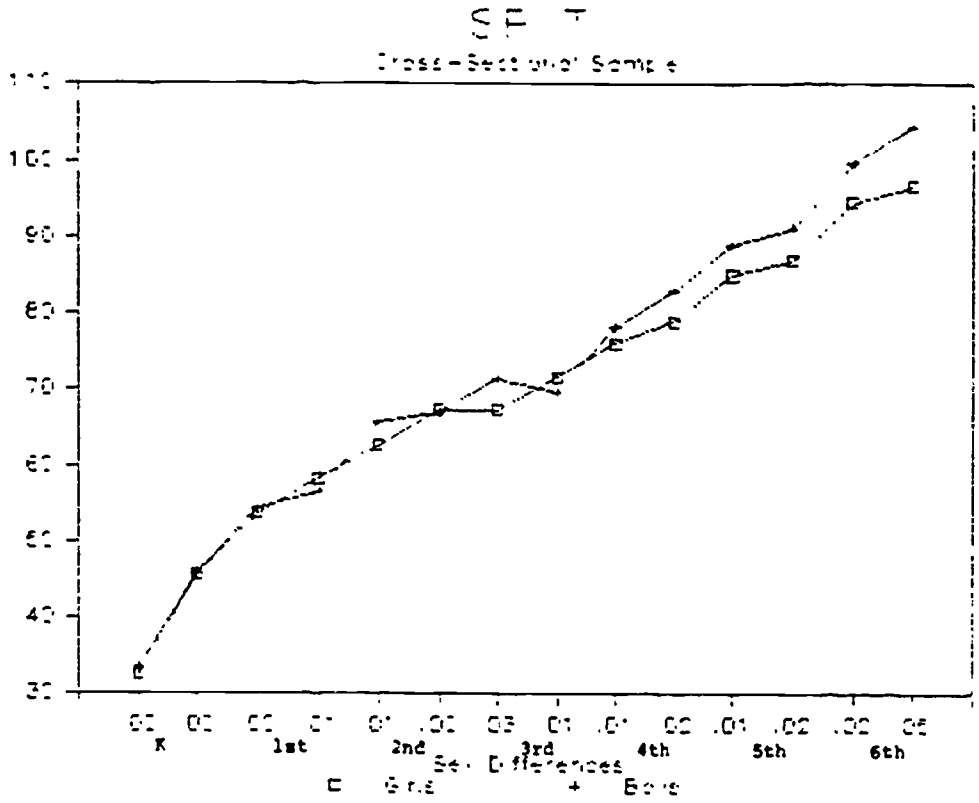
Correlations between each of the measures of the study were calculated for each time period, controlling for Age. These computations were made separately for the combined, cross-sectional samples and for the longitudinal samples. These will be reported separately.

Combined Cross-sectional Samples

Tables of partial correlations between the measures, controlling for age, separately for each time (from Kf through 6s), are reported in Tables 5.5 thru 5.18. One feature to note is that for Cohort01, from Kf thru 3s, there is an increasing correlation between EPVT and SPVT, summarized as follows: Kf: .09, Ks: .08, 1f: .13*, 1s: .18*, 2f: .18*, 2s: .17*, 3f: .21*, 3s: .55***. This correlation does not continue in the fourth grade fall, when Cohort45 comprises the sample. The correlations between EPVT and SPVT here are as follows: 4f: .00, 4s: .21*, 5f: .08, 5s: .21**, 6f: .08, 6s: .24*. The drop from Cohort01 to Cohort45, despite the cross-sectional nature of these samples, is probably due to the fact that rapid mainstreaming of students (usually within 3 years) results in a different set of students who would be found in bilingual classrooms by fourth grade.

FIGURE 5.1-5.2

Means for SPVT and EPVT in combined cross-sectional sample, separately for boys and for girls.



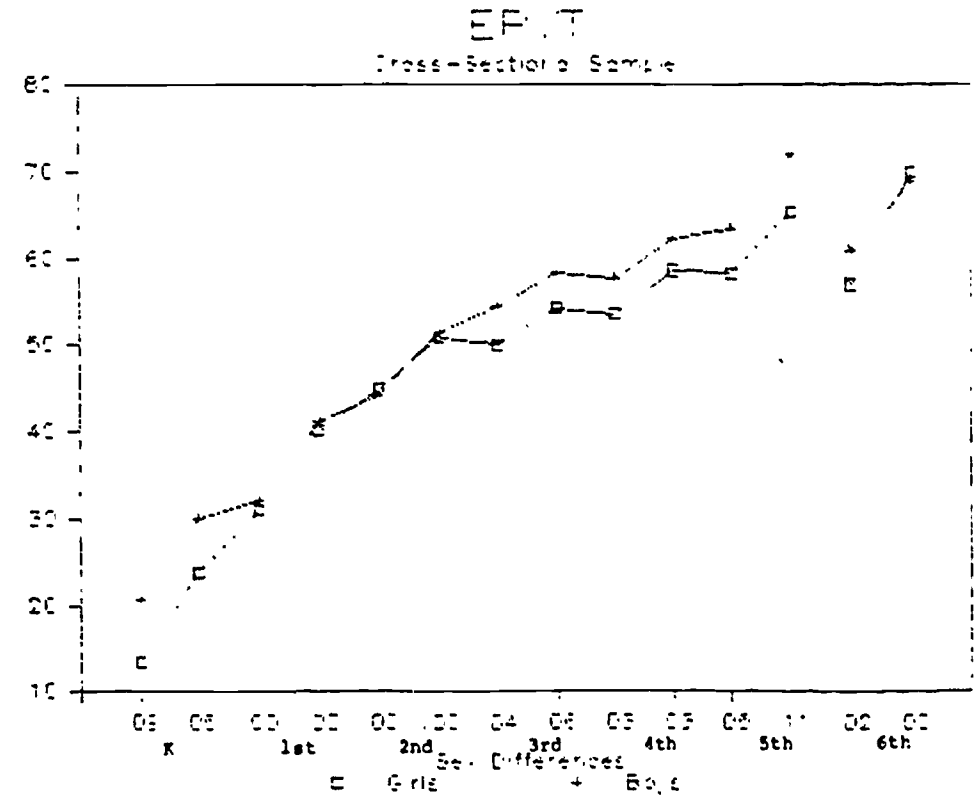
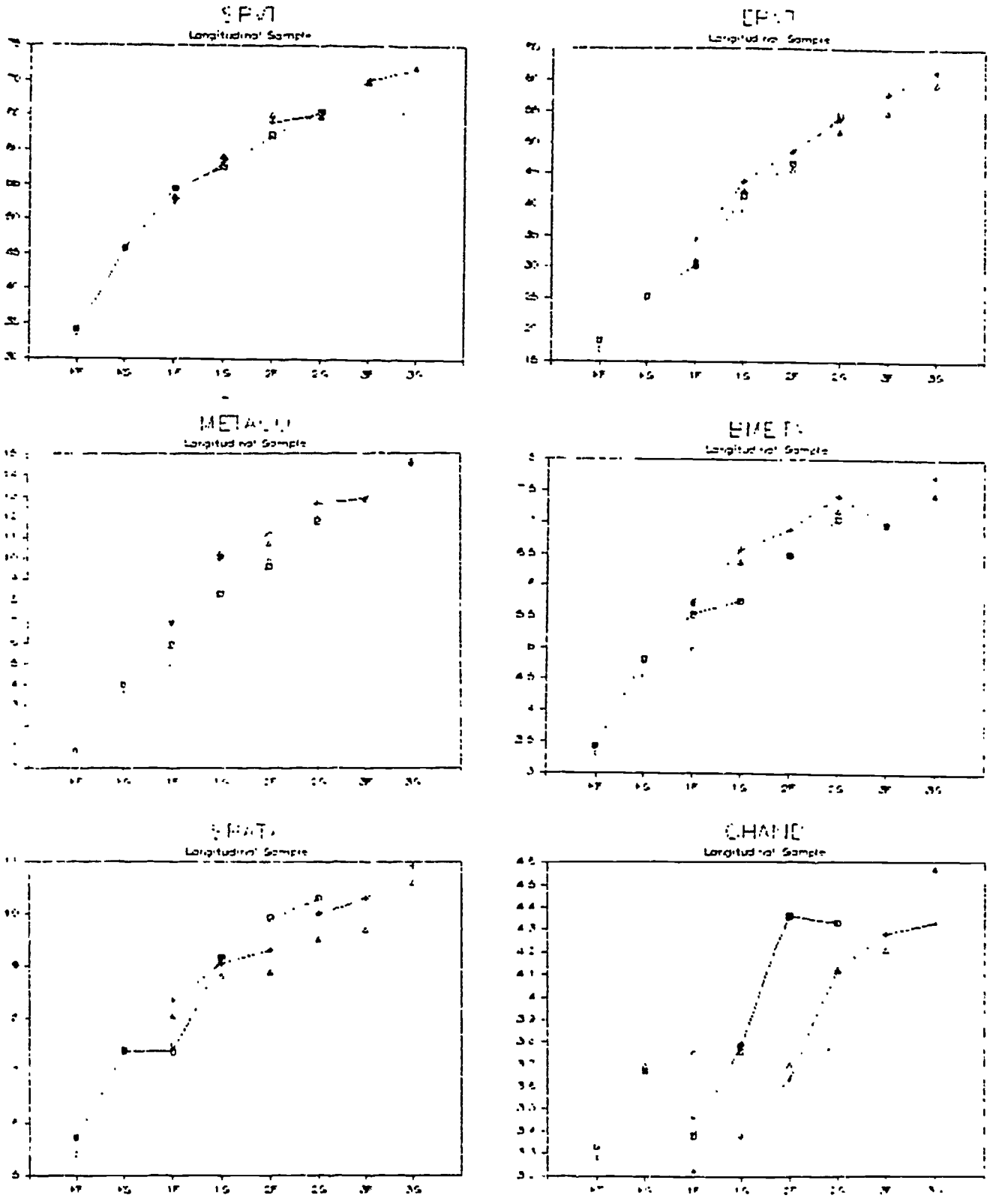
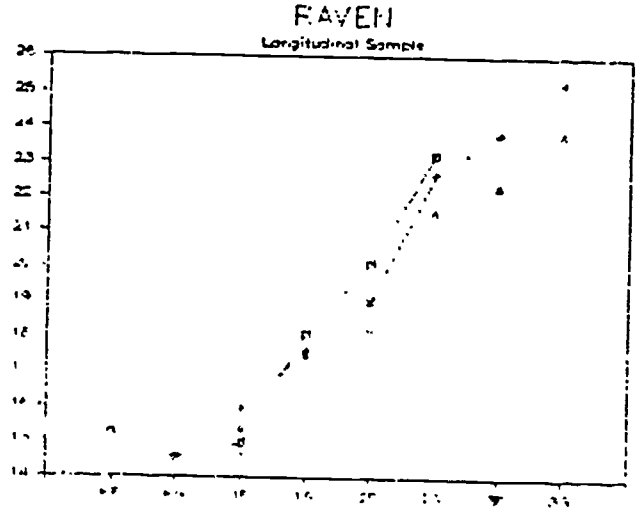


FIGURE 5.3

Means on the major dependent measures for the longitudinal sample, separately by cohort.





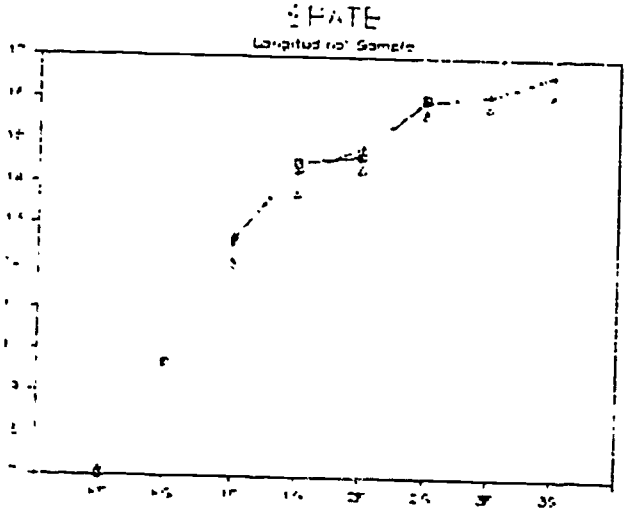


TABLE 5.5

COMBINED SAMPLE: KINDERGARTEN FALL

Partial Correlations Controlling for Age

	EPVT1	SPVT1	METACO1	BMETA1	RAVEN1	SPATIAL1	CHAND1
EPVT1	1.0000	0.0867	0.0496	-0.0064	0.2274	0.2791	0.1116
	(0)	(71)	(68)	(68)	(67)	(40)	(64)
	P=*****	P=0.233	P=0.342	P=0.479	P=0.030	P=0.037	P=0.186
SPVT1	0.0867	1.0000	0.2191	0.0825	0.1610	0.3976	0.0785
	(71)	(0)	(68)	(68)	(67)	(40)	(64)
	P=0.233	P=*****	P=0.034	P=0.249	P=0.093	P=0.005	P=0.265
METACO1	0.0496	0.2191	1.0000	0.2466	0.0488	0.2762	0.1054
	(68)	(68)	(0)	(68)	(67)	(39)	(64)
	P=0.342	P=0.034	P=*****	P=0.020	P=0.345	P=0.040	P=0.200
BMETA1	-0.0064	0.0825	0.2466	1.0000	-0.0508	0.2121	0.2245
	(68)	(68)	(68)	(0)	(67)	(39)	(64)
	P=0.479	P=0.249	P=0.020	P=*****	P=0.339	P=0.092	P=0.035
RAVEN1	0.2274	0.1610	0.0488	-0.0508	1.0000	0.3315	-0.0321
	(67)	(67)	(67)	(67)	(0)	(39)	(63)
	P=0.030	P=0.093	P=0.345	P=0.339	P=*****	P=0.017	P=0.400
SPATIAL1	0.2791	0.3976	0.2762	0.2121	0.3315	1.0000	0.3349
	(40)	(40)	(39)	(39)	(39)	(0)	(38)
	P=0.037	P=0.005	P=0.040	P=0.092	P=0.017	P=*****	P=0.017
CHAND1	0.1116	0.0785	0.1054	0.2245	-0.0321	0.3349	1.0000
	(64)	(64)	(64)	(64)	(63)	(38)	(0)
	P=0.186	P=0.265	P=0.200	P=0.035	P=0.400	P=0.017	P=*****

TABLE 5.6

COMBINED SAMPLE: KINDERGARTEN SPRING

Partial Correlations Controlling for Age

	EPVT2	SPVT2	METACO2	BMETA2	RAVEN2	SPATIAL2	CHAND2
EPVT2	1.0000	0.0826	0.0893	0.0950	0.3292	0.3961	0.2046
	(0)	(63)	(60)	(60)	(60)	(37)	(52)
	P=*****	P=0.256	P=0.245	P=0.231	P=0.004	P=0.006	P=0.069
SPVT2	0.0826	1.0000	0.4339	0.4397	0.0872	0.3452	0.0725
	(63)	(0)	(60)	(61)	(60)	(37)	(52)
	P=0.256	P=*****	P=0.000	P=0.000	P=0.250	P=0.016	P=0.301
METACO2	0.0893	0.4339	1.0000	0.5258	0.1444	0.4442	0.0406
	(60)	(60)	(0)	(60)	(60)	(37)	(52)
	P=0.245	P=0.000	P=*****	P=0.000	P=0.131	P=0.002	P=0.385
BMETA2	0.0950	0.4397	0.5258	1.0000	0.2180	0.6638	0.2038
	(60)	(61)	(60)	(0)	(60)	(37)	(52)
	P=0.231	P=0.000	P=0.000	P=*****	P=0.044	P=0.000	P=0.070
RAVEN2	0.3292	0.0872	0.1444	0.2180	1.0000	0.4322	0.1874
	(60)	(60)	(60)	(60)	(0)	(37)	(52)
	P=0.004	P=0.250	P=0.131	P=0.044	P=*****	P=0.003	P=0.087
SPATIAL2	0.3961	0.3452	0.4442	0.6638	0.4322	1.0000	0.2290
	(37)	(37)	(37)	(37)	(37)	(0)	(34)
	P=0.006	P=0.016	P=0.002	P=0.000	P=0.003	P=*****	P=0.090
CHAND2	0.2046	0.0725	0.0406	0.2038	0.1874	0.2290	1.0000
	(52)	(52)	(52)	(52)	(52)	(34)	(0)
	P=0.069	P=0.301	P=0.385	P=0.070	P=0.087	P=0.090	P=*****

CHAPTER VI

CONCLUSIONS

The results of the main study carried out under the grant empirically demonstrate a positive link between bilingualism and cognitive ability. Previous research with comparisons of (primarily middle class) monolinguals and balanced bilinguals had suggested this relationship. The present investigation extended these findings in two important respects. First, we were able to show the effects even within bilingual subjects, rather than through bilingual-monolingual comparisons. Second, we were able to demonstrate the effects in a group of non-balanced bilinguals. If indeed there is a causal link between bilingualism and cognitive ability, the results suggest that Cummins' notion of a threshold level need not be invoked.

Unfortunately, our early dreams of being able to simply tease apart cause-effect directions were premature. While the effects appear over the course of our longitudinal sample, causal statements are difficult to formulate given the size of the effect and the probable changes in reliability of measures over time. In any event, in the absence of a true experiment with random assignment to treatment groups, a simple version of causality, that "A causes B", is probably doomed from empirical elucidation. Rather, it would appear that the effects are interactive in nature. The longitudinal aspect of the study provided solid support for the position of linguistic interdependence. Over time, there was an increasing correlation between English and Spanish, even when controlling for age.

The Principal Investigator has taken the liberty of formulating an account of bilingualism and cognition far broader than the simple contractual obligation of the grant. In particular, over the course of the

research activities, it became apparent that all too often, bilingualism itself is seen as a causal variable that affects the cognitive ability of the individual, either negatively or positively. Two offshoots of this study are centrally relevant, and appear in various forms in this final report.

First is the historical context of research on bilingualism and intelligence. Research that is conducted by social scientists is not created in a social vaccuum. As the review in Chapter 2 amply demonstrates. Even the present study must be seen, by future historians and contemporaries with such vision, in the current situation of bilingual education and the society within which we operate.

Second is a broader population perspective on bilingualism, such that we can better understand what we mean when we label subjects as "bilinguals" (and treatments as "bilingualism"). Even within the relatively (from a national and world perspective) homogeneous group of bilingual Hispanics in New Haven, selection of subjects in bilingual programs resulted in the selection of a particular sector of the population. Ultimately, social, historical, and demographic factors in combination will influence degrees and types of bilingualism, which in turn may affect cognitive abilities. We are arguing, essentially, for a broadening of the horizons of research on bilingualism. Hopefully after this study, researchers inclined to draw conclusions on the "effects of bilingualism" will at least take pause to reflect on the question, "What is the effect of bilingualism the effect of?" In the historical review of the literature, it was pointed out that the early researchers debated whether the language handicap cause poor IQ test performance, or low IQ produced the language handicap. We are currently in a phase where it would be

worthwhile contemplating the broad meanings of bilingualism.

As we contemplate bilingualism, it would also behoove us to think about the theoretical bases of cognition and its relationship with bilingualism. The Principal Investigator's thoughts on this matter are complex and defy simple summary. This his recent review of the work, recently written for a book (Hakuta, 1985), is appended to this final report as Appendix E.

The activities encompassed in a research grant should not just address the immediate issues contained in the original proposal, but additionally should be forward-looking as to the Principal Investigator's research agenda. Thus, it would be appropriate to end this report with a statement of my future agenda. My work in bilingualism and cognition is immediately extendable to the problem of the transfer of skills (broadly construed) across the two languages of the bilingual. We envision a program of research in which the properties of the bilingual mind can be elucidated by finding out what kinds of skills transfer easily across languages, and what do not. A mediating variable here would be the familiar variable of degree of bilingualism. A statement of the problem, and its relevance to theories of bilingualism, cognitive development, and bilingual education, can be found in Appendix F.

APPENDIX A

BILINGUALISM AND INTELLIGENCE: A BIBLIOGRAPHY

APPENDIX A

BILINGUALISM AND INTELLIGENCE: A BIBLIOGRAPHY

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FINAL REPORT

The Causal Relationship between the Development of Bilingualism, Cognitive Flexibility, and Social-Cognitive Skills in Hispanic Elementary School Children

NATIONAL INSTITUTE OF EDUCATION

NIE-G-81-0123

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VOLUME II: APPENDICES B, C and D.

APPENDIX B

PARENT QUESTIONNAIRE SENT TO ALL COHORT01 AND COHORT45 SUBJECTS

QUESTIONAIRE

Name of yor child· _____

1. What language does your child use with you and the other adults in the household? (Please circle one)

Only Spanish	Mostly Spanish	Both English and Spanish	Mostly English	Only English

2. What language does your child use with his or her brothers and sisters? (Please circle one)

Only Spanish	Mostly Spanish	Both English and Spanish	Mostly English	Only English

3. What language do the adults in your household use with each other? (Please circle one)

Only Spanish	Mostly Spanish	Both English and Spanish	Mostly English	Only English

4. How many hours of television does your child watch every day? (circle one)

1 hour 2 hours 3 hours 4 hours more than 4 hours

5. Can you name some of his/her favorite television programs?

_____ _____

_____ _____

6. Are there any adults in you household whose native language is English? Yes ( ) No ( )

If yes, how are they related to your child? (for example, father, aunt, etc.)

_____

7. Please name the children living in your household and indicate their age. (for example: Benito 2 years)

Name	Age
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8. How many adults live in your household? _____ (number)

9. What is the occupation of the head of your household? (indicate (A) or (B)

(A) Occupation: _____

(B) Not working ( )

10. How long have you lived in the United Stated? _____ (years or months)

11. How long have you lived at your present address? _____ (years or months)

12. How many bedrooms do you have in your present apartment or house? _____ (number)

CUESTIONARIO

Nombre de su Hijo/a: _____

1. ¿Qué idioma usa su hijo/a con usted y con otras personas adultas en la casa? (marque una de las aternativas)

Español Solamente	Mayormente Español	Igual Español que Inglés	Mayormente Inglés	Inglés Solamente

2. ¿Qué idioma usa su hijo/a con sus hermanos y hermanas? (marque una de las alternativas)

Español Solamente	Mayormente Español	Igual Español que Inglés	Mayormente Inglés	Inglés Solamente

3. ¿Qué idioma usan las personas adultas en la casa? (marque una de las alternativas)

Español Solamente	Mayormente Español	Igual Español que Inglés	Mayormente Inglés	Inglés Solamente

4. ¿Cuánta televisión ve su hijo/a? (marque el número se horas que usted crea)

1 hora 2 horas 3 horas 4 horas más de 4 horas

5. ¿Podría nombrar algunos de los programas de televisión favoritos de su hijo/a?

_____ _____

_____ _____

6. ¿Vive alguna persona adulta en la casa cuyo idioma nativo sea el inglés? Si ( ) No ( )

Si contesta Si a la pregunta #6, diga que queda esta persona de su hijo/a? (Por ejemplo: tío, padre, primo, etc.)

_____

7. ¿Cuáles son los nombres y las edades de los otros niños que viven en la casa? (Por ejemplo: Pepito 3 anos)

Nombre:	Edad:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

8. ¿Cuántas personas adultas viven en la casa? _____ (número)

9. ¿Cuál es la ocupación del padre o el encargado de la familia? (llene (a) o (b)

(a) Ocupación: _____

(b) No está trabajando ( )

10. ¿Cuánto tiempo llevan ustedes viviendo en las Estados Unidos? _____ (anos)

11. ¿Cuánto tiempo llevan viviendo en el lugar donde viven ahora? _____ (anos o meses)

12. ¿Cuántos cuartos de dormitorio tienen en su casa? _____ (número)

APPENDIX C

PRELIMINARY REPORT OF DEMOGRAPHIC STUDY OF ALL HISPANIC STUDENTS IN NEW HAVEN

CHARACTERISTICS OF HISPANIC STUDENTS IN THE NEW HAVEN PUBLIC SCHOOLS: A SURVEY

Part I: An Introduction and Simple Statistics

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November 5, 1984

This research was conducted in collaboration with individuals in the New Haven Public Schools and with other members of the community. Names of individuals principally involved in the study can be found in the text of the report. We also gratefully acknowledge the cooperation of the principals, teachers, and staff, too numerous to mention by name, who distributed and collected the questionnaires. We furthermore appreciate the parents and guardians of students who took the time to answer the forms. Data collection, analysis, and presentation were funded in part by Grant NIE-G-81-0123 from the National Institute of Education to Kenji Hakuta. Inquiries and comments should be addressed to Kenji Hakuta or Bernardo Ferdman, Department of Psychology, Yale University, Box 11A Yale Station, New Haven, CT. 06520 (203-436-1273).

Introduction

Very little systematic information exists on the Hispanic community in New Haven. We conducted this survey of Hispanic students in the New Haven Public Schools to begin to fill this gap. The information should be useful for the school system and for local community agencies servicing Hispanic groups, particularly for determining needs of this population and for writing grant proposals.

We intend this report to be an introduction to the data. We describe how the survey was constructed, how it was distributed and collected, and what purposes we had in mind. The results reported here contain no sophisticated statistical analyses, but rather, simple breakdowns of the responses by two variables: the grade level of the student (divided into elementary, middle, and high school), and their program status in the public schools (divided into those who are currently in the bilingual education program, those who are currently in the mainstream classes but have been in bilingual classes in the past, and those who have always been in mainstream classes). A future report will contain more detailed breakdowns.

We have consciously avoided drawing general conclusions from these data in this report. While general statements are of utmost importance for the consumer of these data, this omission is a deliberate attempt to encourage readers of the report to think about the data and to formulate their own impressions. We fear that general conclusions would deter the necessary prerequisite of inspecting the evidence. We save our own conclusions for a later report, after we have had an opportunity to obtain reactions from the community.

This report, then, is better seen as an introduction to the information, rather than to our substantive conclusions. We therefore encourage inquiry by potential consumers of this information. If the data are put to use by various sectors of the community, this will give us an opportunity and an incentive to explore more fully the information and its implications. We welcome requests and suggestions for specific analyses, and will try to accomodate to the best of our resources.

At the same time, we request that the information contained in this report be used cautiously, and that you read the entire description of the study before using the data. We strongly urge that you consult with us prior to drawing conclusions and using them further in your own work, such as in needs assessments and grant writing.

In this report, we will first describe the questionnaire. This will be followed by a description of the sampling procedure. The heart of the report lies in the actual statistics that are reported in the individual tables and figures in the final section.

The Questionnaire

A major motivation for conducting this study, as mentioned above, was to collect useful information about the Hispanic school population. Another motive was to contrast the population in the bilingual programs with the Hispanic students in the mainstream classes. The reason for this comparison was that one of us (Hakuta) has been conducting funded research (through the National Science Foundation and the National Institute of Education) for the past four years, focusing on the language and cognitive development of elementary school students in the bilingual program. In order to interpret the findings, it was necessary to obtain information on how the students in the bilingual program differed from Hispanic students in the mainstream classes. We mention this motivation because it explains

in part the emphasis that the survey questions placed on variables related to language.

The form of the questionnaire developed in several phases. The initial draft was drawn up by ourselves and through intense consultation with Lisette Bernier-McGowan, Patricia Cucuzza, Fernando Comulada, Kay Hill, John McGowan, and Samuel Nash. This draft was circulated to various individuals with an interest in the Hispanic community in New Haven, and was discussed by the Bilingual Education Working Group (which meets in the Department of Psychology, Yale University and is organized by Hakuta). Members of this group, in addition to those mentioned above, include: Eduardo Baez, William L. Bradley, Martha Chavez, Aida Comulada, Lee Cruz, Carol Feldman, Liliana Minaya-Rowe, Rosa Quezada, and Roger Weissberg.

A copy of the final questionnaire is attached at the end of the report. As can be seen, it comes in two parts. The first part is about the specific child. The second part is about the home and family. They were separated because we anticipated that parents would not want to fill out information about the family redundantly for each of their children. The questionnaire is in both English and in Spanish.

Sampling

In February of 1984, we distributed the questionnaire to 2811 Hispanic students in the New Haven Public Schools. This group represented the entire cohort of students who could be identified as Hispanic origin.

Identification proceeded in two ways. Students who were enrolled in bilingual classes were identified through the list of students available at the Bilingual/Foreign Language Office. Students in mainstream classes were identified in a more indirect way. Samuel Nash (Director of Research, Evaluation and Planning) and Patricia Cucuzza (Acting Supervisor,

Bilingual/Foreign Languages) sent a request to all the principals to circulate a form to all mainstream classroom teachers. The form requested that they identify any students who were Hispanic.

Our success in obtaining all Hispanic students can be judged relative to the official count of Hispanic students reported by the Superintendent's office. The data are available for each school, allowing a comparison of our figures with the official statistics. The comparison is shown in the table on page 2. As can be seen, the numbers are roughly comparable, and certainly within acceptable limits when we consider that the count for the Superintendent's report was made in the Fall, 1983, and the present survey was conducted several months later, spanning the Christmas break.

All 2811 students were assigned an identification number that contained information about their school and whether they were currently in a bilingual program or in mainstream classes. Each student's questionnaire was placed in a personalized envelope bearing his or her name. The envelopes were then bundled by classroom, and placed in separate boxes for each school. For the schools with large numbers of Hispanic students, we delivered the boxes personally to the main office. For the smaller schools, the inter-school mail system was used. Mr. Nash had alerted all principals to the delivery of the questionnaires.

Principals were asked to distribute the questionnaires to the teachers, who in turn distributed them to the students. The teachers asked the students to bring the questionnaire home to their parents or guardian, and to return them according to instructions. The instructions stated that all questionnaires from the same family were to be returned in a single envelope, with the oldest child. This procedure was adopted as a way of identifying siblings, since we had no way of obtaining this information *a priori*. Parents were asked to return their questionnaires in sealed

envelopes. This procedure was adopted to ensure anonymity and privacy. Teachers collected the sealed envelopes and forwarded them to the principals, who then forwarded them to Mr. Nash's office.

Considering the complicated logistics of this operation, the return rate for the survey was remarkably good. The table on page 3 gives a breakdown of the number of questionnaires sent out, the number received back that had been answered, the number returned with a note indicating that the student had moved, and the number where no response was obtained. One way of estimating the response rate is to exclude from the base frequency cases where the student had moved, and to calculate the percentage of questionnaires received back out of the total sent out minus the number reported to have moved. By this estimate, the overall response rate for the study was 64 percent. The response rate was highest in the elementary schools at 72 percent, slightly lower in the middle schools at 65 percent, and lowest in the high schools at 42 percent. It should be pointed out, however, that these numbers probably represent an underestimate of the true response rate, since there were considerable inconsistencies in the rate at which teachers returned questionnaires under the category "moved."

The response rates differed by program status. The overall response rate for students in the bilingual program was 68 percent. In contrast, the response rate for mainstream students was 58 percent. The difference may be due to several reasons which we will explore further in the future. For one, it may have to do with the low response rates for high school students, who have a larger representation of mainstream students. There may be other more substantive reasons, such as different attitudes towards the questionnaire itself depending on the program status of the students.

Our original intention was that each parent or guardian would return all their questionnaires in one single envelope with the oldest child. This procedure would have enabled us to identify sibling groups. The instructions were written on the questionnaire itself; in addition, the envelope for returning the questionnaire prominently displayed the message as well. These requests were not followed; practically all questionnaires were returned individually. We were thus left with no simple method of identifying siblings. Since we coded for street address, it would still be possible to identify siblings by matching these with last names. However, this method would still be imperfect, and the labor involved in doing so is at present prohibitive. Therefore, the numbers that we report should be considered representative of Hispanic students in the New Haven Public Schools. They are not necessarily representative of Hispanic households whose students are in the schools. This is a natural consequence of the fact that households with more than one child are proportionately overrepresented in the figures.

Coding of Responses

Questionnaire responses were coded into analytic categories, corresponding to the response categories for the questions found in this report. The coded data were then transferred to the Yale mainframe computer, where tabulations were performed. The division of labor was as follows: Luz M. Ramos conducted the coding, James Driscoll entered the data into the computer, and Bernardo Ferdman performed the statistical analyses.

Statistics in this Report

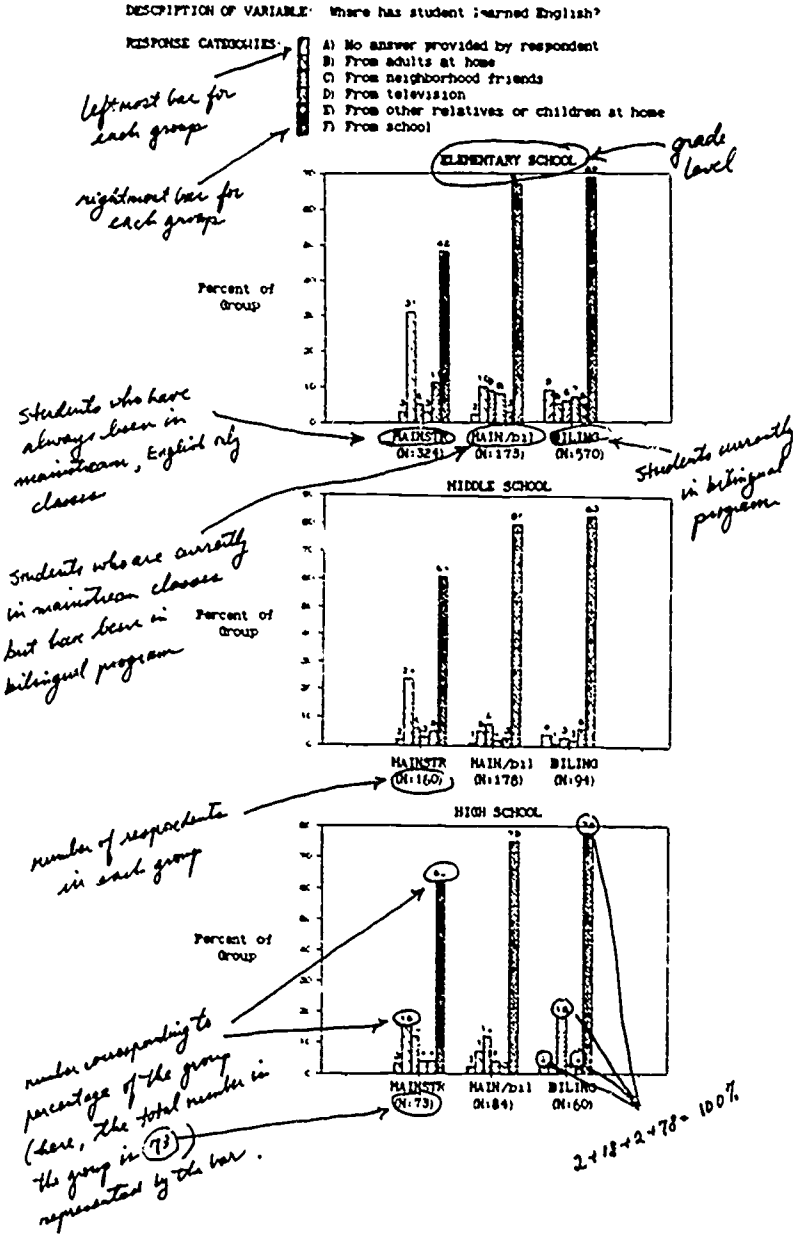
The accompanying *Table of Contents* lists the statistics contained in this report. Responses on variables of interest are broken down by grade level and by program status. For some of the students, grade

level information was not available. For these students, their grade classification was determined on the basis of whether their school was elementary, middle, or high school. This accounts for the slight discrepancy between the numbers reported for the school types in the table on page 2 (Response Rates by School) and those reported for the three grade levels in the subsequent data reported.

The data presented in the tables should be self-explanatory. The data presented in the figures require some explanation. Since they all take the same format, a sample figure with an explanation of the symbols and labels appears in the page immediately following the table of contents.

TABLE OF CONTENTS

SAMPLE FIGURE AND HOW TO INTERPRET IT



Comparison of Hispanic Students Identified by Schools and by Survey

SCHOOL	OUR SURVEY	SUPERINTENDENT'S REPORT*
ELEMENTARY SCHOOLS		
Barnard	32	39
Beecher	3	7
Bishop Woods	6	7
Brennan	2	3
Celentano	28	30
Clinton	148	149
Columbus	200	245
Conte	58	57
Davis	2	3
Dwight	137	108
East Rock	149	156
Edgewood	10	8
Hale	5	3
Hill Central	303	321
Hooker	8	7
King	6	4
Lincoln Bassett	6	6
Prince	80	78
Quinnipiac	25	26
Strong	49	54
Truman	244	241
Welch Annex	116	105
West Hills	4	4
Winchester	3	4
Woodward	9	16
SUBTOTAL (ELEMENTARY SCHOOLS)	*1633*	*1681*
MIDDLE SCHOOLS		
Clemente	294	348
Fair Haven	271	279
Robinson	1	4
Betsy Ross	12	10
Sheridan	6	9
Troup	45	41
SUBTOTAL (MIDDLE SCHOOLS)	*629*	*691*
HIGH SCHOOLS		
Cross	260	289
Hillhouse	12	41
Lee	210	285
H.S. Comm.	25	32
Sound	15	12
Cooperative	27	31
SUBTOTAL (HIGH SCHOOLS)	*549*	*690*
TOTAL SURVEY	2811	3062

*Source: New Haven Public Schools, October, 1983 (Peter A. Persano).

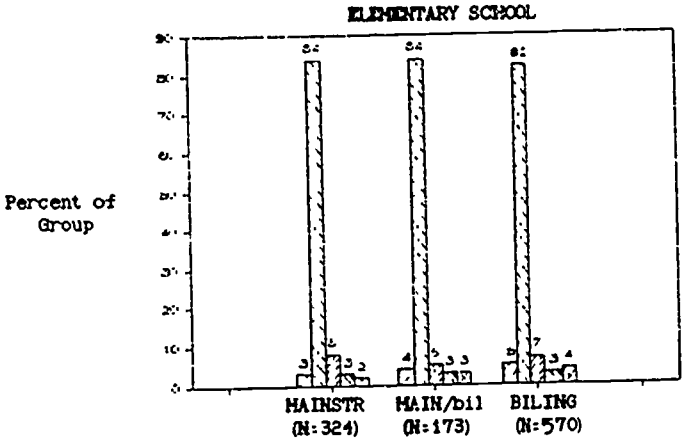
Response Rates by School.

SCHOOL	SENT OUT	RECEIVED BACK	MOVED	NO RESPONSE
ELEMENTARY SCHOOLS				
Barnard	32	20	1	11
Beecher	3	3	0	0
Bishop Woods	6	5	0	1
Brennan	2	0	0	2
Celentano	28	16	1	11
Clinton	148	108	3	37
Columbus	200	150	19	31
Conte	58	31	0	27
Davis	2	2	0	0
Dwight	137	87	3	47
East Rock	149	107	11	31
Edgewood	10	0	0	10
Hale	5	0	0	5
Hill Central	303	223	14	66
Hooker	8	3	0	5
King	6	4	0	2
Lincoln Bassett	6	2	0	4
Prince	80	41	1	38
Quinnipiac	25	15	0	10
Strong	49	38	1	10
Truman	244	176	11	57
Welch Annex	116	77	3	36
West Hills	4	4	0	0
Winchester	3	2	0	1
Woodward	9	8	0	1
SUBTOTAL (ELEMENTARY SCHOOLS)	*1633*	*1122*	*68*	*443*
MIDDLE SCHOOLS				
Clemente	294	188	22	84
Fair Haven	271	162	11	98
Robinson	1	1	0	0
Betsy Ross	12	9	0	3
Sheridan	6	4	0	2
Troup	45	22	0	23
SUBTOTAL (MIDDLE SCHOOLS)	*629*	*386*	*33*	*210*
HIGH SCHOOLS				
Cross	260	92	22	146
Hillhouse	12	0	0	12
Lee	210	101	9	100
H.S. Comm.	25	13	0	12
Sound	15	7	0	8
Cooperative	27	6	1	20
SUBTOTAL (HIGH SCHOOLS)	*549*	*219*	*32*	*298*
TOTAL SURVEY	2811	1727	133	951

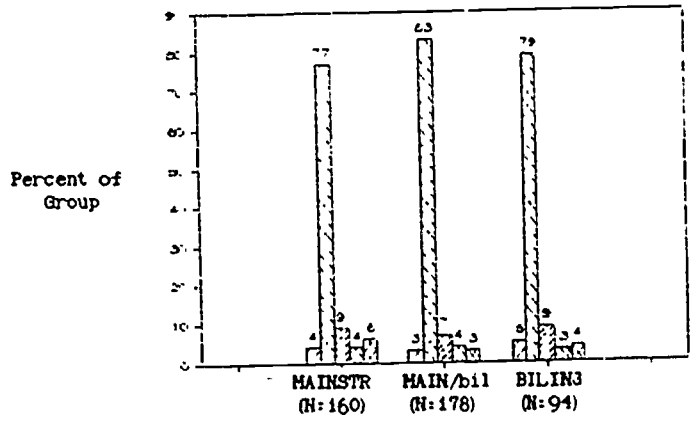
DESCRIPTION OF VARIABLE: Respondent's relation to student.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) mother
C) father
D) guardian
E) both mother and father

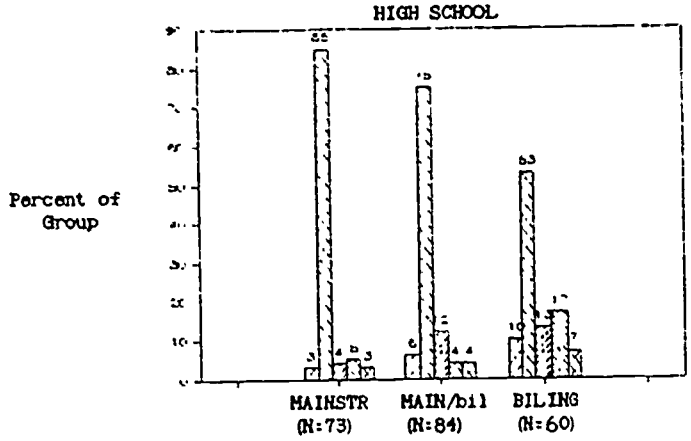
ELEMENTARY SCHOOL



MIDDLE SCHOOL



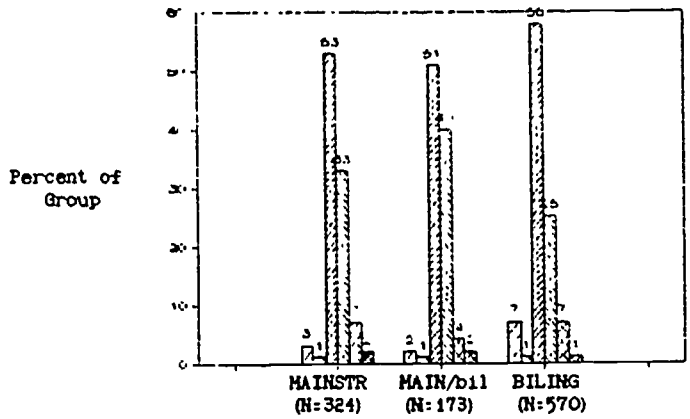
HIGH SCHOOL



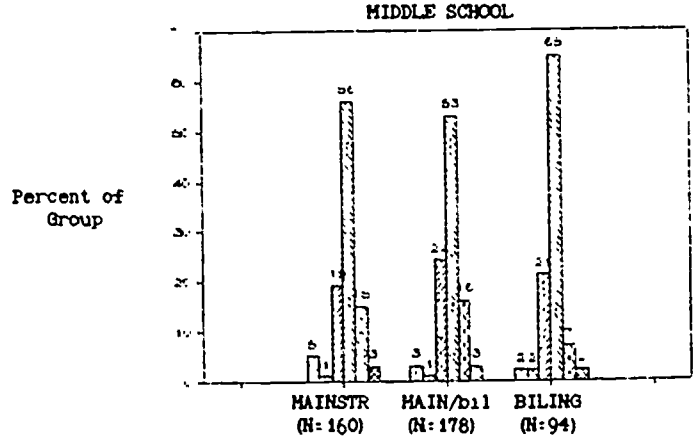
DESCRIPTION OF VARIABLE: Respondent's age.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) under 20
C) 21 to 30
D) 31 to 40
E) 41 to 50
F) over 50

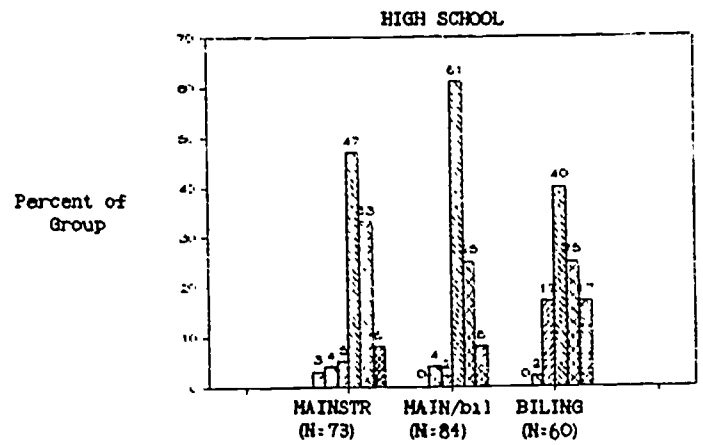
ELEMENTARY SCHOOL



MIDDLE SCHOOL



HIGH SCHOOL



RESPONDENT'S BIRTHPLACE

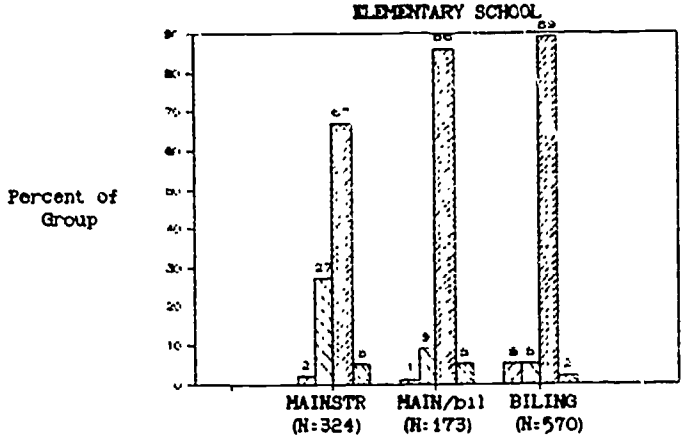
PUERTO RICO	
ADJUNTAS	14
AGUADA	3
AIBONITO	16
AÑASCO	21
ARECIBO	65
ARROYO	10
BARCELONETA	3
BARRANQUITAS	41
BAYAMON	25
CABO ROJO	2
CAGUAS	27
CAMUY	1
CANOVANAS	14
CAROLINA	26
CATAÑO	2
CAYEY	79
CIALES	16
CIDRA	2
COAMO	38
COMERIO	6
COROZAL	5
CULEBRA	3
DORADO	2
FAJARDO	15
GUANICA	3
GUAYAMA	31
GUAYNABO	2
GURABO	9
HATILLO	21
HUMACAO	26
ISABELA	2
JAYUYA	19
JUANA DIAZ	3
JUNCOS	4
LAJAS	3
LARES	17
LAS MARIAS	1
LAS PIEDRAS	6
LOIZA	12
MANATI	34
MAUNABO	5
MAYAGUEZ	17
MOROVIS	4
NAGUABO	22
NARANJITO	2
OROCOVIS	8
PATILLAS	20
PENUELAS	3
PONCE	83
QUEBRADILLAS	2
RINCON	1
RIO PIEDRAS	44
SABANA GRANDE	58
SALINAS	14
SAN GERMAN	4
SAN JUAN	25
SAN LORENZO	11
SAN SEBASTIAN	4
SANTA ISABEL	28
SANTURCE	53
TOA BAJA	1
TRUJILLO ALTO	4
UTUADO	71
VEGA ALTA	2
VEGA BAJA	66
VILLALBA	4
YABUCOA	11
YAUCO	12
UNSPECIFIED	214

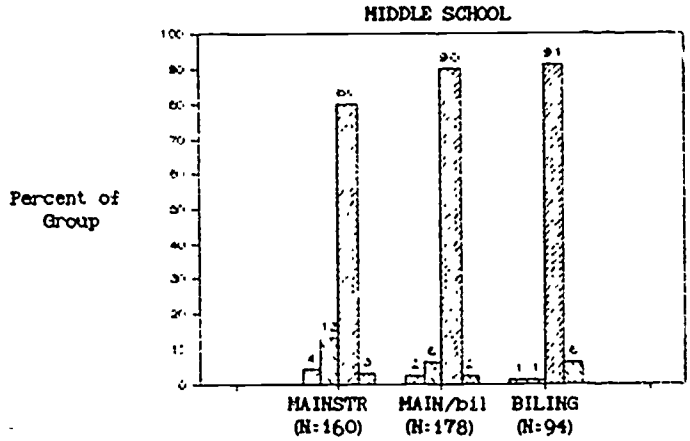
(continued)

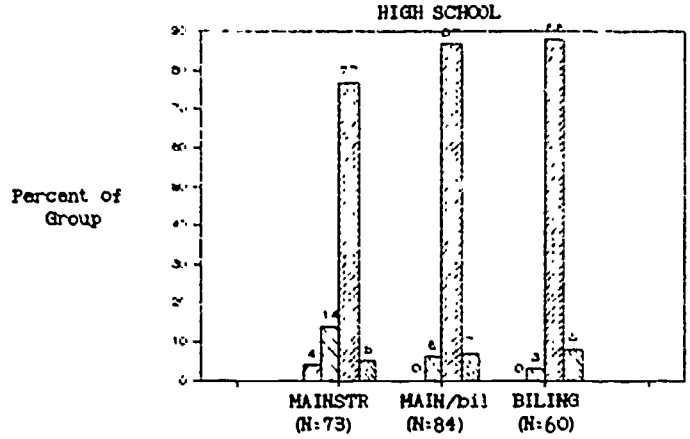
CONNECTICUT	
BRIDGEPORT	1
HARTFORD	1
NEW HAVEN	71
TORRINGTON	1
WATERBURY	2
ILLINOIS	
CHICAGO	9
NEW JERSEY	
CAMDEN	1
NEW JERSEY	2
UNION CITY	3
VINELAND	2
NEW YORK	
BRONX	7
BROOKLYN	10
MANHATTAN	6
NEW YORK	36
SYRACUSE	1
OTHER: UNITED STATES	
CLARKSVILLE, ?	1
FLORIDA	5
MARION, ?	1
MASSACHUSETTS	2
NEW HAMPSHIRE	2
NORTH CAROLINA	1
ORANGE, CA.	1
SAVANNAH, GA.	1
SOUTH CAROLINA	1
SILVER CITY, ?	1
TEXAS	5
VERMONT	3
YOUNGSTOWN, OH.	2
UNSPECIFIED	12
OTHER: FOREIGN COUNTRIES	
BARCELONA	2
BRAZIL	2
CANADA	2
CHILE	3
COLOMBIA	8
CUBA	4
DOMINICAN REPUBLIC	12
EL SALVADOR	4
ENGLAND	2
GUATEMALA	3
MEXICO	12
PANAMA	2
PERU	4
PHILLIPINES	1
PORTUGAL	4
SICILY, ITALY	1
MISSING INFORMATION	47

DESCRIPTION OF VARIABLE: Respondent's birthplace.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) United States
C) Puerto Rico
D) another country



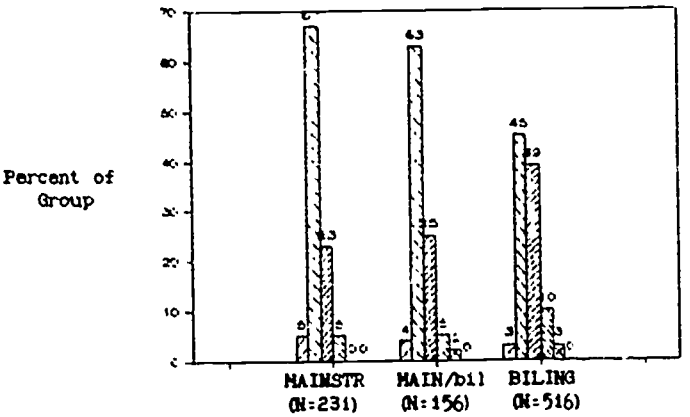




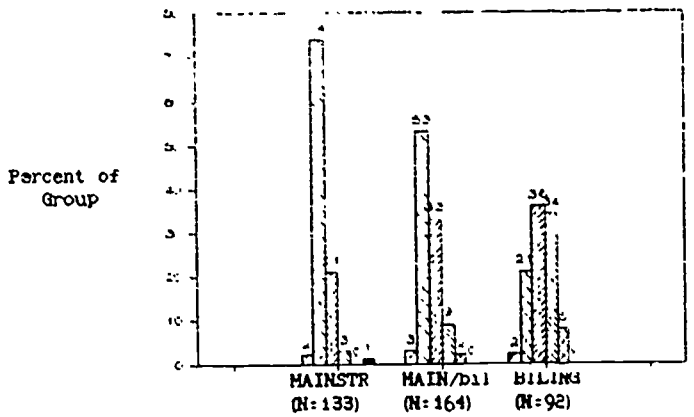
DESCRIPTION OF VARIABLE: Age when respondent moved to mainland U.S.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) under 20
C) 21 to 30
D) 31 to 40
E) 41 to 50
F) over 50

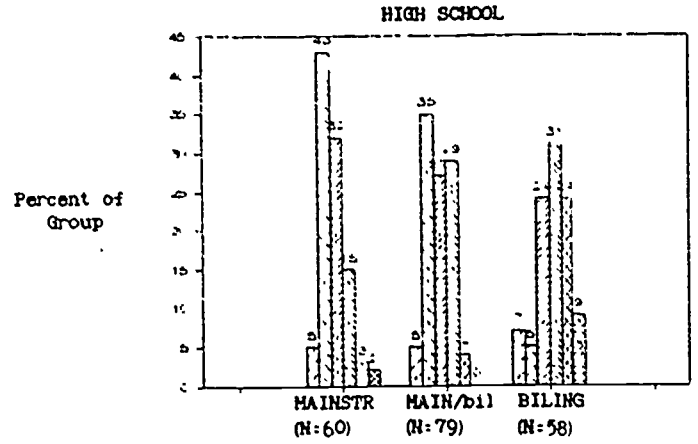
ELEMENTARY SCHOOL



MIDDLE SCHOOL



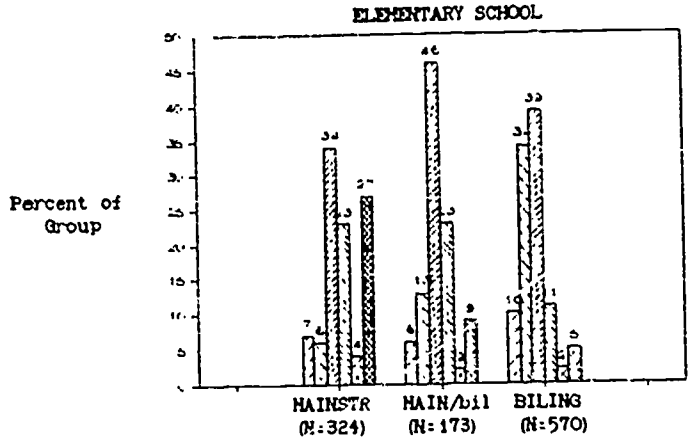
HIGH SCHOOL



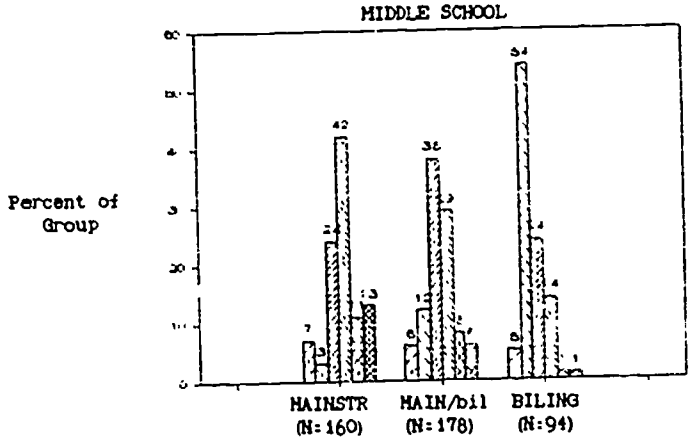
DESCRIPTION OF VARIABLE: Length of residence on mainland United States (estimated from the combination of responses on a) age of respondent when s/he moved to mainland and b) current age of respondent).

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) within 10 years
C) about 10 years
D) about 20 years
E) about 30 years and longer
F) born in the United States mainland

ELEMENTARY SCHOOL



MIDDLE SCHOOL



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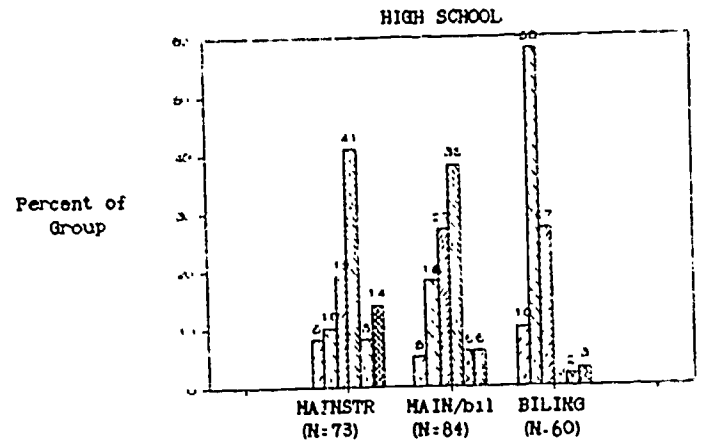


Parents' Education (Means and Standard Deviations).

ELEMENTARY SCHOOL

	Never in Program	Was in Program	Now in Program
MOTHER	Mean:9.61 S.D.:2.72 N:313	Mean:9.29 S.D.:2.81 N:160	Mean:8.65 S.D.:3.16 N:518
FATHER	Mean:9.81 S.D.:3.12 N:222	Mean:9.41 S.D.:3.23 N:118	Mean:8.94 S.D.:3.36 N:369

MIDDLE SCHOOL

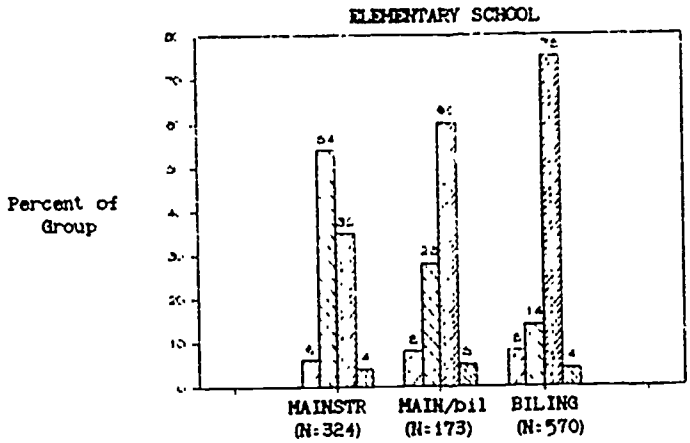
	Never in Program	Was in Program	Now in Program
MOTHER	Mean:9.42 S.D.:2.98 N:142	Mean:8.59 S.D.:3.27 N:162	Mean:8.00 S.D.:3.54 N:90
FATHER	Mean:9.29 S.D.:3.54 N:116	Mean:9.04 S.D.:3.65 N:112	Mean:8.33 S.D.:3.43 N:63

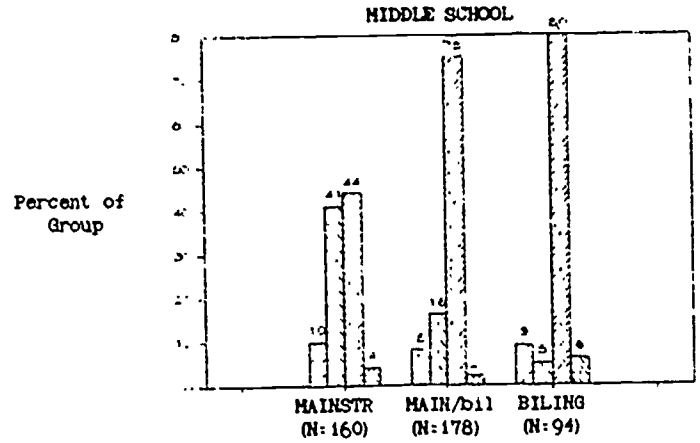
HIGH SCHOOL

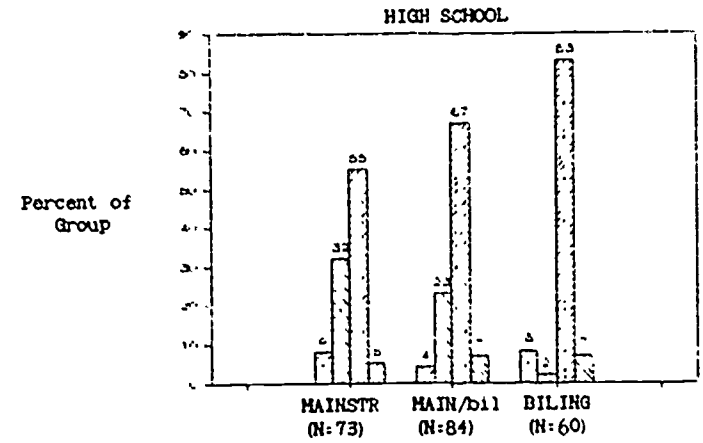
	Never in Program	Was in Program	Now in Program
MOTHER	Mean:9.24 S.D.:3.24 N:66	Mean:7.91 S.D.:3.44 N:80	Mean:8.33 S.D.:3.75 N:51
FATHER	Mean:8.62 S.D.:3.52 N:55	Mean:7.70 S.D.:3.97 N:61	Mean:7.95 S.D.:3.39 N:42

DESCRIPTION OF VARIABLE: Where did respondent receive most of his/her education?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) United States
C) Puerto Rico
D) another country

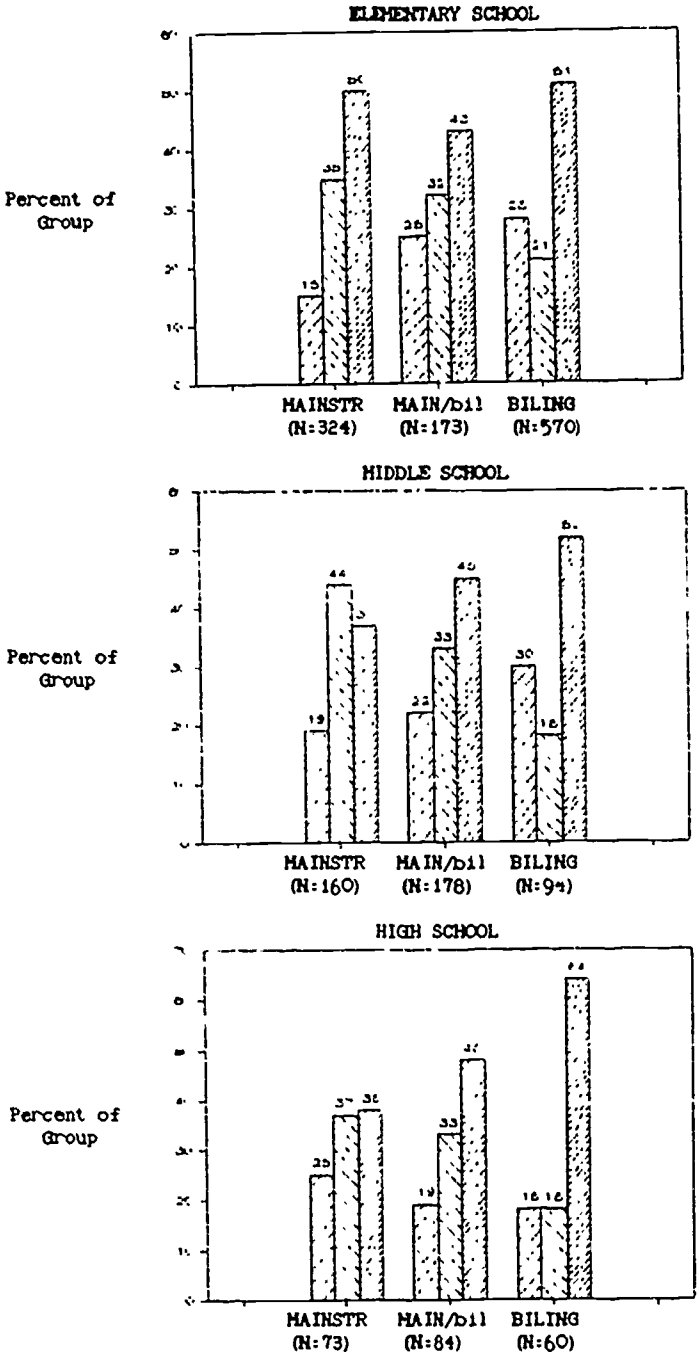






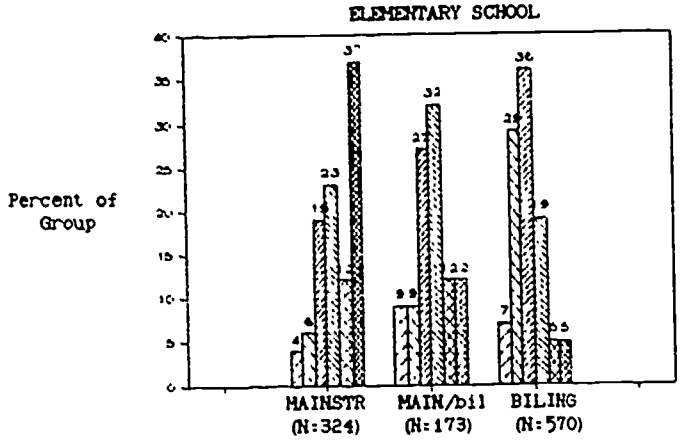
DESCRIPTION OF VARIABLE: Current employment status of household head.

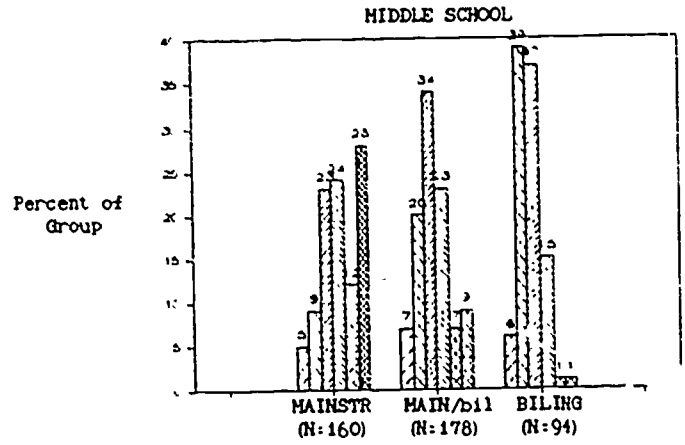
RESPONSE CATEGORIES:
A) No answer provided by respondent
B) employed
C) not employed

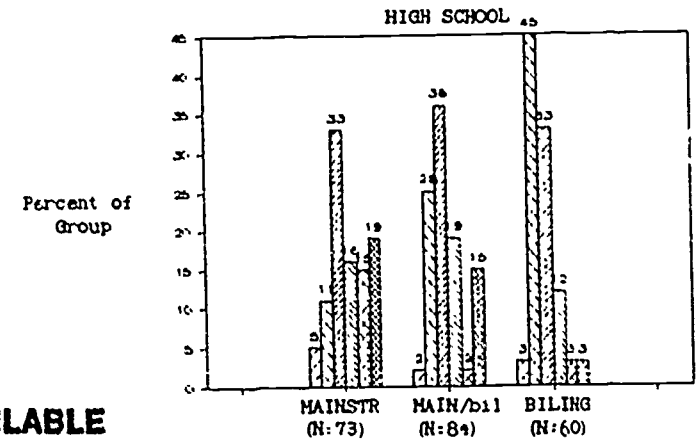


DESCRIPTION OF VARIABLE: Respondent's self-reported ability in English.

RESPONSE CATEGORIES:
- A) No answer provided by respondent
- B) Cannot speak English
- C) Can speak a little English
- D) Can speak enough to communicate basic ideas
- E) Can speak almost as well as a native speaker
- F) Can speak as well as a native speaker or is a native speaker



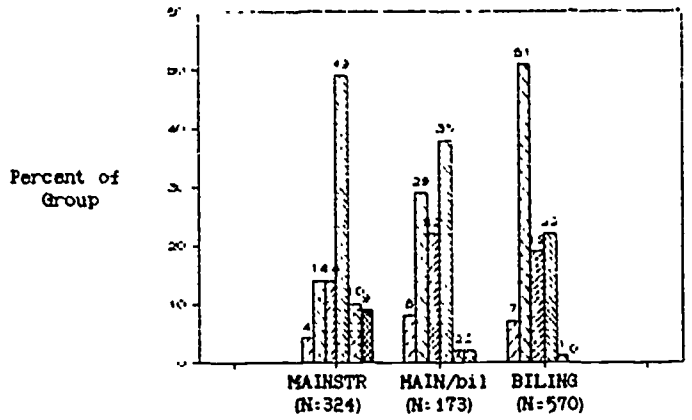




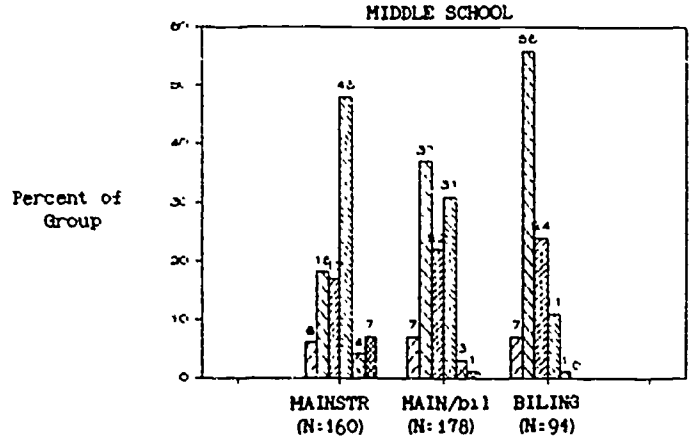
DESCRIPTION OF VARIABLE: Language used by adults at home.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) only Spanish
C) mostly Spanish
D) both English and Spanish
E) mostly English
F) only English

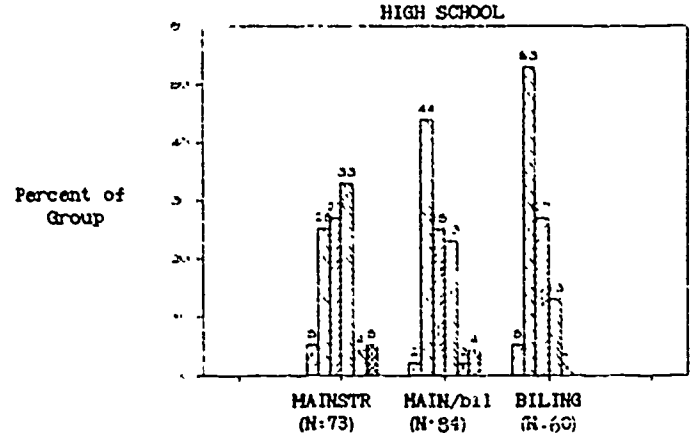
ELEMENTARY SCHOOL



MIDDLE SCHOOL



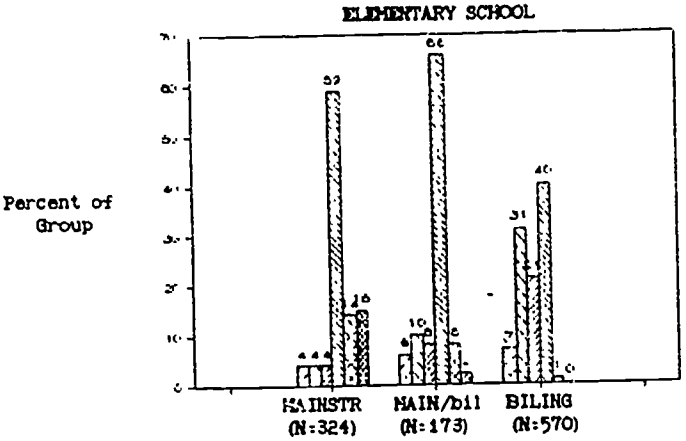
HIGH SCHOOL



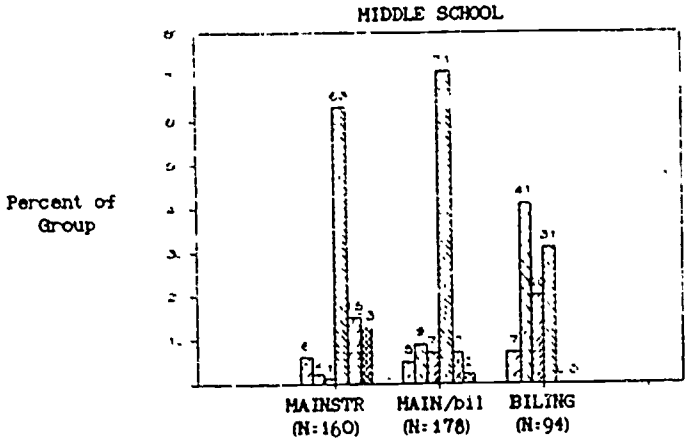
DESCRIPTION OF VARIABLE: Language used by children at home.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) only Spanish
C) mostly Spanish
D) both English and Spanish
E) mostly English
F) only English

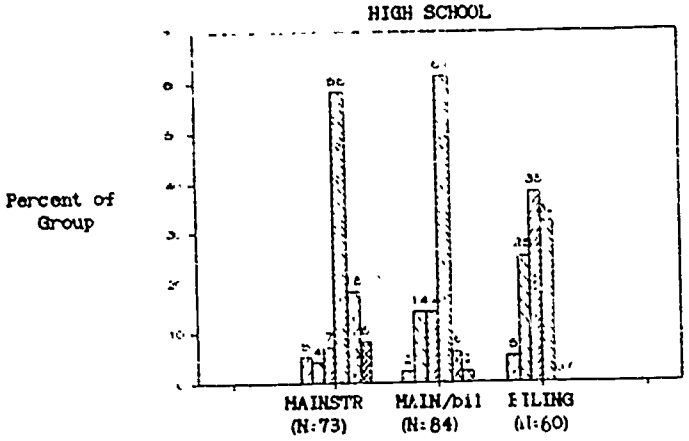
ELEMENTARY SCHOOL



MIDDLE SCHOOL

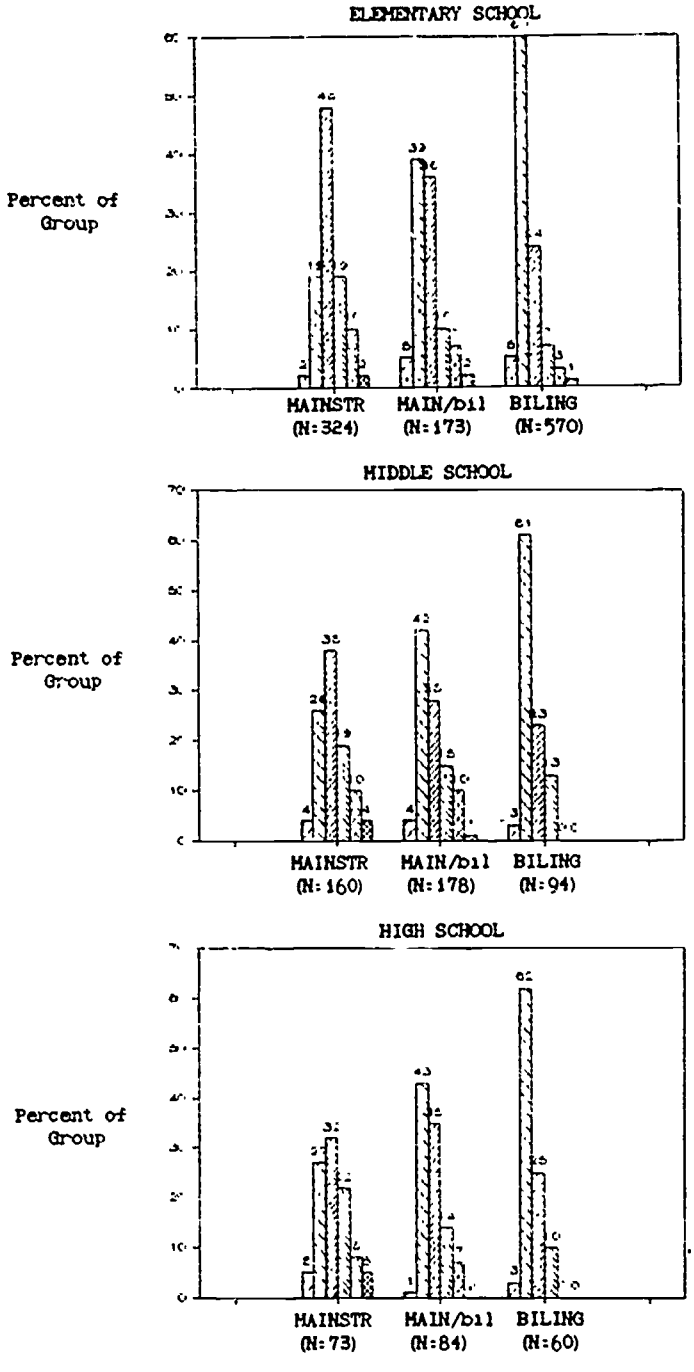


HIGH SCHOOL



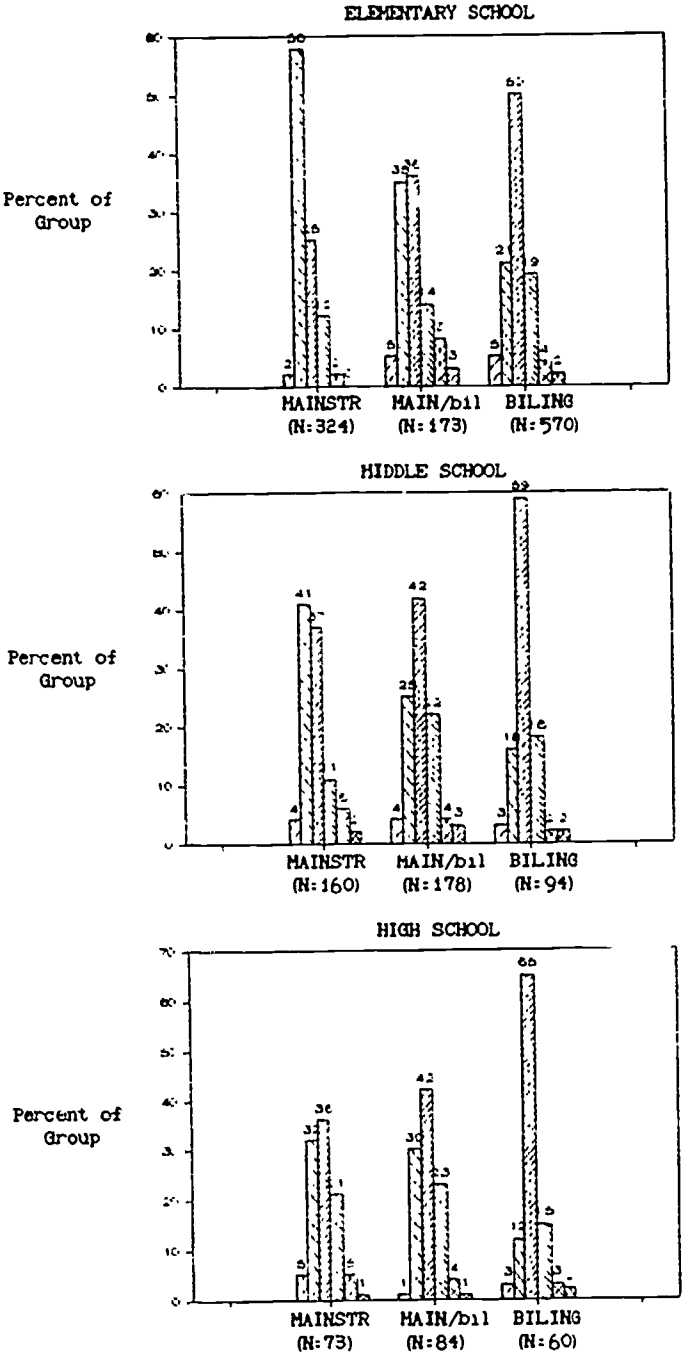
DESCRIPTION OF VARIABLE: Number of English newspapers/periodicals respondent reads regularly.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) none
C) one
D) two
E) three
F) four or more



DESCRIPTION OF VARIABLE: Number of Spanish newspapers/periodicals respondent reads regularly.

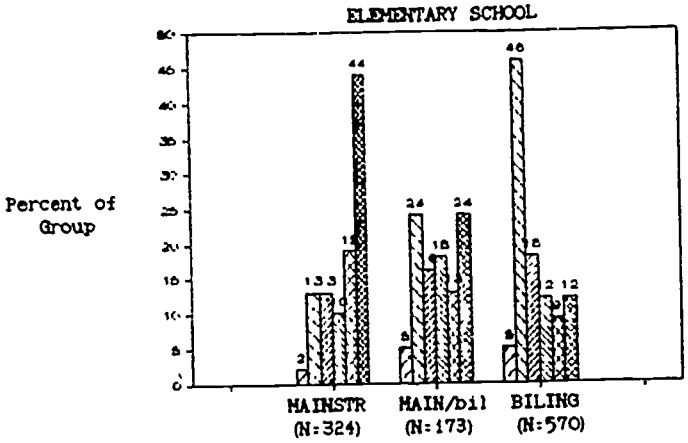
RESPONSE CATEGORIES:
A) No answer provided by respondent
B) None
C) One
D) Two
E) Three
F) Four or more



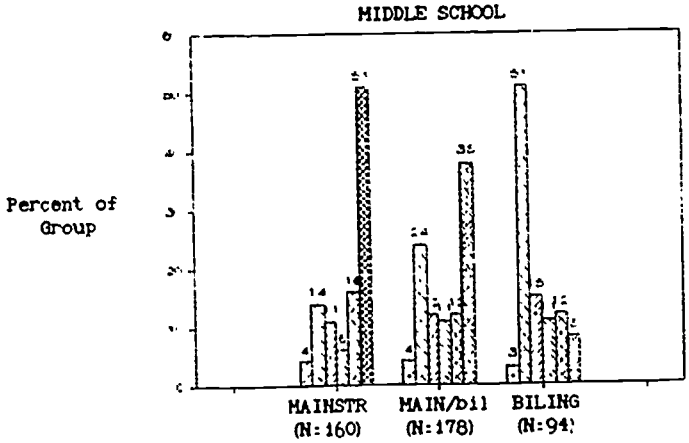
DESCRIPTION OF VARIABLE: Number of types of English books in respondent's home.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) None
C) One
D) Two
E) Three
F) Four or more

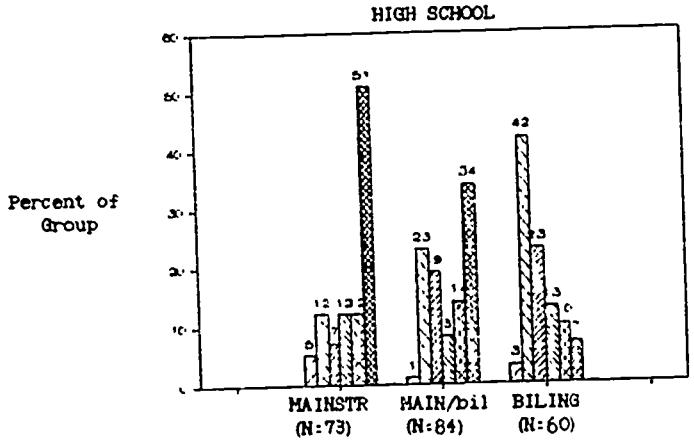
ELEMENTARY SCHOOL



MIDDLE SCHOOL

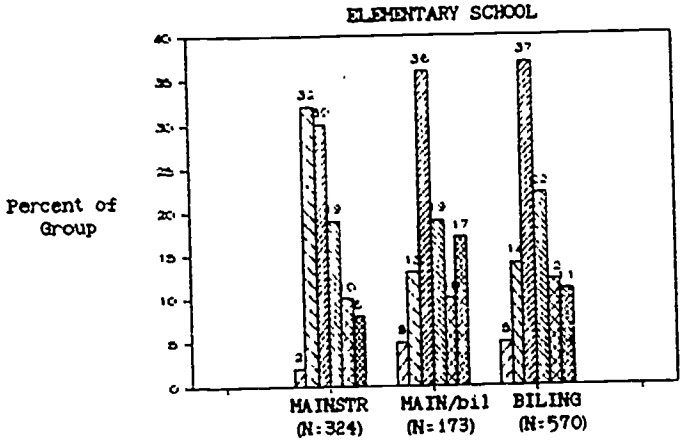


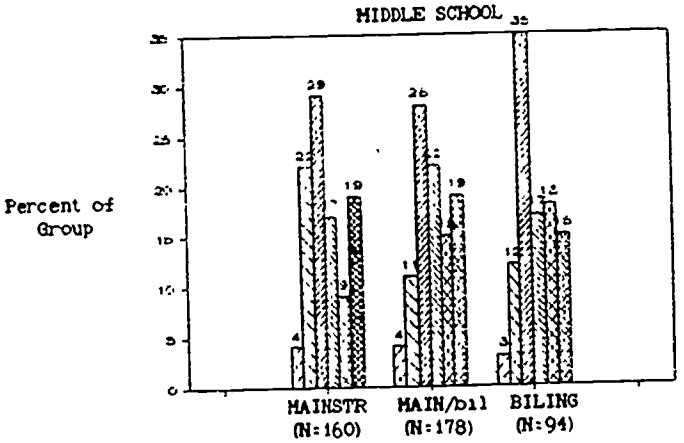
HIGH SCHOOL

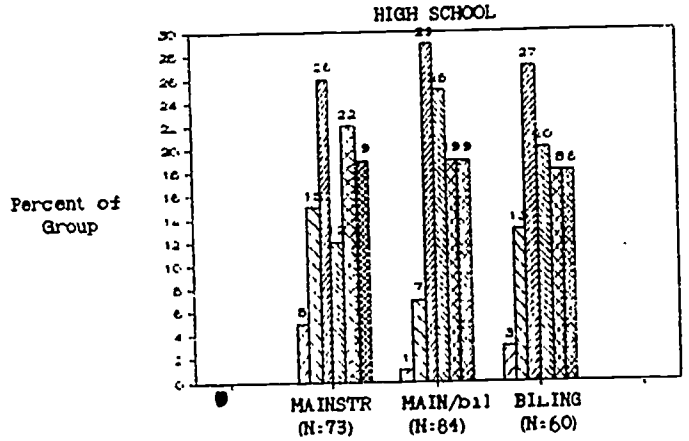


DESCRIPTION OF VARIABLE: Number of types of Spanish books in respondent's home.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) None
C) One
D) Two
E) Three
F) Four or more

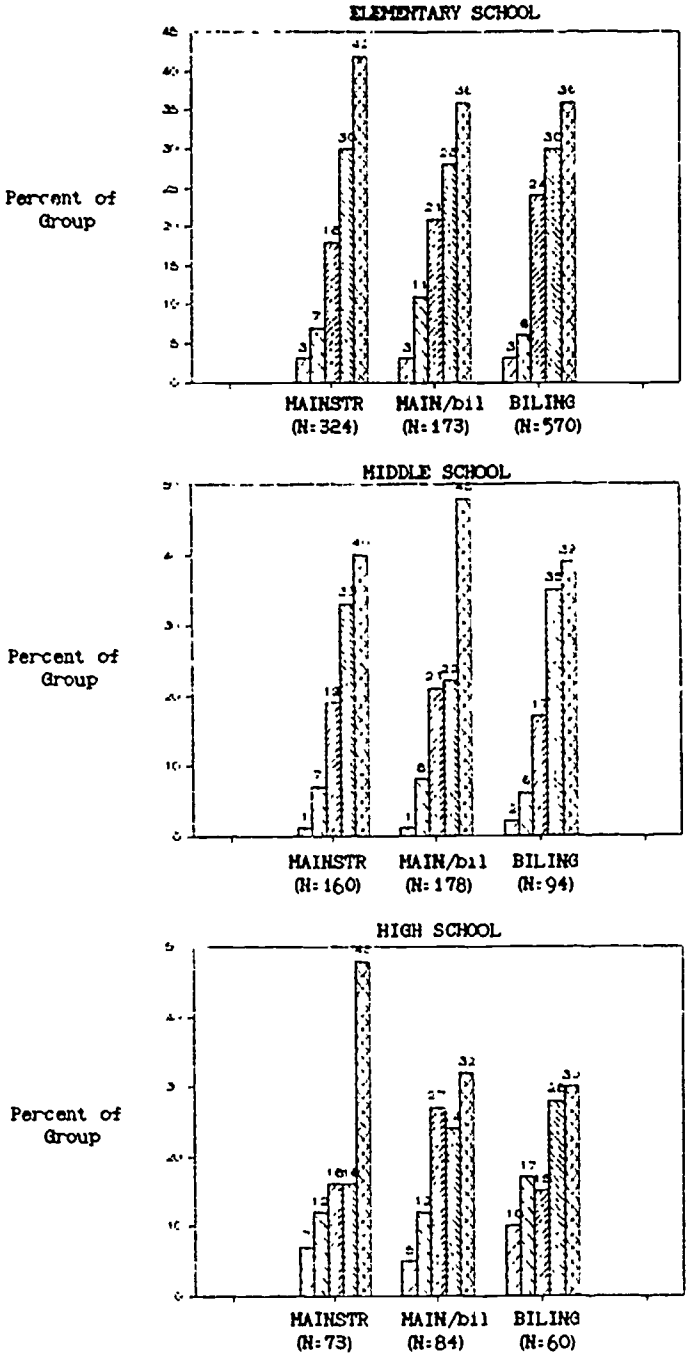






DESCRIPTION OF VARIABLE: Hours of television student watches on weekdays.

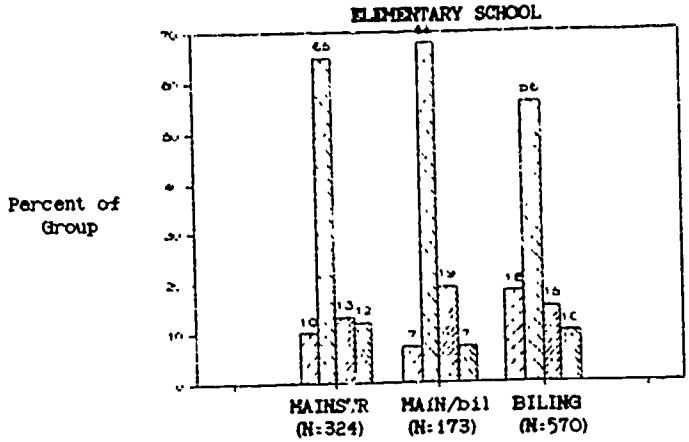
RESPONSE CATEGORIES:
A) No answer provided by respondent
B) one
C) two
D) three
E) four or more



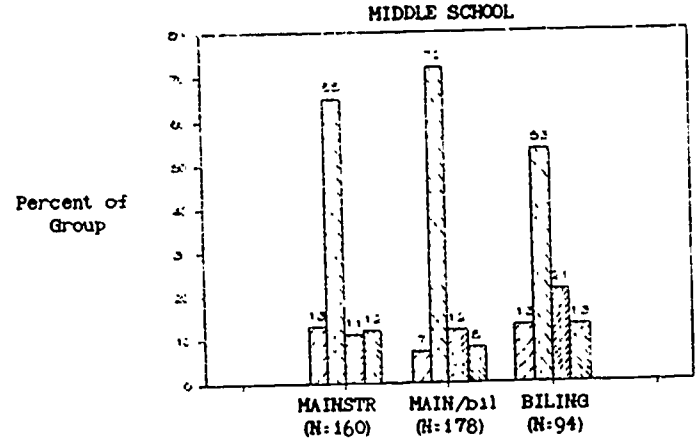
DESCRIPTION OF VARIABLE: How does present apartment compare with previous?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) present one better than previous
C) about the same
D) previous one better than present

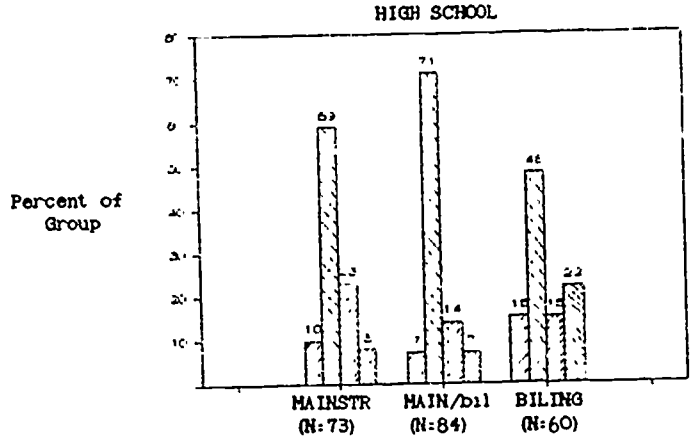
ELEMENTARY SCHOOL



MIDDLE SCHOOL

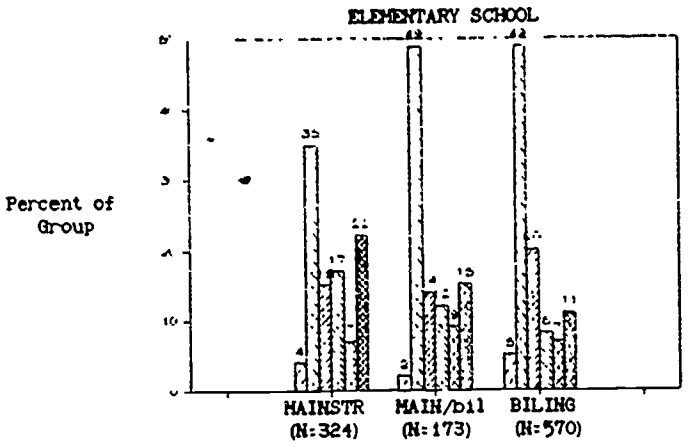


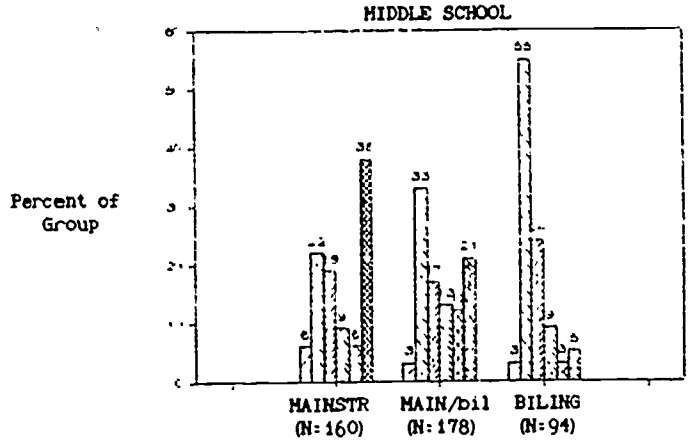
HIGH SCHOOL

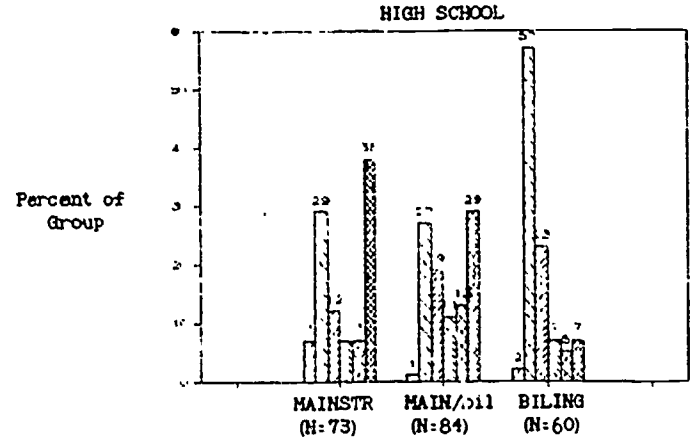


DESCRIPTION OF VARIABLE: When respondent moved to present address.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) one year ago or less
C) two years ago
D) three years ago
E) four years ago
F) five years ago or more



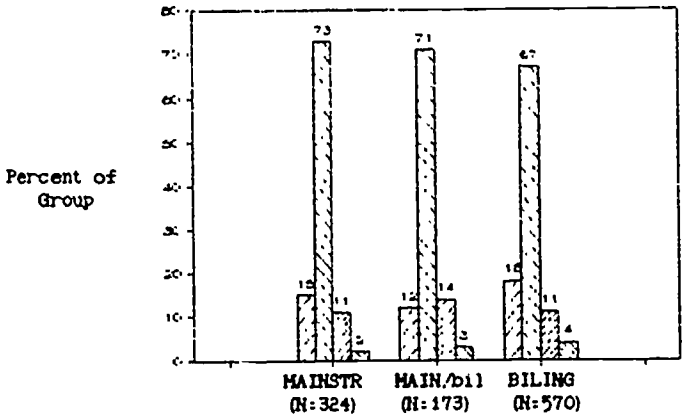




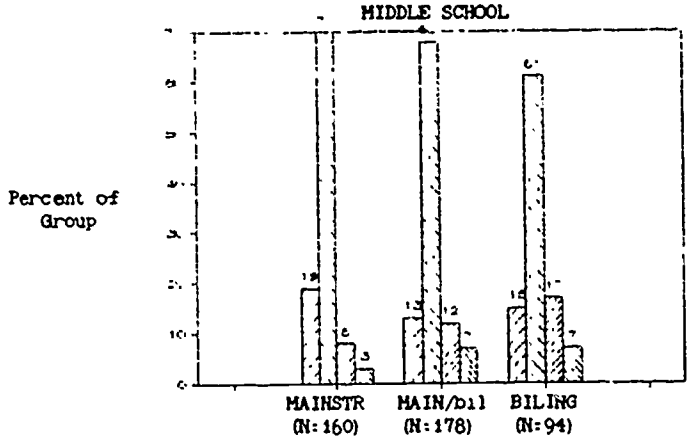
DESCRIPTION OF VARIABLE: Number of different schools that student has attended this year.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) one
C) two
D) three or more

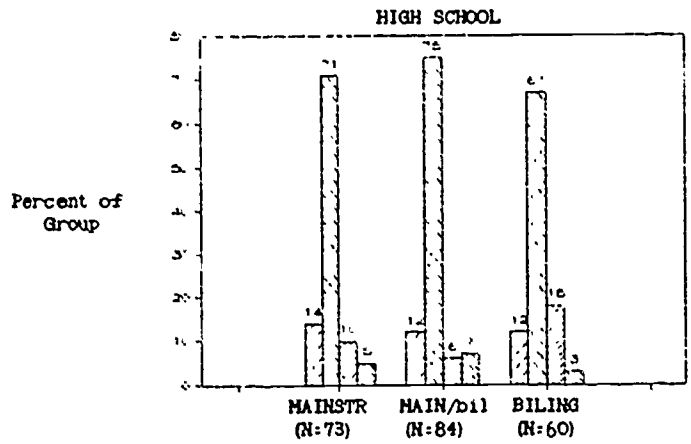
ELEMENTARY SCHOOL



MIDDLE SCHOOL

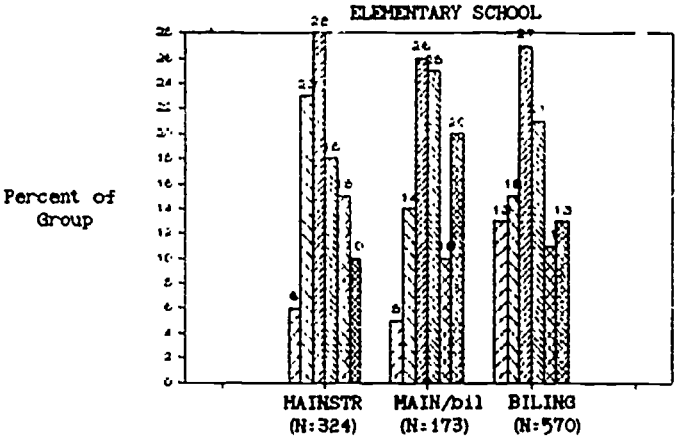


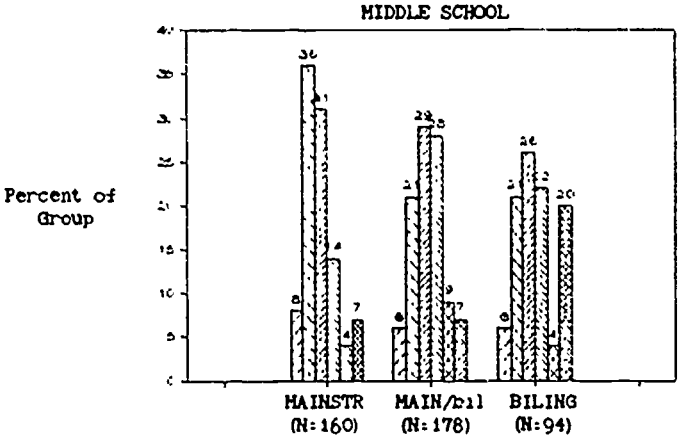
HIGH SCHOOL

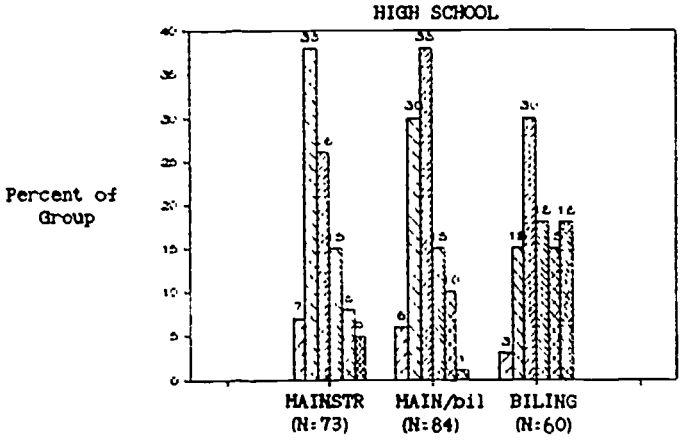


DESCRIPTION OF VARIABLE: Frequency of moves by respondent during last five years.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) Haven't moved
C) Once
D) Twice
E) Three times
F) Four or more times

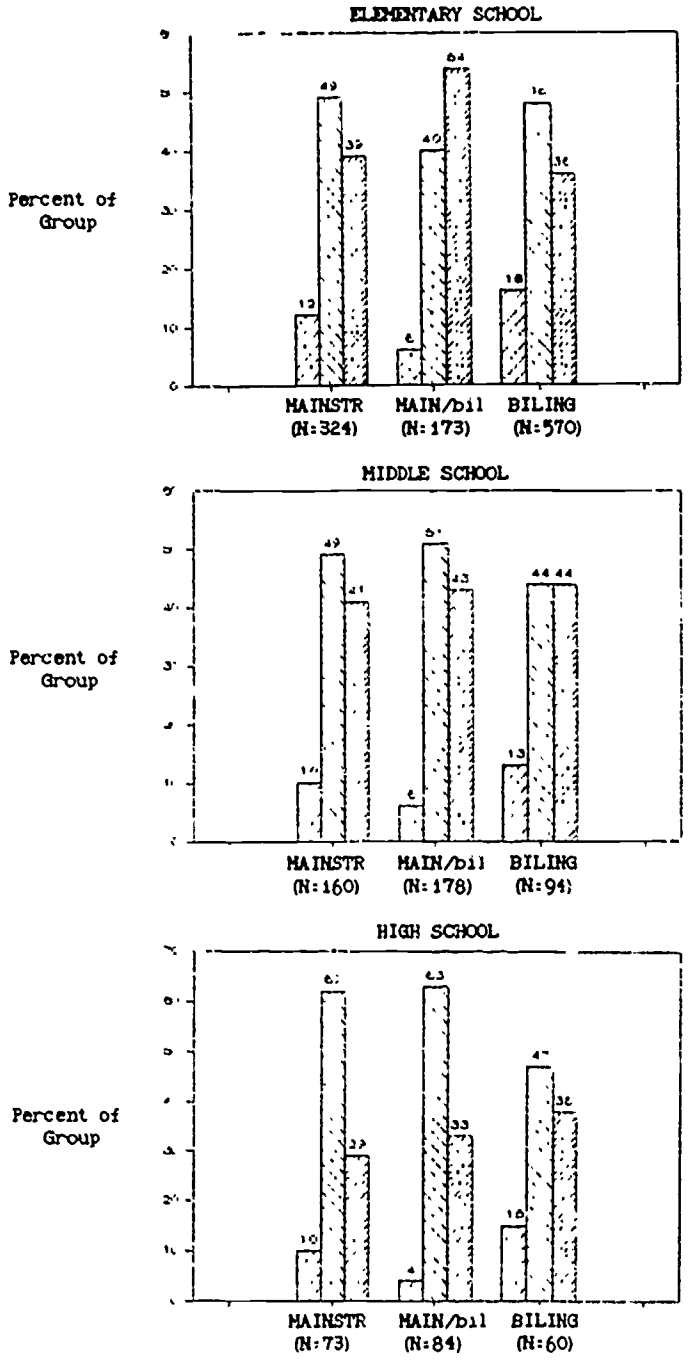






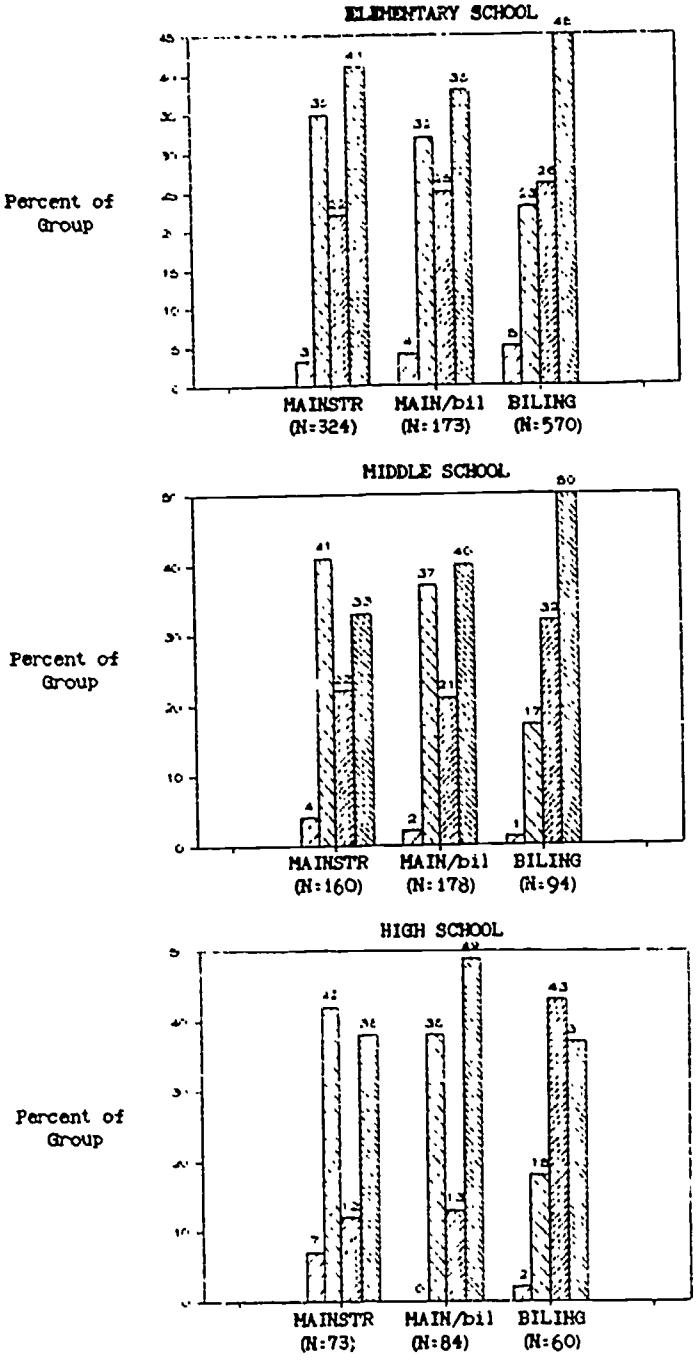
DESCRIPTION OF VARIABLE: Did child change schools when you last moved?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) No, did not change schools
C) Yes, changed schools



DESCRIPTION OF VARIABLE: Does respondent plan to move in the next year?

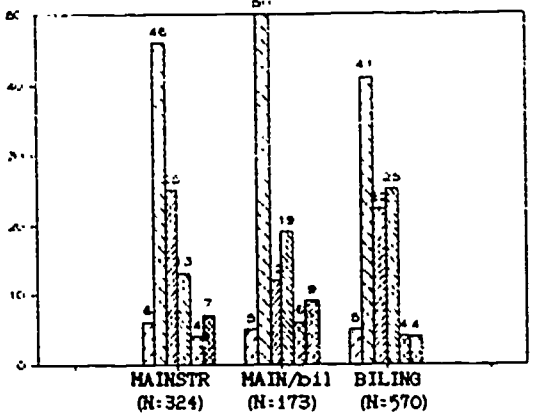
RESPONSE CATEGORIES:
A) No answer provided by respondent
B) no
C) yes
D) not sure/don't know



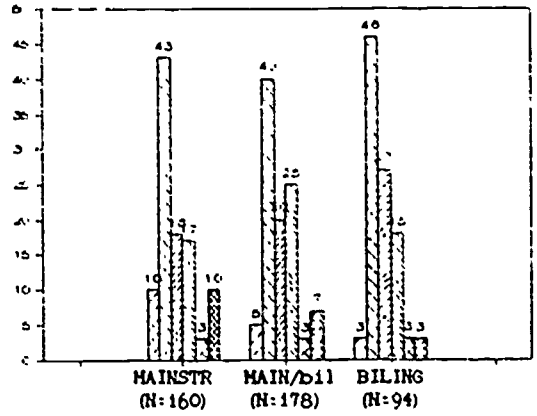
DESCRIPTION OF VARIABLE: If you were to move, where would you like to move to?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) same neighborhood
C) different neighborhood
D) Puerto Rico
E) another country
F) another city or state

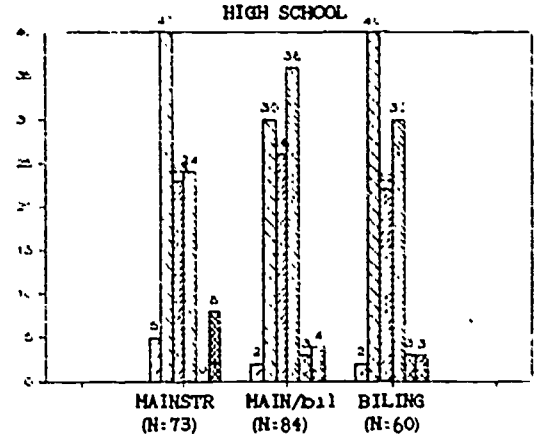
ELEMENTARY SCHOOL



MIDDLE SCHOOL

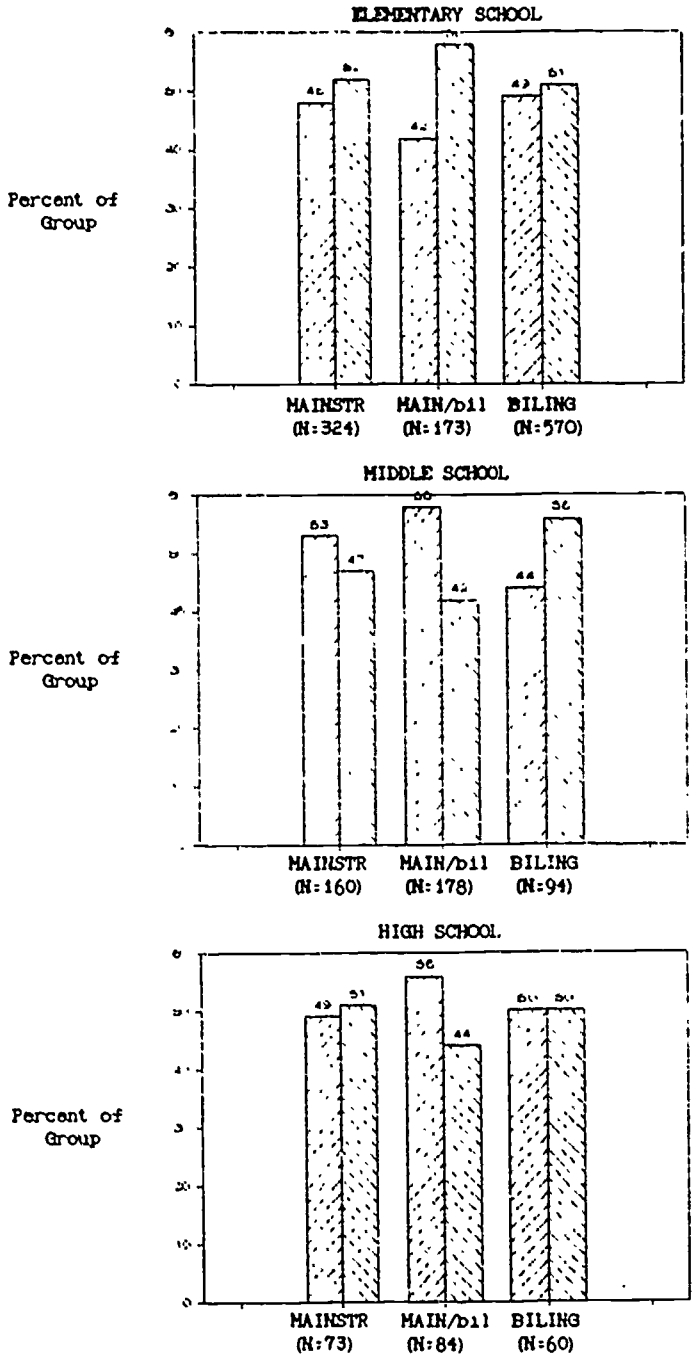


HIGH SCHOOL



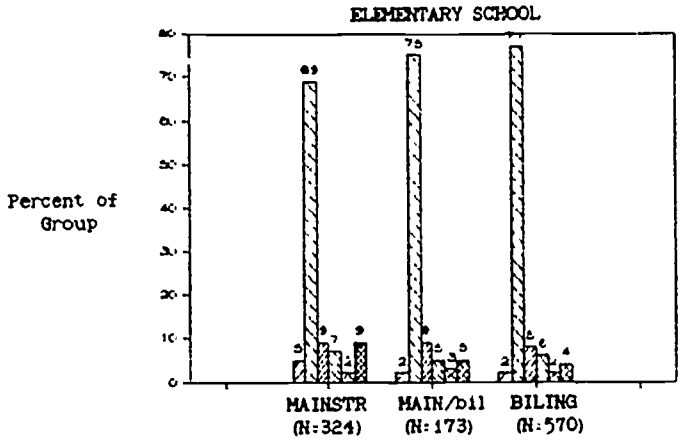
DESCRIPTION OF VARIABLE: Sex of student.

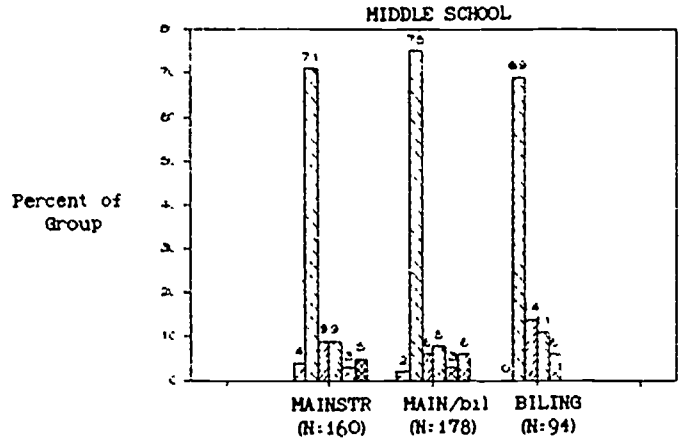
RESPONSE CATEGORIES: A) Female
B) Male

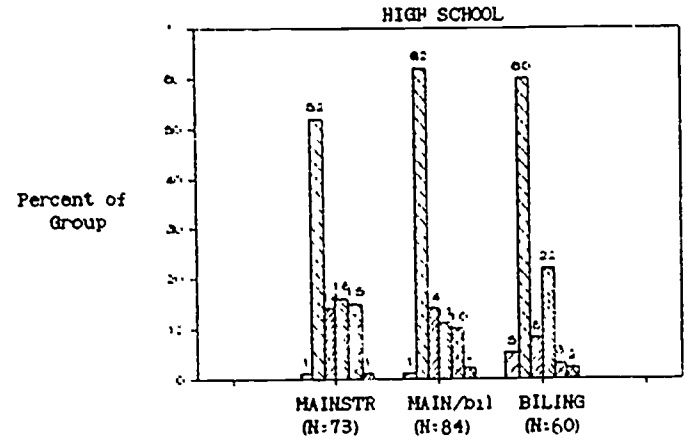


DESCRIPTION OF VARIABLE: Respondent's expectation of what student will do after high school.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) Go to college
C) Go to vocational school
D) Go to work
E) Go to military service
F) Other



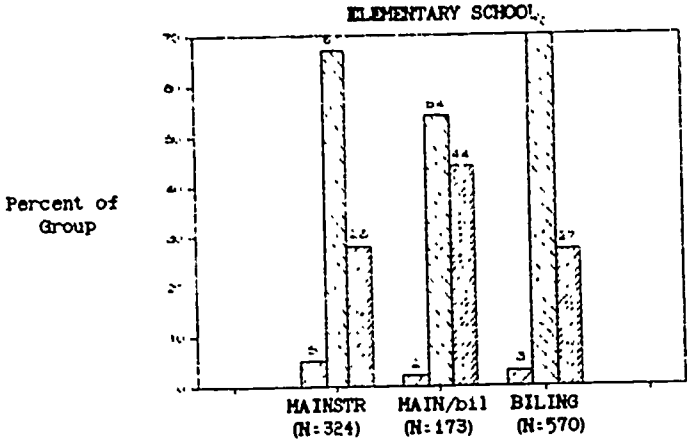




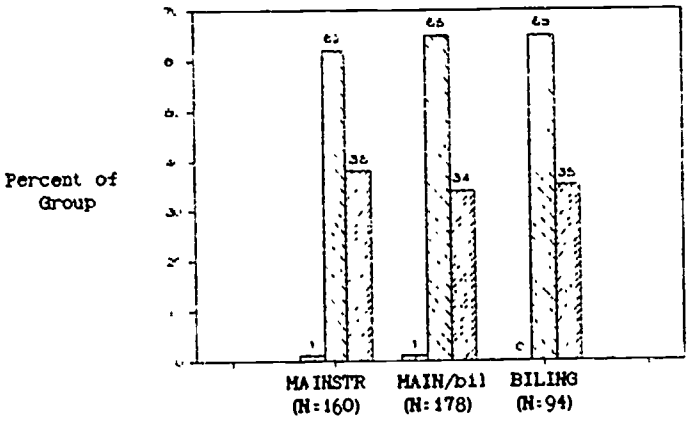
DESCRIPTION OF VARIABLE: Has child repeated a grade in school?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) no, has not repeated
C) yes, has repeated

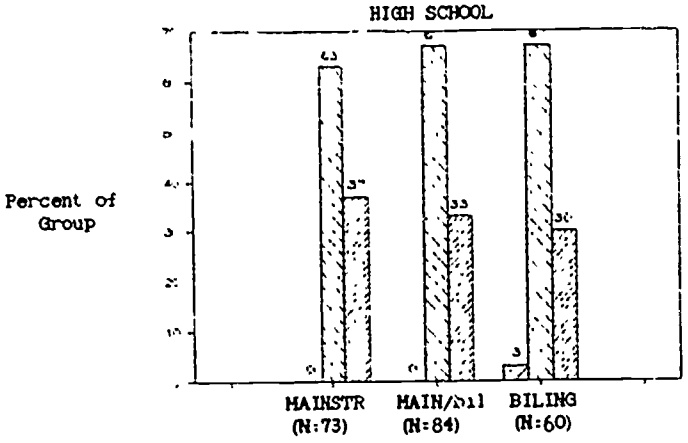
ELEMENTARY SCHOOL



MIDDLE SCHOOL

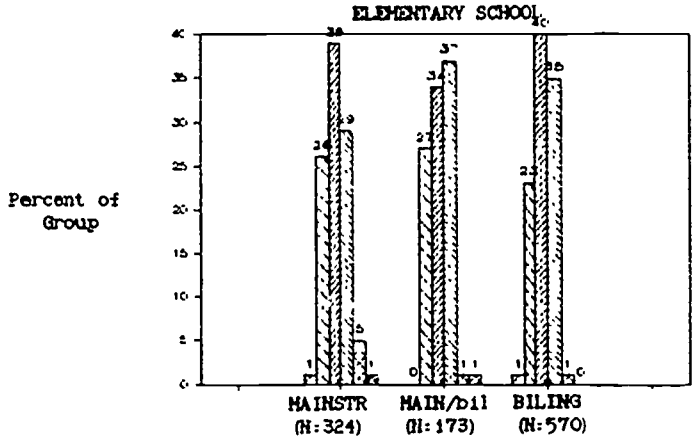


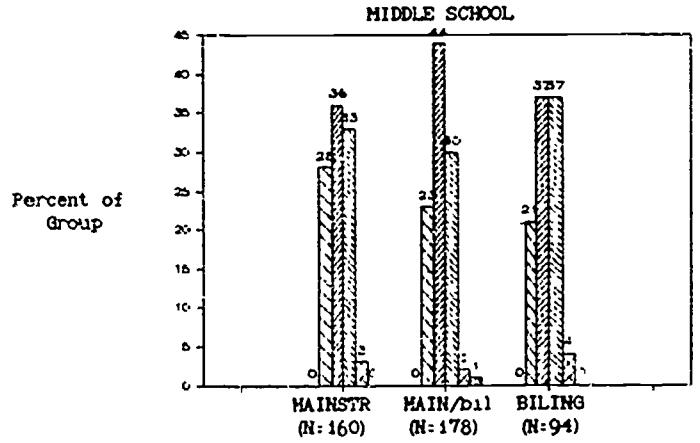
HIGH SCHOOL

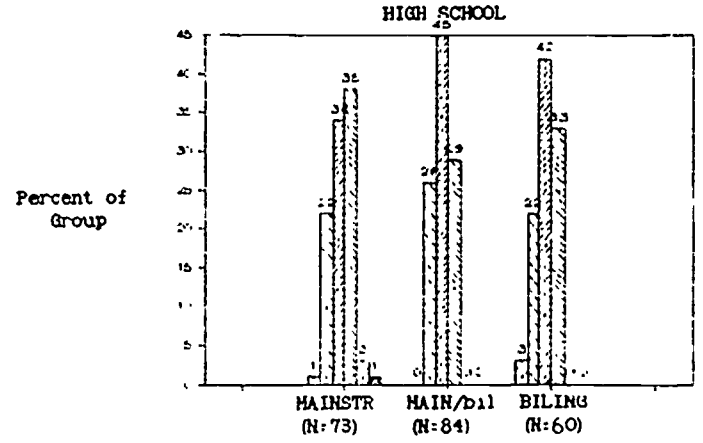


DESCRIPTION OF VARIABLE: Respondent's assessment of how student is doing in school.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) very well
C) well
D) average
E) poorly
F) very poorly



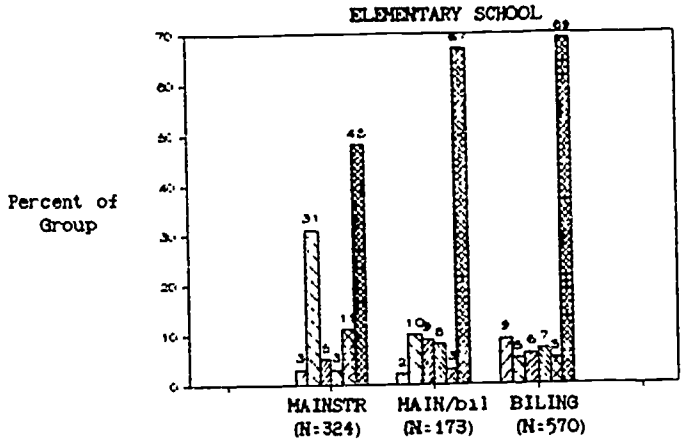




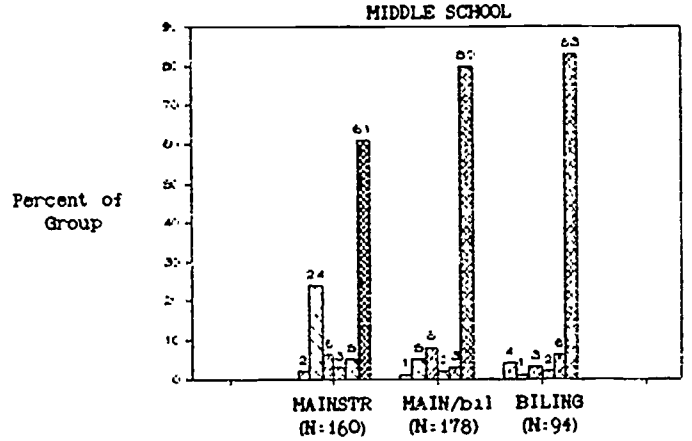
DESCRIPTION OF VARIABLE: Where has student learned English?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) From adults at home
C) From neighborhood friends
D) From television
E) From other relatives or children at home
F) From school

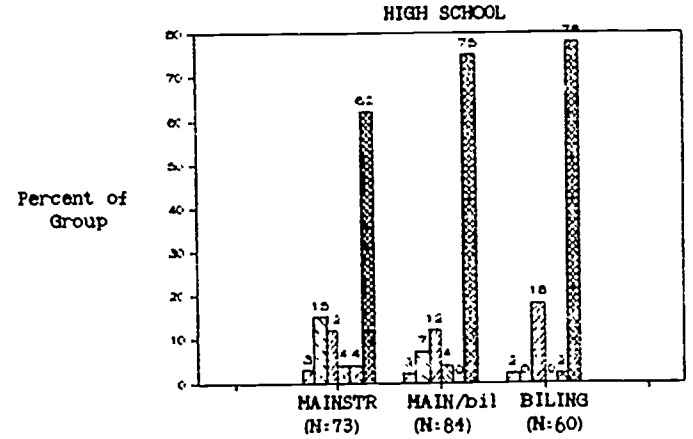
ELEMENTARY SCHOOL



MIDDLE SCHOOL

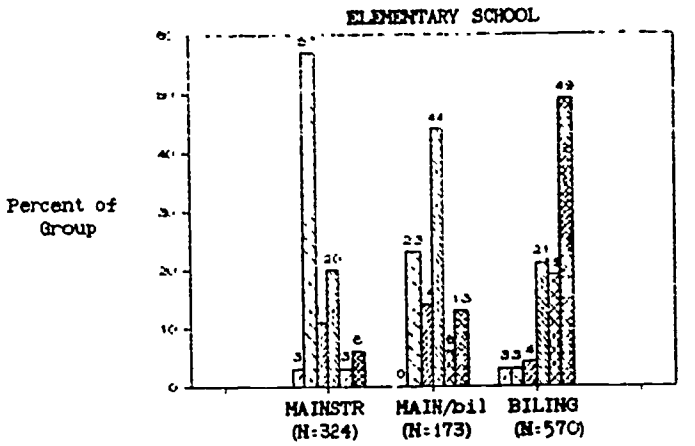


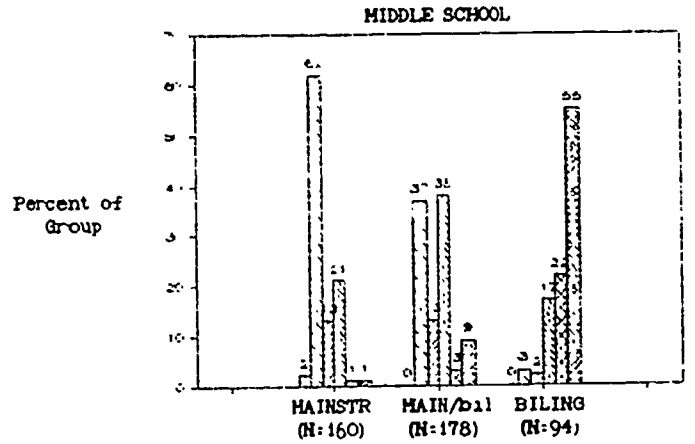
HIGH SCHOOL

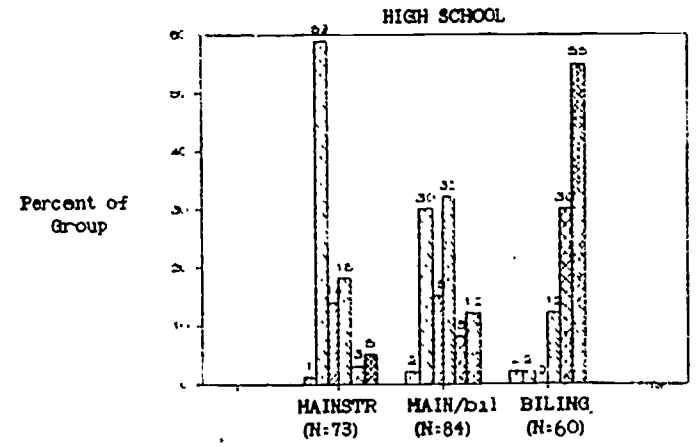


DESCRIPTION OF VARIABLE: Respondent's assessment of student's ability in English compared to Spanish.

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) English much better than Spanish
C) English slightly better than Spanish
D) English about the same as Spanish
E) Spanish slightly better than English
F) Spanish much better than English

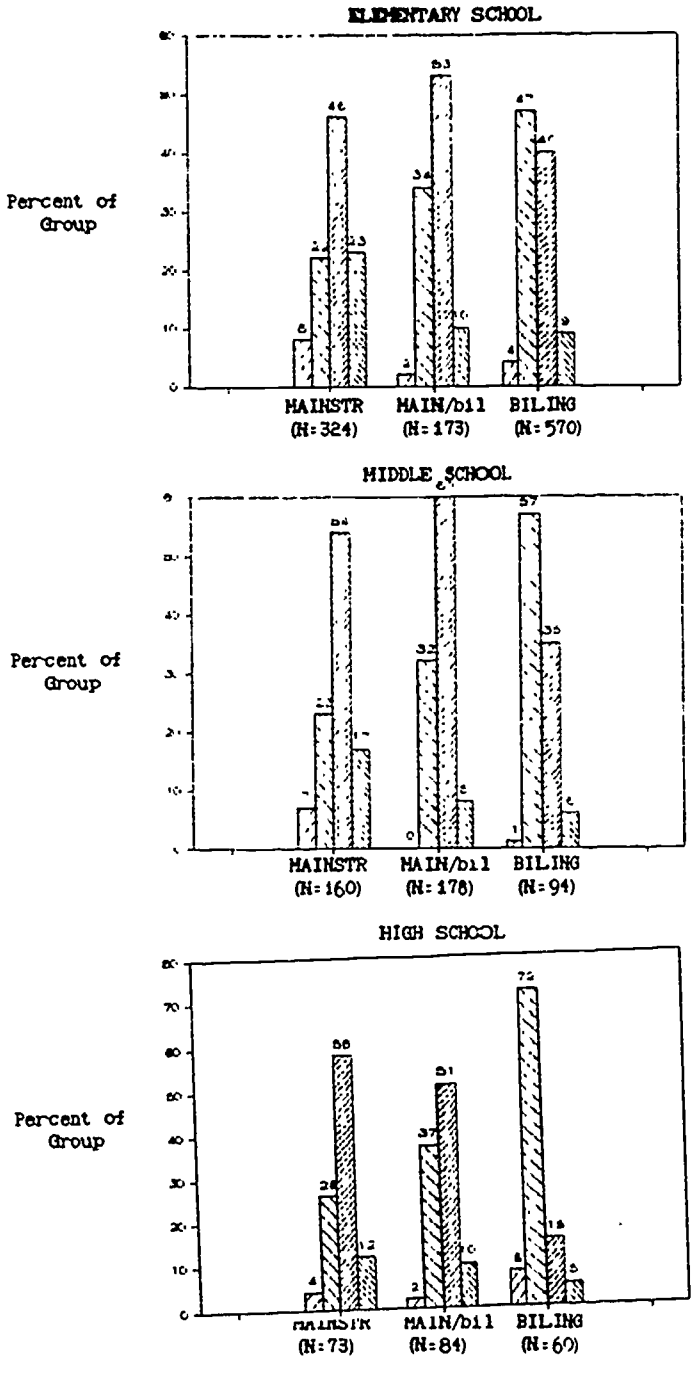






DESCRIPTION OF VARIABLE: Does student have difficulty in understanding Spanish?

RESPONSE CATEGORIES:
A) No answer provided by respondent
B) no difficulty, Spanish is perfect
C) sometimes, Spanish is good but not perfect
D) often, Spanish is limited



(SEE REVERSE FOR THE ENGLISH VERSION)

30 de enero de 1984

Estimados padres:

Estamos haciendo un estudio acerca del sistema de educación de New Haven y como éste sirve a la comunidad hispana. Adjunto le enviamos un cuestionario acerca de su hijo y su hogar. Usted puede llenarlo en inglés o en español.

Entendemos que como la mayoría de los padres, usted está ocupado. Sin embargo, le pedimos que coopere con nosotros tomando unos minutos de su tiempo para llenar el cuestionario. Es muy importante para nosotros recibir la información acerca de todos los niños hispanos que asisten a las escuelas públicas de New Haven y sobre sus hogares. Esta información debe ser completa y correcta. La misma será usada solamente para este estudio. No estará disponible para ninguna otra agencia de la ciudad, del estado o del gobierno federal.

Esta información nos ayudará a entender las necesidades de los alumnos. Va a ser usada para evaluar y mejorar los programas educacionales y los programas de investigación. No será usada para evaluar a los estudiantes individualmente.

Cada uno de los cuestionarios cuenta y aquel que no regrese devuelto a nuestras manos dañará el estudio de investigación que estamos realizando. Por eso, agradeceremos mucho si usted nos enviara el cuestionario en o antes del viernes 3 de febrero.

Si necesita ayuda en contestar alguna de las preguntas del cuestionario en español, siéntase confiado en llamar a Luz M. Ramos al teléfono 436-1273. O si necesita contestar alguna de las preguntas del cuestionario en inglés, pregunte por Kenji Hakuta.

Gracias por su cooperación.

Sinceramente,

P. Cucuzza

Patricia Cucuzza
Programa de educación bilingüe/lenguas extranjeras
Escuelas públicas de New Haven

Kenji Hakuta
Departamento de psicología
Universidad de Yale

Sam Nash
Oficina de investigación, evaluación y planeamiento
Escuelas públicas de New Haven

INSTRUCCIONES

La primera parte es acerca del niño. FAVOR DE LLENAR EN LA PRIMERA PARTE DEL CUESTIONARIO EL NOMBRE DEL NIÑO que lo llevó a la casa.

La parte dos es acerca de su hogar. Usted no necesita llenar la parte dos en el cuestionario de cada niño. FAVOR DE LLENARLA EN UN SOLO CUESTIONARIO.

Al devolver los cuestionarios, favor de ponerlos todos juntos en un solo sobre y dáselo a su hijo mayor para que el lo devuelva a su maestra de salón hogar. Nosotros pasaremos a la escuela a recoger el sobre.

POR FAVOR:

RECUERDE QUE ES MUY IMPORTANTE DEVOLVER TODOS LOS CUESTIONARIOS DE LOS NIÑOS EN UN SOLO SOBRE

SI

PARTE UNA

PARA CADA NIÑO FAVOR DE LLENAR ESTA PARTE DEL CUESTIONARIO

1) Nombre del niño:_____

2) ¿Cúel es su relación familiar con el niño?
   ()madre ()padre ()persona encargada

3) ¿Cúel es la fecha de nacimiento del niño?_____

4) ¿Ha participado su niño alguna vez en un programa bilingüe?
   ()sí ()no

5) Si ha contestado sí, ¿dónde?
   ()New Haven ()otro (¿que ciudad?)_____

6) ¿Cuántos años participó su niño en el programa bilingüe?
   ()1 año ()2 años ()3 años ()4 años o más

7) ¿Dónde piensa usted que el niño aprendió mejor el inglés? (marque una)
   ()de algún adulto en la casa
   ()en la comunidad con sus amigos
   ()de la televisión
   ()de otros niños en el hogar
   ()de otros familiares
   ()en la escuela

8) ¿En qué idioma se comunica mejor el niño? Compare el español con el inglés (marque una).
   ()inglés mejor que en español
   ()inglés un poco mejor que en español
   ()inglés igual que en español
   ()español un poco mejor que en inglés
   ()español es mucho mejor que en inglés

9) Cuando usted le habla en español a su niño, ¿tiene él alguna dificultad para entenderlo?
   ()nunca, el español de mi niño es perfecto
   ()algunas veces, el español de mi niño es bueno, pero no perfecto
   ()frecuentemente, el español de mi niño es limitado

10) ¿A cuántas escuelas diferentes ha asistido su niño durante este año escolar?
   ()una ()dos ()tres o más

11) ¿Qué espera usted que haga su niño cuando termine la escuela superior?
   ()asista a la universidad
   ()asista a una escuela vocacional
   ()consiga un trabajo
   ()ingrese en el servicio militar
   ()otro: (especifique)_____

12) ¿Qué programas de televisión ve su niño regularmente?
   _____ _____
   _____ _____

13) ¿Cuántas horas de televisión ve su niño diariamente, de lunes a viernes?
   ()una ()dos ()tres ()más de cuatro

14) ¿Ha repetido un grado alguna vez su niño?
   ()sí ()no

15) En su opinión, ¿cómo hace su niño en la escuela?
   ()muy bien
   ()bien
   ()regular
   ()mal
   ()muy mal

52

PARTE DOS

1) ¿Qué edad tiene usted?
()menos de 20 años ()de 21 a 30 años ()de 31 a 40 años
()de 41 a 50 años ()más de 50 años

2) ¿Dónde nació usted? Especifique la ciudad.
()Estados Unidos; Ciudad:_____
()Puerto Rico; Ciudad:_____
()otro país; Ciudad:_____

3) Si nació en Puerto Rico o en otro país, ¿cuántos años tenía cuando se mudó a los Estados Unidos?
()menos de 20 años ()de 21 a 30 años ()de 31 a 40 años
()de 41 a 50 años ()más de 50 años

4) ¿Cuántos niños (menores de 18 años) viven con usted?

5) ¿Cuántos adultos (mayores de 19 años) viven con usted?

6) ¿Qué relación familiar tienen los adultos que viven en su casa con el niño? (todas las respuestas apropriadas favor de marcar)
()abuelos ()padre ()madre ()padrastro
()madrastra ()otros

7) ¿Cuál es su dirección?_____

8) ¿Cuánto tiempo hace que se mudó a esa dirección? (marque una):
()un año ó menos ()2 años ()3 años
()4 años ()5 años ó más

9) Si se mudó de una a otra área dentro de la misma ciudad de New Haven, ¿de dónde se mudó? (por ejemplo, del Hill o de Fair Haven):_____

10) Si se mudó de una área fuera de New Haven a New Haven, ¿de dónde se mudó? (por ejemplo, Puerto Rico, New York, Hartford):_____

11) ¿Cuál fue la razón más importante que usted tuvo cuando se mudó la última vez? Marque solamente la razón más importante.
()cambio de trabajo
()la escuela de los niños quedaba muy lejos
()la renta era alta
()vendió su casa o compró una casa nueva
()porque el dueño de la casa se lo pidió (por ejemplo, el dueño vendió el edificio)
()no estaba satisfecho con el vecindario o las condiciones de la casa no eran muy buenas.

12) ¿Tuvo su niño que cambiarse de escuela cuando se mudó?
()sí ()no

13) ¿Cómo compara su casa o apartamento de ahora con el que tenía antes?
()éste es mejor
()es igual
()el anterior era mejor

14) Durante los pasados 5 años (desde, enero 1979), ¿cuántas veces se ha mudado?
()nunca se he mudado
()una vez en 5 años
()2 veces en 5 años
()3 veces en 5 años
()4 veces en 5 años
()una vez o más al año

15) ¿Piensa usted que necesitará mudarse a otra casa o apartamento este año siguiente?
()sí ()no sé ()no

16) ¿Cuántos cuartos de dormitorio tiene su casa o apartamento? Incluya cualquier otra habitación que se usa para dormir.
Circule uno: 1 2 3 4 5 o más

17) Si usted tuviera que mudarse, ¿a dónde le gustaría mudarse?
()me gustaría quedarme en el mismo vecindario
()me gustaría mudarme a otro vecindario
()me gustaría irme a Puerto Rico
()me gustaría irme a otro país (especifique):_____
()me gustaría irme a otro estado o ciudad (especifique):_____

18) ¿Dónde cursó la mayoría de sus estudios?
()en los Estados Unidos
()en Puerto Rico
()en otro país

19) Marque el número de años que LA MADRE completó en la escuela.
1 2 3 4 5 6 7 8 9 10 11 12 Universidad: 1 2 3 4

20) Marque el número de años que EL PADRE completó en la escuela.
1 2 3 4 5 6 7 8 9 10 11 12 Universidad: 1 2 3 4

21) ¿Cuál es la ocupación del padre o del encargado de la familia?
()por favor especifique:_____
()no está trabajando
¿cuánto tiempo hace que está sin empleo? (marque una)
()1 año ()2 años ()3 años o más
¿cuál fue su último trabajo?_____

22) ¿Qué idioma usa su niño en el hogar? (circule uno)

ESPAÑOL SOLAMENTE	MAYORMENTE ESPAÑOL	TANTO ESPAÑOL COMO INGLÉS	MAYORMENTE INGLÉS	INGLÉS SOLAMENTE

23) ¿Qué idioma usan los adultos en el hogar? (circule uno)

ESPAÑOL SOLAMENTE	MAYORMENTE ESPAÑOL	TANTO ESPAÑOL COMO INGLÉS	MAYORMENTE INGLÉS	INGLÉS SOLAMENTE

24) ¿Cómo puede usted mejor describir su habilidad para hablar inglés?
(imagínese que usted necesita comunicarse con su médico, su abogado o con la maestra de su niño y que esta persona solamente habla inglés).
()no puedo hablar inglés
()puedo hablar un poco de inglés
()puedo hablar suficiente inglés para poder expresar en ese momento lo que quiero decir o necesito
()puedo hablar inglés casi como una persona que lo hable nativamente
()puedo hablar inglés como una persona que lo hable nativamente
()el inglés es mi idioma nativo

25) ¿Qué periódicos o revistas lee regularmente?

EN ESPAÑOL	EN INGLÉS
() El Vocero	() New Haven Register/Journal Courier
() El Diario	() New York Daily News
() Horizonte	() New Haven Advocate
() Vea/TV Guide	() Reader's Digest
() Selecciones	() Otro:_____
() Otro: _____	

26) Por favor marque si usted tiene en su casa algunos de estos libros ses en español o en inglés:

EN ESPAÑOL	EN INGLÉS
()enciclopedias en español	()enciclopedias en inglés
()diccionarios en español	()diccionarios en inglés
()Biblia en español	()Biblia en inglés
()libros de cocina en español	()libros de cocina en inglés
()novelas en español	()novelas en inglés
()cuentos reales en español	()cuentos reales en inglés
()cuentos de niños en español	()cuentos de niños en inglés
()cómicos en español	()cómicos en inglés

27) ¿Participa usted en algunas actividades de la comunidad? (marque todas en las cuales participa seriamente)
()comités en la escuela
()Iglesia
()organizaciones de la vecindad
()organizaciones juveniles
()deportes
()organizaciones políticas
()otros:_____

POR FAVOR:

RECUERDE QUE ES MUY IMPORTANTE DEVOLVER TODOS LOS CUESTIONARIOS DE LOS NIÑOS EN UN SOLO SOBRE

(VEASE EL OTRO LADO PARA LA VERSION EN ESPAÑOL)

January 30, 1984

Dear Parents,

We are trying to find out how the Hispanic community is served by the New Haven Public Schools. Enclosed is a questionnaire about your child and about your home. You can fill it out in English or in Spanish.

We realize that like most parents, you are very busy. However, we request your cooperation to take a few minutes to fill out the questionnaire. It is especially important for us to get complete and correct information about all of the Hispanic children and homes in the New Haven Public Schools. You have our assurance that the information you provide will only be used for the purposes of this study and will not be made available to any other City, State, or Federal agency.

This kind of information is very important for helping us to understand the people being served by the schools. It will be used to evaluate and to improve educational and research programs. It will not be used to evaluate individual students.

Because every questionnaire counts, and each questionnaire that we do not get back hurts the completeness of the information, we would appreciate it if you could return us the questionnaire by Friday, February 3.

If you need assistance in answering any of the questions, please feel free to call Kenji Hakuta at 436-1273. Or if you would like assistance in Spanish, please ask for Luz M. Ramos.

Thank you very much.

Sincerely,

P. Cuccuzza

Patricia Cuccuzza
Bilingual Education/Foreign Languages
New Haven Public Schools

Kenji Hakuta
Department of Psychology
Yale University

Sam Nash
Office of Research, Evaluation and Planning
New Haven Public Schools

INSTRUCTIONS

Part One is about the child. PLEASE FILL IN PART ONE FOR EACH CHILD who brought home the questionnaire.

Part Two is about your household. You do not need to fill in Part Two for each child. PLEASE FILL IN PART TWO JUST ONCE FOR YOUR HOUSEHOLD.

To return the questionnaires, please put ALL THE QUESTIONNAIRES FROM YOUR HOUSEHOLD TOGETHER INTO ONE ENVELOP, and have your oldest child return the envelop to his or her homeroom teacher. We will then collect the envelop from the teacher.

PLEASE REMEMBER:

IT IS IMPORTANT TO RETURN ALL THE QUESTIONNAIRES FROM YOUR CHILDREN IN ONE ENVELOPE

E1

PART ONE

FILL THIS PART SEPARATELY FOR EACH CHILD IN YOUR FAMILY

1) Child's name:_____

2) What is your relation to the child?
()sother ()father ()guardian

3) When is your child's birthday? _____

4) Has your child ever been in a bilingual program? ()Yes ()No

5) If yes, where? ()New Haven ()Other: (what city?)_____

6) How many yeers was your child in the bilingual program?
()0 years ()1 year ()2 yesrs ()3 yeare ()4 or more yesrs

7) Where do you think that your child has learned most of his or her English? (check one)
() from adults at home () from other children at home
() from neighborhood friends () from other relatives
() from television () from school

8) How would you compare your child's ability in English and Spanish?
() English much better than Spanish
() English slightly better than Spanish
() English about the same as Spanish
() Spanish slightly better than English
() Spanish much better than English

9) If you speak Spanish to your child, how often does he or she have difficulty in understanding you?
() never; my child's Spanish is perfect
() sometimes; my child's Spanish is good but not perfect
() often; my child's Spanish is limited

10) How many different schools has your child attended this school year?
() one () two () three or more

11) What do you expect your child to do after finishing high school?
() go to college
() go to vocational school
() go to work
() go to military service
() other: (specify)_____

12) What television programs does your child watch regularly?
_____ _____
_____ _____

13) How many hours of television does your child watch on a weekday?
()one ()two ()three ()four ()more than four

14) Has your child ever repeated a grade in school?
()yes ()no

15) In your opinion, how is your child doing in school?
()very well
()well
()average
()poorly
()very poorly

PART TWO

1) What is your age?
   ()under 20 years old ()21 to 30 years old ()31 to 40 years old
   ()41 to 50 years old ()over 51 years old

2) Where were you born? Specify the city.
   () United States; city:_____
   () Puerto Rico; city:_____
   () Other country; city:_____

3) If you were born outside the States, how old were you when you moved here?
   ()under 20 years old ()21 to 30 years old ()31 to 40 years old
   ()41 to 50 years old ()over 51 years old

4) How many children (under 18 yrs.) live in your household? _____

5) How many adults (19 or older) live in your household? _____

6) How are the adults of the household related to the children? (please check all that apply)
   () Grandparents () Father () Mother () Stepfather
   () Stepmother () Other

7) What is your address? _____

8) When did you move to the present address? (Please check one)
   () 1 year ago or less () 2 years ago () 3 years ago
   () 4 years ago () 5 or more years ago

9) If your last move was from somewhere else in New Haven area, please say where you moved from (for example, Hill Area, Fair Haven):_____

10) If your last move was from outside the New Haven area, please say where you moved from (for example, Puerto Rico, New York, Hartford):_____

11) What was the most important reason why you moved the last time. (Mark only the most important reason).
   () change in my job
   () too far from school for the children
   () rent was too high
   () bought or sold home
   () requested by landlord (for example, landlord sold the building)
   () dissatisfied with neighborhood or housing conditions

12) Did your child have to change schools because of the move?
   ()Yes ()No

13) How would you compare your present house/apartment with the one you lived in before?
   () this one is better
   () about the same
   () the last one was better

14) During the past five years (since January, 1979), how often would you say that you have moved? (Please check one)
   () have not moved
   () once in five years
   () twice in five years
   () three times in five years
   () four times in five years
   () once or more every year

15) Do you think that you will need to move to another house or apartment in the next year?
   () Yes () Not sure () No

16) How many bedrooms do you have in your present house or apartment? Include all rooms that are used for sleeping.
   Circle one: 1 2 3 4 5 or more

17) If you had to move again, where would you like to move?
   () would stay in same neighborhood
   () would move to a different neighborhood
   () would move to Puerto Rico
   () would move to another country (specify)_____
   () would move to another city or state (specify)_____

E3

18) Where did you mostly study?
() in the United States
() in Puerto Rico
() in another country

19) Please circle the number of years of schooling that the MOTHER completed (circle one)
0 1 2 3 4 5 6 7 8 9 10 11 12 College: 1 2 3 4

20) Please circle the number of years of schooling that the FATHER completed (circle one)
0 1 2 3 4 5 6 7 8 9 10 11 12 College: 1 2 3 4

21) What is the occupation of the head of the household?
() please specify: _____
() not employed
for how long have you been unemployed? (check one)
() 1 year () 2 years () 3 or more years
what was the last job? _____

22) What language is mostly used by the children in the home? (circle one)

ONLY SPANISH	MOSTLY SPANISH	BOTH ENGLISH AND SPANISH	MOSTLY ENGLISH	ONLY ENGLISH

23) What language is mostly used by the adults in the home? (circle one)

ONLY SPANISH	MOSTLY SPANISH	BOTH ENGLISH AND SPANISH	MOSTLY ENGLISH	ONLY ENGLISH

24) How would you describe your ability to express yourself in English? (for example, imagine yourself in a situation where English is necessary, such as in a job, or speaking to your doctor, lawyer, or your child's teacher who only speaks English)
() cannot speak English
() can speak a little English
() can speak enough English to communicate basic ideas
() can speak English almost as well as a native speaker
() can speak English as well as a native speaker
() English is my native language

25) What newspapers or magazines do you read regularly? (please check)

SPANISH	ENGLISH
() El Vocero	() New Haven Register/Journal Courier
() El Diario	() New York Daily News
() Horizonte	() New Haven Advocate
() Vea/TV Guide	() Reader's Digest
() Selecciones	() Other:_____
() Other: _____	

26) Please check if you have the following books in English or in Spanish in your home:

SPANISH	ENGLISH
() Spanish encyclopedia	() English encyclopedia
() Spanish dictionary	() English dictionary
() Spanish Bible	() English Bible
() Spanish cookbooks	() English cookbooks
() Spanish novels	() English novels
() Spanish nonfiction	() English nonfiction
() Spanish children's books	() English children's books
() Spanish comics	() English comics

27) Do you participate in any of the following community activities? (check ones with which you are actively involved)
() school committees
() church
() neighborhood organizations
() youth organizations
() sports
() political organizations
() other: _____

PLEASE REMEMBER:

IT IS IMPORTANT TO RETURN ALL THE QUESTIONNAIRES FROM YOUR CHILDREN IN ONE ENVELOPE

LETTER SENT TO PARENTS

1 de octubre de 1980

Estimados padres:

En estos momentos estamos haciendo un estudio con los niños que participan en el programa bilingue de New Haven. La directora del programa, Aida Cumulada, está colaborando con nosotros. Les escribimos esta carta para pedirles permiso para que su hijo/a participe en el estu

Varios estudios indican que el aprender dos idiomas al mismo tiempo puede beneficiar el desarrollo intelectual de los niños. Sinembargo, no sabemos tadavía como el hacerse bilingue afecta ciertas abilidades específicas en los niños. En el presente estudio intentamos contestar estas preguntas y entender un poco mejor los beneficios de aprender dos idiomas al mismo tiempo.

En este estudio vamos a entrevistar a los niños por aproximadamente 40 minutos en la escuela. Los niños tomarán dos tipos de pruebas: de lenguaje y de destrezas cognitivas. En las pruebas de lenguaje incluiremos: vocabulario, análisis de estructuras gramaticales y pruebas de abilidades metalinguísticas. Las pruebas de destrezas cognitivas tratar de medir la capacidad del niño para descubrir relaciones abstractas entr varias partes de una figura y su capacidad para asumir la perspectiva de un personaje en un cuento. Los estudiantes serán examinados a principio y a fin de año.

Reglamentos en las escuelas requieren que los padres o encargados sean informados de cualquier prueba que se les vaya a administrar a los niños y que se obtenga la autorización de estos antes de administrar la prueba. Por esta razón estamos solicitando su cooperación. Si usted esta de acuerdo con que su hijo/a participe en este estudio, tenga la bondad de firmar el papel que le incluimos. Devuelva el papel firmado a la maestra lo más pronto que le sea posible.

Si su hijo/a participa en este estudio, usted puede recibir una copia de los resultados al final del estudio. Si asi lo desea, tenga la bondad de incluirnos su dirección.

Las respuestas de los niños seran guardadas confidencialmente. Los nombres de los niños no se usarán cuando se reporten los resultados de este estudio.

Esperamos que permita que su hijo/a participe en este estudio. Si tiene alguna pregunta sobre el estudio, me puede llamar al teléfono-436-8423 o a mi asistente, Juan Perez, al tel. 436-2229.

Le agradecemos mucho su atención y colaboración.

Atentamente,

Kenji Hakuta (JMP)

Kenji Hakuta
Assistant profesor

(English version in back)

October 1, 1980

Dear Parents:

At the present time we are conducting a study with children who attend bilingual programs in New Haven. Ms. Aida Cumulada, the director of bilingual programs, has agreed to collaborate with us. We would like to request your permission for your child to participate in it.

In recent years several studies have found that learning two languages simultaneously can help children's general intellectual development. However, we still know very little about what specific abilities can be positively affected by the process of becoming bilingual. In the present study we intend to investigate and clarify the ways in which bilingual education can influence the development of several intellectual abilities in young children.

In our study children will be interviewed individually for about 40 minutes. The children will take two types of tests: language tests and tests to assess certain cognitive abilities. In the language area we will test: vocabulary, grammatical forms, and metalingustic abilities. In the cognitive area we will test the child's ability to discover abstract relations among several parts of a figure and also the capacity to take the- perspective of different characters in a story

The responses of the children who participate will be kept confidential, and no children will be mentioned by name in any records or reports of the study. A summary of the results will be sent to parer who request one.

We hope you will agree to your child's participation in the study. If you wish to permit your child to participate, please fill out and sign the attached form and have your child return it to the school tomorrow. If you have any questions about the study, please call me at 436-8423, or call my assistant, Juan Perez at 436-2229.

Thank you very much.

Sincerely yours,

Kenji Hakuta (JmP)

Kenji Hakuta
Assistant Professor

(Carta en español en el otro lado)

APPENDIX D

MEASURES USED IN THE STUDY

SPVT ITEMS

SPANISH PICTURE VOCABULARY TEST

(Prueba Ilustrada de Vocabulario en Espanol)

Name: _____ Sex: M F Grade: _____

School: _____ Teacher: _____

Calculation	DERIVED SCORES	Year Month Days
Ceiling item: _____	MEAN: _____	Date: ___ ___ ___
Errors: _____	S.D.: _____	Born: ___ ___ ___
Low score: _____	STANINE: _____	Age: ___ ___ ___

Starting Points:

Age:	Item Number:
2-6 to 3-0	1
3-1 to 3-6	15
3-7 to 4-0	25
4-1 to 4-6	25
4-7 to 5-0	30
5-1 to 5-6	30
5-7 to 6-0	30
6-1 to 6-6	40
6-7 to 7-0	40
7-1 to 8-0	40

Age:	Item Number:
8-1 to 9-0	40
9-1 to 10-0	45
10-1 to 11-0	45
11 -1 to 12-0	50
12-1 to 13-0	65
13-1 to 14-0	65
14-1 to 15-0	65
15-1 to 16-0	75
16-1 to 17-0	75
17-1 to 18-0	90

COMMENTS:

Examiner: _____

.caballo.....(4)___
.escoba.....(1)___
.carro.....(4)___
.llaves.....(1)___
.zapatito.....(4)___
.bate.....(2)___
.sortija.....(2)___
.guagua.....(4)___
.bloque.....(3)___
0.chaqueta.....(2)___
1.hora.....(1)___
2.abanico.....(2)___
3.trepándose....(2)___
4.barco.....(4)___
5.tortuga.....(4)___
6.payaso.....(2)___
7.hermanos.....(1)___
8.campana.....(1)___
9.sentado.....(3)___
0.hoja.....(3)___
1.río.....(1)___
2.echando.....(1)___
3.cono.....(2)___
4.termo.....(4)___
5.canguro.....(2)___
6.parándose.....(4)___
7.halando.....(1)___
8.quantelete....(4)___
9.capitán.....(1)___
0.barbero.....(2)___
1.enseñando.....(2)___
2.paracaidas....(3)___
3.amarrando.....(4)___
4.abeja.....(4)___
5.asomándose....(4)___
6.insecto.....(1)___
7.machete.....(2)___
8.pinzas.....(1)___
9.rueda.....(1)___
0.pavo real.....(2)___
1.baúl.....(2)___
2.termómetro....(3)___
3.chiringa.....(1)___
4.submarino.....(3)___
5.cápsula.....(1)___
6.nadando.....(4)___
7.discusión.....(1)___
8.torcido.....(2)___
9.señal.....(1)___
0.telaraña.....(3)___

51.cacerola.....(2)___
52.proyector.....(3)___
53.asando.....(4)___
54.saludo.....(3)___
55.cerca.....(1)___
56.águila.....(3)___
57.portero.....(3)___
58.juez.....(3)___
59.comunicación....(2)___
60.puerta ventana..(2)___
61.jurando.....(3)___
62.látigo.....(1)___
63.balanceando.....(1)___
64.placa.....(1)___
65.tranquilo.....(1)___
66.conferenciante..(3)___
67.construcción....(3)___
68.químico.....(4)___
69.horror.....(1)___
70.huerfana.....(4)___
71.dirigiendo.....(3)___
72.globo.....(1)___
73.destrucción.....(4)___
74.duelo.....(3)___
75.iluminación.....(4)___
76.ídolo.....(1)___
77.embellecer.....(3)___
78.asaltar.....(4)___
79.eminencia.....(4)___
80.soldando.....(3)___
81.adorno.....(4)___
82.transporte.....(1)___
83.candelabro.....(4)___
84.nido.....(3)___
85.fragmento.....(3)___
86.mercantil.....(4)___
87.deslizando.....(3)___
88.jubiloso.....(3)___
89.alpinista.....(3)___
90.insignia.....(1)___
91.profeta.....(3)___
92.jeroglífico.....(2)___
93.exploratorio....(1)___
94.renovar.....(3)___
95.sextante.....(1)___
96.barrera.....(2)___
97.catarata.....(3)___
98.kayak.....(3)___
99.florete.....(4)___
100.calesín.....(3)___

101.lanoso.....(2)___
102.engrillado....(1)___
103.descender.....(3)___
104.centinela.....(2)___
105.florescencia..(2)___
106.orador.....(1)___
107.anfibio.....(1)___
108.pensil.....(3)___
109.tablero.....(1)___
110.costa.....(2)___
111.excabar.....(1)___
112.deletéreo.....(2)___
113.mendigo.....(1)___
114.constreñir....(3)___
115.embudo.....(4)___
116.senil.....(4)___
117.estadio.....(1)___
118.precario.....(1)___
119.arco.....(3)___
120.marea.....(2)___
121.carroña.....(3)___
122.reposar.....(1)___
123.dromedario....(2)___
124.calibrado.....(3)___
125.macilento.....(1)___
126.entomología...(2)___
127.obelisco.....(4)___
128.presuntuoso...(4)___
129.confinado.....(4)___
130.lubricando....(1)___
131.nuca.....(1)___
132.tasando.....(3)___
133.conífero.....(2)___
134.vástago.....(2)___
135.despeñadero...(4)___
136.elipse.....(2)___
137.gimiendo.....(1)___
138.leguminoso....(3)___
139.consternación.(4)___
140.tangente.....(1)___
141.sumergir.....(1)___
142.buhardа.....(2)___
143.ambulante.....(2)___
144.canino.....(4)___
145.orificio.....(4)___
146.quirografía...(4)___
147.pirueta.....(1)___
148.cáliz.....(4)___
149.inclemente....(1)___
150.cabriola.....(1)___

METALINGUISTIC AWARENESS: AMETA

JUDGEMENTS OF GRAMMATICALITY

(AMETA)

Name: _____ Sex: M F Grade: _____

School: _____ Teacher: _____

	Year	Month	Days
Date:	___	___	___
Born:	___	___	___
Age:	___	___	___

SCORE:

Awareness: _____

Correction: _____

Examples:	AWARENESS		CORRECTION
A. Mi mamá es en la casa.	B	~~(M)~~	Mi mamá esta en la casa
B. La casa es grande.	~~(B)~~	M	CORRECT
C. El maestra es buena.	B	~~(M)~~	La maestra es buena.

****

1. El niño es seis años.	B	(M)	_____
2. La manzana es roja.	(B)	M	_____
3. La casa tiene techo no.	B	(M)	_____
4. La perro es grande.	B	(M)	_____
5. Lápiz un dame.	B	(M)	_____
6. El niño es bueno.	(B)	M	_____
7. Juan fue a la tienda manana.	B	(M)	_____
8. Un niña es mi amigo.	B	(M)	_____
9. Este libro es de la maestra.	(B)	M	_____
10. Juan irá aver a la playa.	B	(M)	_____

Instructions:

Te voy a decir unas oraciones. Dime si la oración esta bien dicha. Si mal dicha. Cómo se dice esa oracion.

Scoring for Corrections:

0=no correction

1 = semantic correction

2 = syntactic correction

JUDGEMENTS OF GRAMATICALLTY

(AMET 2)

Name:_____ Teacher: _____

School _____

1.Pablo y José es un primo.	B (M)	_____
2. La casa es pequeño.	B (M)	_____
3. El flor tiene muchos colores.	B (M)	_____
4. Todos los días, él va al cine.	(B) M	_____
5. El pájaro y el gato comió bien.	B (M)	_____
6. El pescado es bien bonita.	B (M)	_____
7. Mi mama, los me compró.	B (M)	_____
8. La pluma verde asusta a Maria.	(B) M	_____
9. Las señoras se fue a comer.	B (M)	_____
10. José corto la árbol.	B (M)	_____
11. El está lo vendiendo.	B (M)	_____
12. La lluvia enojó a Miguel.	(B) M	_____
13. Ayer estoy limpiando el barco.	B (M)	_____
14. Andrés está bien pequeño.	(B) M	_____
15. Mañana comí muchos dulces.	B (M)	_____
16. Los animales tomó agua.	B (M)	_____

METALINGUISTIC AWARENESS: BMETA

BILINGUAL SENTENCES

(BMETA)

Name: _____ Sex: M F Grade: _____

School: _____ Teacher: _____

	Year	Month	Days
Date:	___	___	___
Born:	___	___	___
Age:	___	___	___

SCORE: _____

Instructions:

Te voy a decir unas oraciones en español. Dime si la oración está bien dicha en español o no.

1.	La teacher está en la clase.	B (M)
2.	Yo tengo un apple.	B (M)
3.	El niño walks a la escuela.	B (M)
4.	La bola es muy big.	B (M)
5.	La escuela es bonita.	(B) M
6.	El niño aprende a writing.	B (M)
7.	La niña esta en su house.	B (M)
8.	La casa es grande.	(B) M
9.	El libto es red.	B (M)
10.	Mi papá is en Puerto Rico.	B (M)

Examples:

A. El dog es grande. B (M)

B. Mi mamá es buena. (B) M

METALINGUISTIC AWARENESS: AMBIGUITY TEST

INSTRUCTIONS FOR THE AMBIGUITY TEST

* * * * * * * * * * * * * * * * *

(A) INTRODUCING THE CHILD TO THE TASK.

Ex: Vas a oir unas oraciones, pon mucha atención porque hay unas oraciones que las puedes entender de una forma y otras que las puedes entender de dos formas. Quiero que me digas si entiendes la oracion de una manera o de dos maneras.
[You will hear a few sentences. Pay attention to the sentences because there are some that you can understand in one way and others that you can understand in two ways. I want you to tell me if you understand the sentence in one way or in two ways.]

* * * * * * * * * * * * * * * * *

(B1) IF CHILD'S FIRST RESPONSE IS THAT THERE IS ONE MEANING.

Oracion: Primera vez.
[Sentence: First time.]
Ex: Esta oración la entendiste de una manera o de dos maneras.
[Did you understand this sentence in one way or in two ways.]
Niño: Una.
[One.]
Ex: Como la entendiste?
[How did you understand it?]
Nino: (Repite la oración.)
[(Repeats the sentence)]
Ex: Explícamelo.
[Explain it to me.]
Nino: (Explica mal la oracion.)
[(Explains the sentence wrongly.)]
Ex: Estás seguro? (Si el niño dice que "si" seguir adelante, si dice que "no' pedir otra respuesta.)
[Are you sure? (If the child says "yes" continue, if the child says "no" ask for another answer.)]
Niño: (Explica bien la oración.)
[Explains the sentence correctly.]
Ex: Estás seguro? (Si el nino dice que "si" seguir adelante, si dice que "no" pedir otra respuesta.)
[Are you sure? (If the child says "yes" continue, if the child says "no" ask for another answer.)]
Oración: Segunda vez.
[Sentence: Second time.]
Ex: La entendiste de la misma manera o de otra manera?
[Did you understand it the same way or another way?]
Niño: De otra manera.
[Another way.]

Ex: Explícame la segunda manera de entender la oracion.
[Explain the other way, how did you understand it?]
(Si el niño da la misma respuesta que la anterior, pedir otra respuesta.) (Seguir el mismo proceso que antes.)
[(If the child gives the same response as before, ask for another one. Then follow same procedure as above.)]

Niño: De la misma manera.
[The same way.]

Ex: Estás seguro?
[Are you sure?]
(Seguir el mismo proceso que antes.)
[Follow same procedure.]

Oracion: Tercera vez. (Mostrar dibujos.)
[Sentence: Third time. (Show drawings.)]

Ex: La entiendes de esta manera? (Enseñar primer dibujo.)
[Do you understand it this way? (Show first drawing.)]

Niño: Si o No.
[Yes or No.]

Ex: La entiendes de esta manera (Enseñar segundo dibujo.)
[Do you understand it this way? (Show second drawing)]

Niño: Si o No.
[Yes or No.]
(Para el dibujo que contestó "No" averiguar si le falta vocabulario.)
[(For the drawing where the child answered "No", find out if child lacks the necessary vocabulary.)]

* * * * * * * * * * * * * * * * *

(B2) IF CHILD'S FIRST RESPONSE IS THAT THERE ARE TWO MEANINGS.

Oración: Primera vez.
[Sentence: First time.]

Ex: Esta oración la entendiste de una manera o de dos maneras.
[Did you understand this sentence in one way or in two ways.]

Nino: Dos.
[Two.]

Ex: Dime una de las formas.
[Tell me one of the ways.]

Nino: (Repite la oración.)
[Child repeats sentence.]

Ex: Explícamelo.
[Explain it to me.]

Nino: (Explica mal la oración.)
[(Explains the sentence wrongly.)]

Ex: Estas seguro? (Si el niño contesta "si", seguir con oracion; si el nino con testa "no", pedir otra respuesta.)
[Are you sure? (If the child says "yes" continue; if the child says "no" ask for another answer.)]

Nino: (Explica bien la oración.)
[(Explains the sentence correctly.)]

Ex: Estás seguro? (Si el nino contesta "si", seguir con oracion; si el nino contesta "no", pedir otra respuesta.)
[Are you sure? (If the child says "yes" continue; if the child says "no" ask for another answer.)]

Oracion: Segunda vez.
[Sentence: Second time.]

Ex: La entendiste de la misma manera o de otra manera?
[Did you understand it the same way or another way?]

Nino: De otra manera.
[Another way]

Ex: Explícame la segunda manera como tu entendiste la oración.
[Tell me the other way of understanding the sentence.]
(Si el niño da la misma respuesta que la anterior, pedir otra respuesta.) (Seguir el mismo proceso que antes.)
[(If the child gives the same response as before, ask for another one.)
(Follow same procedure as above.)]

Nino: De la misma manera.
[The same way.]

Ex: Estás seguro?
[Are you sure?]
(Seguir el mismo proceso que antes.)
[(Follow the same procedure.)]

Oracion: Tercera vez. (Mostrar dibujos.)
[Sentence: Third time. (Show drawings.)]

Ex: La entiendes de esta manera? (Enseñar primer dibujo.)
[Do you understand it this way? (Show first drawing.)]

Nino: Si o No.
[Yes o No.]

Ex: La entiendes de esta manera (Enseñar segundo dibujo.)
[Do you understand it this way? (Show second drawing.)]

Nino: Si o No.
[Yes or no.]
(Para el dibujo que contesto "No" averiguar si le falta vocabulario.)
[(For the drawing where the child answered "No", find out if child lacks the necessary vocabulary.)]

* * * * * * * * * * * * * * * * *

NAME: _____ ( )
SCHOOL: _____
DATE: _____

Practice Sentences

Eg. 1. Oscar puso gasolina en el tanque.
(tanque de ejercito, tanque de carro)

Eg. 2. El carpimtero esta almorzando.

Eg. 3. La senora vio los ganchos en el patio.
(ramas, ganchos de ropa)

Eg. 4. El criado va alabar al rey.
(El criado va a lavar al rey.)

Eg. 5. Esa cotorrita es suave.
(Esa cotorrita es su ave.)

Eg. 6. La enfermera lavo al paciente.

Eg. 7. El nino tomo agua del pozo.
(tomo, cogio)

Test Sentences

A.(11) La pluma verde esta en la mesa.
(pluma de pajar, pluma de escibir)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

B.(7) Cuando Claudio entro, Juan se cayo.
(Cuando Claudio entro, Juan se callo.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

C.(20) Mario esta comprando tres naranjas.

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

D.(8) Luis boto y luego recogio la ropa.
(Luis voto y luego recogio la ropa.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

E.(18) El soldado quiere esa bandera.
(amar, querer tener)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

F.(16) Ana esta limpiando la cocina.
(cocina electrica, cocina(lugar))

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

G.(14) A Luisa se le rompio la muneca.
(muneco de mano, muneca de jugar)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

H.(19) Lucia esta comiendo pescado.

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

I.(15) En California se ven muchas estrellas.
(estrellas de cine, estrellas en el cielo)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

J.(9) Papa se fue de casa con su amigo.
(Papa se fue de caza con su amigo.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

K.(4) Elena va a pagar las velas.
(Elena va a apagar las velas.)

1) _____

2)_____

_____

_____

< > < > (L) (R)

COMMENTS:

L.(21) Los dos amigos estan juganfo tennis.

1)_____

_____

2)_____

_____

< > < > (L) (R)

COMMENTS:

M.(6) Mis dos amigos se fueron a casar.
(Mis dos amigos se fueron a cazar.)

1)_____

_____

2)_____

_____

< > < > (L) (R)

COMMENTS:

N.(13) El obrero pinto el banco de gris.
(banco de sentarse, banco de dinero)

1)_____

_____

2)_____

_____

< > < > (L) (R)

COMMENTS:

O.(23) Pablo se esta asoleando en la playa.

1)_____

_____

2)_____

_____

< > < > (L) (R)

COMMENTS:

P.(3) Jose se paro y limpio los jugetes.
(Jose separo y limpio los jugetes.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

Q.(1) Rene se escondio del agente.
(Rene se escondio de la gente.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

R.(10) Elena vio las cartas de Maria.
(Naipes, cartas que se escriben)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

S.(17) El musico toco la guitarra.
(tentar, hacer musica)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

T.(22) En la carrtera hay dos tuneles.

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

U.(2) El loro esta en la cueva.
(El oro esta en la cueva.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

V.(5) La costurera va a cortar la falda.
(La costurera va a acortar la falda.)

1) _____

2) _____

< > < > (L) (R)

COMMENTS:

W.(12) Las hojas se cayeron al piso.
(hojas de papel.hojas de planta)

1) _____

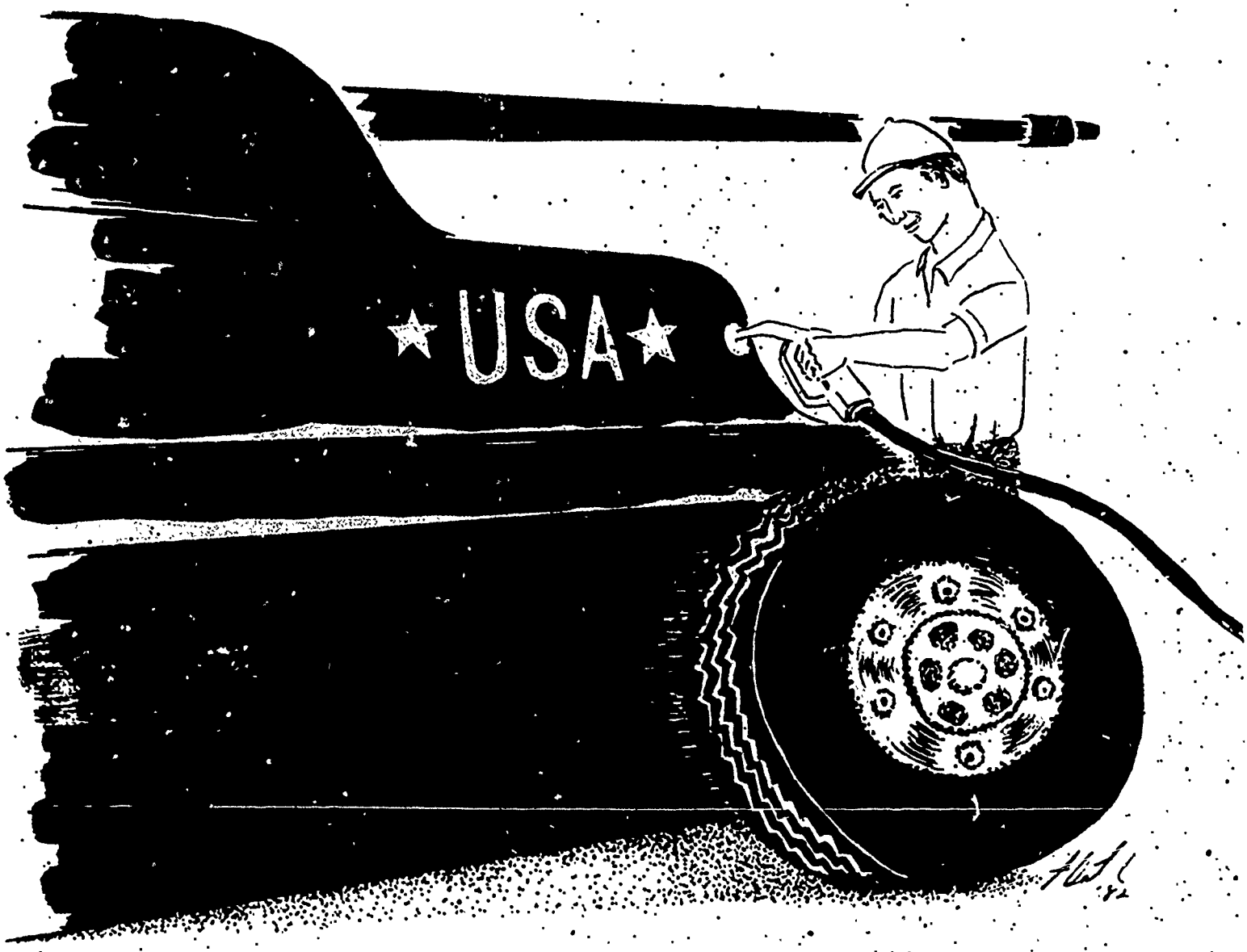
2) _____

< > < > (L) (R)

COMMENTS:

PICTURES

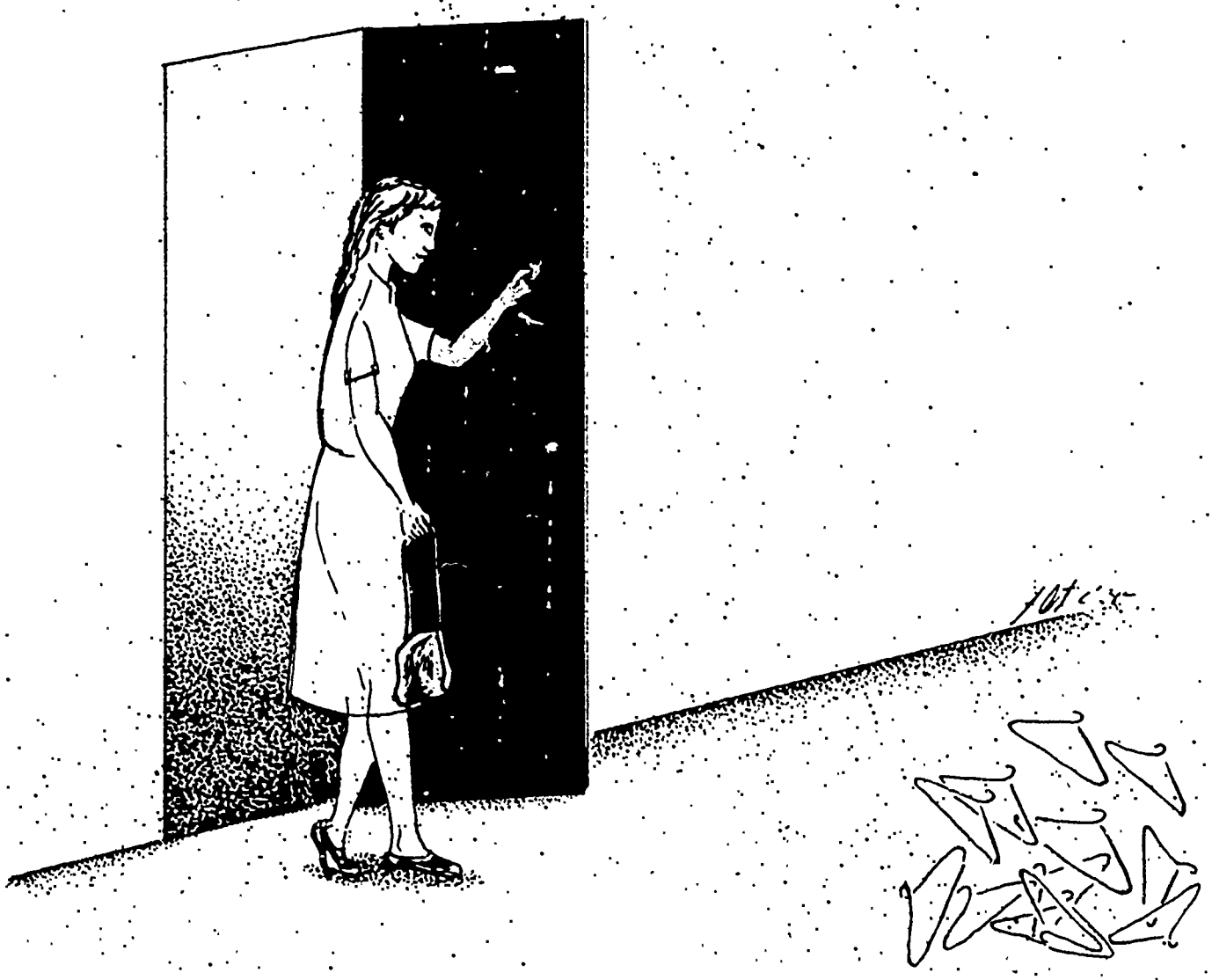
EG. 1 LEFT



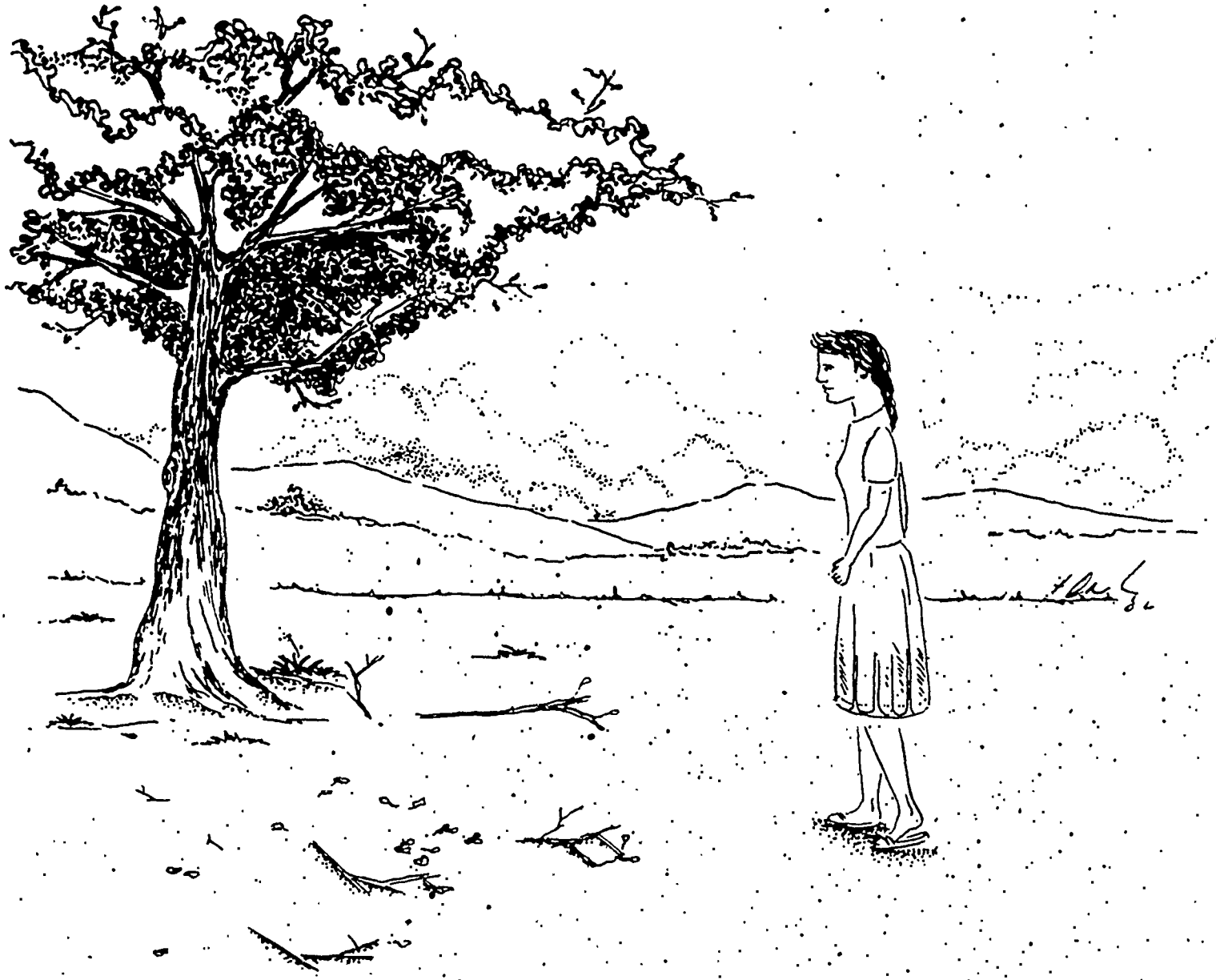
EG. 1 RIGHT

EG. 2 LEFT

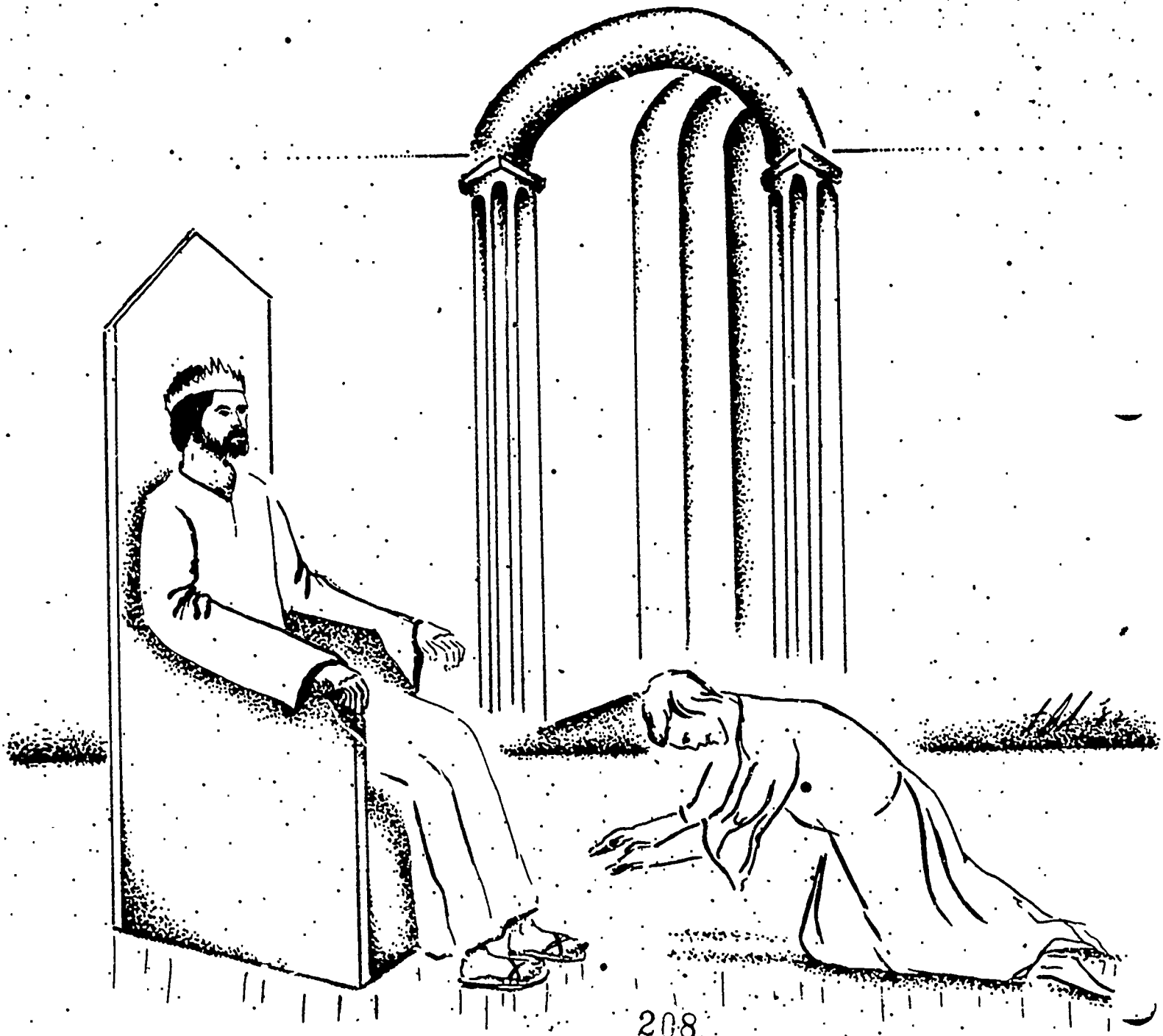
EG. 2 RIGHT



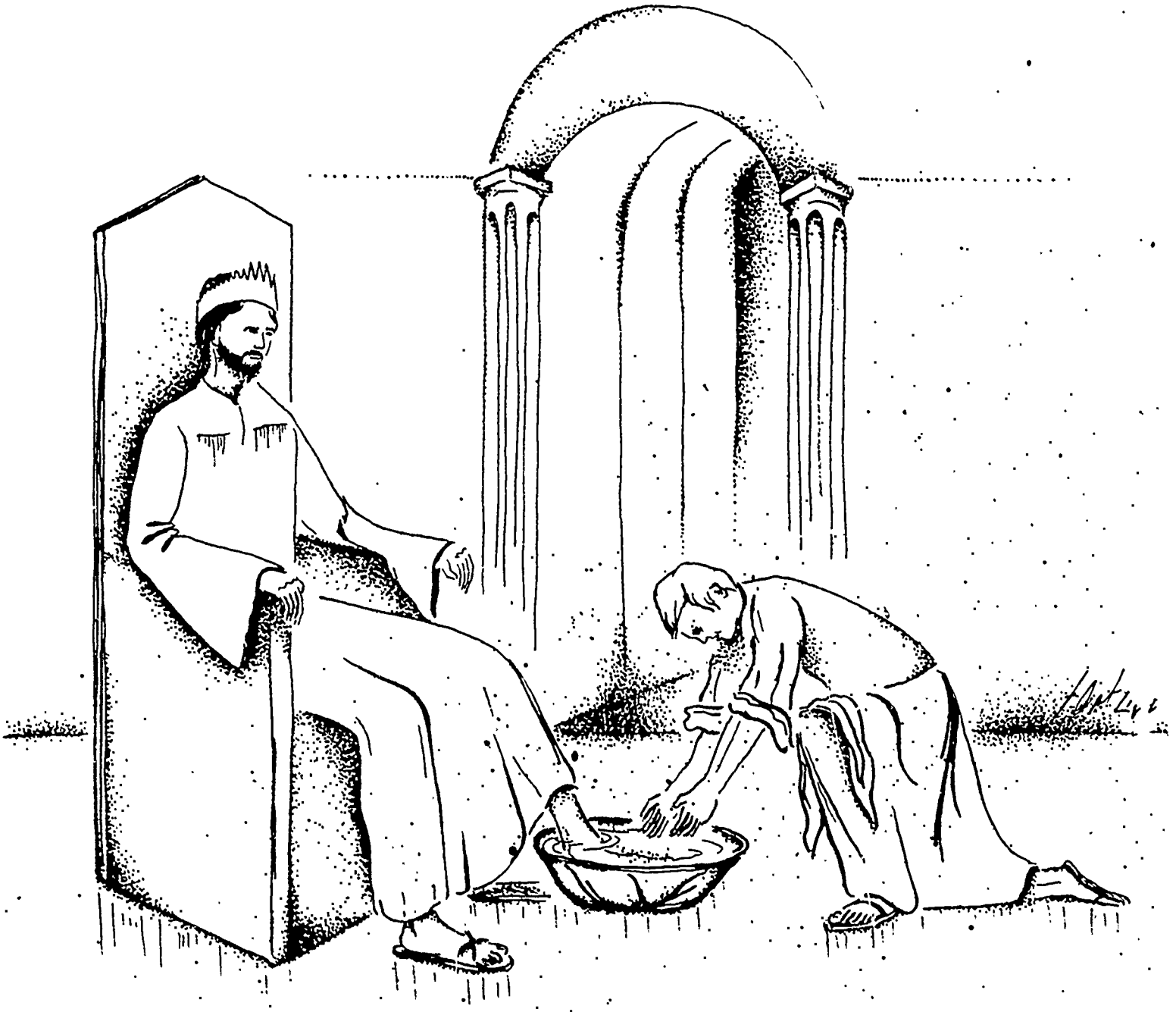
EG. 3 RIGHT



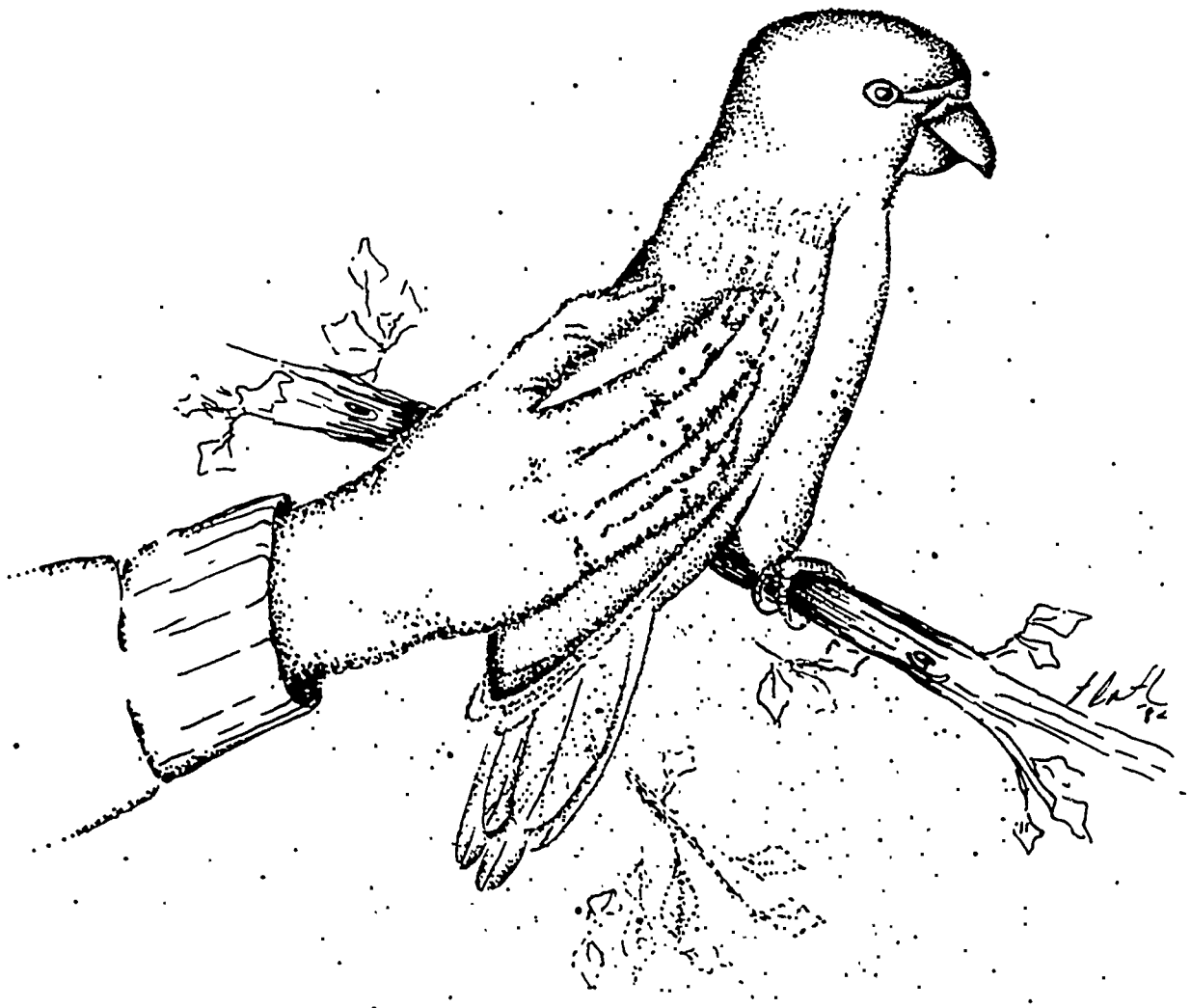
EG. 4 LEFT



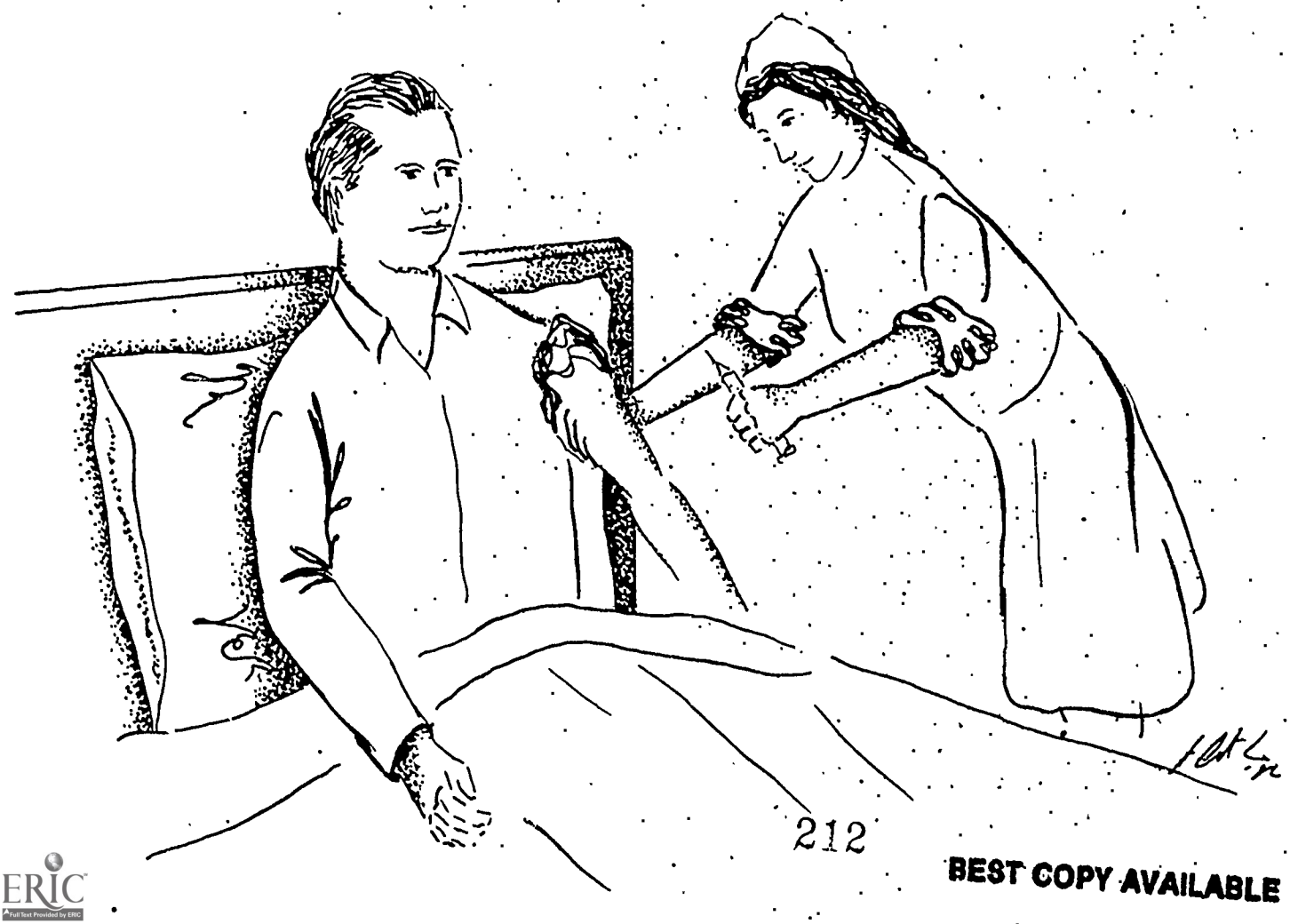
EG. 4 RIGHT



EG. 5 RIGHT

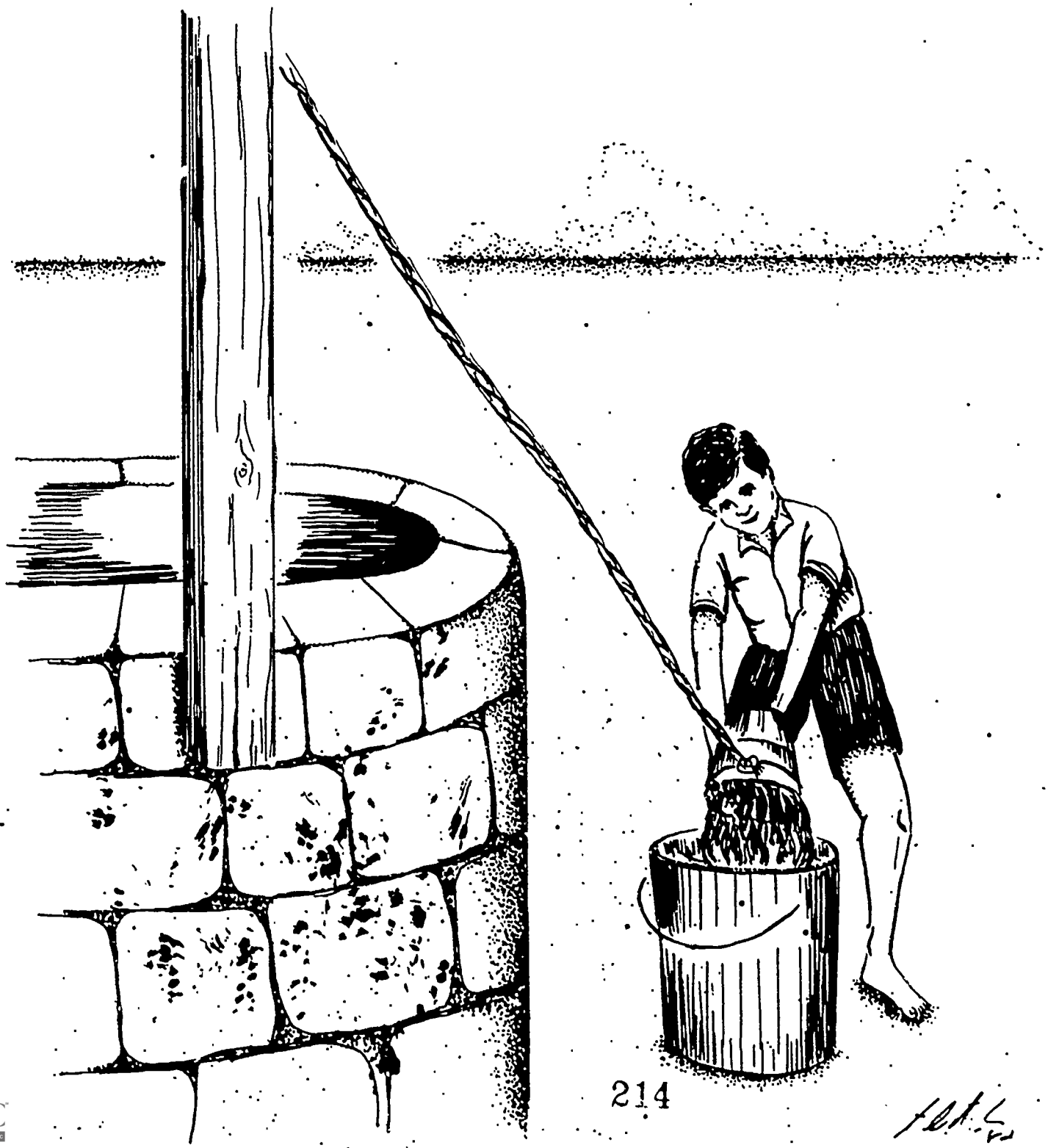


EG. 6 LEFT

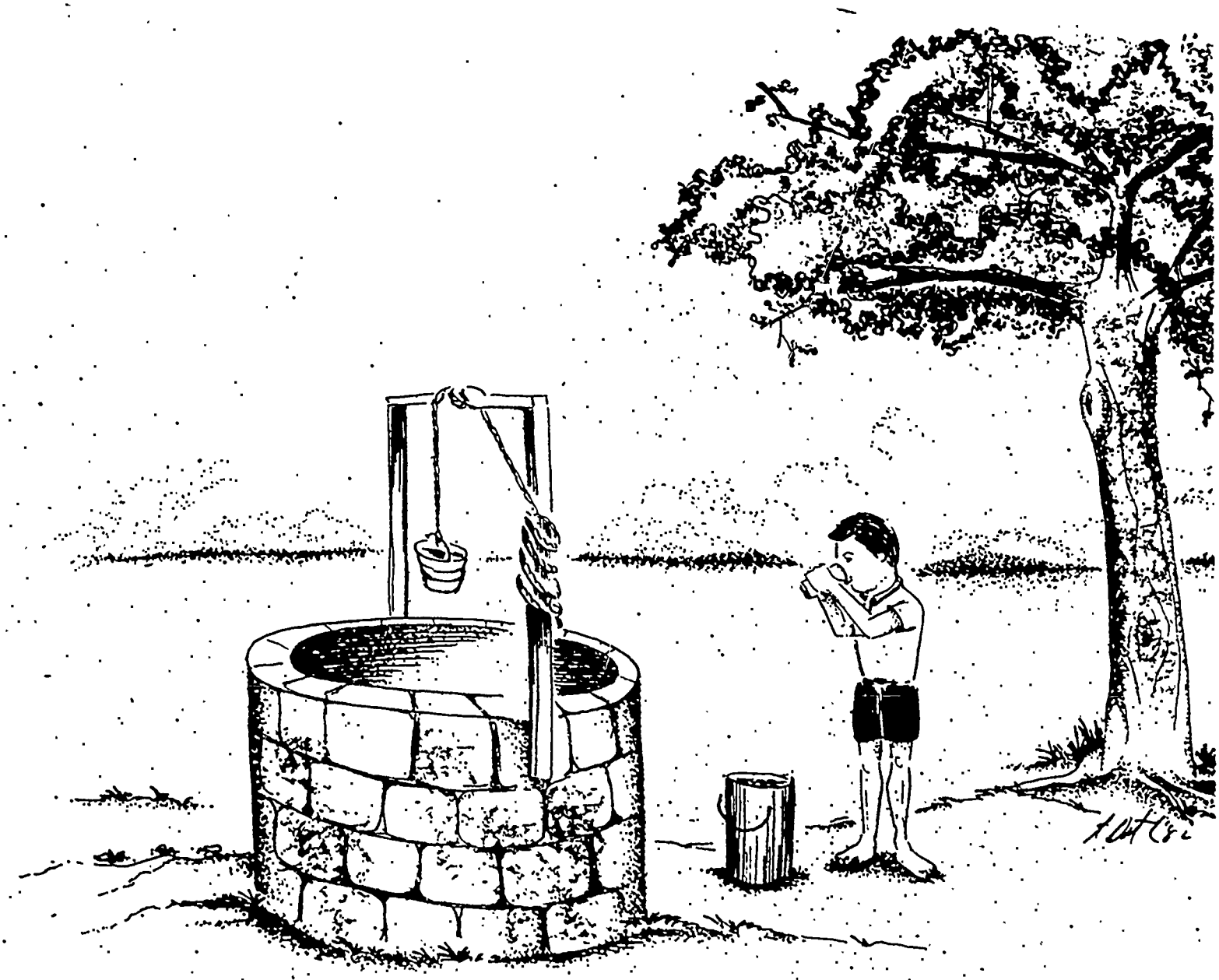


EG. 6 RIGHT

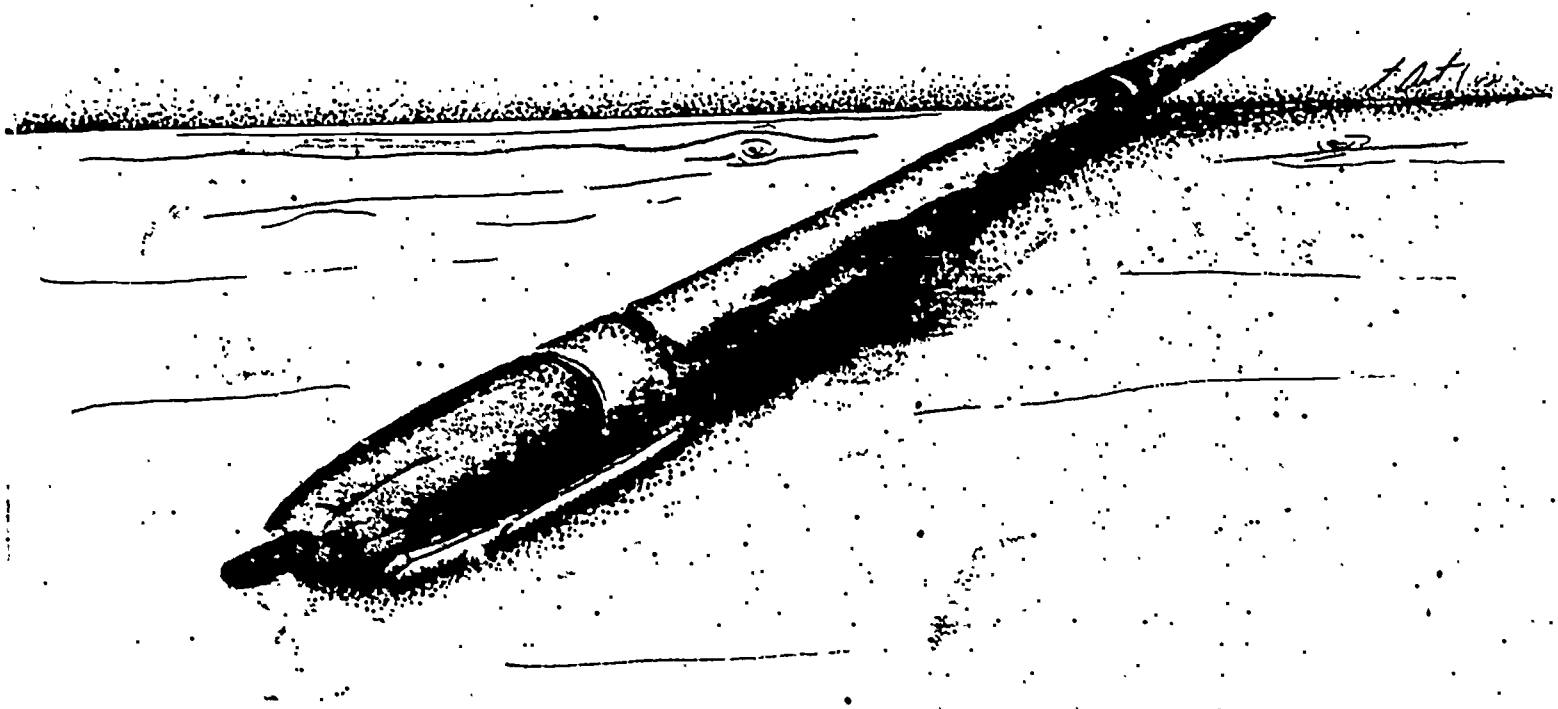
EG. 7 LEFT



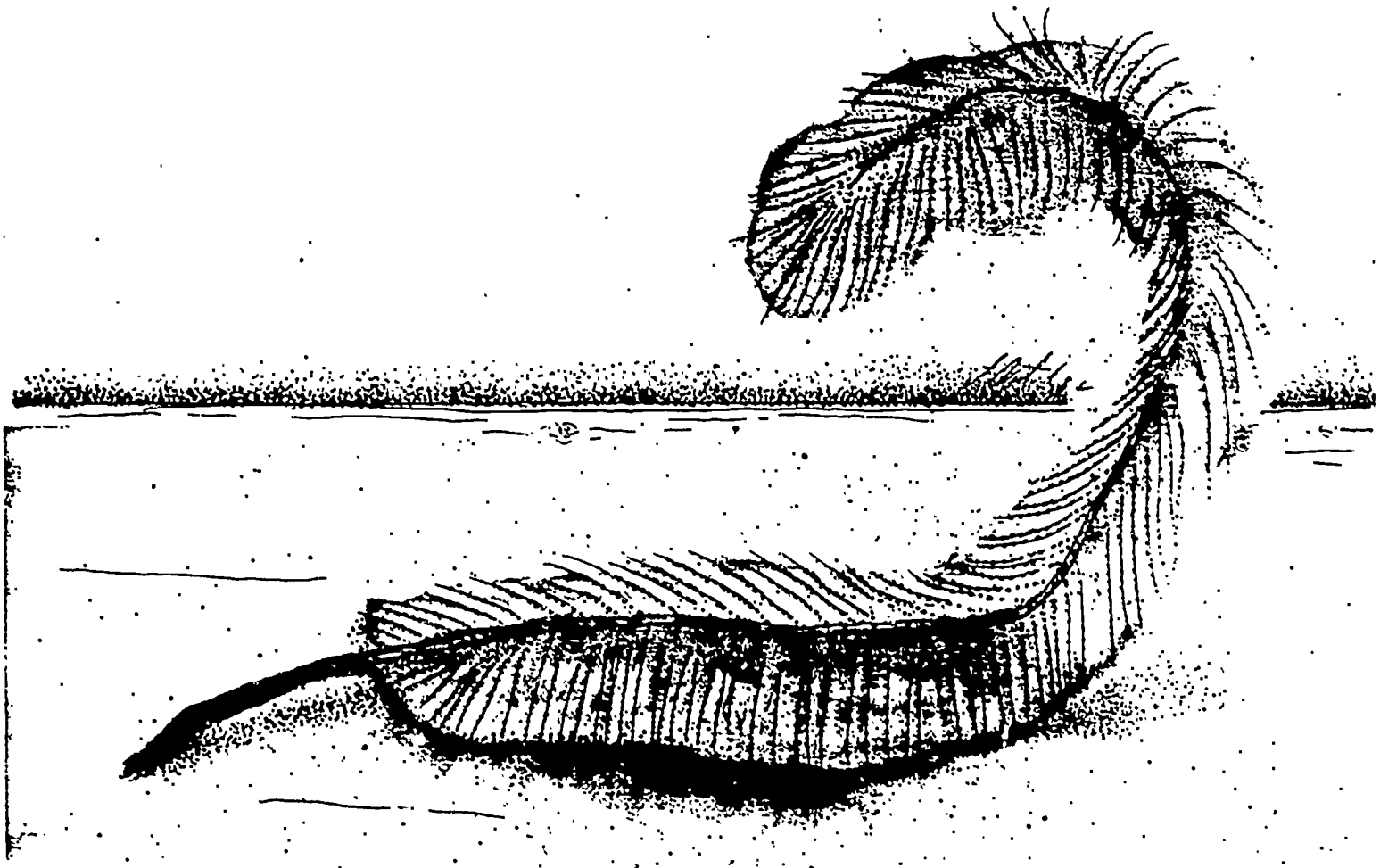
EG. 7 RIGHT

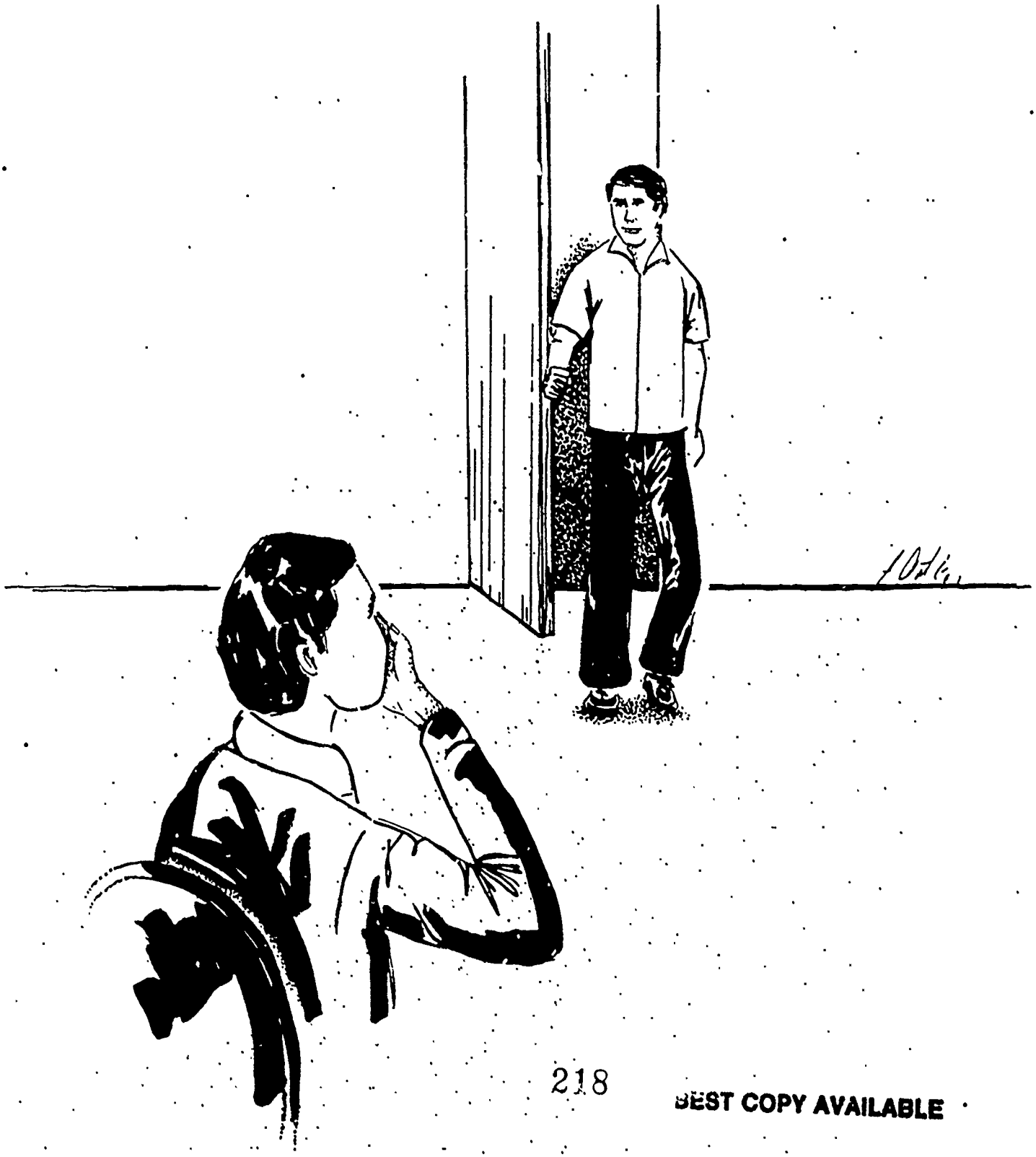


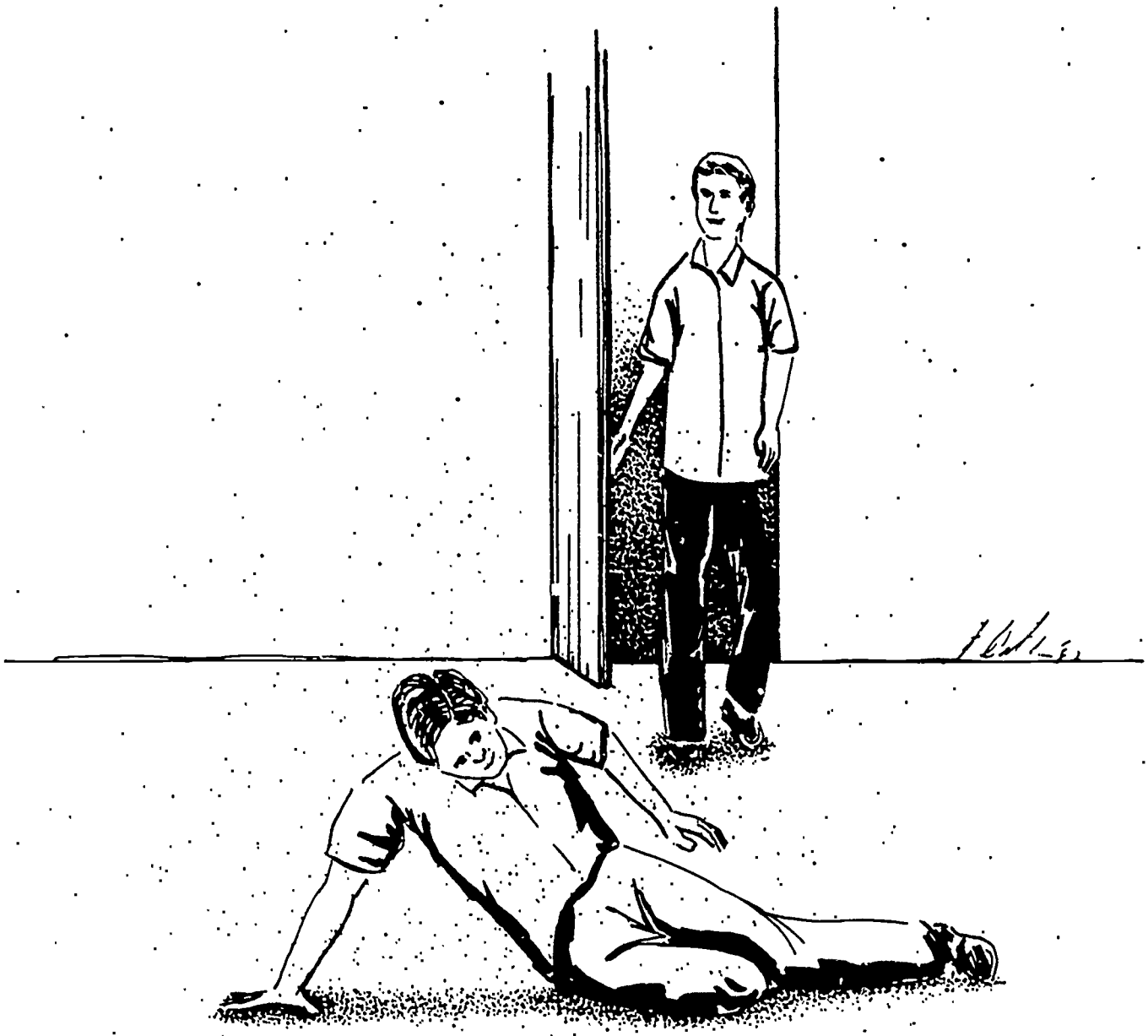
A - LEFT

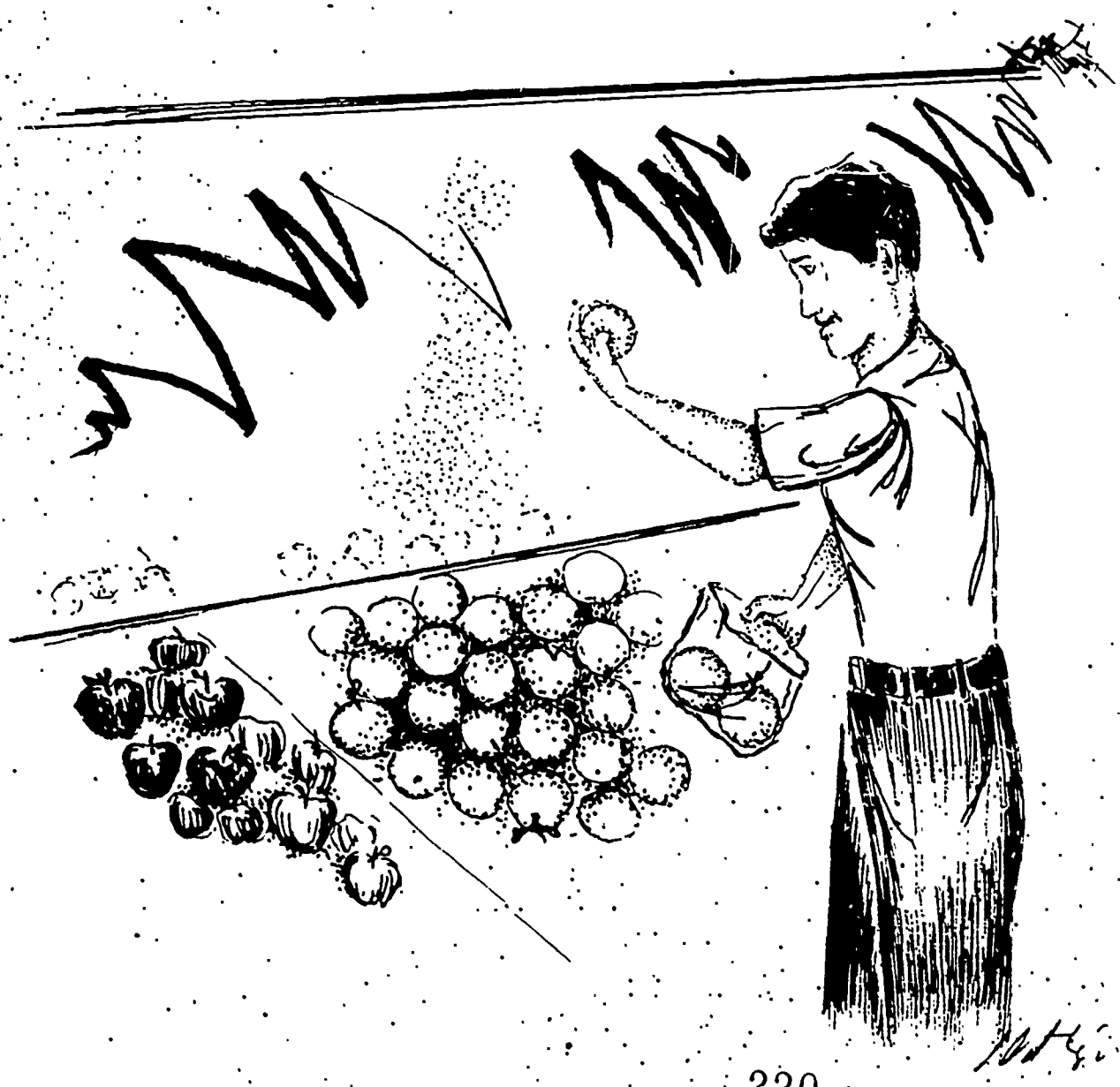


A - RIGHT

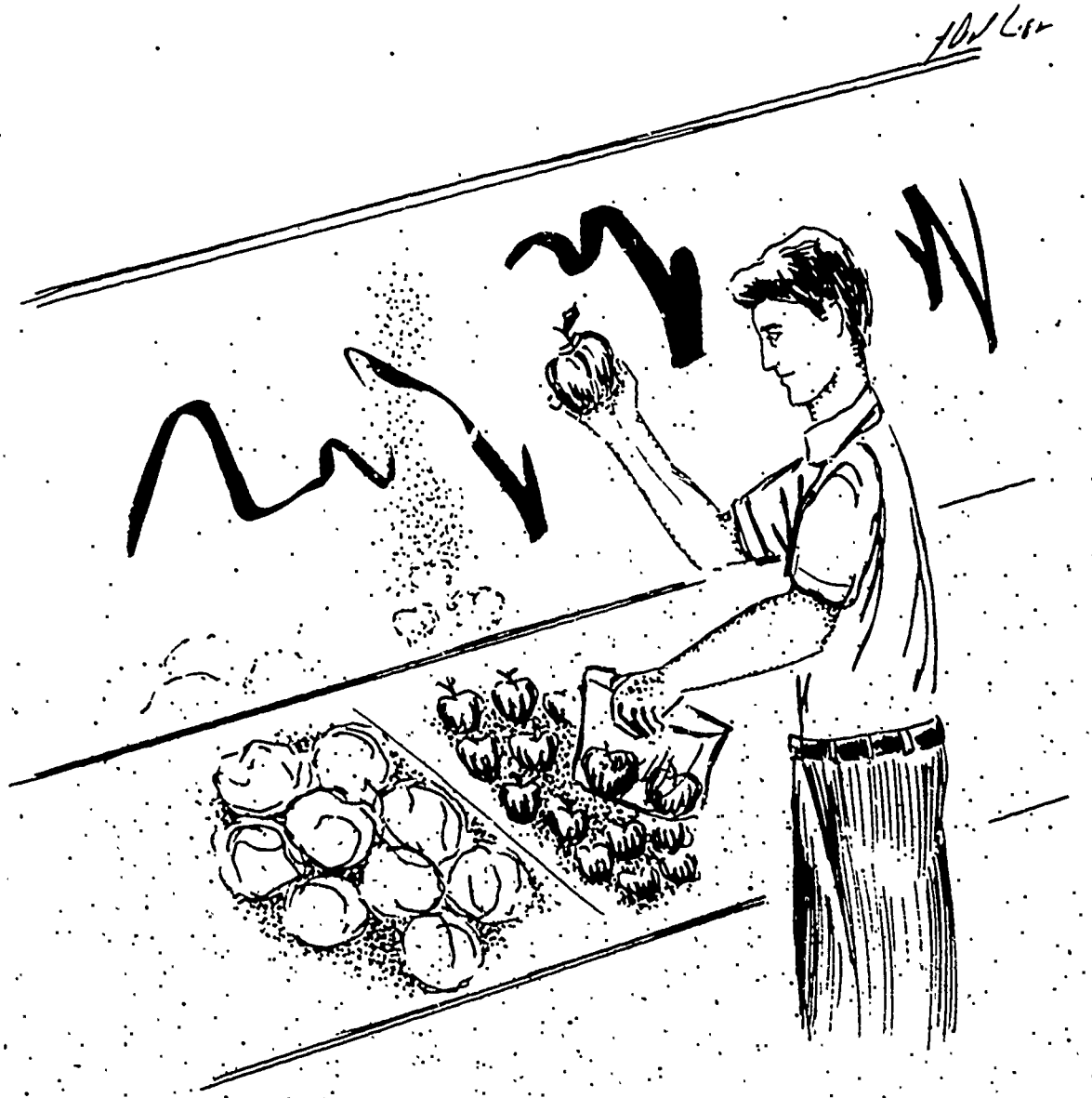




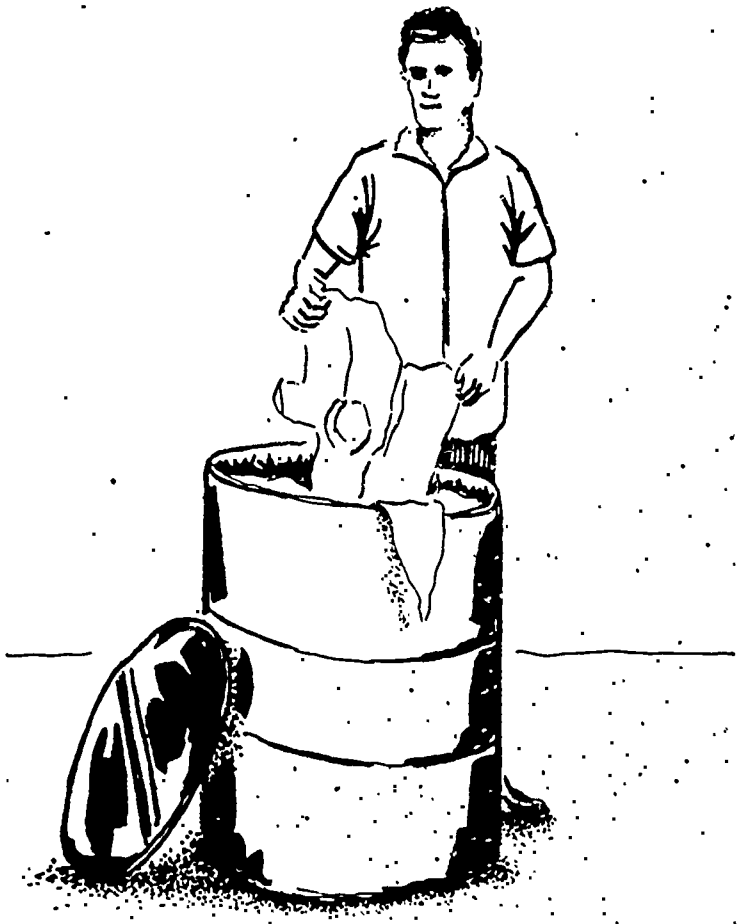


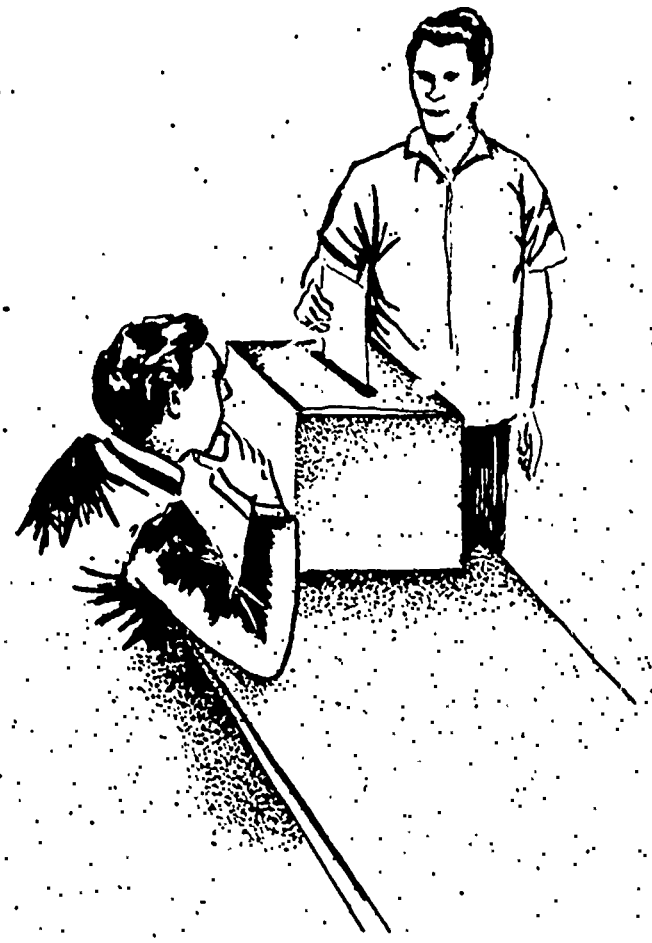


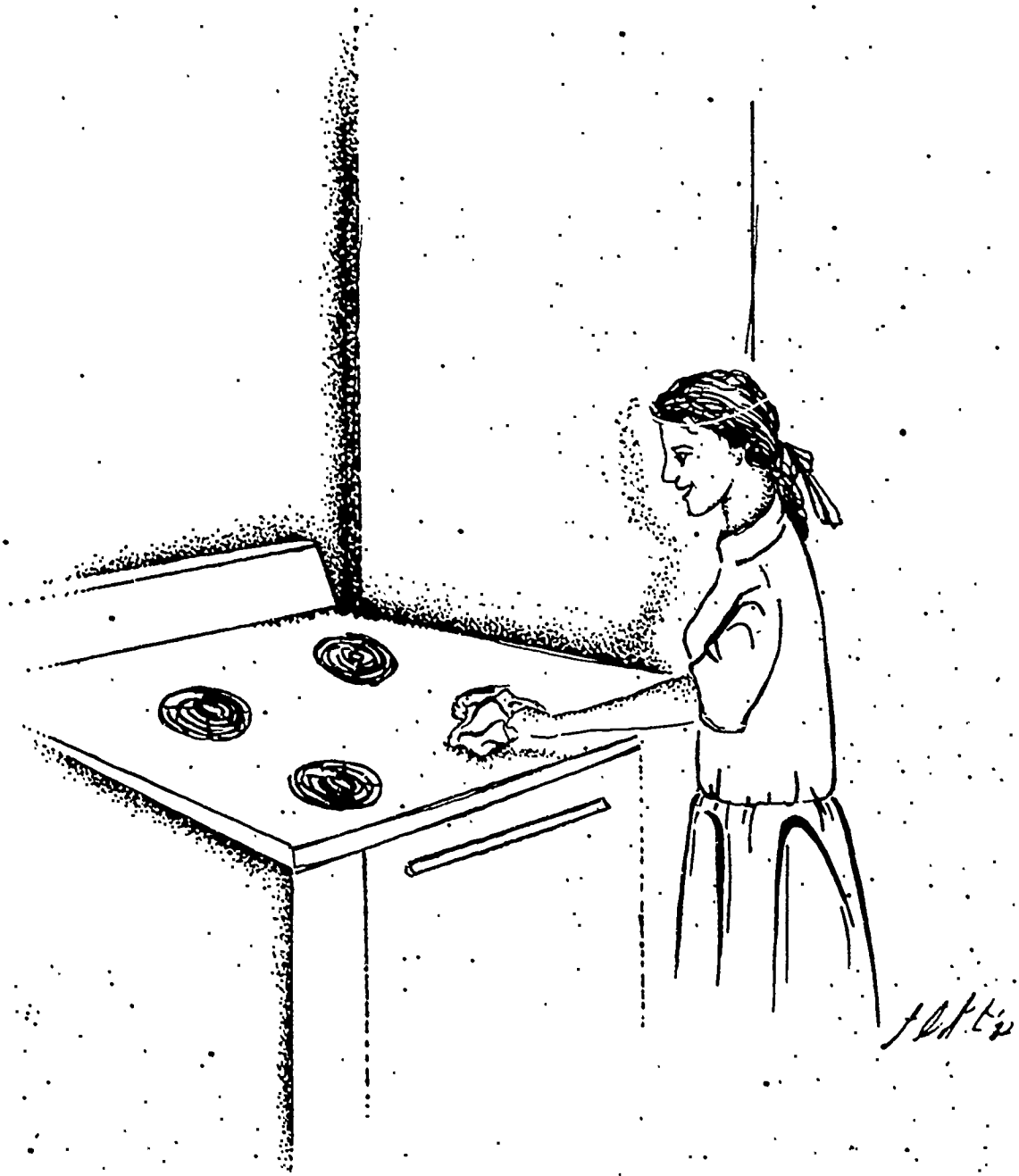
C - RIGHT

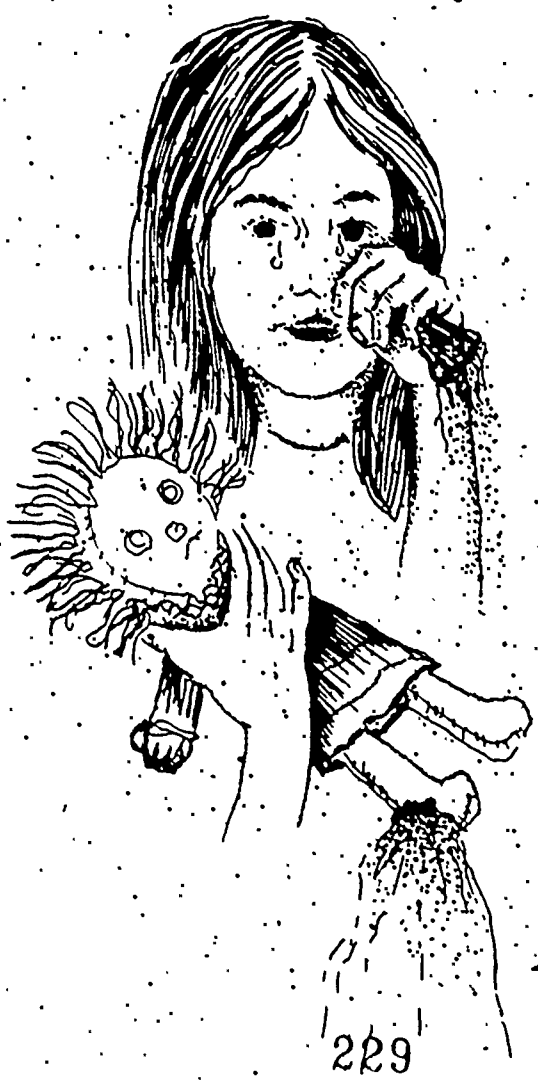


D - LEFT

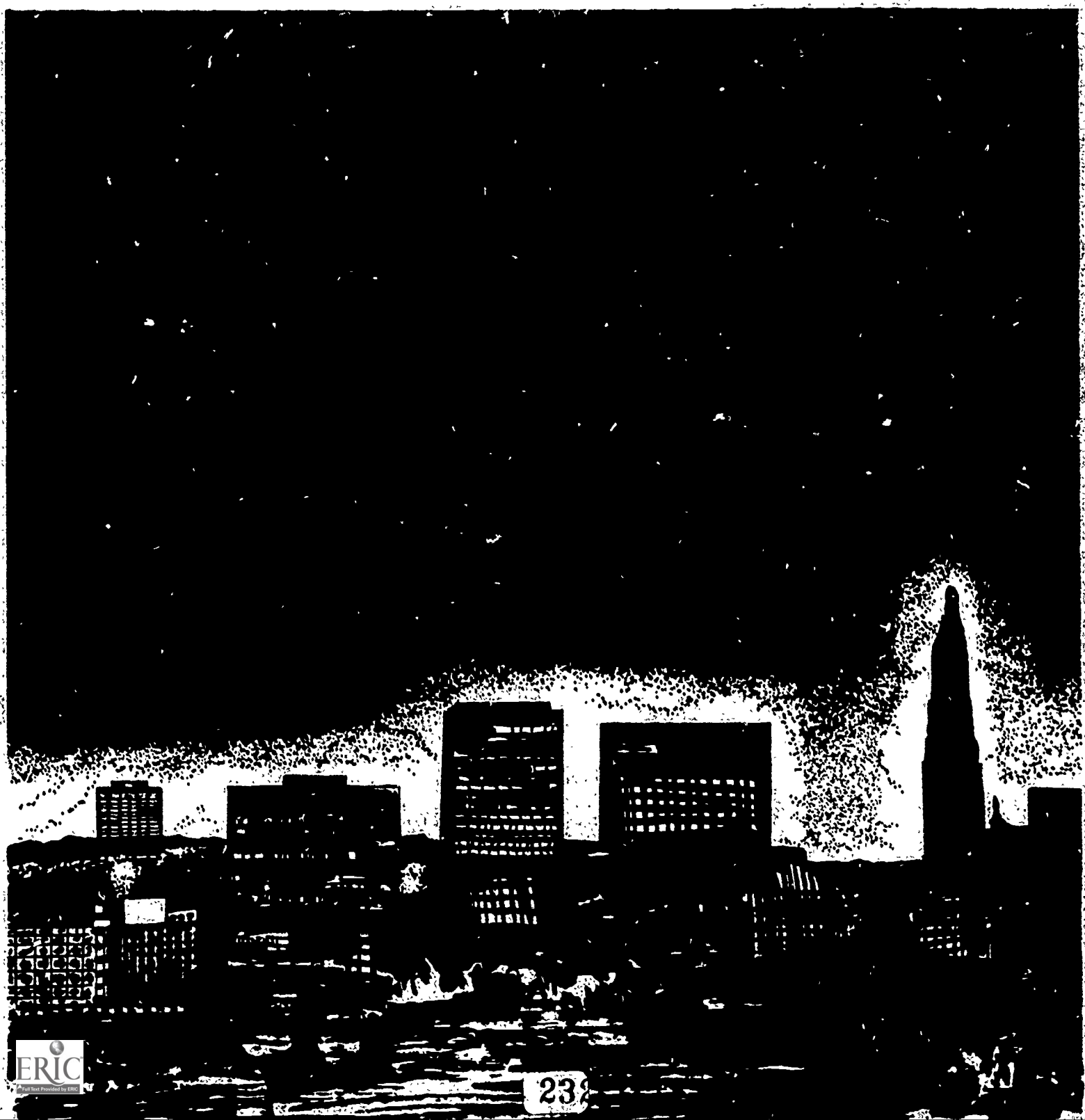


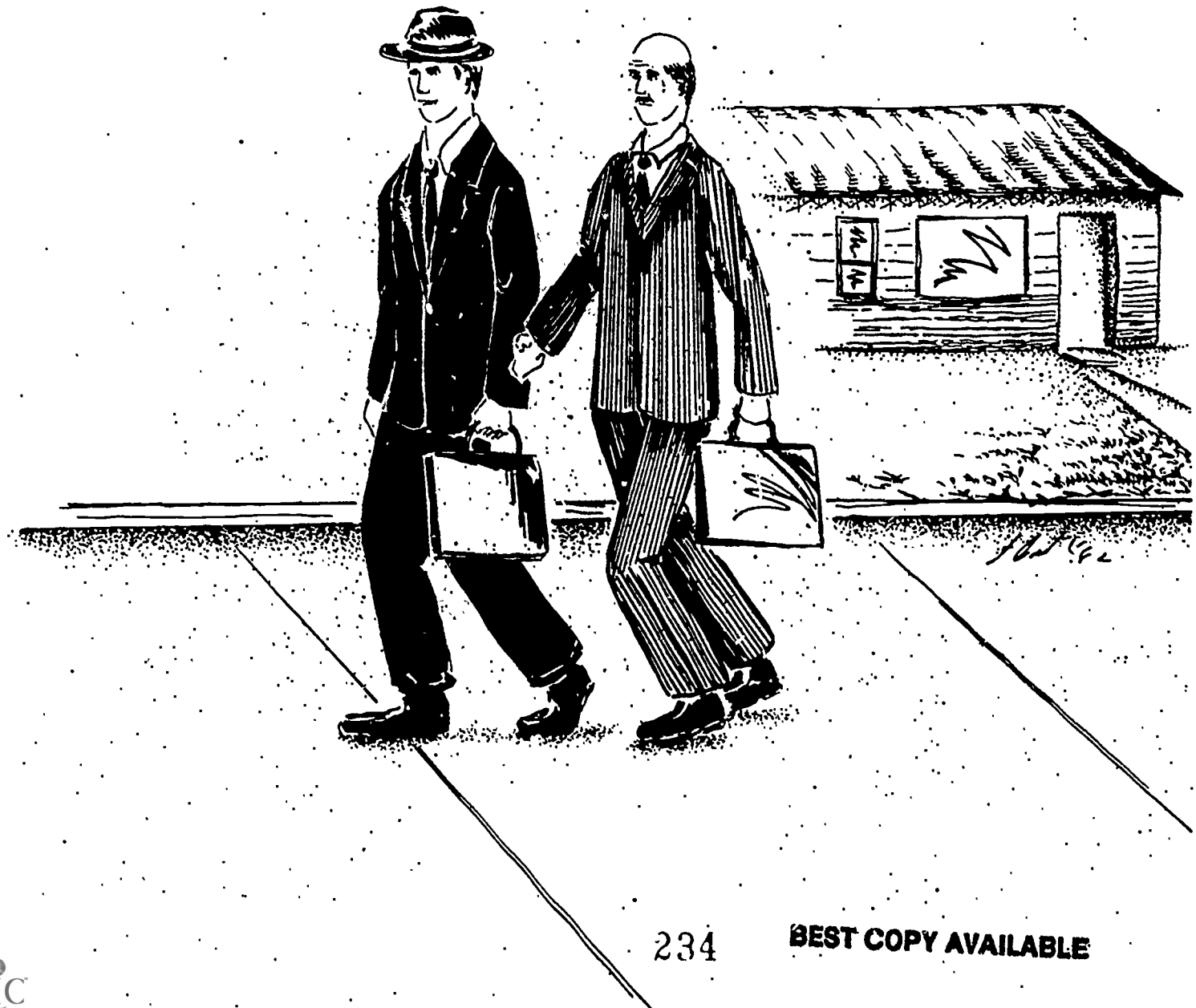




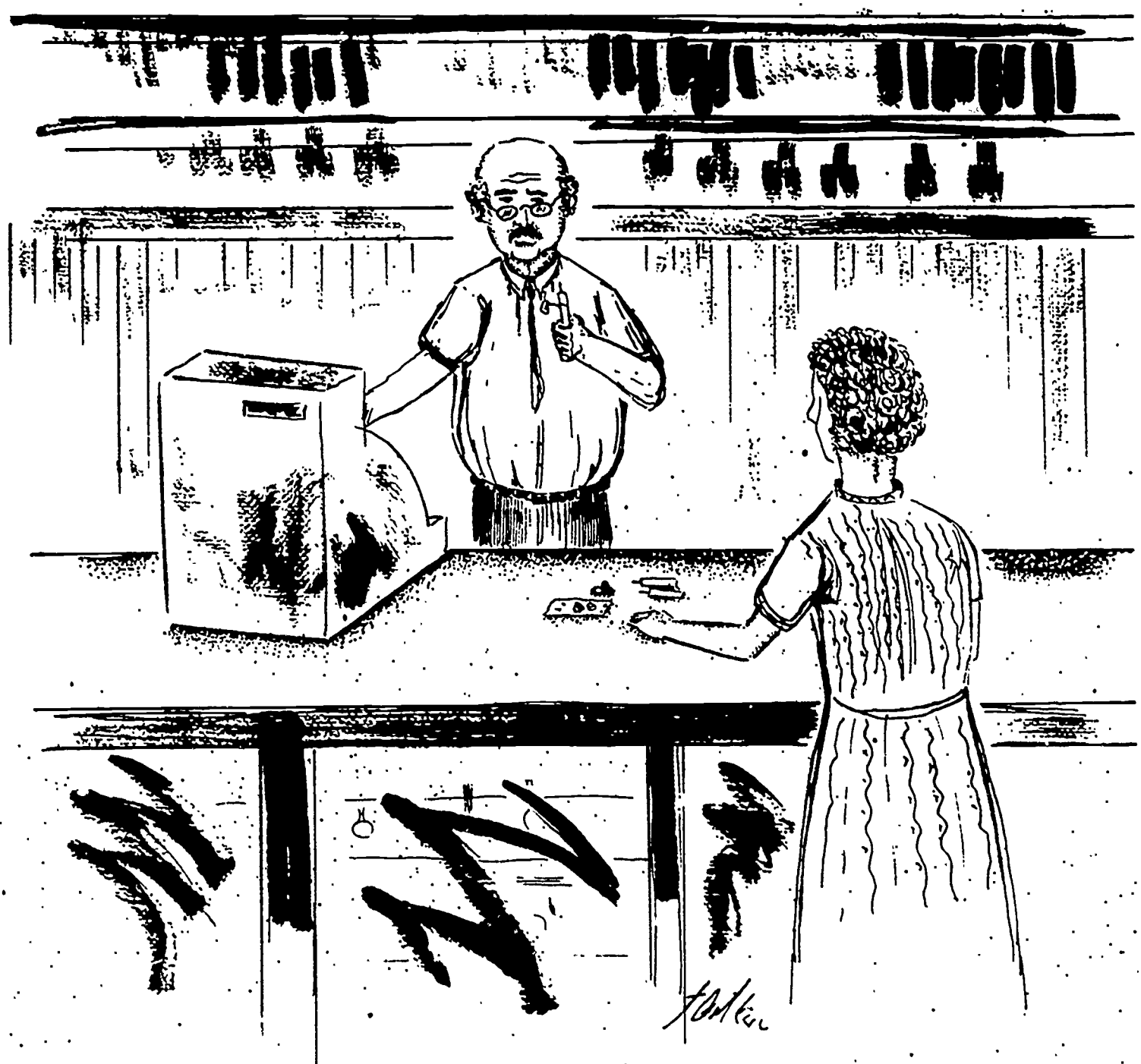


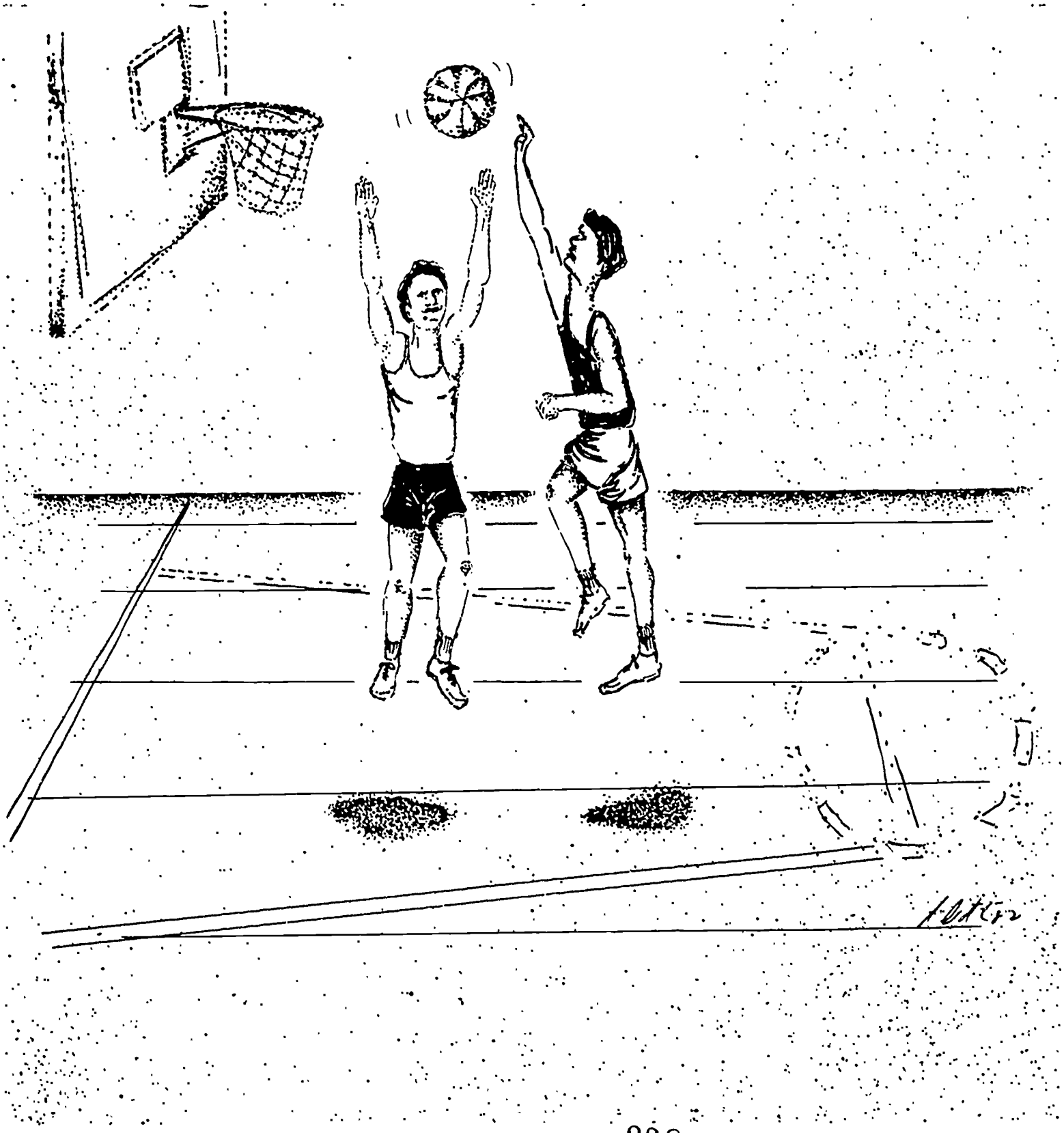
H - LEFT

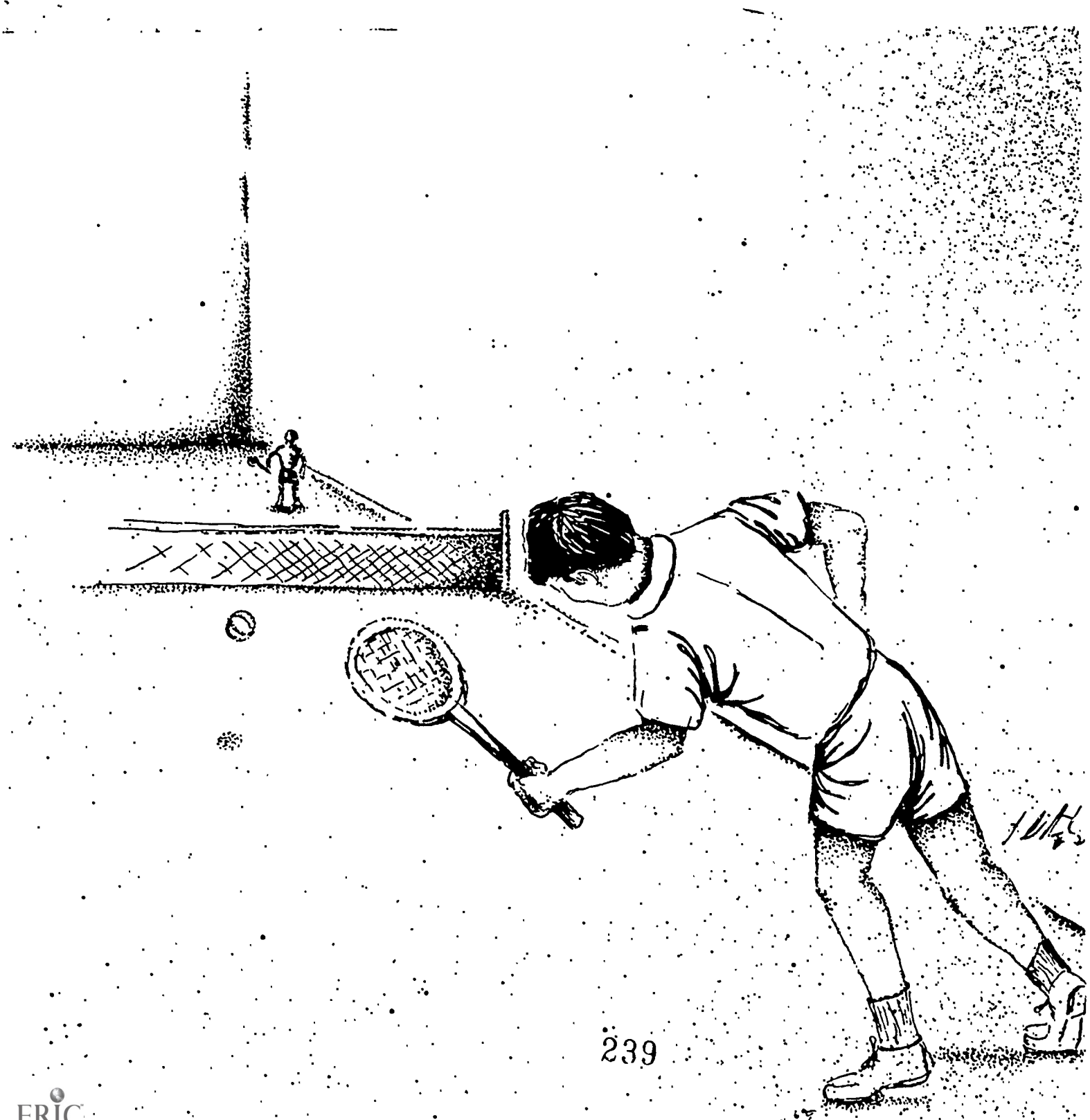




J - RIGHT

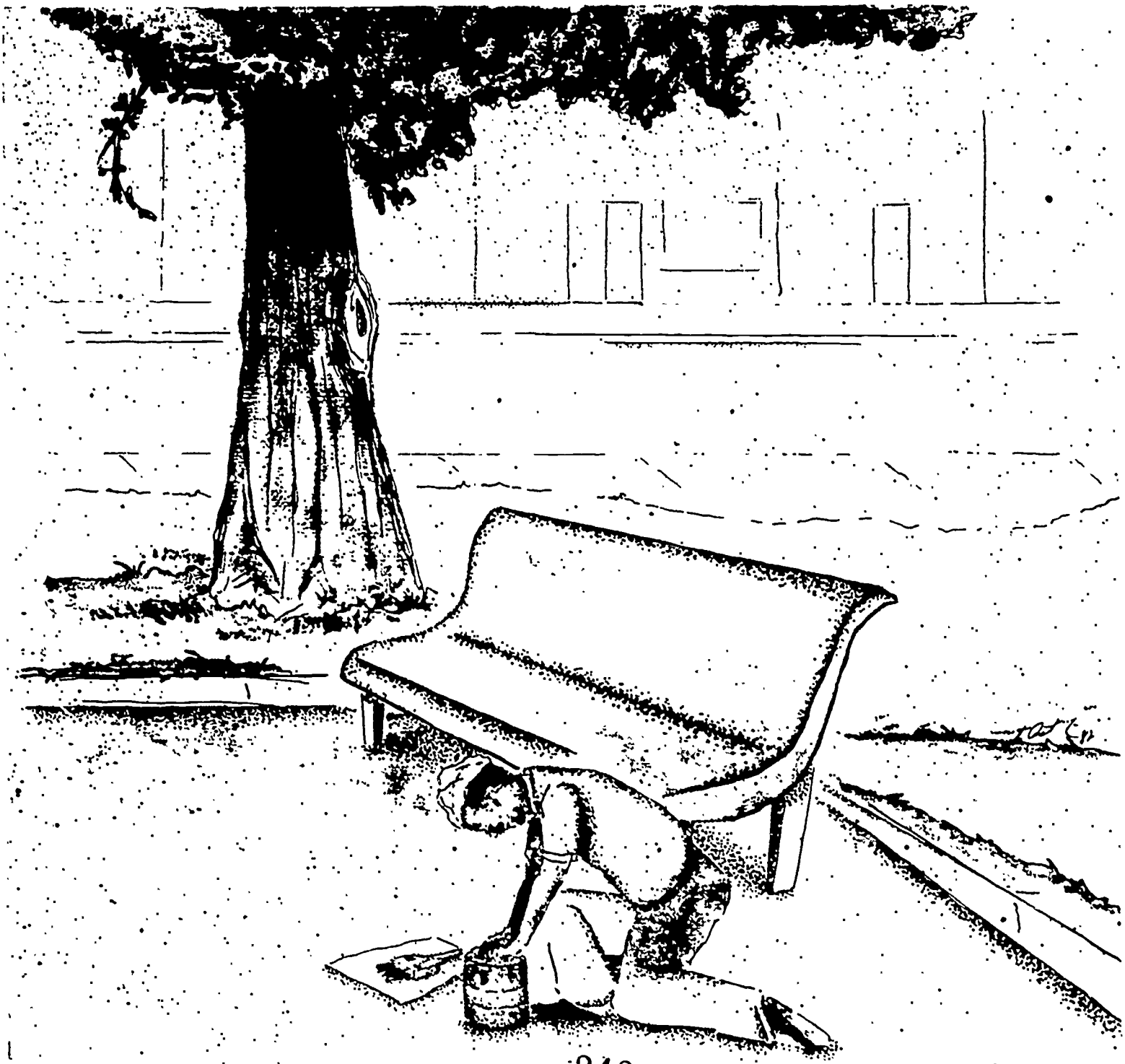


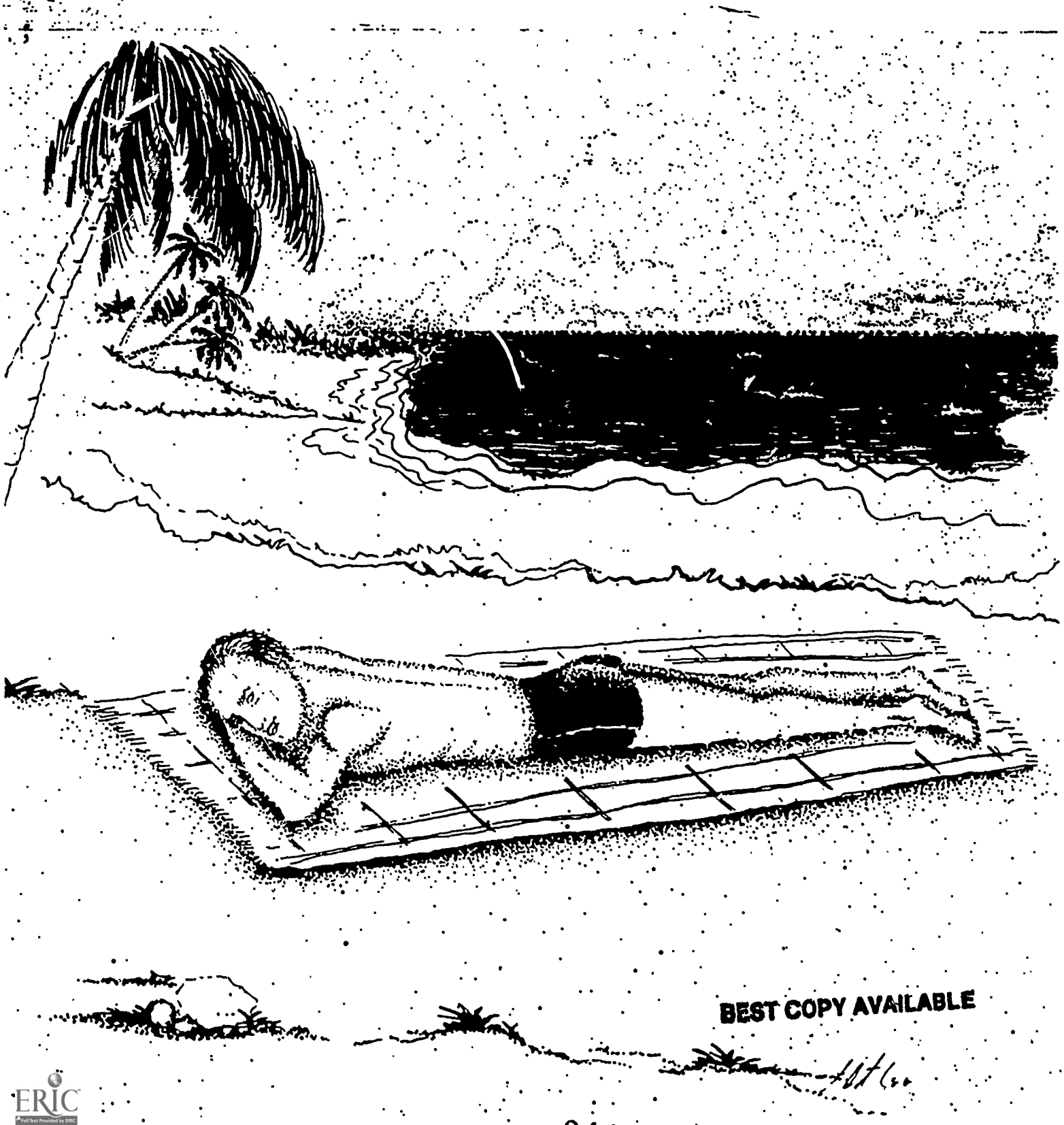


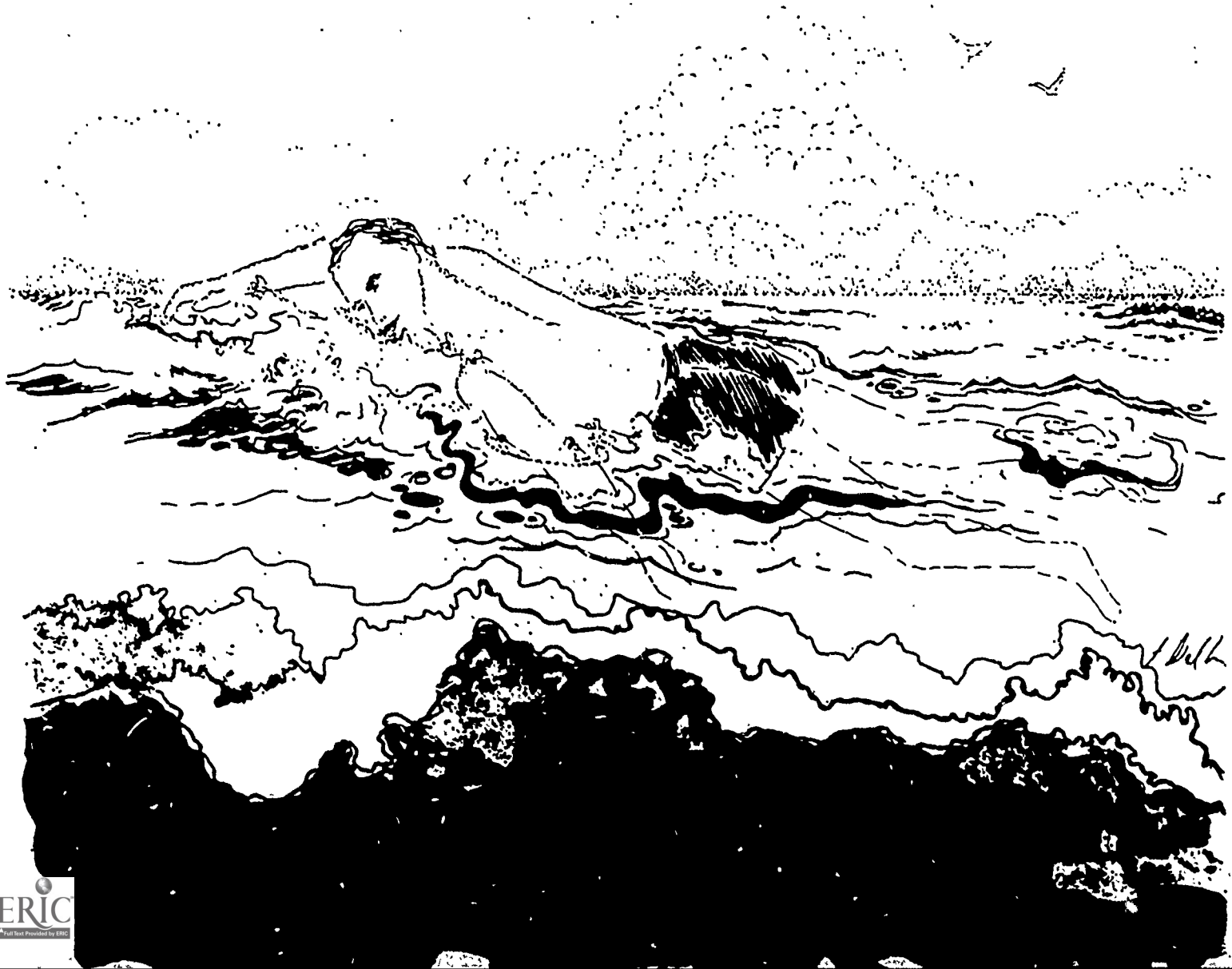


M - LEFT

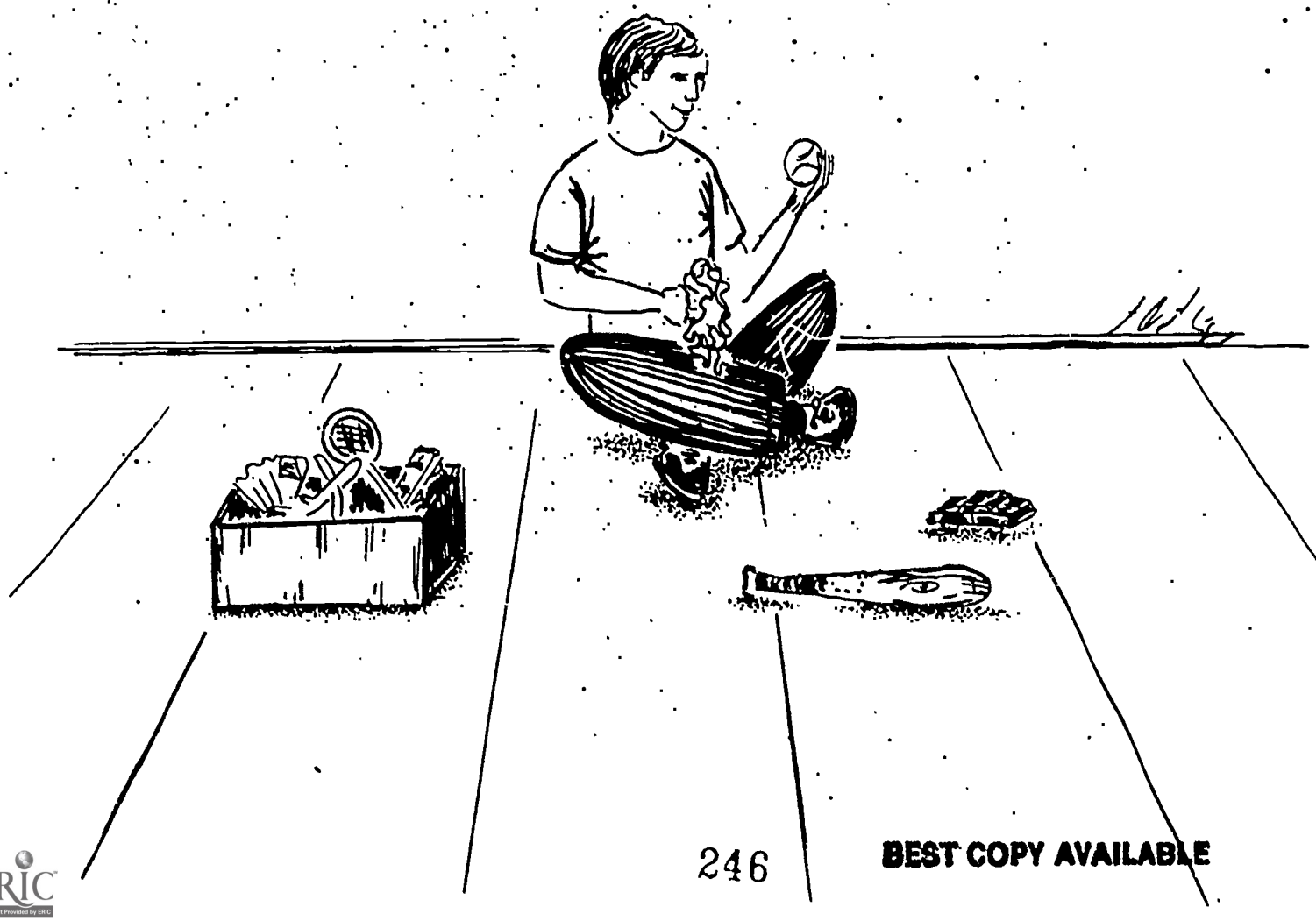
N - LEFT



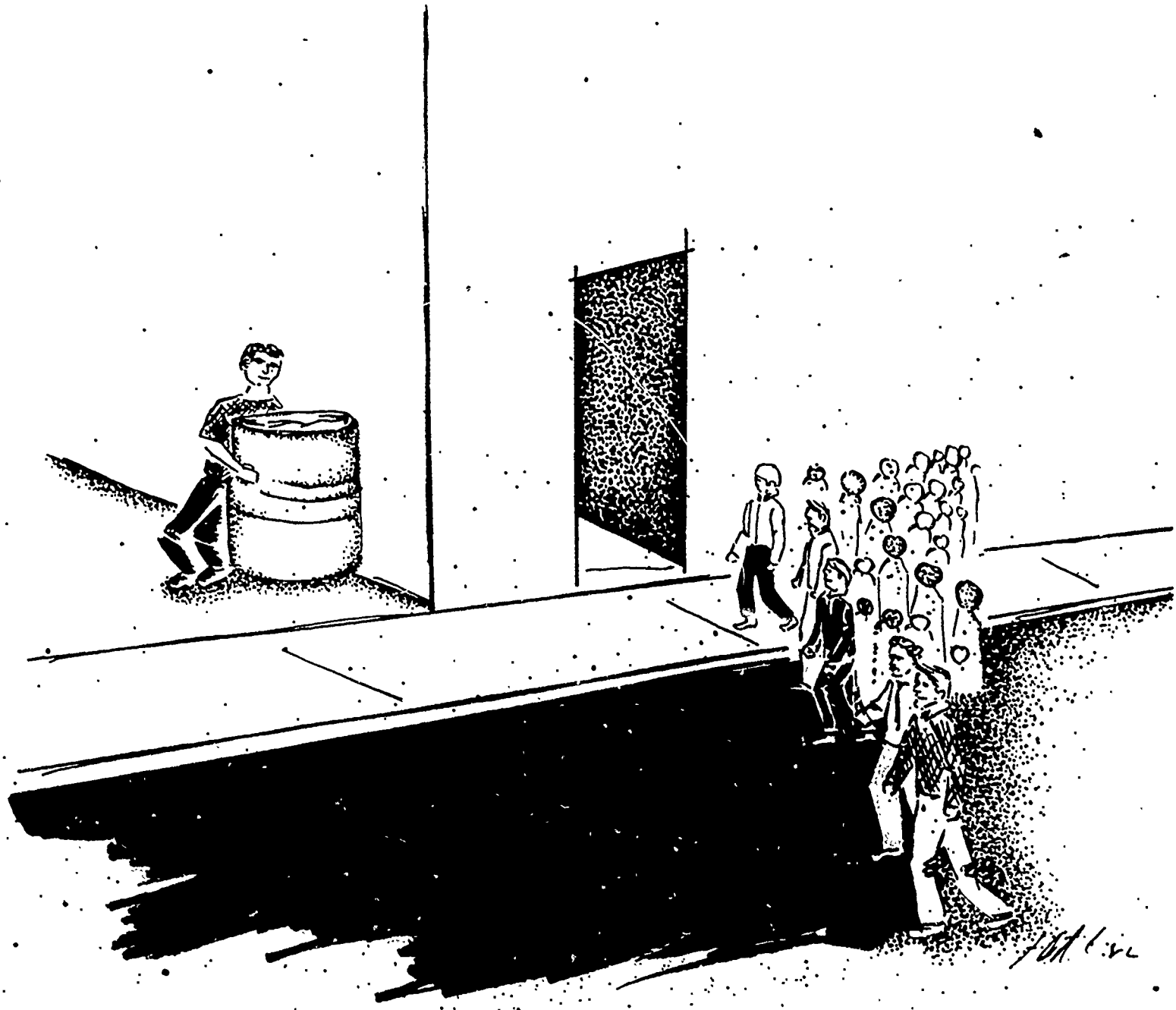




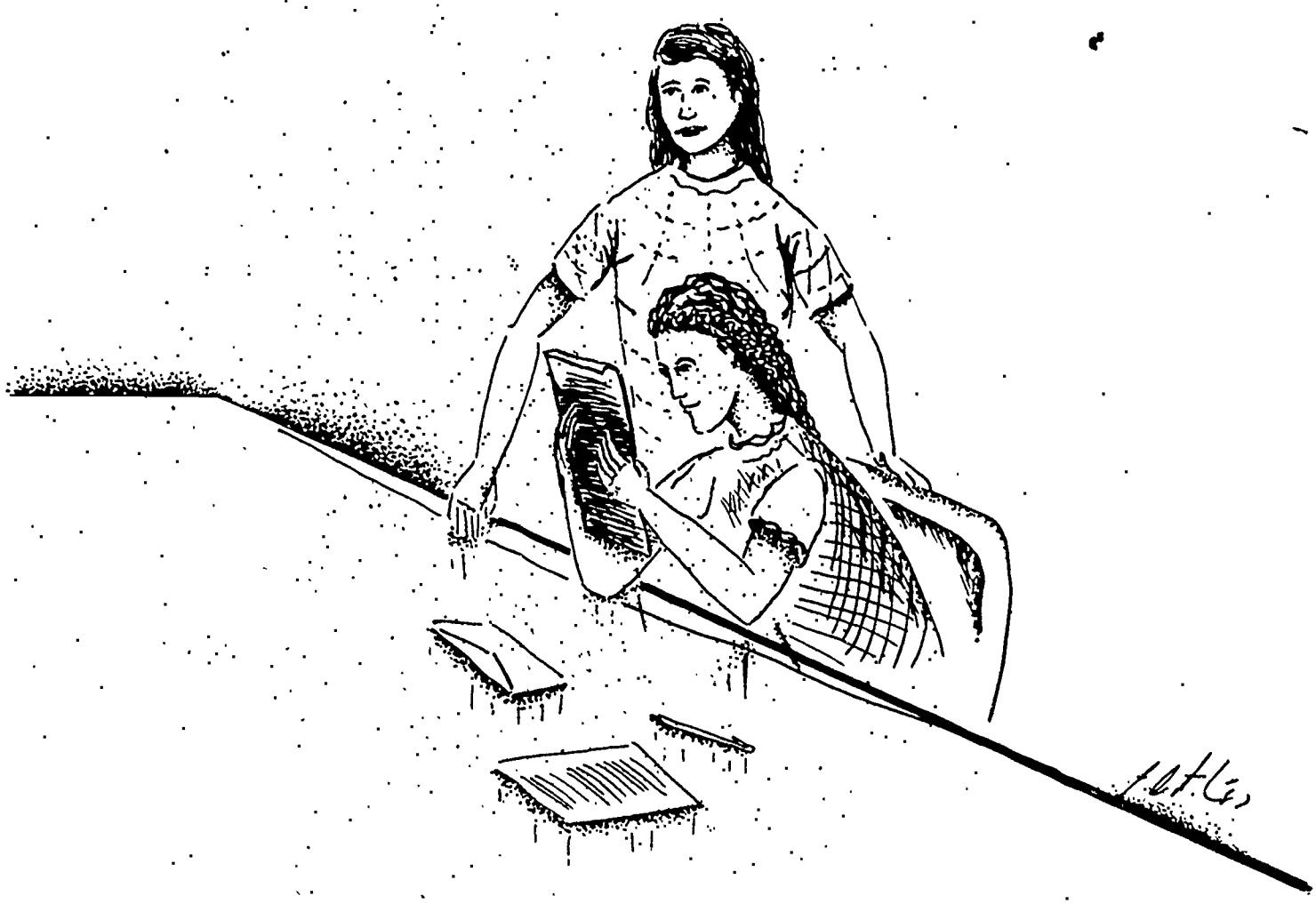
P - LEFT

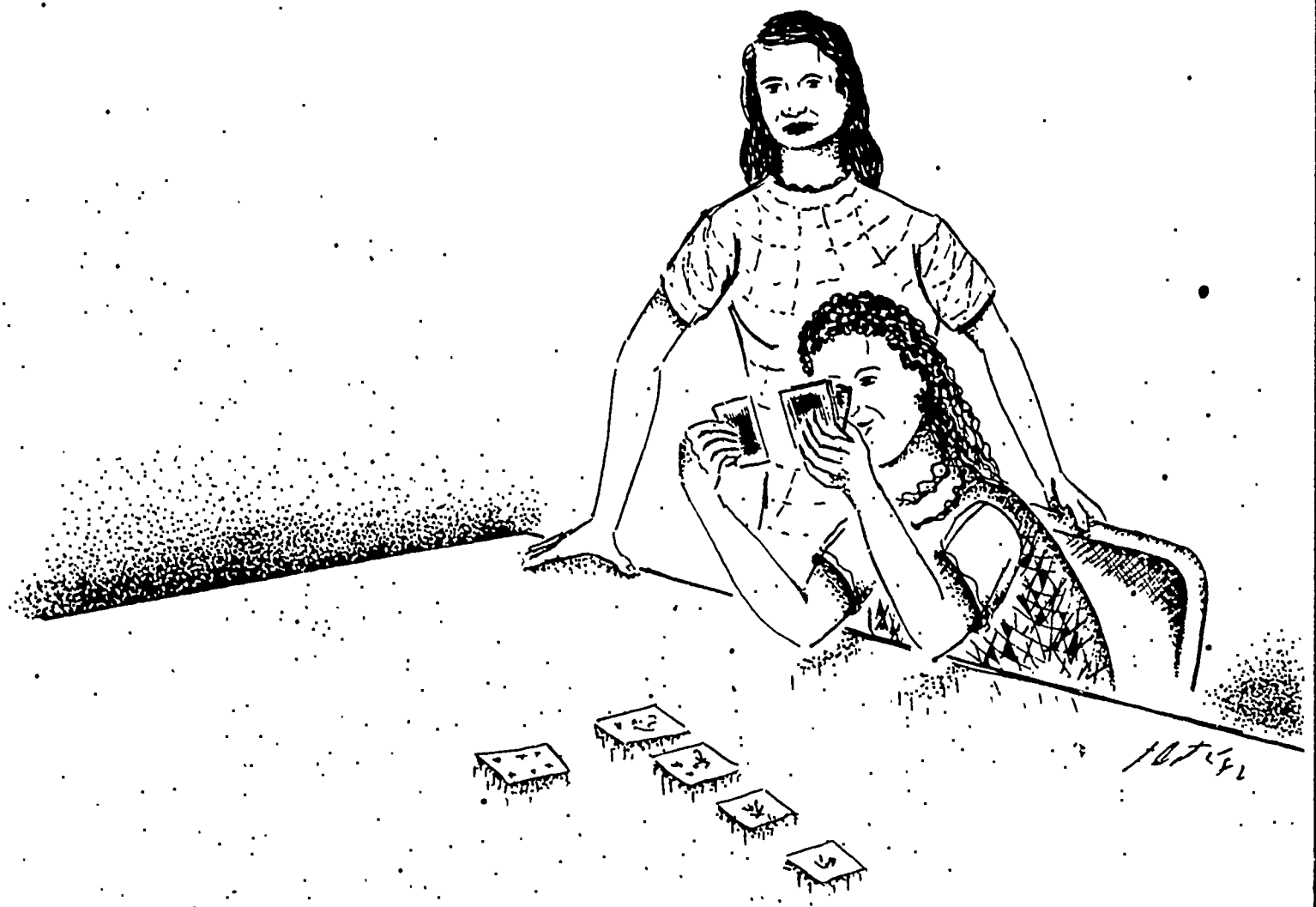


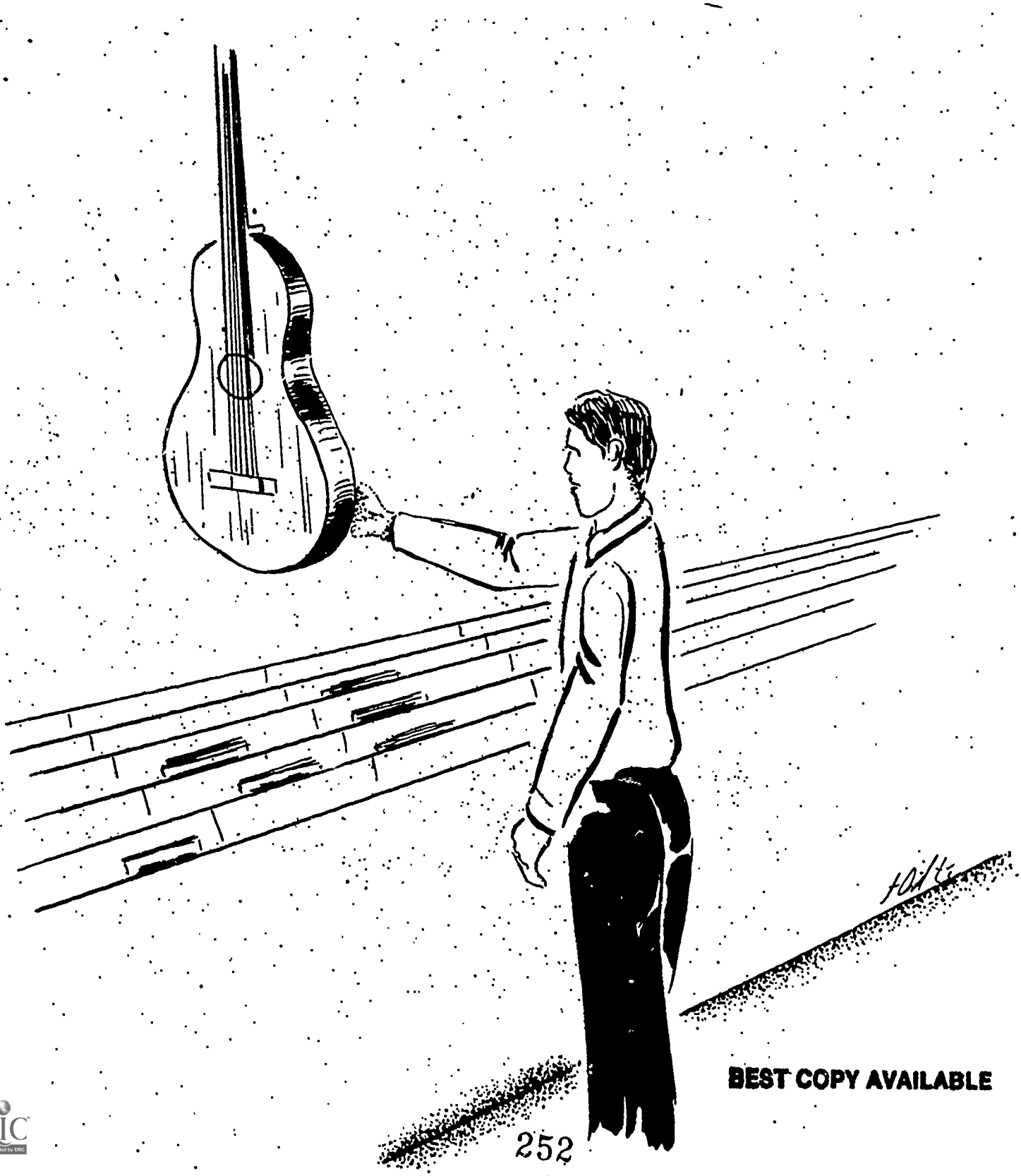
Q - LEFT



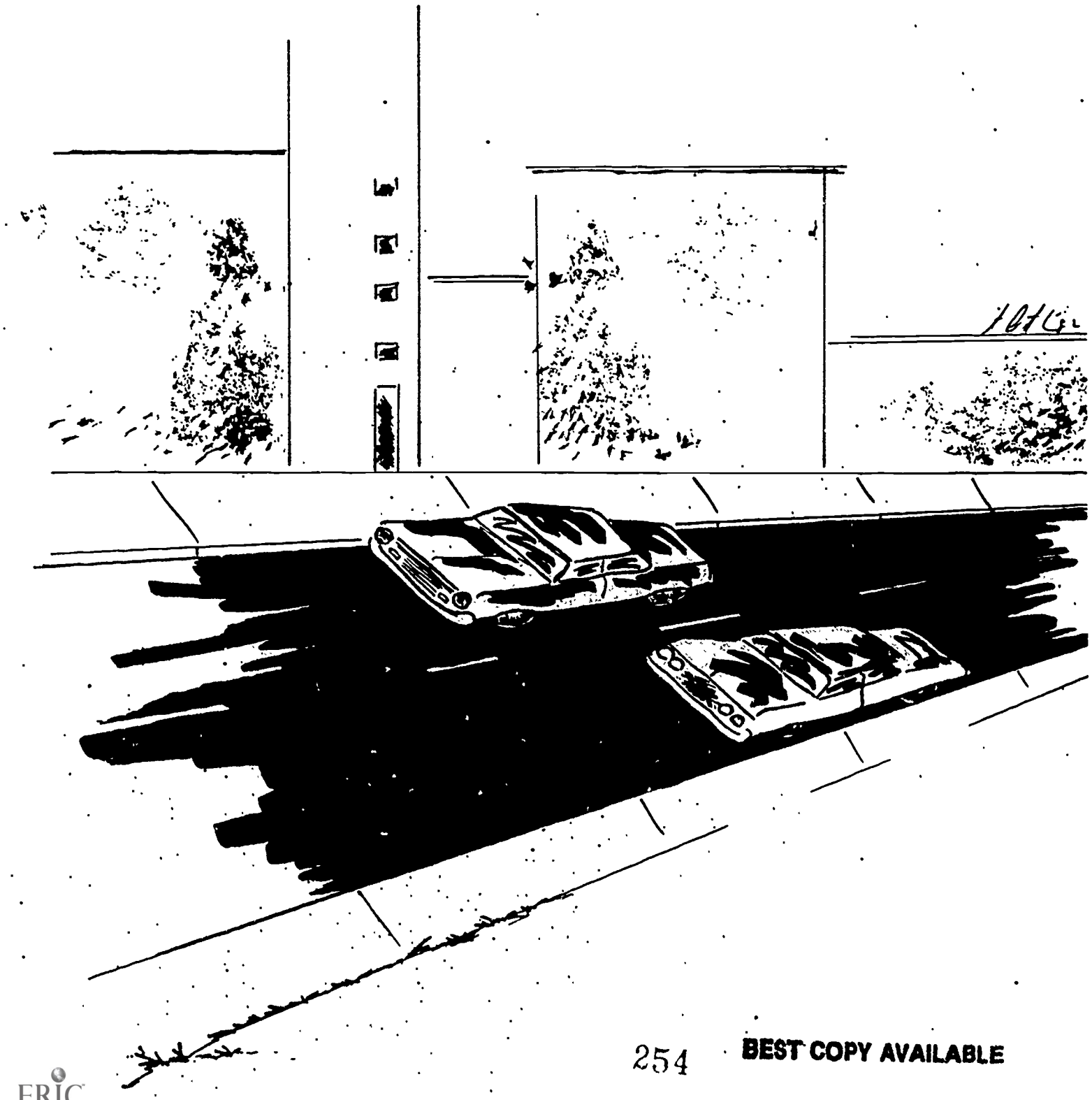
R - LEFT



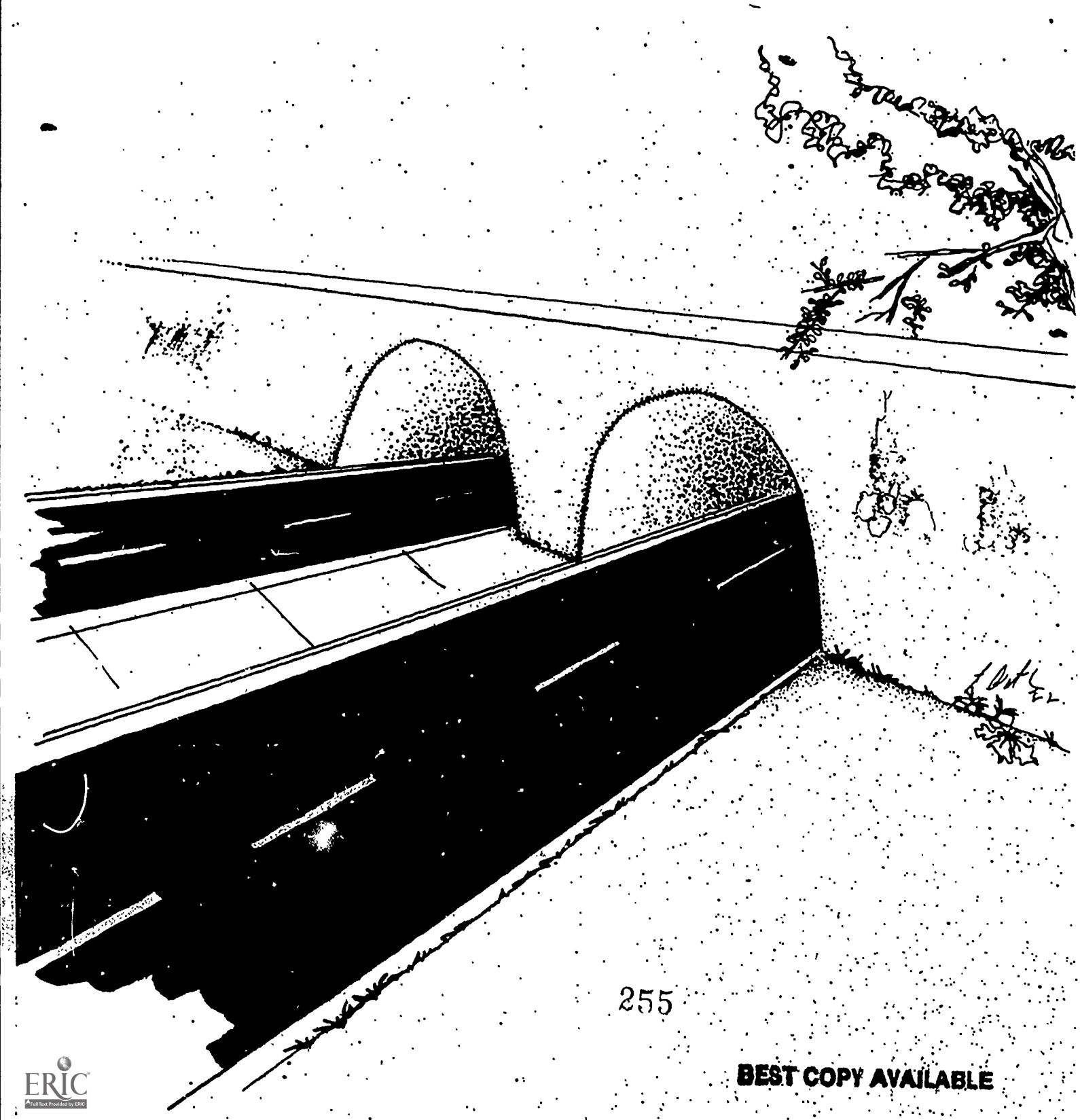


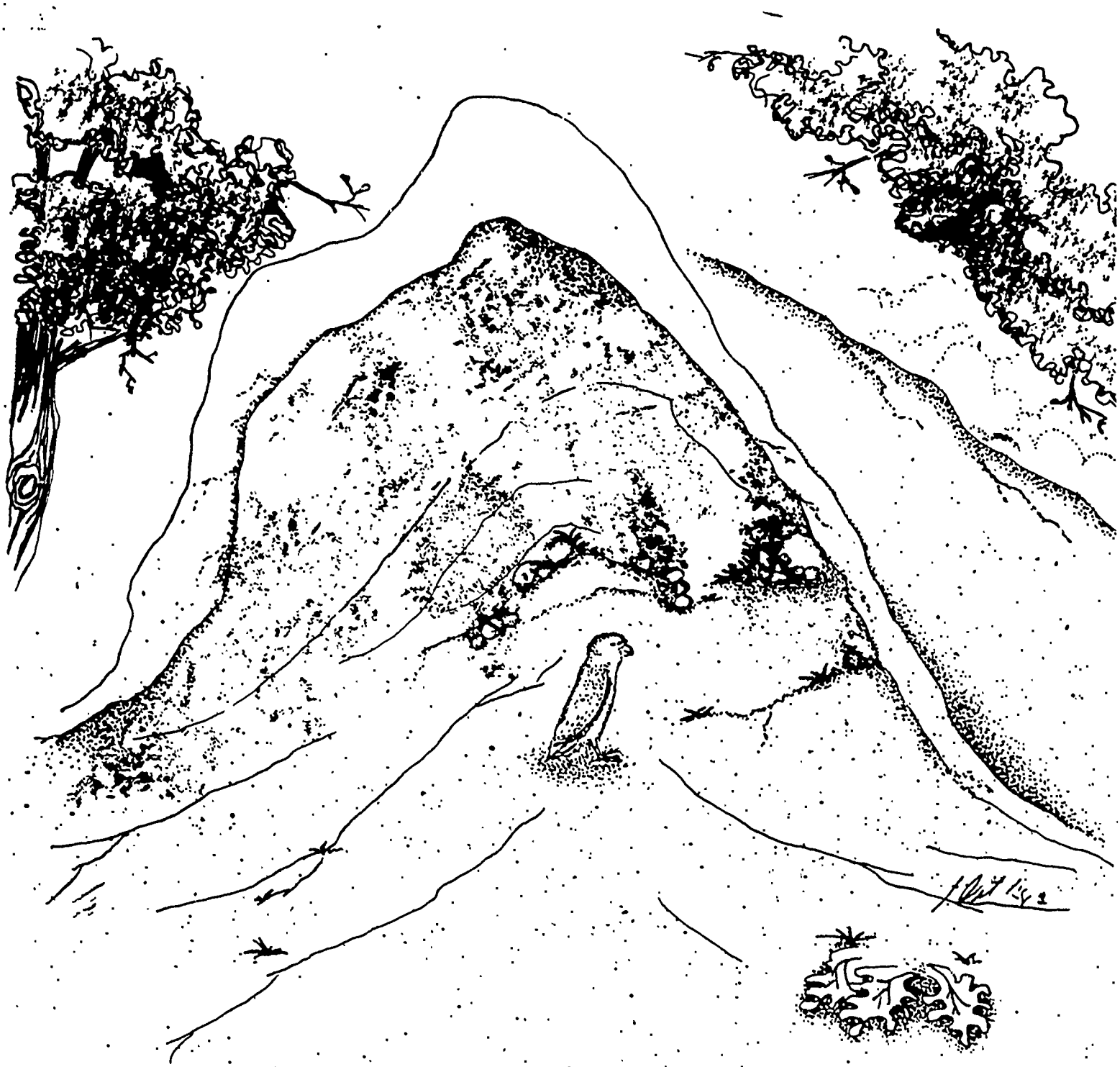


T - LEFT

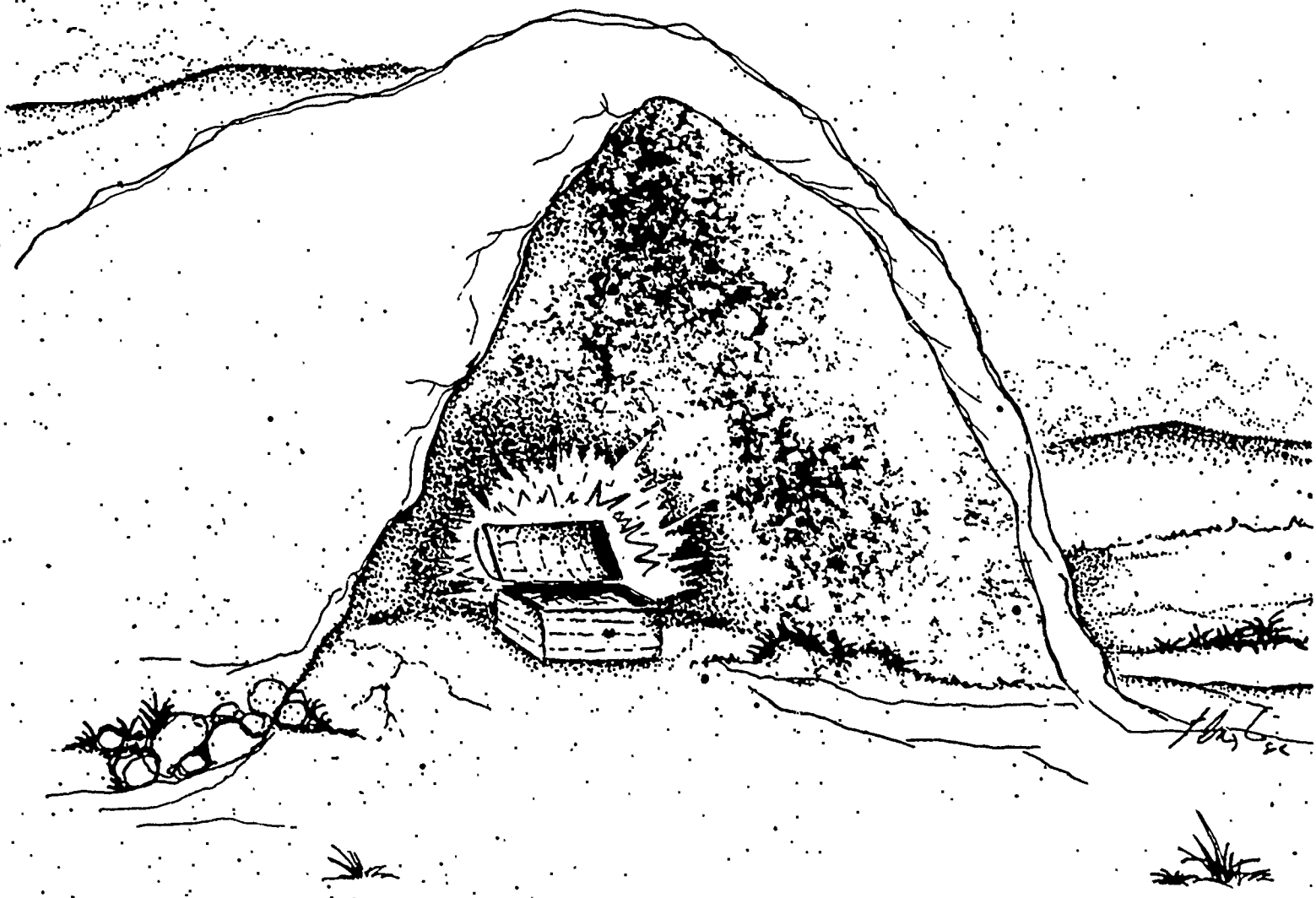


T - RIGHT

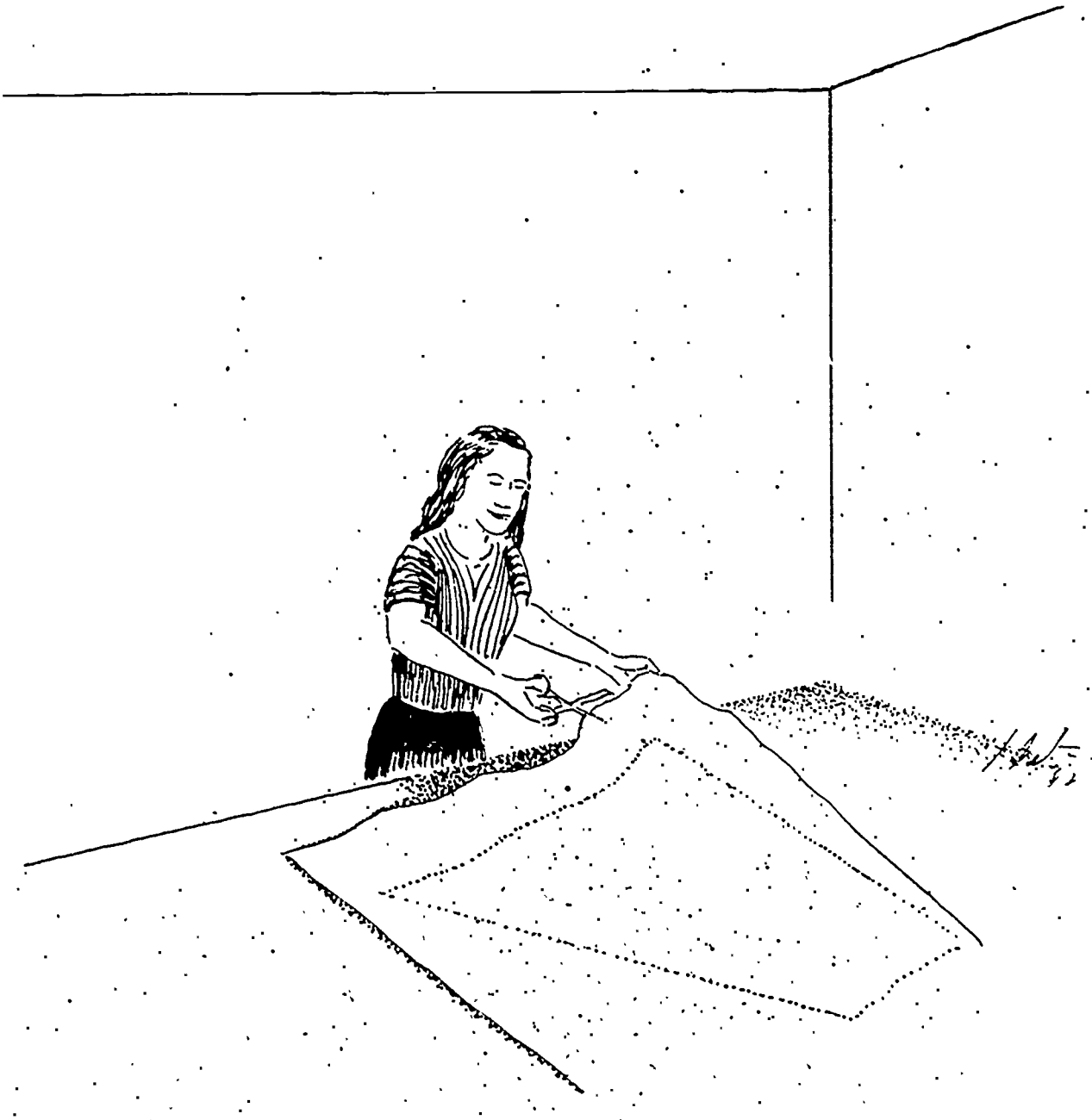


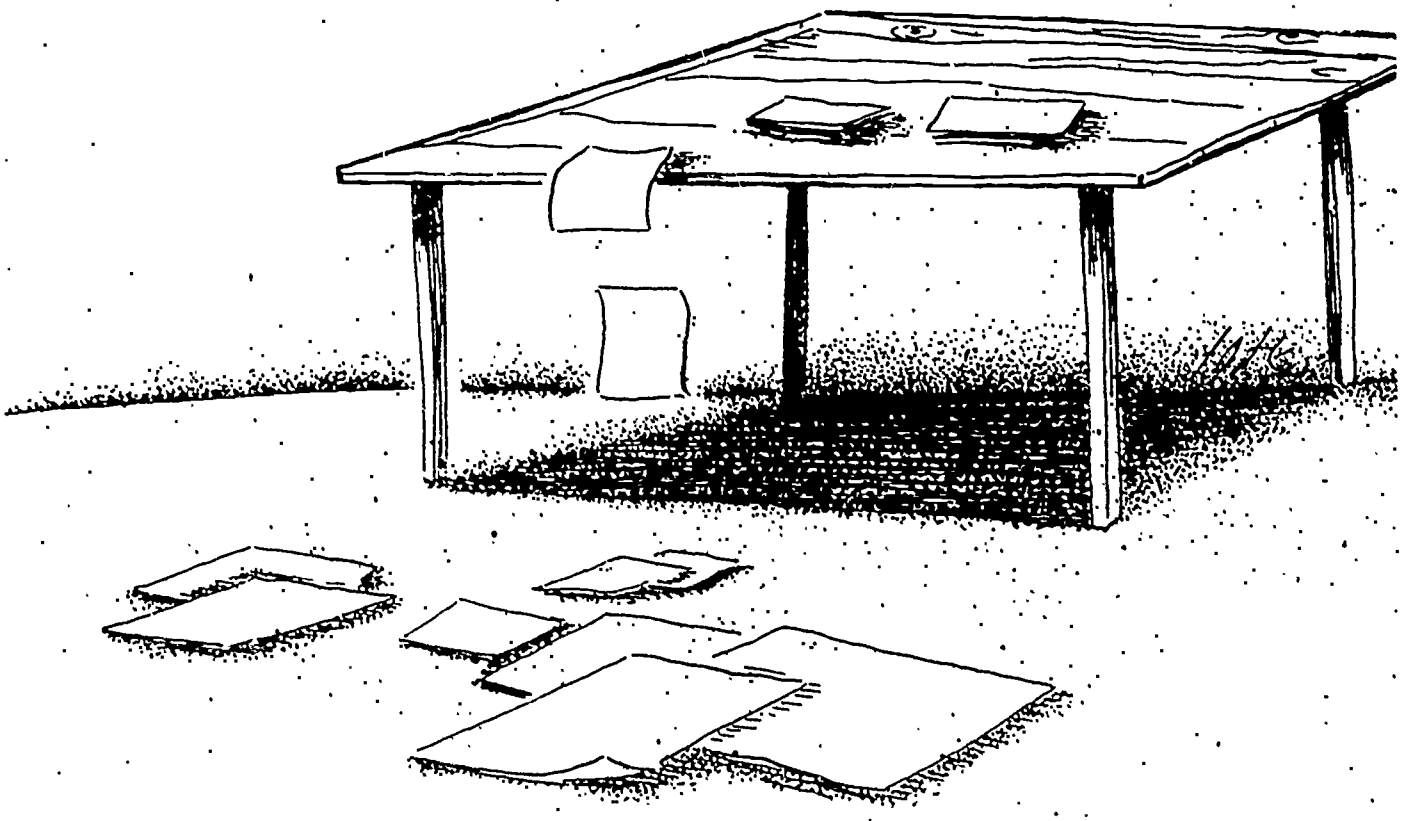


U - RIGHT

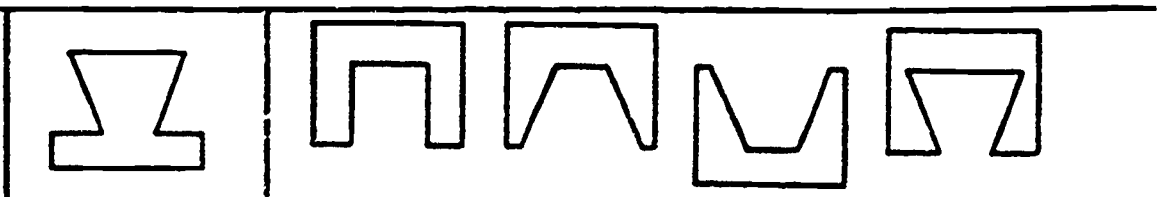


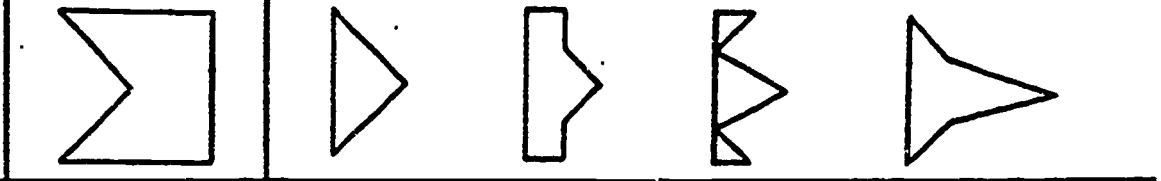
V - RIGHT

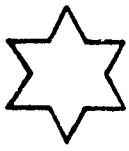




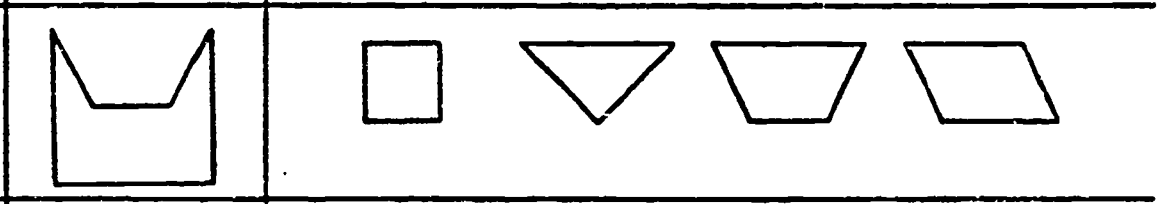
SPATIAL RELATIONS SUBTEST
FOR COHORT01

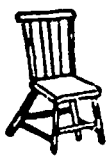
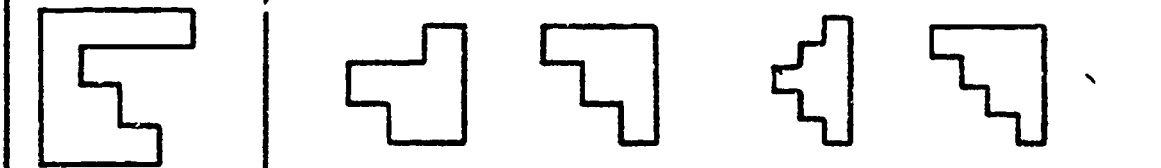



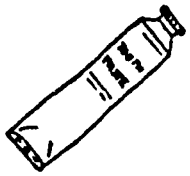
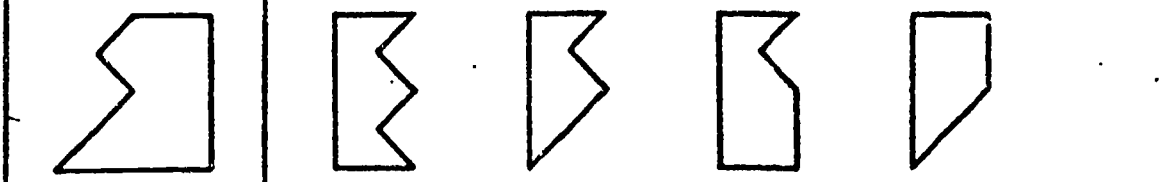



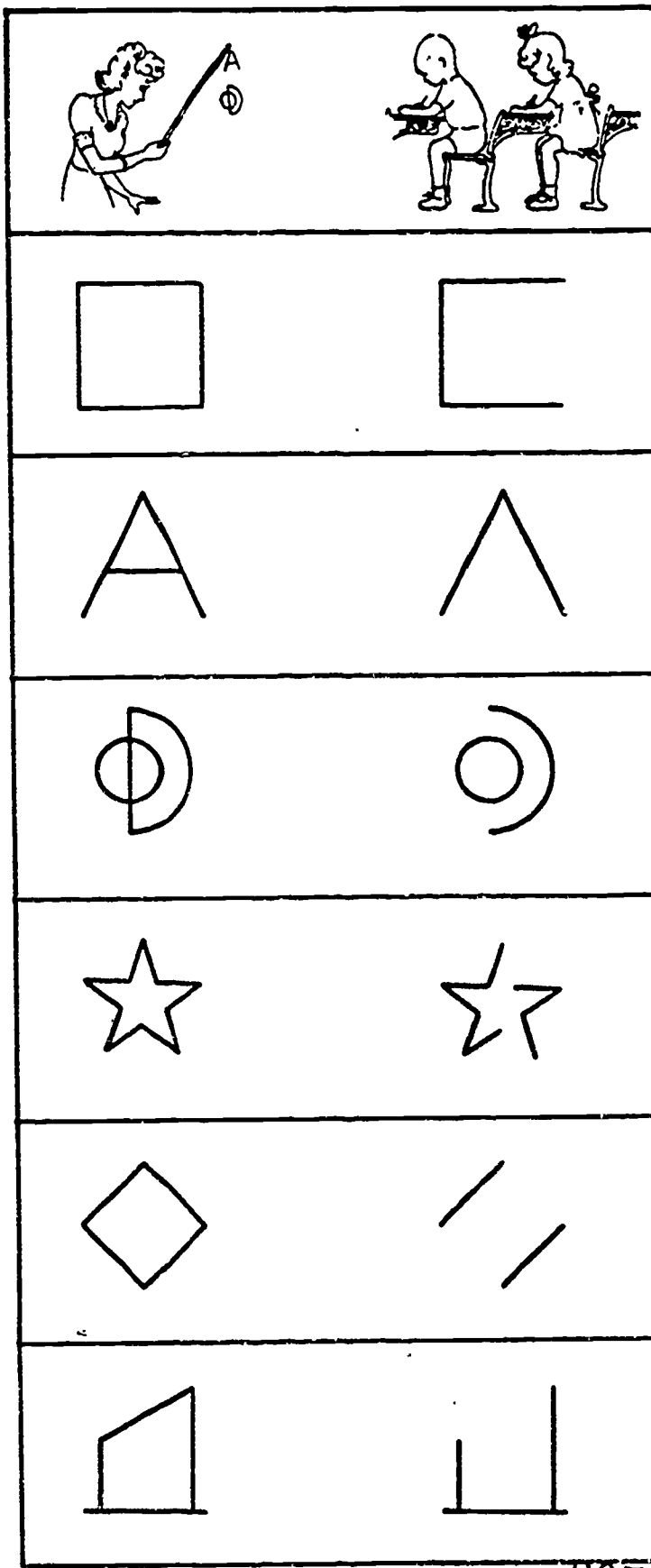






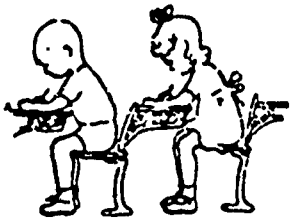




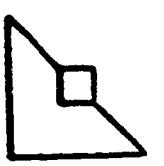


A
D

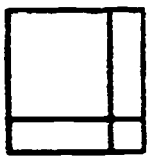
		
		
		
		
		
		

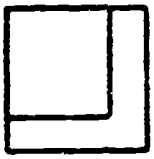
7-1801

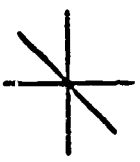

A
D

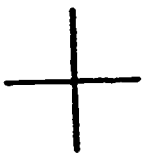


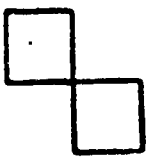


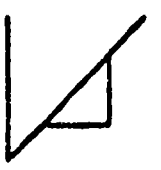


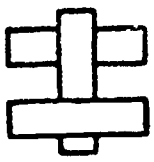


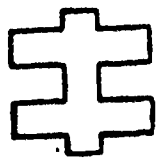












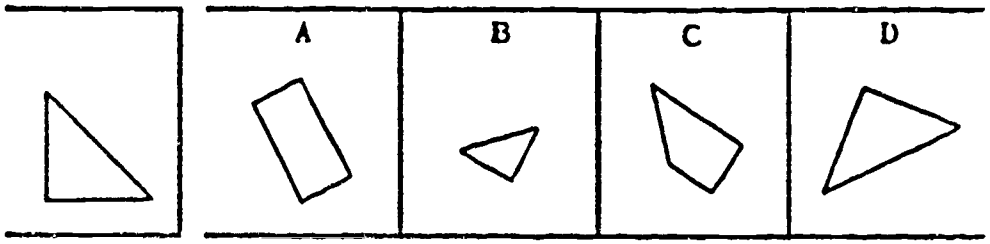
SPATIAL RELATIONS SUBTEST
FOR COHORT45

NOMBRE_____ FECHA_____

CLASE_____

Esta prueba se llama "Relaciones Especiales." Sirve para ver cuán bien Ud. puede reconocer formas y figuras. En ejemplo No. 17 el primer dibujo es una parte de un cuadrado. Fijese en los otros dibujos y encuentre la figura que forma la otra parte del cuadrado. Ponga su dedo sobre la otra parte del cuadrado.

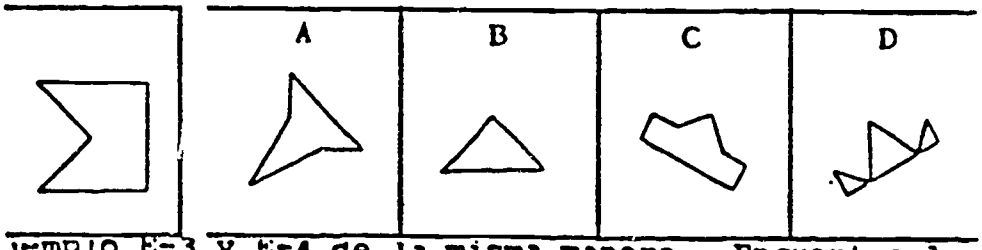
E-1



Fijese que la letra D está sobre la figura. Ahora encuentre respuesta en la seccion marcada "EJEMPLOS DE RELACIONES ESPECIALES." Haga un circulo alrededor de la letra D ya que esa letra indica la otra parte del cuadrado.

Ahora mire al problema E-2. Fijese que el primer dibujo es parte de un cuadrado. Ahora ponga su dedo sobre la otra parte del cuadrado. En la fila E-2 de la hoja de respuesta haga un circulo alrededor de la letra que indica la otra parte del cuadrado. Haga un circulo alrededor de la letra B, ya que B indica la otra parte del cuadrado.

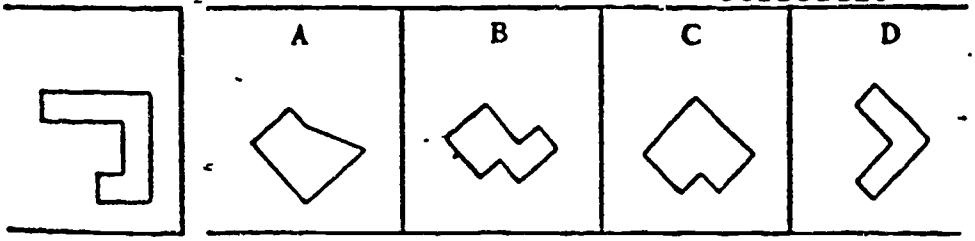
E-2



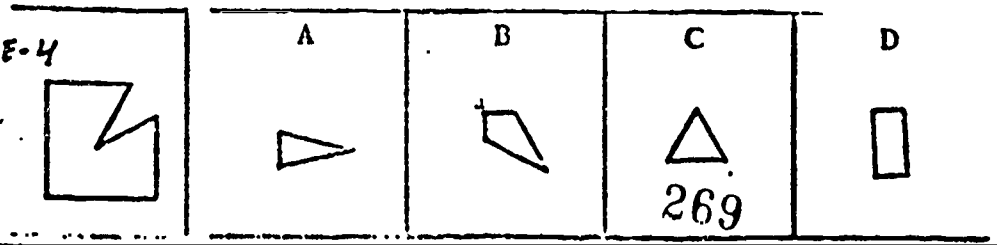
Haga ejemplo E-3 y E-4 de la misma manera. Encuentre la forma en cada fila que es la otra parte del cuadrado.
En E-3 la letra que indica la otra parte del cuadrado es C. Marque la figura C.

En E-4 la letra que indica la otra parte del cuadrado es B. Marque la letra B, ya que B es la respuesta correcta.

E-3



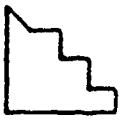
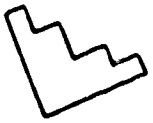
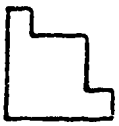
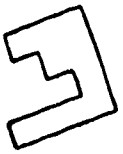
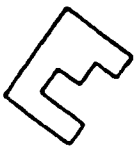
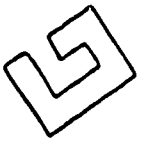
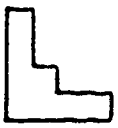
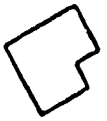
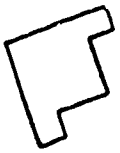
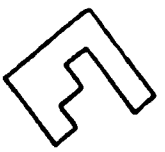
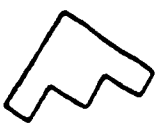
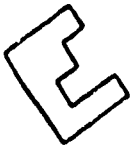
E-4



Cuando se le de la senal debe empezar. Trabaje rapidamente pero sin equivocarse. No se quede demasiado tiempo con un mismo problema. Indique la mejor respuesta y siga. Si termina antes de tiempo puede volver atras.
Si quiere cambiar su respuesta, borre la marca anterior.

		A	B	C	D
1.					
2.					
3.					
4.					
5.					
6.					
7.					

GO ON TO NEXT PAGE.

		A	B	C	D
8.					
9.					
10.					
11.					
12.					
13.					
14.					

7-1821

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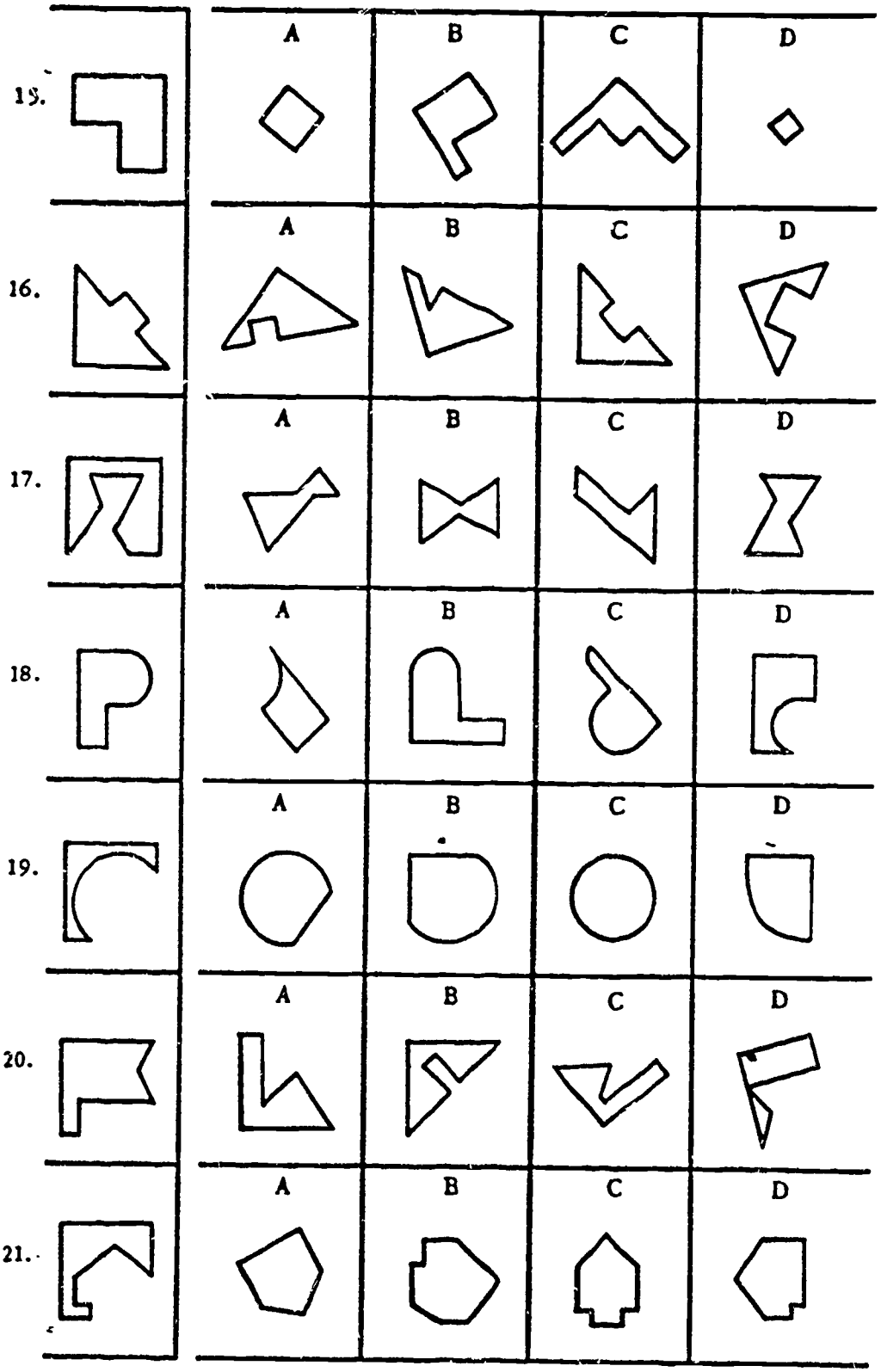

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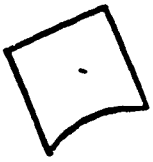
		A	B	C	D
22.					
23.					
24.					
25.					

7-1821

STOP.

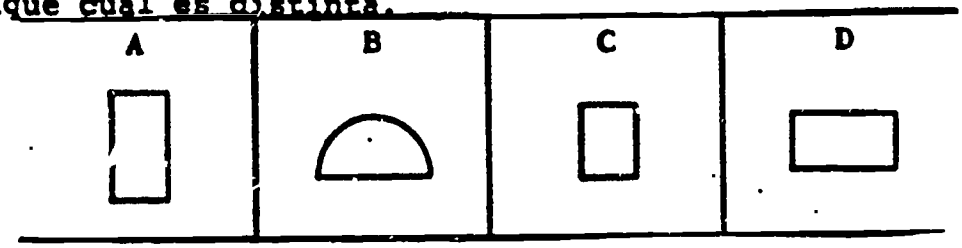
NOMBRE_____ FECHA_____

CLASE_____

Esta prueba se llama "Agrupación de Figuras." Es una prueba para ver cuán bien pueden ver la diferencia en figuras. En E-1 tres de las figuras son iguales pero una es distinta.

Indique cuál es distinta.

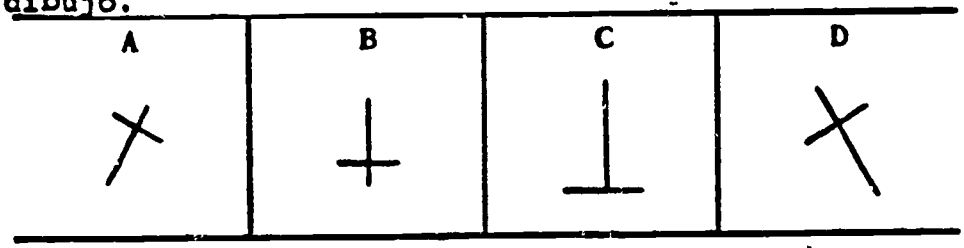
E-1



El dibujo distinto es el medio circulo ya que tiene una curva y las demas no. Fijese que la letra B indica ese dibujo. Ahora, haga un circulo alrededor de la letra B.

Fijese ahora E-2. Indique con su dedo el dibujo que es distinto a los demás. Haga un circulo alrededor de la letra que indica ese dibujo.

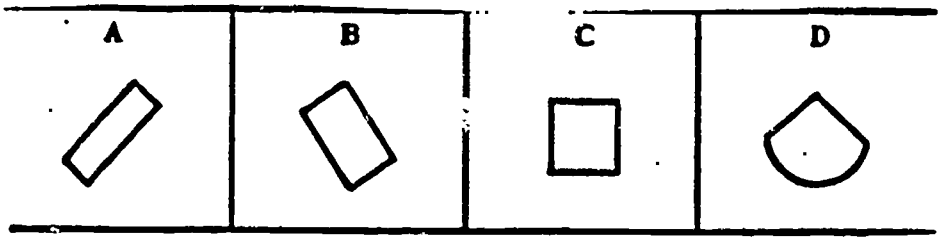
E-2



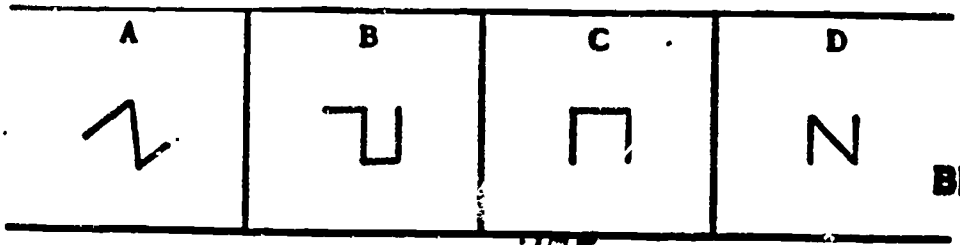
El dibujo que es distinto es la letra C ya que las lineas no se cruzan como en los otros dibujos.

En ejemplos E-3 y E-4 encuentra el dibujo en cada linea que es distinto a los demás de esa linea. Ponga un círculo alrededor de esa letra.

E-3



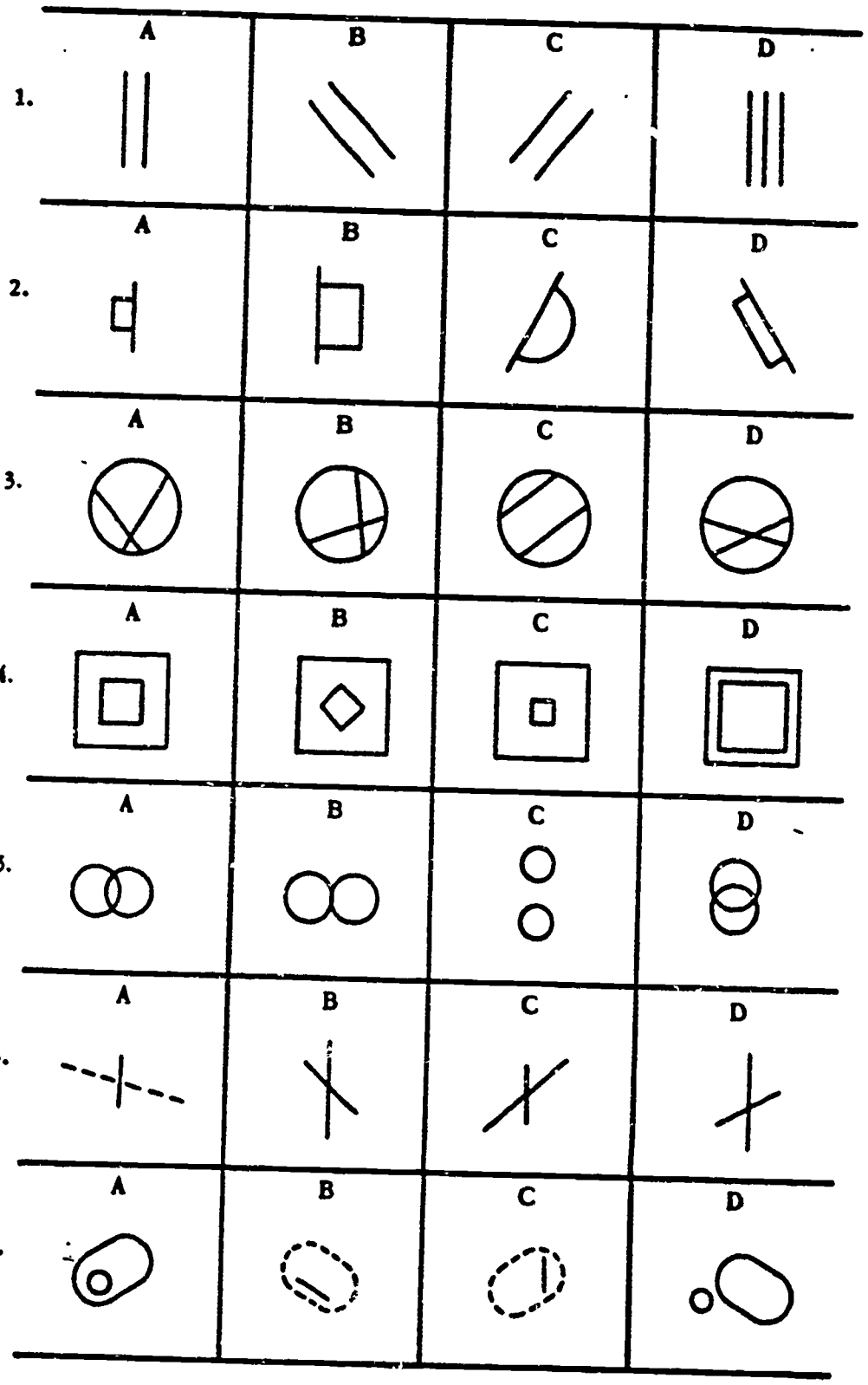
E-4



En E-3 la letra que indica el dibujo distinto es D ya que ese dibujo esta curvado. Debe de haber marcado la letra D. En E-4 la letra que indica el dibujo distinto es B ya que tiene cuatro lineas rectas y las demas tres. Debe hacer un circulo alrededor de la letra B.

Cuando se le de la senal debe comenzar. Trabaje rápidamente pero sin cometer errores. No pierda mucho tiempo en un problema que le sea difícil, marque la mejor contestación y siga. Si termina antes de tiempo puede volver atrás.

Si quiere cambiar alguna respuesta, borre bien la marca anterior.



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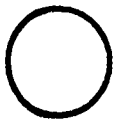
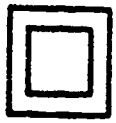
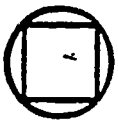
	A	B	C	D
8.				
9.				
10.				
11.				
12.				
13.				
14.				

	A	B	C	D
15.				
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17.				
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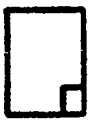
20.				
21.				

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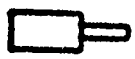
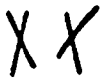
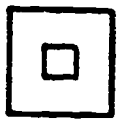
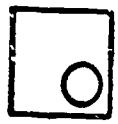
	A	B	C	D
22.				
	A	B	C	D
23.				
	A	B	C	D
24.				
	A	B	C	D
25.				

STOP.

CHANDLER'S BYSTANDER CARTOONS

El castillo de Arena

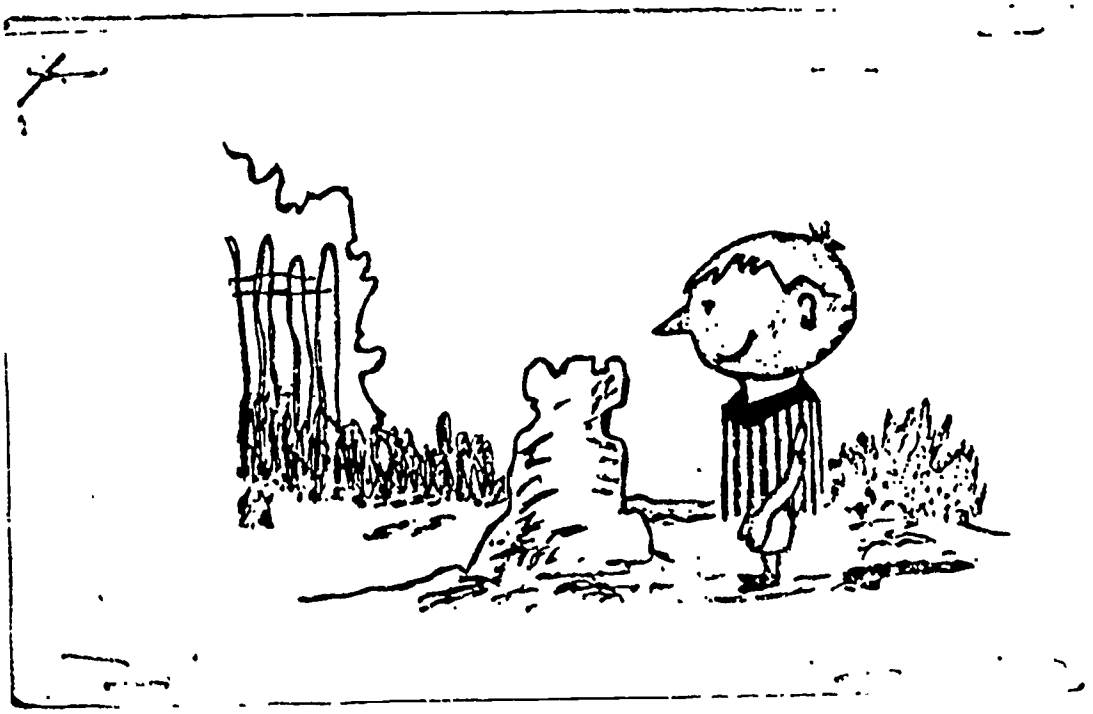
Historia

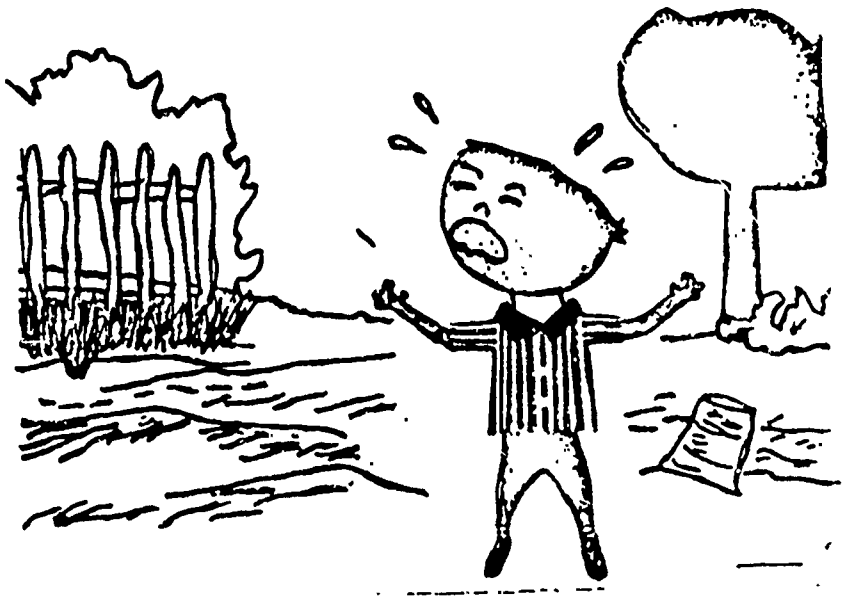
Aquí tenemos un nene que está jugando en la playa y está haciendo un castillo de arena. Termina su castillito y se pone muy contento. Pero viene una nena con una bicicleta y le pasa por encima al castillo de arena y se lo rompe. El nene se puso a llorar y estaba muy enojado. ¿Porqué el nene estaba enojado? Porque la nena le tumbó el castillo con la bicicleta. Y el se fué para su casa enojado.
Y llega a su casa y encuentra que el bebé de la casa ha hecho una casita de cartas y se la sopla y la tumba. ¿Porqué le tumbó la casita al bebe? Porque él se recuerda de su castillo de arena que la nena le tumbó. El nene se va enojado y el bebé se queda pensando.

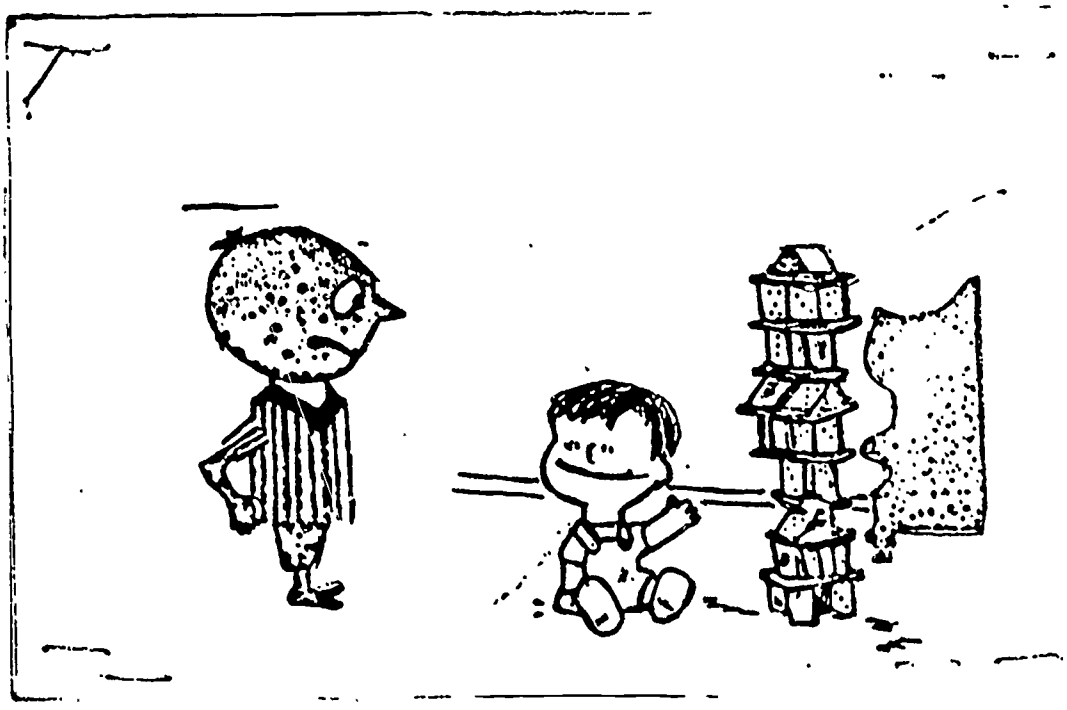
Instrucciones

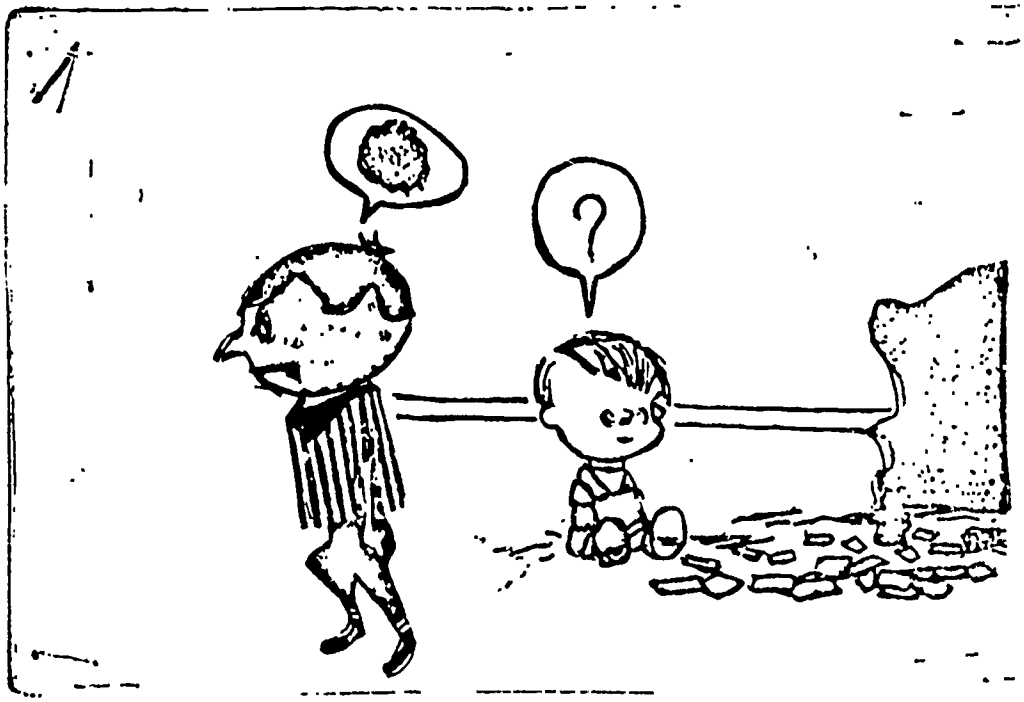
Se le pide al niño que relate el cuento como si él fuera el bebé. Después se le hacen tres preguntas.

1. ¿Qué está pensando el bebé?
2. ¿El bebé sabe porqué el nene le sopló las cartas? Si o No
3. ¿Que cree el bebé de porqué el nene le tumbó la casita?









El cartero

Historia

Aquí tenemos una nena, el papá y un avión. El papá se va para Puerto Rico y la nena lo fue a llevar al aeropuerto. Y la nena le está diciendo adiós al avión. El avión se va y la nena se pone triste.
La nena se fué para su casa bien triste. ¿Porqué la nena va triste? Porque el papá se fue para Puerto Rico.
Y estando en la casa llega el cartero y le da algo a la nena, ¿qué le dio el cartero a la nena? Un regalito o una cajita.
La nena se pone contenta y empieza abrir su regalito pero cuando abre el regalo, ¿qué encuentra que es? Un avión.
Y la nena volvió a ponerse triste, porque se recordó de su papá que se fue en un avión para Puerto Rico. Y la nena se puso a llorar y el cartero se quedó pensando.

Instrucciones

Se le pide al niño que relate el cuento como si él fuera el cartero. Y después que termina se le hacen tres preguntas.

1. ¿Qué está pensando el cartero?
2. ¿El cartero sabe porqué la nena está llorando? Sí o No
3. ¿Qué cree el cartero de porqué la nena está llorando?