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AUTHOR Gordon, Don E.
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ABSTRACT

Reported was a study involving 20,000 (army) military dependent children (MDC) attending 75 schools in seven school systems throughout the continental United States during 1971. Testing of 412 randomly selected MDC using the Goldman-Fristoe Test of Articulation revealed a significant correlation and associative factor between MDC speech articulation disorders and the number of combat tours of duty spent by the soldier-father in Vietnam. No significant correlations were reported between comparisons of speech articulation disorders to geographical separation of the soldier father from his family unit, number of houses in which the child lived, military grade or rank of the father, father's age, familial placement of the child, or the father's military occupational specialty. The types of speech articulation disorders recorded among tested MDC approximated those reported in the literature for the general school age population. The incidence rate among MDC was higher than the norm in grades 1 through 4, but lower than the norm in grades 5 and 6. In two of the three schools in which MDC attended with civilian dependent children (CDC), the speech articulation disorder incidence rate among MDC was about three times greater than that for CDC in grades 2 through 4, but lower in grades 5 and 6. (Author)

Final Report

Project No. 1-A-036
Grant No. OEG 1-71-0020 (509)

Don E. Gordon
Department of Special Education
Fitchburg State College
160 Pearl Street
Fitchburg, Massachusetts 01420

SURVEY OF SPEECH ARTICULATION DISORDERS AMONG MILITARY DEPENDENT CHILDREN

July 1972

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

National Center for Educational Research and Development
(Regional Research Program)

ABSTRACT

Survey of Speech Articulation Disorders

Among Military Dependent Children

by

Don E. Gordon

Report of investigative research involving 20,000 (army) military dependent children (MDC) attending seventy-five schools in seven school systems throughout the continental United States during 1971. Testing of 412 randomly selected MDC using the Goldman-Fristoe Test of Articulation revealed a significant correlation and associative factor between MDC speech articulation disorders and the number of combat tours of duty spent by the soldier-father in Vietnam. No significant correlations were reported between comparisons of speech articulation disorders to geographical separation of the soldier-father from his family unit, number of houses in which the child lived, military grade or rank of the father, father's age, familial placement of the child, or the father's military occupational specialty. The types of speech articulation disorders recorded among tested MDC approximated those reported in the literature for the general school age population. The incident rate among MDC was higher than the norm in grades one through four, but lower than the norm

in grades five and six. In two of the three schools in which MDC attended with civilian dependent children (CDC), the speech articulation disorder incident rate among MDC was about three times greater than that for CDC in grades two through four, but lower in grades five and six.

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Don E. Gordon

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Fitchburg, Massachusetts

July 1972

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U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
National Center for Educational Research and Development

PREFACE

The primary purpose of this research is to assist teachers and parents to better understand children of military families. The term "military dependent children" used in this text is intended only to clearly define these children and in no way indicates their subordination to the military.

Deep appreciation is extended to Captain Edward E. Eiler, Assistant Project Director, and to my wife, Patti, without whose extreme dedication, inspiration, and tolerance this study could not have been possible.

Appreciation and professional respect are expressed to the officers, men, and Department of the Army civilians of the United States Army Security Agency Training Center and School, Fort Devens, Massachusetts, whose assistance, cooperation, and ability greatly abetted this research.

The professional assistance of Dr. Anne May, Captain (Dr.) Arthur Cosby, and SP5 Clifford Highnam (M. S. P. A.) in the respective fields of educational research, statistics, and speech pathology was invaluable to this project.

This research is also indebted to the school superintendents, principals, and speech therapists who assisted in the testing and screening program of this study.

Special appreciation is afforded to Mr. John Greenwald of Army Times for his special assistance and encouragement during the infancy of this two year project.

Recognition is afforded American Guidance Service, Inc., publisher of the Goldman-Fristoe Test of Articulation, and Appleton-Century-Crofts, publisher of the Handbook of Speech Pathology and Audiology for the permission to reproduce portions of their texts.

Pages 39 and 94 of this report were reprinted from the Handbook of Speech Pathology and Audiology by Lee Edward Travis by permission of Appleton-Century-Crofts, copyrighted 1971 by Meredith Corporation. Appendix A of this report was reprinted from the Goldman-Fristoe Test of Articulation score sheet; Appendix B of this report was reprinted from the Goldman-Fristoe Test of Articulation instruction manual by Ronald Goldman and Macalyne Fristoe by permission of American Guidance Service, Inc., copyrighted 1969.

Some footnotes of this study cite the Handbook of Speech Pathology and Audiology as a secondary source. The primary sources referred to in that text are fully identified in the bibliographies of the Handbook of Speech Pathology and Audiology located at the end of each chapter throughout the book.

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Chapter 1

INTRODUCTION

Military family life provides an exciting and enjoyable alternative to contemporary American society for those families having the collective temperament to thrive on it. However, a price is demanded for the advantages of military family life. The father frequently is separated from his family for periods of six to eighteen months. His participation in military combat, riot-control duty, or other endangering requirements provides the potential to create apprehension among the entire family. The children of military families usually change school systems approximately every two years and frequently are separated from other stabilizing family influences such as grandparents or close family relatives. The military dependent child must be considered sociologically in order to evaluate the impact of his life pattern upon his educational process. This study examines the speech articulation disorder incident rate among military dependent children as one sampling of the learning and adjustment problems suspected of their group. The speech articulation disorder incident rate of approximately 20,000 military dependent children is

reported and test results of 412 children are correlated to specific aspects of the military father's life.

THE PROBLEM

The impetus for this study was initiated when a certified speech therapist with three years experience assisted the researcher in an initial survey of speech articulation disorders of military dependent children (MDC) attending the Ayer, Massachusetts, Public School system during her normal screening of the entire elementary student body in October 1969. Included were 1,846 students in grades one through six of which about half (962) were MDC. According to Wendell Johnson in Speech Handicapped School Children[1] and the American Speech and Hearing Association in the Journal of Speech and Hearing Disorders[2], a typical elementary student group of this size would normally have an articulation disorder incident rate of about five percent. Half of the affected children could be expected to have severe disorders with the remaining half having moderate

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[1] Wendell Johnson et al., Speech Handicapped School Children (New York: Harper & Row, 1967), p. 15.

[2] American Speech and Hearing Association, Committee on the Midcentury White House Conference, "Speech Disorders and Speech Corrections," Journal of Speech and Hearing Disorders, 17 (June, 1952), p. 130.

disorders but still requiring speech correction. However, in the Ayer schools the speech therapist identified nine percent (162) of the students as falling equally divided into these two categories. This percentage rate is almost twice as high as the national average expressed in the references cited previously. Further evaluation revealed that only three percent of the civilian dependent children (CDC) were affected, accounting for only 23 cases of articulation disorders, but about fourteen percent of the 962 MDC were identified as having articulation disorders, accounting for 139 cases dispersed through all six grades. The incident rate among MDC appeared to be 3.5 times greater than the national average and five times greater than the incident rate for the CDC attending the same schools in this survey. The Ayer survey may have been performed with stricter standards than the standards applied in compiling the national average survey, but this variable did not explain the wide disparity between MDC and CDC since the therapist was unaware of each child's affiliation at the time of the screening. The survey did not include children who were identified as mentally retarded by the school's records or those identified by the therapist as having organic disorders affecting speech articulation, voice problems, or those who only stuttered. The therapist's screening procedure focused upon her observation

of every child in the performance of the student's speech in the classroom. The names of those children identified as needing speech correction were then recorded.

In the Ayer survey, the 139 affected MDC were identified with their soldier-father. Additionally, a separate group of randomly selected MDC in grades one through six were selected and identified with their soldier-father. The military personnel records of the fathers in both groups, military dependent child-affected (MDC-A) and military dependent child-not affected (MDC-NA), were studied in considerable detail. Twenty-three measurable aspects of the father's life were collocated in an effort to determine if correlations existed between specific aspects of the father's military service and the incident rate of articulation disorders among their children.

There was a definite involved relationship between the soldier-father and the affected children in two measurable areas. First, of the 139 children having articulation disorders, every father had experienced exceptional geographical separation from his family unit during the affected child's life. Approximately 70 percent of their military service was spent overseas with 48 percent of the time spent separated from their families for periods in excess of three months. The fathers of the 139 randomly selected unaffected children spent about 57 percent of their service

overseas but less than 20 percent of their service separated from their family unit. Only one child in the MDC-NA group had a diagnosed emotional problem carried over into school. Among the most important and disturbing points brought out by this survey was that 65 percent of the children surveyed in grades one through six whose fathers were then serving in Vietnam had severe articulation disorders. The second significant correlation was established between speech articulation disorders and children raised in bilingual families. Twenty-eight MDC-A fell into this category as well as into the extensive separation category outlined previously. These children were believed to be affected not only by the separation of the father, but also by the need for a dominant family language which the child was also expected to use in school. The survey indicated there were no significant correlations between the child's articulation disorder incident rate and fourteen other aspects of the paternal military life or five other aspects of the paternal marital life.[3]

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[3]Don E. Gordon, "Speech Articulation Disorders Among Military Dependent Children--Speech Articulation Survey--Ayer Public School System, 1969-1970" (Army Registry of Special Education Materials, number 2996, October 1970).

PURPOSE

The Ayer survey suggested a need for further research on speech articulation disorder incident rates among military dependent children. There are over one half million military dependent children attending elementary and high schools around the world. About half of these children attend military operated dependent schools while the remaining half are integrated into public school systems located adjacent to military communities. The need for this project rests upon widely suspected learning disabilities and speech articulation defects peculiar to military dependent children. It is suspected that military dependent children may have a speech articulation disorder incident rate two or three times higher than the national average. It is essential to the education of the one half million children involved that these suspicions be confirmed or denied.

OBJECTIVES

The purpose of this research is:

1. To determine if there is a significant correlation between separation of the soldier-father and the children's speech articulation disorder incident rate.

2. To sample more widely the incident rate of speech articulation disorders among MDC attending geographically dispersed schools in order to eliminate the prejudice of one survey.

3. To determine if MDC have a higher than average, average, or lower than average speech articulation disorder incident rate. [4]

4. To determine if the speech articulation disorder incident rate among MDC increases, remains the same, or decreases from grade two to six.

5. To determine if the type of speech errors among MDC differ from the norm as determined by the civilian population.

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[4]It is not the purpose of this study to establish the causal factors responsible for a higher, lower, or average incident rate of speech articulation disorders among MDC. Though the literature used in this examination will address emotional involvement with misarticulation, it is beyond the scope or competence of this report to identify emotional maladjustment as either a primary or secondary influence or as a causal or concomitant factor. Adequate literature to support such a finding is lacking.

JUSTIFICATION

A review of pertinent literature and of general sources published during the past fifteen years indicated that some functional speech articulation disorders may be manifestations of emotional disturbance and that separation of the father from the family unit may result in emotional problems for his children. However, a comprehensive review of the literature did not disclose any relevant studies directed toward the military dependent child and his learning disabilities or speech defects. Sociologists have studied the peculiarities of the military family, but the implication of military life upon the education of MDC is not documented. This research offers several objectives in that direction.

TERMS

Articulation can be defined as the production of speech sounds by the stopping or constricting of the vocalized or non-vocalized breath stream by movements of the lips, tongue, velum, or pharynx.[5]

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[5]Margaret H. Powers, Ph. D., "Functional Disorders of Articulation--Symptomatology and Etiology," Handbook of Speech Pathology and Audiology, ed. Lee Edward Travis (New York: Appleton-Century-Crofts, 1971), p. 837.

Certified speech therapist. A speech therapist certified in accordance with the requirements of the Certificate of Clinical Competence in Speech Pathology issued by the American Speech and Hearing Association.

Civilian dependent child (CDC) for the purposes of this study is a male or female child between the chronological ages of five to twelve years whose natural or adopted father or mother are not presently (nor have been for two years previously) uniformed or civilian members on active duty with the Armed Forces of the United States. CDC are categorized as CDC-A if affected with mild or serious speech articulation disorders or CDC-NA if not affected as determined by the school speech therapist.

Department of Defense (DOD) is a major subdivision of the executive branch of the government of the United States exercising civilian supervision of the armed forces.

Department of Defense Operated Dependent Schools are, for the purpose of this study, restricted to elementary schools operated on military posts or stations within the forty-eight contiguous states of the United States. DOD operated dependent schools serve MDC in areas where local school systems

cannot adequately handle the influx of military children. DOD operated dependent schools are regulated, funded, and supervised by the Directorate of Dependent Education, an office of the Department of Defense, and by the local post commander.

Dialect is a regional variety of language distinguished by features of vocabulary, grammar, and pronunciation from other regional varieties.

Errors reported on the Goldman-Fristoe Test of Articulation are classified into two separate groups. Gross test errors reported on the Goldman-Fristoe Test of Articulation include every error recorded by the testing therapist on the scoring sheet. In this application, misarticulation of one sound in six situations, as an example, would count as six gross test errors, but only one true test error. True test errors reported on the Goldman-Fristoe Test of Articulation are limited to the number of sounds which are misarticulated rather than the total errors recorded. If one sound is recorded on the score sheet as a misarticulation three times, then it is regarded as only one true test error. It would, however, be regarded as three gross test errors.

Functional disorders of articulation may be synonymous with nonorganic disorders and usually include physiological and neurological connotations as well as anatomical significance. A functional disorder is an inability to produce correctly all of the standard speech sounds of the language, an inability for which there is no appreciable structural, physiological, or neurological basis in the speech mechanism or its supporting structures, but which can be accounted for by normal variations in the organism or by environmental or psychological factors. In reality, there can be no strict separation between organic and functional. Functional is an etiological, not a symptomatological term.[6]

Geographical separation in this study indicates continuous separation of the soldier-father from his family unit for periods in excess of thirty days. Distance of separation is not a factor.

Goldman-Fristoe Test of Articulation, published by American Guidance Service, Inc., Circle Pines, Minnesota, is advertised by the publisher as a systematic method for locating and recording errors in articulation by making it possible to obtain a profile of consonant sound articulation for a wide range of subjects starting with the very young. A further explanation and evaluation is provided in Chapter 2.

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[6]Powers, p. 837.

Military dependent child (MDC), for the purposes of this study, is a male or female child between the chronological ages of five to twelve years. The child is qualified as a legitimate dependent if claimed as such by a male, uniformed, member of the armed forces of the United States on active duty at the time of the study in accordance with qualifications contained in the Department of Defense Military Pay and Allowance Entitlement Manual.[7] Essentially, a child may be claimed as a dependent if born to the soldier-father and his wife, if a stepchild by virtue of a previous marriage of either present parent, or if adopted in accordance with pertinent state or national laws. Those MDC adopted from outside the United States or Canada after the child's third birthday will be omitted from the study.

Military dependent child-affected (MDC-A) is a military dependent child identified by the school speech therapist as affected with a mild or serious articulation disorder. The terms serious and moderate disorders are open to interpretation. Therefore, this study will not include children with a defect so slight that it does not attract the attention of others besides the

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[7] Department of Defense Military Pay and Allowance Entitlement Manual (Washington: Department of Defense, 1971).

speech therapist. The survey of MDC-A will not include those children identified by school records as having been diagnosed as mentally retarded, children with clinical disorders such as cleft palate, children who stutter, or those who have impaired hearing or voice problems.

Military dependent child-not affected (MDC-NA). A military dependent child not identified by the school speech therapist as affected with a mild or serious speech articulation disorder.

Military occupational specialty (MOS). A term used to identify a grouping of duty positions possessing such close occupational or functional relationship that an optimal degree of interchangeability among persons so classified exists at any given level of skill. Advanced--One which reflects specialized occupational qualifications above the entry MOS level required for performance in those duty positions which represent the journeyman, supervisory, or leadership levels of skill. Duty--One in which the soldier is actually performing duty. Entry--One which reflects the occupational qualifications required for performance in those duty positions which represent the lowest level of skill within an entry group. Primary--One (entry or advanced) representing the highest or most significant job skill which the

individual can best perform. Secondary--Any awarded, other than that designated primary.[8]

Military pay grade. Category in which an officer or enlisted member of the Armed Forces is classified for basic pay and one of the bases of rank in the military.[9]

Military supporting public school is a public school operated in conjunction with state and community supervision which is situated adjacent to a military post and which provides education to MDC living on the post or in the local community. Public Laws 81-815 and 81-874 provide compensating federal funds for both categories of MDC in attendance. Military participation in the supporting school system usually consists of one nonvoting member of the military post commander's staff.

Phoneme is a group or family of closely related speech sounds all of which have the same distinctive acoustic characteristics in spite of their differences; often used in place of the term

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[8] Dictionary of United States Army Terms, AR 320-5 (Washington: Department of the Army, 13 January 1961), p. 339.

[9] Dictionary of United States Army Terms, AR 320-5, p. 257.

"speech sound". Phonemes serve to distinguish one utterance from another in a language or dialect.[10]

Public Law 81-815, Providing Financial Assistance For School Construction in Federal Affected Areas (1950) amended by PLs 85-620, (1958); 89-750, (1966); 90-247, (1968); and 90-247, (1970). Outlines the procedure to request federal construction funds for schools heavily populated by federally supported children (parent is employed by federal government).

Public Law 81-874, Titles I and II, Providing Financial Assistance for Maintenance and Operation of Schools in Federally Affected Areas (1950) amended by PL 90-247 (1968), provides for reimbursement of educational expenses incurred by public schools in educating children of employees of the federal government. Reimbursement is computed from a formula considering actual expenses, local tax contribution, size of federal installation, and by categorizing students as (a) living on a government installation or (b) living on a taxable property in the local community.

Soldier-father. A uniformed, male member on active duty with the armed forces of the United States for at least four

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[10] Kenneth Scott Wood, "Terminology and Nomenclature," Handbook of Speech Pathology and Audiology, ed. Lee Edward Travis (New York: Appleton-Century-Crofts, 1971), p. 18.

continuous years and who was assigned to pay grade E5 (sergeant or specialist) or higher, a warrant officer WO-1 through WO-4, an officer in pay grade 03 (captain) or higher during the period of this study.

Speech articulation disorders are those in which the abnormality in speech is due to the presence of defective, nonstandard speech sounds, characterized by the substitution, omission, addition, or distortion of speech sounds in the English language. Synonymous and overlapping terms include baby talk, infantile perseveration, lolling (defective r, l, t, d, or s sounds), lisping, a disorder of sibilant sounds, and delayed speech. Identification of a speech articulation disorder is not mutually exclusive since frequently more than one speech error may be present. All articulation disorders are identified by defective and incorrect sounds and are distinguished from disorders of voice, stuttering, clinical abnormalities, and impaired hearing. The severity of the disorder depends upon how many speech sounds are defective, the type of error, and other factors.[11] [12]

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[11] Charles Van Riper, Speech Correction (Englewood Cliffs: Prentice Hall, 1963), pp. 21-22, 218-220.

[12] James F. Curtis, (Wendell Johnson et al.), Speech Handicapped School Children, pp. 111-114.

Speech articulation disorder incident rate is the percentage of affected children in a school population.

Speech therapist, also referred to as speech clinician. The speech therapist is the trained individual within a school system or clinic assigned the duty of providing speech therapy and correction to children affected with speech disorders. Minimal qualification of the speech therapist is considered a bachelor's degree in speech pathology, therapy, or a similarly named area of specialization. Speech therapists may be required to meet higher qualifications, such as earning a master's degree. In addition, a Certificate of Clinical Competence may be issued by the American Speech and Hearing Association after the MA is awarded.

HYPOTHESIS

In order to achieve those objectives listed previously, the writer directed his research to evaluating the following null hypothesis:

> There is no difference between the number of speech articulation disorders incident to military dependent children (MDC) in grades two through six whose fathers are geographically separated from the family unit at least fifty percent of the child's

life and the number of speech articulation disorders incident to those military dependent children (MDC) whose fathers are geographically separated from their family unit less than fifty percent of the child's life.

METHOD OF PROCEDURE

The null hypothesis was evaluated by studying the speech articulation disorder rates incident to public schools heavily populated (at least 35% of school population) with MDC in grades two through six. Seven military supporting school systems consented to the study during October 1969 to December 1971 with approximately 20,000 MDC in attendance. These military posts were specifically chosen in the continental United States to offer a large MDC population situated in communities of significant size so as to represent the full spectrum of military families with respect to rank or grade and duty. Military operated dependent schools located overseas were omitted to eliminate the influence of living in a foreign country and the pressures of a culturally insulated community. The larger sampling base should reduce the geographical prejudice in the survey conducted at the Ayer schools. The results of this survey are of importance to the military as well as to the field of general education.

In five school systems the speech therapists indicated all children in grades two through six who had need of speech articulation correction as identified by therapist screening. Two school systems utilized only teacher referral, since no therapist was employed by the system. A distinction was made between civilian dependent children (CDC) and military dependent children (MDC) needing speech correction. Thirty MDC having speech articulation disorders were randomly selected. An additional thirty MDC not having speech articulation disorders were randomly selected.[13] In the two school systems not having a speech correction program, all sixty MDC were selected randomly without regard to their being affected or non-affected. The sixty randomly selected children were administered the Goldman-Fristoe Test of Articulation and scored by a speech therapist.[14]

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[13]Thirty MDC in the affected and not affected categories were chosen as an adequate student sampling in each school and as a number suitable for management of the testing procedure.

[14]The Goldman-Fristoe Test of Articulation was chosen because it is academically recognized, comparatively free of published controversy, and easily administered. The Goldman-Fristoe Test was chosen instead of the Templin and Darley, Arizona, or Photo Articulation Tests (PAT) because it was administered by several therapists possessing unknown qualifications in speech testing. The articulation test, in this application, is intended to measure the degree of articulation disorder between thirty affected and thirty non-affected children in each school system.

The personal data questionnaires of the fathers of the sixty tested children were examined by the writer to determine the amount of time in months that the father was geographically separated from the family unit during the life of the tested child, as well as other relevant information.

Children's scores on the Goldman-Fristoe Test of Articulation were correlated with the amount of separation of the father from the family unit. The significance of the correlations was tested. Other relative data on all sixty children in each school system are also presented.

RELEVANCE OF FINDINGS

New Knowledge and General Contribution

1. This project is intended to indicate whether MDC attending public schools have a higher, lower, or similar incident rate of speech articulation disorders in grades two through six than do their CDC contemporaries.

2. This project is intended to indicate whether MDC attending military operated dependent schools have a higher, lower, or similar incident rate of speech articulation disorders in grades two through six than is the national average.

3. This project is intended to indicate if there is a degree of discrepancy or similarity in reporting speech articulation disorders between public schools and military operated dependent schools in paragraphs one and two above.

4. This project is intended to indicate if the correlation between speech articulation disorders and separation of the father from the family unit is significant.

5. This project is intended to show if the degree of discrepancy or similarity in reporting speech articulation disorders between an integrated military operated dependent school at one military post and the recently integrated county school system in the adjacent county is significant. As an example, the MDC may have a significantly higher speech articulation disorder incident rate in consideration of the seven sampled school systems and the national average, but have a lower and apparently normal rate when compared with CDC in the county school system. About half of the MDC attend school on post and half in the adjacent public school system.

6. This project is intended to indicate if the father's service in Vietnam has an impact upon speech articulation disorders incident to his children while he is serving in Vietnam.

7. This project is intended to provide an insight into

possible speech defects whose incidence may be peculiar to MDC.

8. This project is intended to be of importance not only to the military but also to the field of civilian education. The military family is a mixture of the traditional community and that which the sociologist Ernest Burgess identifies as the newly emerging "companionate" family more appropriate to the requirements of the industrial, professional, and mobile society.[15]

National Importance of Results

1. U. S. Department of Health, Education, and Welfare:

a. as it pertains to over one half million MDC of school age.

b. as it has ramifications to the fatherless civilian family.

c. as it has ramifications to the itinerant civilian father and civilian family (salesman, executive, et cetera).

d. as it has ramifications to the mobile family.

2. Department of Defense:

a. as it pertains to over one half million MDC.

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[15]Morris Janowitz, The Professional Soldier (New York: The Free Press, 1960), pp. 188-189.

b. as the Directorate of Dependent Education is charged with responsibility of supervising and operating facilities to educate the approximately one half million MDC.

(1) Allocation of educational assets in accordance with Public Law 874.

(2) Determining the ratio of speech therapists to MDC in impacted school systems.

(3) Determining the ratio of school psychologists to MDC in impacted school systems.

(4) As an indication of problems in remedial reading, truancy, juvenile delinquency, and other emotional problems.

c. as it pertains to the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) and their planning for health problems peculiar to military service.

d. as it pertains to the "volunteer" army.

e. as it pertains to apprising military families of preventive care.

f. as it pertains to enlightening the military post commander, unit commander, social workers, and

military parents of a problem that is best overcome by coordination within the military community.

Outcome of Project

1. The data presented in the project findings may serve as a foundation upon which to build other studies of the military family and itinerant civilian families.

2. This project may serve as a pilot study for the Directorate of Dependent Education, Department of Defense, to conduct broad and intensive studies into learning disabilities peculiar to MDC in all three branches of the armed forces. This project provides an indication to the Directorate of Dependent Education whether MDC at the seven sampled military posts have a higher, lower, or similar incident rate of speech articulation disorders than the national average. The Educational Planning and Development Office of that Directorate should consider the purchase and administration of the Goldman-Fristoe Test of Articulation, or a similar test, to randomly selected MDC at its over 340 military operated dependent schools around the world, if this project indicates such an effort would be of value.

3. This project should enable military post commanders to direct emphasis in the allied fields of speech therapy, special

education, and child psychology to the MDC. As an example, the Ayer School Survey provided impetus to create a unique speech clinic at the Fort Devens post hospital which is operated by a full time speech therapist having benefit of part time assistance from graduate students attending local universities. The speech clinic is unusual for a post as small as Fort Devens. This study may provide impetus for similar clinics at other military posts.

4. This project may warrant a more equitable distribution of charitable funds collected on military installations.

Dissemination of Material

1. The findings of the project will be disseminated to the Directorate of Dependent Education, Department of Defense, and the Deputy Chief of Staff for Personnel Operations for further dissemination to separate commands and school systems under their supervision.

2. A copy of the project will be sent to the Army Library in the Pentagon, to the Army Surgeon General, and to the Library of the Command and General Staff College, Fort Leavenworth, Kansas.

3. A copy of the completed project will be sent to the office of CHAMPUS.

4. Copies of the completed report will be sent to participating military posts for dissemination to their supporting school systems.

5. The final project findings will be submitted as an opinionated paper for publication in the Naval Institute Proceedings, Annapolis, Maryland.

6. The final project findings will be submitted as an article suitable for general reading to the Family Magazine of the Army-Navy Times, a weekly service-oriented periodical.

7. The final report will be prepared for publication as an article in the Journal of Educational Research.

It is expected that this study will be an inroad into many educational problems peculiar to the approximately one half million military dependent children. If the project findings indicate that the MDC is not adversely affected by his father's transient life, then it has value by nature of its positive implications. If the contrary proves to be true, then the report may help the Department of Defense to direct its resources toward developing a more stable family life for the soldier and to provide additional assistance to the schools charged with the responsibility of educating the MDC.

The review of the literature in Chapter 2 of this study addresses the definition of speech articulation disorders, establishes

an "average" incident rate from the diverse reports of many authorities, and examines responsibility for the education of MDC as defined by public law. Though this is not a sociological study, the MDC will be examined with respect to his role in society from the standpoint of the military community and nuclear family.

Chapter 2

REVIEW OF THE LITERATURE

The review of literature relevant to this study encompassed three general areas: learning disabilities peculiar to military dependent children; the effect of transience on student achievement; and causes of speech articulation disorders. Additionally, a review of suitable testing material was performed to select the most appropriate instrument for measuring and comparing speech articulation disorders which were of interest to this study.

Most literature and general sources published during the past fifteen years indicate that speech articulation disorders may be manifestations of emotional disturbance and that separation of the father from the family unit may result in emotional problems for his children. However, a comprehensive review of pertinent literature did not yield any relevant studies directed toward the military dependent child and his learning disabilities. The Army Registry of Special Educational Materials (ARSEM) Catalog,[16] compiled by the Army Library, is a catalog of military education

[16] The Army Library (comp.), Army Registry of Special Educational Materials (ARSEM) Catalog, DA Pam 350-16 (Washington: Department of the Army, 21 November 1969).

items which includes theses, research papers, faculty presentations, and reports of boards, committees, or seminars which are on file at one or more of the twenty-seven army libraries. It does not list any reference pertinent to speech articulation disorder incident rates peculiar to MDC. A telephone conversation with the chief librarian of the Army library on January 7, 1971, indicated that the only relevant paper on file was the researcher's Ayer survey indicated previously and filed under reference number ASDRS 2996.

A final report of the U. S. Department of Health, Education, and Welfare entitled A Study of Resources and Major Subject Holdings Available in U. S. Federal Libraries Maintaining Extensive or Unique Collections of Research Materials [17] does not list any reference pertinent to learning disabilities peculiar to MDC. Likewise, Reader's Guide, Education Index, Research in Education, Union List of Serials, Journal of Speech and Hearing Disorders, Journal of Speech and Hearing Research, Exceptional Children,

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[17] U. S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, OE Bureau of Research Project No. 8-0310, Contract No. OEC-O-8080310-3742(095), A Study of Resources and Major Subject Holdings Available in U. S. Federal Libraries Maintaining Extensive or Unique Collections of Research Materials (Washington: U. S. Department of Health, Education, and Welfare, September, 1970).

and Journal of Education Research do not list articles applicable to MDC.

The Directorate of Dependent Education, Department of Defense, has two relevant unpublished papers on file which were written by military service school students. In the paper "Problems in the Education of Army Children," the author LTC Lachlan M. Sinclair notes that the transient nature of the military family and frequent separation of the father are a part of military life that contributes to educational problems, but he does not elaborate further. Colonel Sinclair draws exclusively from studies of migratory children. Literature cited by Sinclair does not support his comparison of MDC with other migratory children. Many of the points raised in his paper are logically accepted but his evidence is laced more with subjective opinions than with supportive and comparative data reflecting the performance of MDC. Nevertheless, Colonel Sinclair is one of the first researchers to effectively express educational problems thought to be peculiar to MDC. [18]

In a second paper, "A Comparison of the Reading Skills at Fort Leavenworth's Elementary Schools" LTC Theodore H. Schmidt

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[18] Lachlan M. Sinclair, LTC, USA, "Problems in the Education of Army Children" (unpublished paper presented to the faculty of Loyola College, 1964).

notes that army children who have received their basic reading skills in DOD overseas dependent schools have a high incident rate of remedial reading problems. He reports that in 1968 he sampled 33 MDC who had received their basic reading skills exclusively in DOD operated overseas dependent school systems and who were at the time of his study attending the Fort Leavenworth Elementary Schools. The subjects were measured under SRA equivalent norms. All measured MDC were children of military officers. Of the 33 measured MDC, 18 were identified as in need of remedial reading. Intelligence was not a factor since only three of the 18 affected MDC had IQ scores below 100 on a Binet test. Five of the 18 affected MDC had an academic average of 3.00/5.00 or higher.[19]

The Directorate of Dependent Education, Department of Defense, does not provide comparative statistical data or conclusions relevant to learning disabilities peculiar to MDC.[20]

Though not directly related to speech articulation disorders, two unpublished doctoral dissertations pertaining to

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[19]Theodore H. Schmidt, LTC, USA, "A Comparison of the Reading Skills at Fort Leavenworth's Elementary Schools" (unpublished study transmitted to Commanding General of Fort Leavenworth, Kansas, 1968).

[20]The function of the Directorate of Dependent Education, Department of Defense, is elaborated upon further in Chapter 3 of this report.

student mobility are of value. Snipes studied the relationship of student mobility to achievement in his 1964 paper, "An Analysis of the Relationship of Mobility to Pupil Achievement in Reading, Arithmetic, and Language in Selected Georgia Elementary Schools."[21] Snipes examined the null hypothesis that no significant relationship exists between mobility and various achievement factors at the sixth grade level. Data for his study were obtained by administering the California Short-Form Test of Mental Maturity; the California Achievement Tests, Complete Battery, Form W; and the Hollingshead Two Factor Index of Social Position.

In his conclusions, Snipes reports that the number of moves made by students did not appear to affect academic achievement in the areas of reading vocabulary and reading comprehension, arithmetic reasoning, mechanics of English, and spelling. Rather, in most cases, although not statistically significant, the non-movers revealed the tendency to score lower academically than the movers. Further, recency and distance of move did not appear to significantly relate to academic achievement. However, pupils who were retained in grade showed a greater number of moves and had

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[21]Walter Thomas Snipes. "An Analysis of the Relationship of Mobility to Pupil Achievement in Reading, Arithmetic, and Language in Selected Georgia Elementary Schools" (unpublished doctor's dissertation, University of Georgia, 1964).

moved shorter distances than their promoted peers, while pupils moving long distances tended to have higher IQs than their non-moving or short-moving peers.[22] This study amplifies the numerous mobility studies conducted with migratory children and which are frequently used as a basis of comparison with respect to the transience of MDC. Though Snipes did not study MDC, his study addresses the impact of long-range versus short-range relocations which are directly applicable to the long-range programmed moves of MDC vis-à-vis the short-range moves of the migratory child of agricultural workers as an example. However, a generalization of Snipe's findings to MDC is not warranted since longer moves by civilians may be characteristic of families higher in business hierarchies, i.e., management. This may be related to the IQ factor and would probably not generalize to the military. In fact, ranking officers travel less.

A second study addressing student mobility was written by Hand in 1967 entitled, "A Comparison of Permanent Pupils and Transient Military Pupils in Grades Four, Five, and Six

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[22] Snipes, p. 124.

in Relation to Mathematical Mastery."[23] Hand studied 426 pupils, members of twenty-four self-contained classes at the Ayer, Massachusetts, School System adjacent to Fort Devens. The Otis Quick Scoring Mental Ability Test, Beta Form; the Stanford Achievement Test, Form W; and a constructed mathematics test were administered to study the following null hypotheses:[24]

> (1) There is no difference in the intelligence level of the permanent pupil and the transient military pupil.
>
> (2) There is no difference in the chronological age of the permanent pupil and the transient military pupil.
>
> (3) Within each aspect of mathematical learning, there is no difference in the level of mathematical achievement of the permanent pupil and the transient military pupil.
>
> (4) Within each aspect of mathematical learning, the level of mathematical achievement of the transient military pupil is not related to the enlisted or officer status of father, or number of schools attended.
>
> (5) Within the aspect of conceptual learnings, the level of mathematical achievement of the permanent pupil and the transient military pupil is not related to word meaning and language in gains

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[23] Charles Reginald Hand, "A Comparison of Permanent Pupils and Transient Military Pupils in Grades Four, Five, and Six in Relation to Mathematical Mastery" (unpublished doctor's dissertation, Boston University School of Education, 1967).

[24] Hand, p. 4.

achieved.

Dr. Hand concluded that there was no statistically significant difference at each grade level between permanent pupils and transient military pupils with respect to intelligence, chronological age, or mathematical achievement and mastery.[25]

The conclusions of these two studies indicate that MDC apparently make proper academic adjustments to their transient status. However, both studies were based on data accumulated prior to the Vietnam War and the increased frequency and duration of military family separation which it caused. The present study of speech articulation disorders is based on data accumulated during the peak years of the Vietnam War and also the year of its major decline with respect to involvement of United States armed forces.

The author's preliminary study of this problem, "Speech Articulation Disorders Among Military Dependent Children--Speech Articulation Survey--Ayer Public School System, 1969-1970"[26] lends strong support to the possibility of emotional involvement

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[25]Hand, p. 360-374.

[26]Don E. Gordon, "Speech Articulation Disorders Among Military Dependent Children--Speech Articulation Survey--Ayer Public School System, 1969-1970" (Army Registry of Special Education Materials, number 2996, October, 1970).

among MDC with the Vietnam War since sixty-five percent of all children studied whose fathers were then currently serving in Vietnam had serious speech articulation disorders.

Emotional involvement is considered by Joseph and Zern in their book Emotional Problems of Children [27] in which they discuss the implications of the father's separation upon the psychodynamic interpersonal relationship between the child and the father. This topic is further pursued by Bettelheim [28] and Berkowitz, [29] but without direct implication to the military family. Morris Janowitz offers a social portrait of the military family in his 1960 book The Professional Soldier [30] which is brought up-to-date by Ward Just in his 1970 book Military Men. [31] These several

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[27]Harry Joseph and Gordon Zern, Emotional Problems of Children (Crown Publishers, 1964), cited by LTC Lachlan M. Sinclair, "Problems in the Education of Army Children" (unpublished paper on file with the Directorate of Dependent Education, Department of Defense, Washington, D. C.; Loyola College, 1964).

[28]Bruno Bettelheim, Love Is Not Enough (Glencoe, Illinois: The Free Press, 1950).

[29]P. Berkowitz and E. Rothman, The Disturbed Child (New York: New York University Press, 1960).

[30]Morris Janowitz, The Professional Soldier (New York: The Free Press, 1960).

[31]Ward Just, Military Men (New York: Alfred A. Knopf, 1970).

references offer a potpourri of conditions which might breed learning disabilities attributable to emotional involvement of the military child with military life.

In essence, sociologists have studied the peculiarities of the military family but educators have failed to study adequately the implications upon the education of MDC.

Speech articulation disorders are demonstrated by substitutions, omissions, additions, and distortions of the speech sounds and cause affected children difficulty in intelligible verbal expression. Van Riper, in his 1963 book Speech Correction,[32] lists several developmental factors which contribute to the speech articulation disorders: (1) maturation of articulation in the child; (2) illness or disabilities; (3) intelligence or social maturity; and (4) parental and family influences which include (a) foreign, parental brogue, (b) unwanted child, (c) emotionally turbulent living environment, and (d) imitation. Writing in the Handbook of Speech Pathology and Audiology, Powers notes, "In order to judge whether a child's misarticulations are normal for his age or are perseverations of speech characteristic of an earlier age level, we must be aware of the developmental orders of sounds and the ages at which the

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[32]Van Riper, p. 196.

various speech sounds normally appear."[33] Table 1, Development of the Purposive Use of Consonant Sounds,[34] presented on the following page, illustrates considerable agreement among the studies reported in regard to the developmental order of the different sounds, but less agreement on the age levels at which the different sounds appear.

Articulation problems are the most prevalent of all disorders of speech; functional articulation problems constitute the majority of these problems. Very few articulation problems are organically based. An organic disorder is correctly diagnosed only when operating factors are present. It also should be considered that many functional articulation disorders are incorrectly labeled through default. The causal factors of functional articulation disorders are of three types: predisposing, precipitating, and perpetuating.[35]

The majority of research directed toward functional disorders has been aimed at normal variations rather than at pathological variations, hence, reference to predisposing causal

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[33]Powers, p. 841.

[34]This table reprinted from page 842 of the text Handbook of Speech Pathology and Audiology, 1971 edition, with the permission of the publisher, Appleton-Century-Crofts, New York.

[35]Powers, pp. 837-839.

Table 1

Development of the Purposive Use of Consonant Sounds

INVESTIGATOR	AGE IN YEARS: 2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8
Wellman, Case, Mengert, and Bradbury (1931, pp. 50–52) Given correctly by 75% or more of the children.	p– –p– b– –b– t– d– m– –m– n– –n– w– –w– h		–b f– –t –f– –d– –f k– –z– –k– –z g– –g– –m –n –ŋ–		–p l– –d –l– –k –l –g –r– –v –ɹ –tʃ j– dʒ– –j– –dʒ–		–t– v– –v– θ– ð– –ð– s– –s– –s z– ʃ– –ʃ– –ʃ ʒ	tʃ– –tʃ– r–	–dʒ	(The authors do not list the following by 6:) –ŋ m– –m– –θ –θ– –ð			
Poole (1934)				p b m w h		t j d n ŋ k g		f		v ð ʃ ʒ l		s θ z m r tʃ dʒ	
Roe (in Johnson, Editor, 1950)			p b m		t k d g n ŋ		f v		l r ʒ dʒ tʃ		s z ʃ sl pl st		
Templin (1952) Percentage of correct utterance.			90% (vowels and diphthongs) 2/3 (consonants) ½ (2-cons. blends) 1/3 (3-cons. blends)		80% (cons.) 70% (2-cons.) 60% (3-cons.)				90% 80% 70%		90% 90% 90%		Not uttered correctly by 90%: Initial m, sl Medial: m, ʒ Final: ʒ, z, r, θ, nt, kt, skr, str, dʒ, tl, tr
Templin (1957)** Earliest age at which 75% of children gave correctly. (Only single consonants included—initial, medial and final positions)			I M F m m m n n n ng ng p p p t t k k b b d d g g f f f h h w w	I M F s z r y y	I M F k b d g s sh sh v j r r l l	I M F ʃ sh ch ch ch	I M F j		I M F t th th th v v th l		I M F th th z z zh zh j		Not produced by 75% of subjects: hw– –hw–

factors is found more often in the literature than is research regarding precipitating causal factors.[36]

Van Riper notes that speech is learned and difficult to change and relearn since so much of the function is automatic.[37] Van Riper continues that when parental and peer relationships are painted with unpleasant emotions, our motivation to speak properly falters. Some children may feel that it is better not to grow too far or too fast, and they keep a few infantile errors as a hedge against identification with their problems. He states that troubled homes are not good schools for the teaching of normal children. Some children suffer too much to be able to handle daily anxieties.[38] Van Riper does not discuss the military child; but one may easily extend the impact of the domestically troubled home to the impact of the soldier-father's frequent separation for prolonged periods--as when required to serve in a war.

In a 1970 book, Speech and Language Problems, Egland writes that the process and mechanism by which speech is normally learned is not yet fully understood but that it is a language art

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[36]Powers, p. 838.

[37]Van Riper, p. 196.

[38]Van Riper, p. 202.

having many psychological and social functions.[39]

Egland continues that most cases of misarticulation appear principally to have functional causes, the result of faulty learning often caused by the failure of the child's environment to provide an incentive for learning speech.[40] He also indicates, as do most authorities in this field, that it is not unusual to find articulation errors in a child's speech in kindergarten through third grade--the consonants r, l, s, ch (tʃ), sh (ʃ), and j (dʒ), and their blends with other consonants, being the most troublesome.[41]

Perkins and Curlee, writing in the Journal of Speech and Hearing Disorders, address the causality of speech problems. They note that the knowledge of disorders of communication is not exact or extensive and that the therapeutic art is not certain. Further, that it cannot be presumed that the cognitive processes are independent of behavioral processes. They state that the cognitive processes precede behavioral processes and hence cause them; the cognition becomes cerebral and involves abstractions about what presumably

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[39]George O. Egland, Speech and Language Problems (Englewood Cliffs: Prentice Hall, 1970), p. 104.

[40]Egland, p. 106.

[41]Egland, p. 32.

goes on in the mind.[42]

Powers, again writing in The Handbook of Speech Pathology and Audiology lends support to the concept of extensive involvement of functional disorders with disorders of articulation. She indicates that there may be many etiological factors involved or only one or two factors.[43] Powers also agrees that about eighty percent of all misarticulation cases are functional. Powers continues that clinical speech pathology has shown a trend in the direction of giving greater importance to the child's personality and emotional and social needs as effective determinants of his speech.[44]

Table 2, on the following pages, illustrates the incident rates of speech articulation disorders reported in eleven different speech articulation studies conducted by varied sources from 1925 to 1970 and is used as the basis from which to interpolate the "average" speech articulation disorder incident rate of five percent cited in this study.

In a study completed by Schreiber, it was determined that

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[42]U. H. Perkins and Richard E. Curlee, "Causality in Speech Pathology," Journal of Speech and Hearing Disorders, 34: 231-8, August, 1969.

[43]Powers, pp. 837-839.

[44]Powers, p. 839.

Table 2

Results of Speech Articulation Studies
Conducted by Varied Sources
1925-1970

Grades	*Source A	Source B	Source C	Source D	Source E	Source F	Source G	Source H	Source I	Source J	Source K
1					5.7%	27.8%					
2					3.6%	19.3%					
3					2.5%	9.0%	3%				
	7%	7%	3.9%	4%	2.7%	10.8% to		3%	14%	5%	4.7%
4					1.0%	3.1%	4%				
5					2.7%	3.6%					
6					1.0%	2.1%					

*Sources identified on following page.

Table 2 (continued)

Source A

Mills, A. W. and H. Street. "Report of Speech Survey", Journal of Speech Disorders, 1942, Vol. 7, pp. 161-167. Each child was examined individually and all thus diagnosed were doubly and triply checked. Survey taken at Holyoke, Massachusetts, school.

Source B

White House Conference Report of 1931.

Source C

Pronovost, Wilbert. "A Survey for the Speech and Hearing Handicapped in New England," Journal of Speech Disorders, 1951, Vol. 16, pp. 148-156. Studied 87,288 New England children.

Source D

American Speech and Hearing Association Committee for 1950 White House Conference reported that as a conservative estimate four percent of all children in the United States had an articulation disorder.

Source E

Travis, Lee Edward, ed. Handbook of Speech Pathology and Audiology, New York: Appleton-Century-Crofts, 1971, p. 624. Speech survey conducted by Root in 1925 by questionnaire.

Table 2 (continued)

Source F

Travis, Lee Edward, ed. Handbook of Speech Pathology and Audiology, New York: Appleton-Century-Crofts, 1971, p. 624. A personal survey of Iowa City, Iowa, school children, conducted by G. Reed, 1925.

Source G

American Speech and Hearing Association, Committee on the Midcentury White House Conference. "Speech Disorders and Speech Correction," Journal of Speech and Hearing Disorders, 17 (June, 1952).

Source H

A speech articulation survey of civilian dependent children attending the Ayer, Massachusetts, public school system. Unpublished. Don E. Gordon, 1969-1970.

Source I

A speech articulation survey of military dependent children attending the Ayer, Massachusetts, public school system. Unpublished. Don E. Gordon, 1969-1970.

Source J

Johnson, Wendell et al. Speech Handicapped School Children. New York: Harper & Row, 1967, p. 15.

Source K

Travis, Lee Edward, ed. Handbook of Speech Pathology and Audiology. New York: Appleton-Century-Crofts, 1971, p. 850. Current data reflecting Chicago public schools speech program.

institutionalized children have a higher incidence rate of functional articulation disorders than do non-institutionalized children.[45] Though MDC as a group are not institutionalized, it may be interesting to note if the quasi-regimented life of the military family affects speech articulation disorders.

The effect of the military dependent school systems upon the speech articulation disorder incident rates among MDC should be considered. The North Central Association of Colleges and Secondary Schools reports that in only 58 of 310 DOD schools is the quality of education compared favorably with schools graded above-average by accrediting associations.[46] But, as a recent Congressional Report illustrates, any child able to survive the DOD operated schools overseas, while maintaining an above average level of academic achievement, has become quite accomplished in social and academic adjustment.[47] Other evaluations of DOD operated schools are vague and not very illuminating with respect to providing an insight into their

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[45]Flora R. Schreiber, Psychological and Psychiatric Aspects of Speech and Hearing, Chapter III (Springfield, Illinois: Thomas, 1960).

[46]Army Times, 19 February 1971, Washington, D. C. p. 3.

[47]United States Congressional Report, Committee on Education and Labor, House of Representatives, April 1967, p. iii.

handling problems peculiar to MDC.

Powers reports in the Handbook of Speech Pathology and Audiology that most speech pathologists today would admit a close relationship of emotional adjustment to speech, although the exact nature and influence remains obscure and theoretical. She further provides that intelligence has been shown to have only a gross relationship to articulation skill and is not a helpful index, except at low I. Q. levels, for the prediction of probable articulation skill. But when environmental and adjustment factors are considered, the results are somewhat more conclusive and positive. The educational and cultural level of parents and the amount and kind of speech stimulation given the child seem to represent a direct relationship with the child's articulatory skill.[48]

In the Handbook of Speech Pathology and Audiology, Rousey suggests in Chapter 32, "The Psychopathology of Articulation and Voice Deviations," a hypothesis intended to advocate that, with the exception of blatant organically caused speech problems, a speech articulation disorder may be symptomatic of a primary psychological disturbance. Rousey contests the popular thesis that speech

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[48]Powers, pp. 869-875.

development proceeds through a specific maturation sequence and cites Hall (1962) and Healey (1963) when suggesting that there is no apparent standard pattern for sound acquisition in children. Rousey also reports that research has indicated a significantly high (60 to 80 percent) incidence of articulation problems in psychiatric patients who have passed the normal development phase.[49]

Findings reported by Rousey lend credence to the possibility that the developmental hypothesis accounting for articulation problems in the first seven or eight years are insufficient. An alternative hypothesis which he introduces is that errors in articulation of consonants reflect developmental failures in personality rather than reflecting stops or arrests in the normal maturation process of speech articulation.[50]

Rousey's views are in contradiction to those reported in many speech pathology texts which contend that articulation

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[49]Clyde Lee Rousey, Ph. D., "The Psychopathology of Articulation and Voice Deviations," Handbook of Speech Pathology and Audiology, ed. Lee Edward Travis (New York: Appleton-Century-Crofts, 1971), pp. 819-820.

[50]Rousey, p. 820.

is dictated by maturation and should be treated as such. Nevertheless, Rousey's hypotheses provide a foundation for suspected emotional causes, not merely concomitant causes, reflected in the high incident rate of speech articulation disorders among MDC. If a speech articulation disorder may be considered as a manifestation of an emotional maladjustment, then it may also be considered as a symptom reflecting a dynamic and adaptive difficulty in the child's social influences. Following Rousey's penetration into the psychopathology of articulation disorders, it may also be considered that such deviations are centered upon libidinal needs. The speech disorder may be an outlet for aggressive discharge, self-adjusted aggression, a salvaging device to maintain one's emotional balance, or a regressive device to seek security as manifested in infantile speech. Above all else, the speech disorder may be a distress signal.

Many current textbooks of speech pathology Van Riper (1957), Irwin (1958), Berry and Eisenson (1965), Brian (1965), and Travis (1957), consider emotional involvement with individuals affected with speech articulation disorders, but the primary thesis usually presented is that the psychological disorder is a secondary result of the articulation disorder. The suggestion that an articulation disorder may be a manifestation of a primary emotional

maladjustment is usually not presented.[51]

The pooled experience of speech pathologists, often with the support of research findings, indicates that faulty learning is a significant influence, if not the major influence, upon misarticulating children. This premise may also be carried forward in consideration of the higher than per capita average of foreign-born mothers married to soldier-fathers in the United States armed forces. It may be assumed that many foreign-born mothers do not provide an ideal articulate model for their children being raised in the United States. However, studies by McCarthy (1930) and Beckey (1942) failed to establish that this retarded speech development. Additionally, many MDC are bi-and tri-lingual as a result of living overseas or because of living with a foreign-born mother or foreign-born mother and father. A substantial number of United States armed forces personnel are foreign-born under the definition used in this study.

It also should be considered that military families tend to be stationed in rural versus urban environments and may be affected by rural school systems. Studies completed by Louttit and Hall (1936) and Wilson (1952) are contradictory in establishing

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[51]Rousey, p. 821.

whether or not rural or urban school children have a higher incident rate of speech articulation disorders.[52]

Misarticulation in relation to sex is indicated by several studies conducted by Root (1925) in which he reports a boy to girl ratio of 1.5 to 1.0; Chicago Public School data (1970) reporting 3.5% of the girls; Templin (1952) reported that girls reach correct articulation about one year earlier than boys. On the other hand, studies by Roe and Milisen (1942) and Sayler (1949) indicated no significant difference between boys and girls with respect to functional speech articulation problems for an unselected population.[53]

One of the most significant studies involving the emotional involvement of children and its relationship to speech articulation disorders was done by Wood. He gave the California Test of Personality and Aspects of Personality to fifty elementary school children with functional defects of articulation. Their fifty parents were given the Bernieuter Personality Inventory and the California Test of Personality. Two clinical groups of children were established on the basis of paired neurotic tendency ratings of

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[52]Powers, p. 868.

[53]Powers, pp. 843-850.

mothers. Wood found, in agreement with Anders and McAllister, that the speech defective children did not fall below test norms in personality adjustment. Tested mothers, however, were rated more neurotic, more submissive, and more self-conscious. Fathers did not, as a group, differ significantly from the norms. Seventy-two percent of the affected children had at least one parent above the sixtieth percentile in neurotic tendency. The fathers and mothers rated significantly lower in social adjustment, but the social standards of mothers were very high in comparison with other adjustment scores. Wood concluded that the affected children had a very high set of social standards imposed upon them in an atmosphere of emotional outbursts from their parents. The Thematic Apperception Test suggested a sense of frustration in sixty-six percent of the children, withdrawing tendencies in sixty-five percent, and lack of affection in thirty percent. The results also suggested higher incidences of anxiety, insecurity, lack of belongingness, lack of achievement, aggressiveness, hostility, and escape. [54]

There are numerous influences which may act as predisposing factors to a functional speech articulation problem.

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[54] Powers, p. 871.

Some of these influences include low intelligence, education, cultural status, effects of siblings, poor speech model, lack of stimulation or training, personality traits, parental adjustment, visual, tactile, kinesthetic and auditory sensory factors, and motor coordination and control. The more predisposing factors that are present and the more severe each factor is, the greater the chance for one, or more than one, factor to cause misarticulation.[55]

Returning to Rousey, writing in the Handbook of Speech Pathology and Audiology, it is noted that he interjects a proposal focused upon Freudian psychology. In his proposal, he relates articulation problems to psychopathology by noting that Freud (1922) proposed that man had two psychological drives--his sexual drive and his aggressive drive. Rousey proceeds in his proposal by considering that vowels may have psychological significance in the sense of their presenting the earliest vocal expression of libidinal and aggressive drives. He continues this assumption by speculating that the consonant sounds may reflect the onset of control over these drives. A parallel in the emergence of speech illustrated by the maturational hypotheses and the classical pattern of psychosexual development proposed up to the latency period is

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[55]Powers, p. 875.

suggested. The developmental notion regarding the emergence of normal articulatory patterns holds that all consonantal sounds are mastered by children by seven or eight years of age. From the standpoint of psychosexual development, it is usually held that early relationship difficulties are experienced, worked through, and resolved by the same ages. This correlation may be interpreted as signaling a parallel sequence. Therefore, the conflicts appropriate to the various psychosexual stages may be reflected in misarticulation of the consonantal sounds at the various ages. Rousey proposes that certain sounds may be assigned to specific levels of psychosexual development. He cites studies by Templin (1957) in which three chronological time-groups are identified and which may be related to broad areas of psychological development which precede the latency period.

In a review of Erickson (1950), Rousey assigns specific sounds, presented on Table 3, to Erickson's developmental stages as he elaborates additionally upon his proposal that some misarticulations may have psychopathological origins.[56]

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[56]Rousey, p. 825.

Table 3

Rousey's Identification of Sound Mastery
by Developmental Stages

Oral respiratory-sensory stage: /m/ /p/ /w/ /h/ /y/ /l/ /n/ and /t/
Oral-biting stage: /b/ /f/ /k/ /g/ and /d/
Anal-retentive stage: /s/ /r/ /sh/ and /z/ as in azure
Anal-expulsive stage: /ch/ and /j/
Phallic stage: /th/ /v/ /z/ and voiced /th/

Rousey continues by developing a working hypothesis related to psychosexual development and its possible impact on misarticulation. He asks if an assumption that the voiceless /th/ sound is related to the phallic stage of psychosexual development is correct, and if the assumption can then be extended to one's feelings about masculinity and inferentially to one's father, then the child's inability to produce the voiceless /th/ may be related to the child's feeling about the father, and masculinity in general, and to some confusion within the child of his sexual identity.

Rousey offers that the /l/ phoneme may represent deprivation disturbances in mother-child relationships; the substitute /d/ for the voiced /th/ may relate to an oral expression of aggression; the voiceless /th/ for /s/ may give passive

indications of immaturity; and the whistling /s/ may reflect anxiety.[57]

Whether or not the reader accepts Freudian psychology in its entirety or as the keystone of more modern theories of psychology, the psychosexual developmental theory is of interest to this study. Rousey is introduced into the literature of this study as a creditable authority having gained recognition in a respected text and because of the possible impact of the psychosexual developmental theory upon some affected MDC. As an example, consider the impact of this study if it finds that MDC do have a higher than normal incident rate of speech articulation disorders; and if a large number of the affected MDC have a specific misarticulation which can be related to the separation of the soldier-father at a given point of matriculation. It is beyond the competence of this study to equate misarticulation with the child's development through specific stages of life, but the study may report an unfavorable relationship between separation of the soldier-father from his child at a given point in the child's chronological age.

In summation, the Department of Defense has not found

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[57]Rousey, pp. 825-826.

it necessary to sponsor a study of speech articulation disorders among military dependent children, apparently because a problem of significant impact has not been identified or because the problem, if it exists, works itself into solution through the educational or social process or both.

An exact average incident rate of speech articulation disorders cannot be agreed upon nationally or even regionally due to the diverse interpretations with regard to severity of each case. A realistic appraisal of the problem can therefore only be viewed with respect to an approximate "national average" or more definitely with respect to CDC attending the same school system or affected and non-affected groups of MDC.

If MDC have a peculiarly high incident rate of functional speech articulation disorders, there is substantial reason to suspect an emotional problem created by family separation as one primary causal factor.

THE TESTING INSTRUMENT

It will be recalled that the purpose of this study is to determine if separation of the soldier-father has an effect upon his child's speech articulation. Four hundred and twelve children from seven separate school systems were studied and the process

of identifying affected children was delegated to the speech therapists at each school system. A standardized testing instrument, the Goldman-Fristoe Test of Articulation, was selected to provide a comparatively uniform method of identifying and recording errors of articulation. The Goldman-Fristoe Test of Articulation was chosen because it required no reading, it examined all important phonemes, its administration was efficient--requiring less than ten minutes per child, and the test was interesting to the tested child, gaining his interest and cooperation. Perhaps the most important consideration in selecting the Goldman-Fristoe Test of Articulation was that it provided a subtest which tested the child's conversational articulation by requiring spontaneous production. Goldman and Fristoe point out that children with normal articulation or severe articulation disorders perform consistently in all contexts of phonemic measurement--that is when the phoneme occurs in isolation, in syllables, in words, in phrases, or in sentences. However, the child with moderate articulation disorders may produce a given phoneme correctly in one context but not another. This test samples both spontaneous and imitative production which includes single word and conversational speech production.[58]

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[58]Ronald Goldman and Macalyne Fristoe, Goldman-Fristoe Test of Articulation, Instruction Manual (Circle Pines, Minnesota: American Guidance Service, Inc., 1969)., p. 4.

The Goldman-Fristoe Test of Articulation is designed around the principle that accurate and reliable judgements can be obtained by testing several sounds within the same stimulus word. The test makes use of three basic assessment procedures: the Sounds-in-Words Subtest, the Sounds-in-Sentences Subtest, and the Stimulability Subtest.[59]

Only the Sounds-in-Words and the Sounds-in-Sentences Subtests were used in this study to provide a method of measuring the subject's articulatory performance demonstrated through patterns of articulation in simple and complex speech situations and in comparison to standards of correct speech production.

The Sounds-in-Words Subtest consists of 35 color picture cards depicting objects and activities commonly known to first grade children. The subject is required to identify the picture and in some instances to reply to questions about the picture providing for 44 possible responses. The examiner does not articulate the word called for. In a 1967 study by Goldman and Fristoe, this subtest elicited 95 percent of the required sounds spontaneously. All of the single consonant sounds in the English language except /zh/ are tested.[60]

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[59]Goldman, pp. 5-7.

[60]Goldman, pp. 5-6.

The Sounds-in-Sentences Subtest consists of two narrative stories read aloud by the examiner and illustrated by color picture cards. The subject recounts each story in his own words using the picture cards as memory aids and to key the use of those words being scored. This test is limited to those consonants most frequently misarticulated. The Sounds-in-Sentences Subtest provides a method of eliciting content-controlled, conversational-type speech.[61]

The Stimulability Subtest is used to have the subject watch and listen carefully as the therapist correctly produces a sound that the subject misarticulates in spontaneous production. The subject attempts to repeat the sound that he has heard. This subtest was not used in this project since the study is concerned primarily with identifying incidences of misarticulation and not diagnosis or therapy.[62]

The Sounds-in-Sentences Subtest was designed to assess only those sounds most likely to be defective while the Sounds-in-Words Subtest was designed to assess almost all consonant sounds.

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[61]Goldman, p. 6.

[62]Goldman, pp. 6-7.

The Sounds-in-Sentences Subtest should, therefore, elicit a higher percentage of errors.[63]

The Goldman-Fristoe Test of Articulation may be administered at two levels. At level one, each sound production is judged only for presence of error, and may be administered by a qualified classroom teacher. In level two, each sound is judged for type of error.[64] Only level two testing was used for measurement in this study.

The testing kit also includes a device called a "sound locator" which is used to locate the picture card required to elicit a particular sound. The key words on the examiner's plates (reverse side of a picture card) and on the response form are coded by color and number to designate the particular sounds and their positions being tested with each word. Errors are recorded in the appropriate cells on the Sounds-in-Words or Sounds-in-Sentences Subtest response matrices of the score sheet.[65] See Appendix A.

By examining the matrices of either of the subtests

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[63]Goldman, p. 16.

[64]Goldman, p. 8.

[65]Goldman, pp. 11, 13.

used in this study, the examiner can judge which sounds are misarticulated and under which conditions, the degree of consistency on over-all articulation and on individual sounds, positions in which misarticulations most frequently occur--initial, medial, final--and types of error.[66]

The Goldman-Fristoe Test of Articulation is easily administered, but one area of caution is emphasized. The testing speech therapist must practice coordinating the scoring sheet with the test before administering the test or the results will prove unsatisfactory. The process is complicated and requires more familiarity than is expected by reading the instruction manual or noting the comparative simplicity of the other testing materials. Coordination and practice are the keys.

Spontaneous responses of children to articulation tests were studied in the administration of the Look-and-Say, Templin and Darley, Arizona Articulation Proficiency Scale, and the Photo Articulation Tests to first grade students. The PAT pictures were the only colored pictures shown in the experiment and they elicited more correct response than did the other tests. Moreover, the PAT cards are actual photographs of objects The

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[66]Goldman, p. 15.

Templin and Darley, Look-and-Say, and Arizona Articulation Proficiency Scale had thirteen, twelve, and thirteen pictures respectively which did not elicit spontaneous naming from at least three of the four groups of children chosen from middle class or low socio-economic backgrounds.[67]

The Goldman-Fristoe Test of Articulation is comparatively new (1969) and lacks the test validity, reliability, and experience factors of the Look-and-Say, Templin and Darley, Arizona Articulation Proficiency Scale, and the Photo Articulation Tests. However, the test uses color drawings of easily recognized objects presented in clear dimensional concept. Familiarity tests conducted in conjunction with this study at an army hospital speech clinic indicated that object recognition was possible in all cases by first grade students and to several trainable mentally retarded children, with the exception that "gun" was often referred to as "rifle" and "chicken" was referred to as "hen."

MDC may be expected to have a wide range of dialect as a result of the extensive geographical variety inherent in their

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[67]Susan J. Shanks et al., "Spontaneous Responses of First Grade Children to Diagnostic Picture Articulation Tests." Exceptional Child 36 357-8 January, 1970.

place of birth, numerous places of domicile, and their variety of educational and school experiences. The Goldman-Fristoe Test of Articulation was chosen because it tested only consonants and not vowels which account for most differences in dialect within the English language.[68]

The Goldman-Fristoe Test of Articulation was used to measure speech articulation errors among two groups of MDC. Group one consisted of MDC previously identified by school speech therapists as needing speech correction. Group two consisted of MDC not identified as needing speech correction. The results of test scores were compared to the measured separation of the soldier-father and other influences.

The procedures of test administration, sampling, selection, and examination of the soldier-father's extent and frequency of separation are addressed in Chapter 3.

RELIABILITY AND VALIDITY OF THE GOLDMAN-FRISTOE TEST OF ARTICULATION

The Goldman-Fristoe Test of Articulation is a

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[68]Goldman, p. 7.

comparatively new test published in 1969. The writer has been unable to obtain disinterested reliability or validity data pertaining to the test from either Mental Measurements Yearbook, Journal of Speech and Hearing Disorders, Journal of Speech and Hearing Research, Journal of Educational Research, or Research in Education. In consideration of this, the reliability and validity data provided by the publisher in the instruction manual for the Goldman-Fristoe Test of Articulation is reproduced in Appendix B.

INSTRUMENT EVALUATION

The Goldman-Fristoe Test of Articulation was administered to 444 military dependent children attending seven different school systems. Data from 412 respondents were used in this study and data from 32 respondents were omitted because of disqualification resulting from their failure to meet the selection criteria established for age, grade, or length of military service of the father.

Experience with the testing instrument during its application in this study reflects that:

a. Consideration should be given to changing the object in plate 4 to a large naval gun, or else change the response word entirely, as most military children correctly identify plate 4 as a rifle. This situation may occur among civilian children.

b. Consideration should be given to changing plate 8 so as to omit the nest and chicks. Most of the tested children identified the chicken as a hen when associating it with the nest and chicks.

c. In the Sounds-in-Sentences Subtest the child is prone to repeat the story in the past tense, as is natural, despite guidance to the contrary. As a result, the word "catch" in plate 43 was usually reported as "caught", thereby omitting the /ch/ sound. In plate 22, most children reported "lost" rather than "loses", thereby omitting the /z/ sound.

d. With exception of those items noted above, most children easily identified all subjects and found the Sounds-in-Sentences Subtest both interesting and humorous. The humor interjected into the Sounds-in-Sentences stories served to remove a sense of composure placing the child in a situation of pronouncing words in a situation that was not fully controllable.

Chapter 3

METHOD OF PROCEDURE

The administration of this project was conducted with benefit of coordination established between the researcher and a federal office of central responsibility. Research work was conducted jointly within the field of education and the military and involved several military posts, school systems, and the Department of Defense. Additionally, the magnitude and geographic dispersion of the study suggested that encouragement of local participation was best passed down the chain of authority rather than upward. Consideration of the problem implies that the logical starting point of coordination may well be the Department of Defense (DOD). The DOD directory indicates an office identified as the Directorate of Dependent Education with subordinate offices listed under Office of Educational Planning and Development. The semantics are deceptive. Interviews with officials of the directorate indicated that the Department of Defense has not assigned responsibility for the monitoring of the education or curriculum of the over

one half million MDC to either this directorate or any other known office or combination of offices within the Department of Defense.

Rather, the Directorate of Dependent Education is charged with responsibility of supervising the operation of the DOD operated dependent schools located overseas and at select military installations within the forty-eight contiguous states and the approximately one hundred thousand MDC in attendance. This responsibility is further delegated to the army and air force which respectively have responsibility for DOD operated schools in the Pacific Theater and the European Theater.

Other responsibility is assumed by the United States Department of Health, Education, and Welfare, Office of Education, in accordance with its responsibility for administration of Public Laws 81-815 and 81-874 (1950) which pertain to federal impact funding granted to public schools located in federally affected areas.[69] Officers at OOE-ESE-DSA, Department of Education, indicated that their mandate excludes responsibility to monitor academic proficiency or curriculum since under public law that aspect of the

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[69]Public Law 81-815 Providing Financial Assistance For School Construction in Federal Affected Areas (1950). Public Law 81-874, Titles I and II Providing Financial Assistance for Maintenance and Operation of Schools in Federally Affected Areas (1950).

program is primarily a state and community responsibility.

There is no central federal office of responsibility charged with monitoring the curriculum, achievement, or speech articulation disorders peculiar only to MDC.

An understanding of the delineation of authority is therefore essential to recognize that MDC educated in DOD operated schools overseas and at select military posts within the forty-eight contiguous states fall under the direct supervision of the local military post commander. The MDC educated in public schools under the provisions of Public Laws 81-815 and 81-874, however, fall under the direct supervision of the local school board which normally invites a member from the military post commander's staff to participate as a nonvoting member.

Having grasped the administrative parameters within which the study would be completed, each of the objectives delineated in Chapter 1 was addressed with consideration to the method of procedure.

Objective number one, the null hypothesis, was evaluated by studying the speech articulation disorder incident rate of elementary schools heavily populated (at least 35 percent of school population) with MDC and DOD operated dependent schools with MDC in grades two through six.

The DOD operated dependent schools serving army MDC living overseas were omitted from the study to eliminate the immediate influence of living in a foreign country and in a culturally insulated community. This omission cannot, however, eliminate the influence of possible previous attendance at the overseas schools by MDC or the unknown impact that such attendance may have had on the speech articulation disorder incident rate of the MDC.

After preliminary interest had been established with the liaison officer at each post, a letter of proposal was sent to military and school officials. See Appendix C. Special Form Number One, developed by the author, was enclosed with each letter of proposal. See Appendix D. The special form was used to establish if the public school systems participating in the study were indeed populated by at least thirty-five percent MDC, as stipulated in Chapter 1, and to estimate the speech articulation incident rate with which the remaining portion of the study would be involved.

In each participating school system, the speech therapist indicated all children in grades two through six having need of speech articulation correction as identified by screening or classroom teacher referral. Special Form Number One advised the speech therapist that:

> The terms serious and moderate disorders are open to interpretation; therefore, this survey will

> not include children with a defect so slight that it does not attract the attention of others besides the speech therapist. The survey will not include those identified by school records as having been diagnosed as mentally retarded children, children with constitutional disorders such as cleft palate, children with voice problems, or children who only stutter.

The initial data collected on Special Form Number One indicated that the speech articulation disorder incident rate among MDC varied from 2.1% to 14.5%, depending upon the school studied. In two out of the three cases examined, the MDC speech articulation disorder incident rate was higher than the incident rate of the CDC attending the same school system. These findings are detailed in Table 12, Chapter 4. The data collected on the special form confirmed the population of MDC attending the participating public schools and indicated a need for continued inquiry into the speech articulation disorders of MDC.

After compilation of the data from the Special Forms Number One, a second letter was sent to each school system asking their continued cooperation. See Appendix E. Enclosed with this letter was a complete Goldman-Fristoe Test of Articulation testing packet; copies of a personal data sheet, developed by the author, to be distributed to parents (Appendix F); and an information sheet,

developed by the author, for the school speech therapist (Appendix G).

In each school system, the speech therapist indicated on Special Form Number One, all children in grades two through six having need of speech articulation correction as identified by therapist screening. A distinction was made between CDC and MDC needing speech correction.

Upon the school's receipt of the test packet, thirty MDC having speech articulation disorders were selected randomly. An additional thirty MDC not having speech articulation disorders were randomly selected. These children were selected by the therapists within the limitations established by this researcher with reference to the span of chronological ages and grade of the student. This information was provided to the therapist in special instructions accompanying each test packet (Appendix G). Ths sixty selected children were administered the Goldman-Fristoe Test of Articulation during 1971 and scored by the school speech therapist. The Goldman-Fristoe Test of Articulation was chosen to obtain an adequate and accurate measurable sample of the subject's speech production under conditions of stimulus response and imitative conversation. Only the Sounds-in-Words Subtest and Sounds-in-Sentences Subtest were administered to each child--at level two of the test, in which each

sound production was judged for type of speech error (as opposed to level one, where each sound production is judged only for the presence of error). The Stimulability Subtest was not administered for this study.

The testing therapist administered the Goldman-Fristoe Test of Articulation specifically as directed in the instruction manual accompanying the test. Each child was scored on a separate Goldman-Fristoe Test of Articulation score sheet--having the child's full name printed or typed in the appropriate blank before the testing procedure began.

The Goldman-Fristoe Test of Articulation score sheet was then scored to indicate a correct response, omission, distortion, substitution, or addition for each sound production as indicated in the instruction manual.[70] Dentalized (denasalized) and nasalized production as well as glottal stop were not scored as errors or specifically identified.[71] All score sheets were tabulated at the end of the testing period. There were 73 possible sound productions for the Sounds-in-Words Subtest; 44 possible sound productions for the Sounds-in-Sentences Subtest--giving a total of 117 possible sound productions

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[70]Goldman, p. 12.

[71]Goldman, p. 13.

listed on the score sheet for the tests administered. One point was given for each incorrect sound production regardless of type. The total points accumulated by each student provided the articulation score recorded as either gross test errors or true test errors. It will be recalled from Chapter 2 that gross test errors include every incorrect sound production recorded on the score sheet, whereas true test errors are recorded only once for each incorrect sound production even though it may occur several times on the score sheet. That is, the lower the score, the better the articulation.

An information sheet, developed by the author, (Appendix F), was sent to the parents of each child prior to the testing procedure with a request for data pertaining to the father's rank, branch, and amount of time he was separated from the child tested (number of months and frequency of separations). The field military personnel records of the fathers were reviewed to confirm rank, branch, and the amount of time in months that the father was geographically separated from the family unit during the life of the tested child. The father's field finance records were checked to confirm the field

personnel records.[72] Respondents were deleted from the random selection if the parent failed to return the completed information sheet. Children deleted from the selection were replaced by additional selections until the full complement of thirty MDC affected and thirty MDC non-affected had been chosen.

The soldier-father's completed information sheet, after verification, was attached to his child's score sheet. Both the information sheet and score sheet were assigned a coded prefix serial number. The coded prefix represented the military post; the respondent's serial numbers were assigned in sequence. Names of the father and child were then deleted from both the information and score sheets to insure anonymity.

Once this information was received, a coding guide was developed (Appendix H). Then the information was coded and transferred to Hollerith cards. Range, mean, standard deviation, and the

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[72] Field records are maintained at the father's duty post by the servicing Adjutant General unit and finance unit. Researchers unfamiliar with military personnel records and procedures are advised to complete the following extension subcourses available without charge from the United States Army Adjutant General, Fort Benjamin Harrison, Indianapolis, Indiana, 46216:

USAAGS
- 4 Pay and Allowances
- 23 Records Management
- 27 Basic Administrative Records
- 34 Authorized and Unauthorized Absences
- 303 Utilization of Enlisted Personnel
- 307 Personnel Control Devices
- 308 Officer Career Management and Utilization
- 359 Personnel Administration and Records

standard error were computed for each of the columns, and where appropriate, frequency distributions were constructed for the lines of the columns.

The correlation between the two variables of the major null hypothesis (the gross and true test error scores on the Goldman-Fristoe Test of Articulation, and the time the soldier-father was geographically separated from the tested child) was made using the Pearson product-moment correlation coefficient (r). The significance of the Pearson r was tested. Since the score on the Goldman-Fristoe Test of Articulation was reflected in two scores, gross errors and true errors, both were correlated against geographical separation.

The students were then divided into two groups. One group was compiled of those children whose fathers had been separated at least fifty percent of the time. The second group consisted of those children whose fathers had been separated less than fifty percent of the time. Means were determined for the score on the Goldman-Fristoe Test of Articulation for each group and the difference between the means was tested for significance at the .05 level.

The second objective was to sample more widely the incident rate of speech articulation disorders among MDC attending geographically dispersed schools in order to eliminate the prejudice of one survey.

In order to coordinate the conduct of this or any other survey at any military post or with any public school affording support to a military post, the military post commander should be addressed on the matter first. This may be properly accomplished by initiating a telephone call or letter to the military post adjutant, the commander's representative in matters of administration and personnel, to outline one's program and to solicit cooperation.

The adjutant usually referred the research director to a Department of the Army civilian or military officer serving on the adjunctional staff and having as one of his duties that of liaison between the military post and either the DOD operated school for dependents or the local public school, or at some posts both types of schools. At larger posts, in the southern United States as an example, MDC living on-post may attend DOD operated schools while MDC living with families off-post attend the local public schools. In many northern states, however, MDC living on-post as well as those living off-post are sent to the adjacent local public school.

In order to treat objective number two, military posts invited to participate in the project were selected from among one service, the army, to facilitate examination of personnel records, administrative procedures, and to sample one well defined service.

While many similarities exist between the army, navy, and air force, there may be significant differences which affect MDC. One important difference is that air force families usually enjoy more stability than do army families, and the navy father is often separated more frequently than is the army father.

Those army posts selected for this study were chosen because of their troop complement, environment, and educational facilities. Any military post is an unique community and depending upon the composition of the troop units assigned to it, as well as the competency of the post administration, it can vary from a depressed to an advantaged socio-economic environment. The combination of army posts were chosen to sample the wide spectrum of the army sociological environment.

The army is a large organization consisting of over one million uniformed men and women. There are over 1,800 job categories referred to as military occupational specialties (MOSs). Each MOS requires a different type of training and degree of education, intelligence, and temperament. It is impossible to sample the entire environmental spectrum with the means immediately available. The next best solution is to sample military posts having a large variety of functions and supporting personnel.

Post 1 was selected because it was considered to be an ideal military post with a population of 15,000 service members and dependents. Post 1 is located in a rural setting near a major city, is well maintained, and is served by a supporting public school providing student achievement scores considerably above the national average for MDC and CDC. Post 1 is significant because its troop complement is comprised of soldiers from every portion of the army spectrum. The post is small enough to be relatively free of local community prejudice, but large enough to be self-sufficient.

Post 2 operates its own dependent school system for MDC living on-post. Its troop complement is comprised primarily of combat arms and combat support arms units. Its primary function is maintaining an army division, operating officer training schools, and providing combat arms training.

Post 3 is a large military post (population exceeds 50,000) operating its own dependent school system for MDC living on-post. The troop complement is significant and characterized as highly aggressive and subject to numerous short term family separations (30-90 days) for participation in military contingency operations.

Post 4 is one post supported by two public school systems (designated as 4a and 4b). It is a significant post because it is a large, comparatively impersonal community comprised primarily of

combat arms and combat support units. A major post function is basic training. Duty days are long.

Post 5 is primarily a school-type post; most soldier-fathers are officers in grade 04 to 06, assigned to Post 5 for a period of about nine months. Post 5 is significant because most soldier-fathers are participating in graduate level schooling as their only duty and are not separated from their family. Duty days are short.

Post 6 is a large military post (population exceeds 50,000) that sends all MDC living off-post in the local community to the local school system which was recently racially integrated (1967). Off-post housing is rated from excellent to below poverty level.

Post 7 is an army post of medium size (population ranging from 15,000 to 50,000) which operates its own school system. Post 7 is significant because it is primarily a basic and advance combat arms training center. The soldier-father may frequently work 50 to 80 hours per week.

Eight letters of proposal were submitted indicating that the Goldman-Fristoe Test of Articulation would be administered, and all but one military post consented to lend full assistance. The exception, with an estimated MDC attendance of 4,000, indicated that elementary MDC attending their public school system were screened for speech articulation disorders only in the third grade and that the school lacked

sufficient personnel to identify the number of children affected by speech disorders. This school system was deleted from the study.

Objective number three, to determine if MDC have a higher than average, average, or lower than average speech articulation disorder incident rate, was treated by determining the speech articulation disorder incident rate from the data provided by the seven participating school systems. The disorder rate is defined as the percentage of affected children in a school system. These data were compared with data reported in other surveys currently in the literature. This comparison is reported in Table 2 of Chapter 2.

Objective four pertained to determining if the speech articulation disorder incident rate among MDC increases, remains the same, or decreases from grade two to six. These data were obtained by reporting the percentage of MDC-A with respect to grade in each of the seven participating schools. This information is reflected in Table 14of Chapter 4. Comparative data reflecting the incident rate by grade of the civilian population is extracted from the literature and reported in Table 2 of Chapter 2.

In order to treat objective number five, which was to determine if the type of speech errors among MDC differ from the norm as determined by the civilian population, the study planned to graphically illustrate significant comparisons between the Sounds-in-

Sentences Subtest (SSS) and the Sounds-in-Words Subtest (SWS) as well as individual therapist differences and differences pertaining to substitutions, omissions, distortions, and additions. The ten most misarticulated sounds, ranked in terms of the frequency of their occurrence, and their interrelationship with one another are displayed graphically in Chapter 4.

It should be recalled that objectives one and five were treated by testing thirty MDC previously identified by therapist's screening as affected and thirty MDC not previously identified as affected from each of the seven schools. This selection process is obviously weighed to a testing population of which at least half is affected. This procedure is justified in order to study the mobility pattern of a sufficient number of soldier-fathers of affected MDC.

Objectives three and four were treated by examining the data presented by 20,000 MDC attending the seven participating schools. These children were reported by the schools in terms of total population and the number of MDC requiring speech therapy for mild or serious speech articulation disorders as indicated on Special Form Number One.

In summation, this study reviewed the speech articulation disorder incident rate reflected by approximately 20,000 MDC attending seven separate school systems located throughout the United

States. Information provided by the school systems indicated a higher than normal incident rate of speech articulation disorders among MDC. Subsequently 412 MDC were selected for testing in conjunction with the Goldman-Fristoe Test of Articulation. Test results were then compared with factors involving the soldier-father's military records and the results displayed statistically and graphically. Conclusions reflected by the data are presented in Chapter 4, Findings.

Chapter 4

FINDINGS

As was indicated in Chapter 3, the correlation between the two variables of the major null hypothesis (the scores on the Goldman-Fristoe Test of Articulation and the time the soldier-father was geographically separated from the tested child) was made using the Pearson product-moment correlation coefficient (r) to determine the findings of the first objective. Since the score on the Goldman-Fristoe Test of Articulation was reflected in two variables, gross and true test errors, both scores were correlated against time of geographical separation. The time the soldier-father was geographically separated from the tested child was recorded by columns 10 and 11 of the coding guide;[73] the number of gross test errors on the Goldman-Fristoe Test was represented by column 18, and the number of true test errors by column 22. When duration of separation measured in months was correlated to gross test errors based on a population of 377, the Pearson r was found to be .024. This index is not significant

[73]Administrative annex.

at the .05 level. When the population was divided by sex, the Pearson r for 225 males was found to be -.016 and for the 152 females .125, neither of which is significant.[74] [75] See Table 4.

When the duration of separation measured in months was correlated to true test errors based on a population of 377, the Pearson r was found to be .077 which is not significant at the .05 level. When the population was divided by sex, the Pearson r for the 225 males was found to be .049, and .094 for the 152 females, which is not significant.[76] [77] See Table 5.

The null hypothesis was also tested on a dichotomous basis involving a population selected by dividing the population into two groups, using as a criterion the percentage of time the soldier-father was geographically separated from his child (columns 10 and 11). Each child was either considered to be geographically separated from his father more than or equal to fifty percent of the child's life, or less than fifty percent of the child's life, as defined in accordance

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[74]N. M. Downie and R. W. Heath, Basic Statistical Methods (New York: Harper & Row, 1966), pp. 132-133.

[75]Henry E. Garrett, Elementary Statistics (New York: Longman's Green, and Co., 1958), appendix.

[76]Downie, pp. 132-133.

[77]Garrett, appendix.

Table 4

A Comparison of Gross Test Errors and Time of Geographical Separation Divided by Sex

	Total Population	Males	Females
N	377	225	152
r	.024	-.016	.125

This index is not significant at the .05 level.[78] [79]

Table 5

A Comparison of True Test Errors and Time of Geographical Separation Divided by Sex

	Total Population	Males	Females
N	377	225	152
r	.077	.049	.094

This index is not significant at the .05 level.[80] [81]

[78] Downie, pp. 132-133.

[79] Garrett, appendix.

[80] Downie, pp. 132-133.

[81] Garrett, appendix.

with the terms section of Chapter 1. Gross test scores (column 18) on the Goldman-Fristoe Test of Articulation of the two groups were compared. The results are depicted in Table 6.

True test errors (column 22) for the Goldman-Fristoe Test of Articulation of the two groups were also compared as depicted in Table 7.

A Pearson product-moment correlation coefficient (r) was computed between the number of gross test errors (column 18) measured on the Goldman-Fristoe Test of Articulation and the time spent by the soldier-father in Vietnam (column 20) measured in months. See Table 8.

Additionally, the number of true test errors (column 22) was also correlated to the amount of time spent by the soldier-father in Vietnam (column 20). See Table 9.

In addition to treating objective number one solely with respect to geographical separation, the data were considered with respect to the soldier-father's separation from the child due to one or more combat tours of duty in Vietnam (Republic of Vietnam).

The variable of time spent by the soldier-father assigned to duty in Vietnam was also treated by separating the tested MDC using as a criterion the number of combat tours in Vietnam (a combat tour is twelve months in duration). The datum was tested on a dichotomous basis involving a randomly selected population. Each child was identified as being separated from the father less than or

Table 6

A Comparison of the Number of Child's Gross Test Errors
Versus Time of Separation from Father

	N	M	S_D	S_M
X	213	2.84	3.31	.22
Y	195	4.15	3.54	.24

X is less than 50% separation. Y is 50% or more than 50% separation.
The resultant "t" is equal to 4.09 which is significant at the .01 level.[82] [83]

Table 7

A Comparison of the Number of Child's True Test Errors
Versus Time of Separation from Father

	N	M	S_D	S_M
X	213	1.92	5.38	.37
Y	195	3.60	5.57	.40

X is less than 50% separation. Y is 50% or more than 50% separation.
The resultant "t" is equal to 3.11 which is significant at the .01 level.[84] [85]

[82] Downie, pp. 132-133.

[83] Garrett, appendix.

[84] Downie, pp. 132-133.

[85] Garrett, appendix.

Table 8

A Comparison of Gross Test Errors and Time Spent
by the Soldier-Father in Vietnam

N	410
r	.106

Significant at the .05 level.[86] [87]

Table 9

A Comparison of True Test Errors and Time Spent
by the Soldier-Father in Vietnam

N	405
r	.171

Significant at the .05 level.[88] [89]

[86] Downie, pp. 132-133.
[87] Garrett, appendix.
[88] Downie, pp. 132-133.
[89] Garrett, appendix.

equal to one combat tour of duty in Vietnam (12 months), Group X; or more than one combat tour in Vietnam, Group Y. The gross test scores on the Goldman-Fristoe Test of Articulation of the two groups were compared in Table 10.

When data representing children in Groups X and Y were correlated with regard to the number of true test errors, the results were as depicted in Table 11.

The second objective of the study, to sample more widely the incident rate of speech articulation disorders among MDC attending geographically dispersed schools in order to eliminate the prejudice of the Ayer survey, was accomplished as described in Chapter 3 by reporting from seven school systems comprising seventy-five schools and approximately 20,000 MDC in grades one through six.

Findings of the third objective, to determine if MDC have a higher than average, average, or lower than average speech articulation disorder incident rate, are presented in Table 12, Speech Articulation Disorder Incident Rates Reported by Participating School Systems.

Table 10

A Comparison of the Number of Child's Gross Test Errors Versus Number of Father's Vietnam Combat Tours

	N	M	S_D	S_M
X	162	2.20	2.51	.197
Y	171	4.93	2.31	.176

X is one combat tour. Y is more than one combat tour. The resultant "t" is 10.3 which is significant at the .01 level.[90] [91] The resultant significant "t" is attributed to the large difference in the means of groups X and Y but a relatively small difference in the error of the mean.

Table 11

A Comparison of the Number of Child's True Test Errors Versus Number of Father's Vietnam Combat Tours

	N	M	S_D	S_M
X	162	1.63	1.83	1.44
Y	171	3.50	1.94	1.48

X is one combat tour. Y is more than one combat tour. The resultant "t" is 9.35 which is significant at the .01 level.[92] [93]

[90] Downie, pp. 132-133.

[91] Garrett, appendix.

[92] Downie, pp. 132-133.

[93] Garrett, appendix.

Table 12

Speech Articulation Disorder Incident Rates
Reported by Participating School Systems
1971

Military Post Code	Number MDC Attending	Number MDC Affected	Percentage MDC Affected	Number CDC Attending	Number CDC Affected	Percentage CDC Affected
1	962	139	14.5%	886	23	2.5%
2	2632	106	4.0%	0	--	--
3	3182	122	3.8%	0	--	--
4a	2246	158	7.0%	4771	114	2.3%
4b	799	49	6.1%	0	--	--
5	1572	76	4.8%	0	--	--
6	6937	148	2.1%	13067	585	4.5%
7	731	36	4.9%	0	--	--

The literature presented in Chapter 2 indicated that the national average of serious and mild speech articulation disorders is about five percent, which is evenly divided into both categories. Table 12 illustrates that three schools (01, 4a, and 4b) serving MDC exceeded the national norm. One of the schools (01) had an extremely high incident rate of 14%. Since categorization of a child as having a serious, mild, or slight speech articulation problem may be subjective and dependent upon inconsistent variables, this significance may be attributed to several causes unexplained by this study. However, in two of the three schools (01 and 4a) serving both MDC and CDC, the incident rate among MDC was three times greater than among CDC when categorized by the same therapists in the same school systems. Though school 6 proves an exception to this finding, it should be considered that school 6 is a recently racially desegregated rural school system.

Table 13, Investigations on Misarticulations in Relation to Age, is presented as a comparis n between previous studies of CDC and this research. [94]

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[94] This table reprinted from page 849 of the text Handbook of Speech Pathology and Audiology, 1971 edition, with permission of the publisher, Appleton-Century-Crofts, New York.

Table 13

Investigations on Misarticulation in Relation to Age

GRADE	ROOT (1925) % OF SCHOOL POPULATION WITH LISPING OR LALLING	FRANCIS (1930) % OF SCHOOL POPULATION WITH ORAL INACCURACY	ROE AND MILISEN (1942) (GRADES I THROUGH VI) SAYLER (1949) (GRADES VII THROUGH XII) ARTICULATION ERRORS			WHITE HOUSE CONFERENCE REPORT (1931) NO. OF SOUND SUBSTITUTION CASES	
			MEAN NO.	DIFFERENCE	CRITICAL RATIO	BOYS	GIRLS
Kindergarten		27.8					
I	5.70	19.3	13.30			3,854	2,533
II	3.60	11.5	9.99	3.31	6.89	2,684	1,725
III	2.50	9.9	8.85	1.14	2.71	1,916	1,042
IV	1.04	3.1	7.62	1.23	2.91	1,223	738
V	2.70	3.6	7.61	.01	.02	848	538
VI	1.01	2.1	8.01	−.40	−1.21	657	402
VII	0.60	2.6	3.92			277	175
VIII	1.00	4.7	4.31	.39	.72	190	108
IX		2.6	4.54	.23	.77	82	71
X		6.7	4.39	.15	.54		
XI		2.1	3.34	1.05	3.75	28	25
XII		4.7	3.25	.09	.32		
Number of cases		191	Grades I–VI, 1,989 Grades VII–XII, 1,998				

* Some modifications have been made here in the form of presentation of the data from the presentation in the original publications. In each case the author's own diagnostic terms are given in the table. The data presented in Table 33-III, all show misarticulations in relation to grade level though all are not comparable as to the measure used. Root and Francis report percentage of defectives in the school population, Roe and Milisen, and Sayler report mean number of errors made by unselected children and the White House data give numbers of speech defectives.

The findings of objective number four, to determine if the speech articulation disorder incident rate increases, remains the same, or decreases from grade two to six, indicates that in consideration of the literature, the speech articulation disorder incident rate among the 20,000 MDC reported in this study decreases from grade two to six at all participating schools with only one exception. The exception is grade three, school 4b, which has a comparatively low incident rate. The deviation between grades four and five at school 4b is attributed to the small sample size. Table 14 illustrates these findings in tabular form. It should be recalled from Chapter 3 that determination of this incident rate was determined by therapist screening and not through administration of the Goldman-Fristoe Test of Articulation. Only those children qualifying by age for their respective grade were considered in the screening and retarded or handicapped school children were omitted by the therapist as outlined in her instruction sheet (Appendix G).

Objective number five, to determine if the type of speech errors among MDC differ from the norm as determined by previous studies of the civilian population, is presented in twenty-three graphs, numbered one through ten, and consisting of alphabetically identified sub-graphs.

Table 14

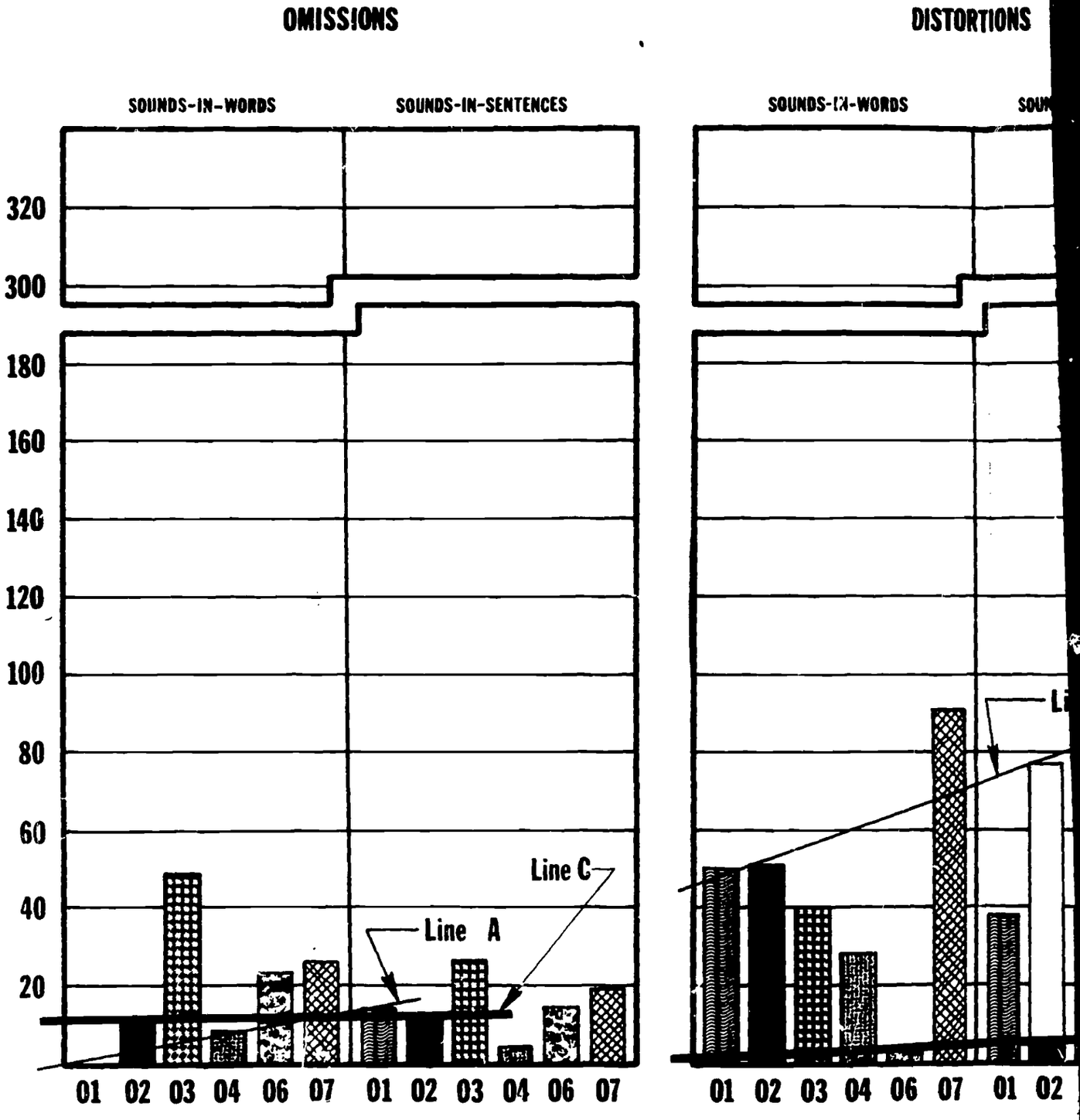
Speech Articulation Disorder Incident Rate by Grade
of MDC at Seven Participating School Systems
1971 - 1972

Schools	1	2	3	4a	4b	5	6	7
Grade 1	22%	5.0%	4.8%	13.1%	9.5%	8.5%	3.7%	--
2	20%	6.7%	5.6%	9.7%	8.9%	6.5%	4.6%	10.8%
3	18%	6.3%	3.4%	8.9%	3.9%	4.8%	2.2%	7.3%
4	12%	2.6%	2.9%	4.1%	6.1%	4.0%	1.4%	5.8%
5	9%	2.8%	3.5%	3.4%	5.8%	3.9%	.08%	.90%
6	6%	0%	.09%	1.7%	1.8%	2.0%	.03%	.20%
Total Population	962	2632	3182	2246	799	1572	6937	731

It should be noted that school 05 is omitted from the graphs. This omission was intentional and predicated upon the unique composition of school 05's MDC population. Virtually all MDC attending school 05 are children of officers in the ranks of major and lieutenant colonel who are assigned to post 05 for about ten months. Additionally, school 05 did not have a speech therapy program at the time this study was conducted. The screening program at school 05 was directed primarily to whether or not speech articulation disorders were recorded for each respondent in conjunction with the Goldman-Fristoe Test of Articulation, as explained in the method of procedure. Additional data collected from schools 01, 02, 03, 04, 06, and 07 were not obtained from school 05 and therefore not graphed.

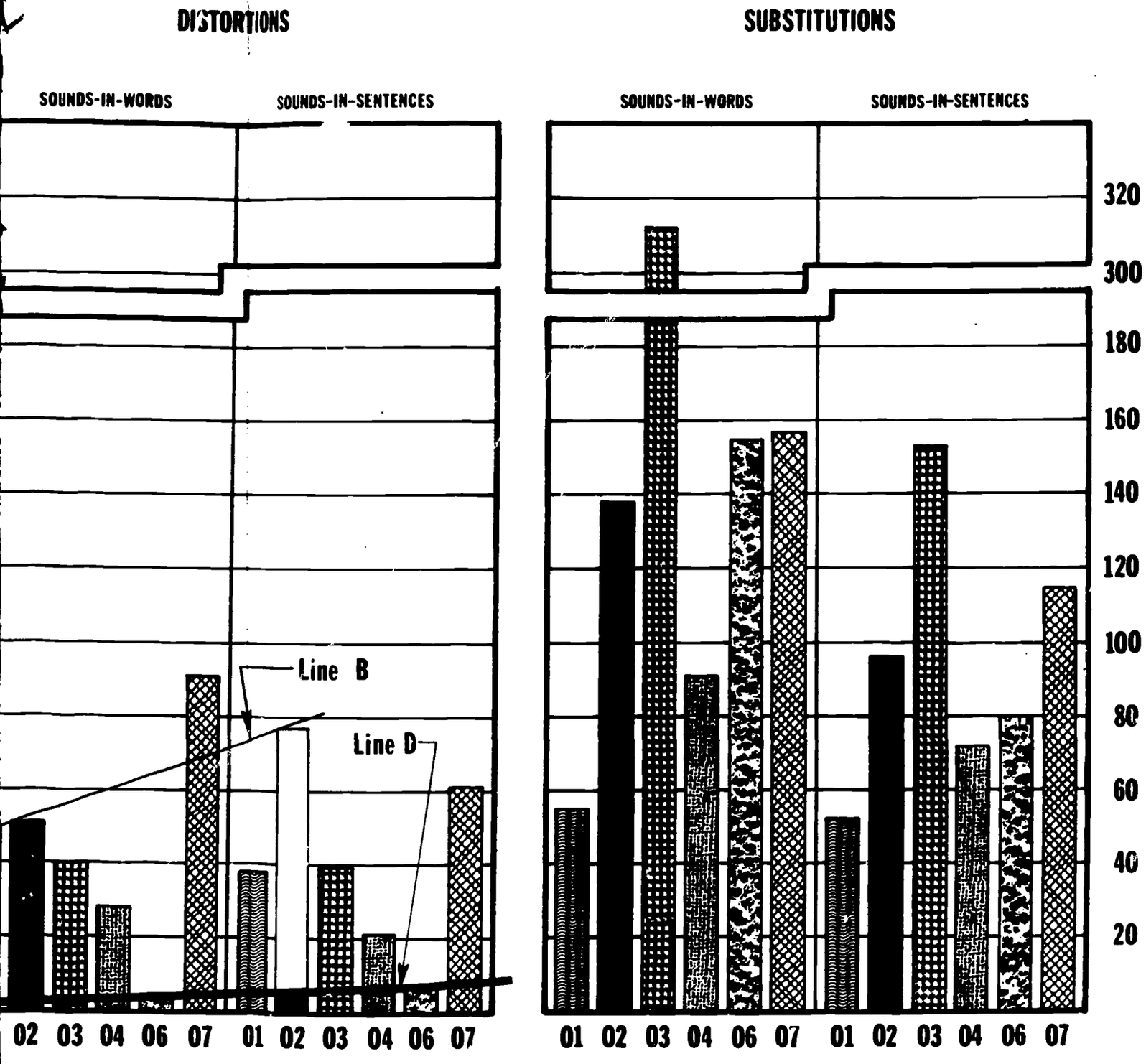
The twenty-three graphs, immediately following in this chapter, illustrate various aspects of MDC speech errors.

SOUNDS-IN-WORDS SUBTEST ERRORS VERSUS SOUNDS-IN



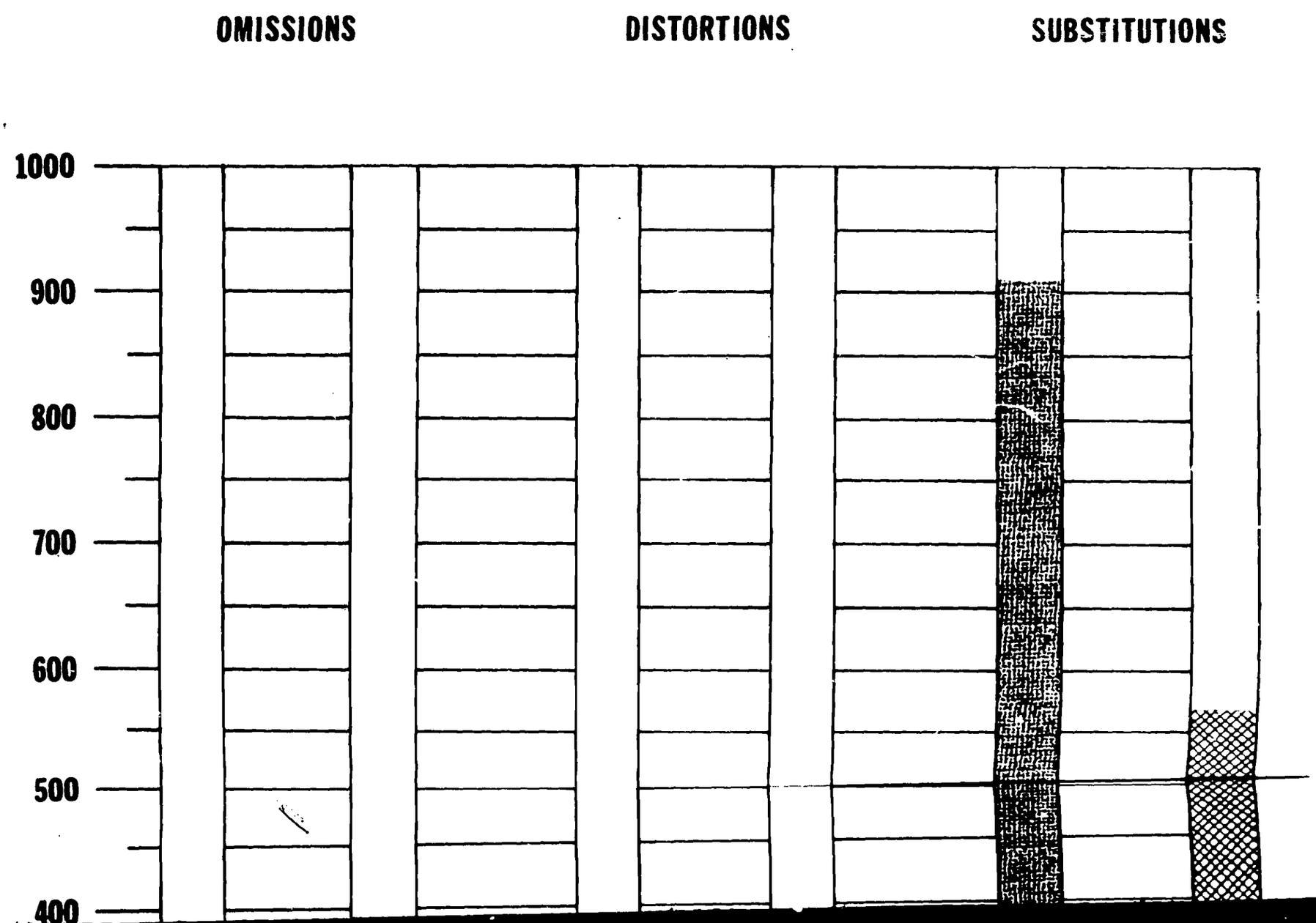
GRAPH 1A

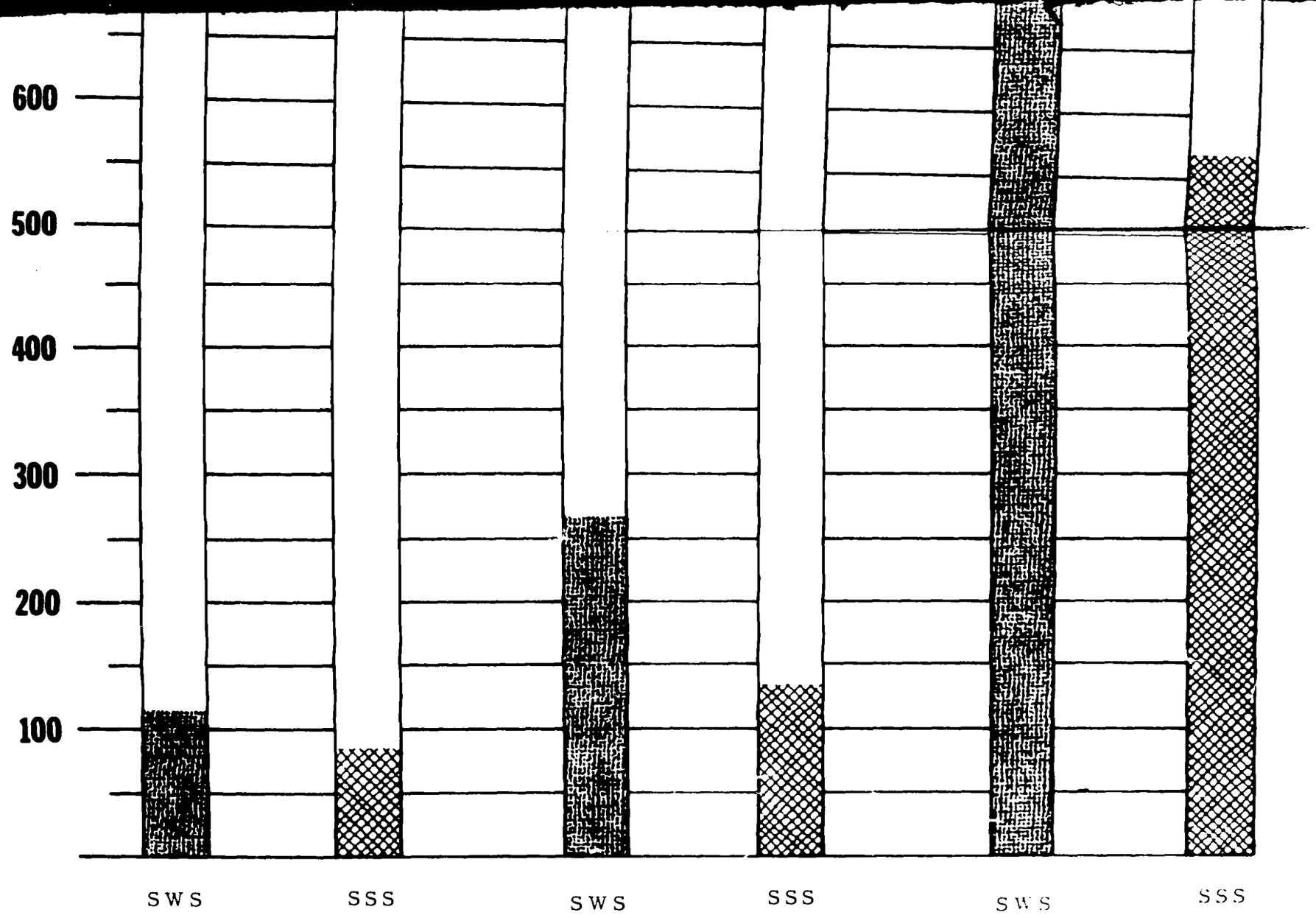
ERRORS VERSUS SOUNDS-IN-SENTENCES SUBTEST ERRORS, BY SCHOOL



GRAPH 1A

SOUNDS-IN-WORDS SUBTEST ERRORS VERSUS SOUNDS-IN-SENTENCES SUBTEST ERRORS, COMBINED STUDY





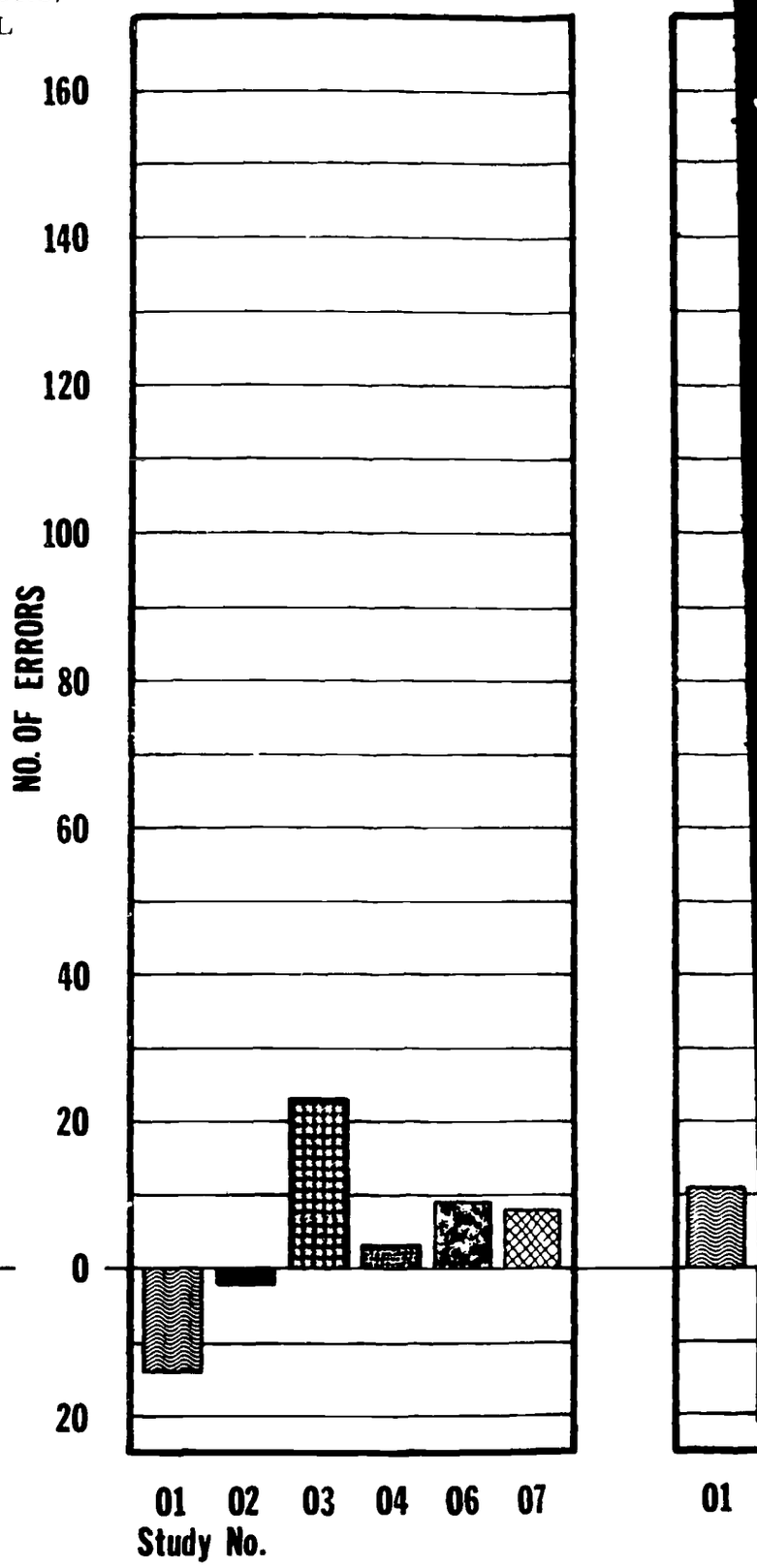
GRAPH 1B

SOUNDS-IN-WORDS SUBTEST ERRORS VERSUS
SOUNDS-IN-SENTENCES SUBTEST ERRORS,
INCONSISTENCIES BY SCHOOL

OMISSIONS

SWS - SSS = X

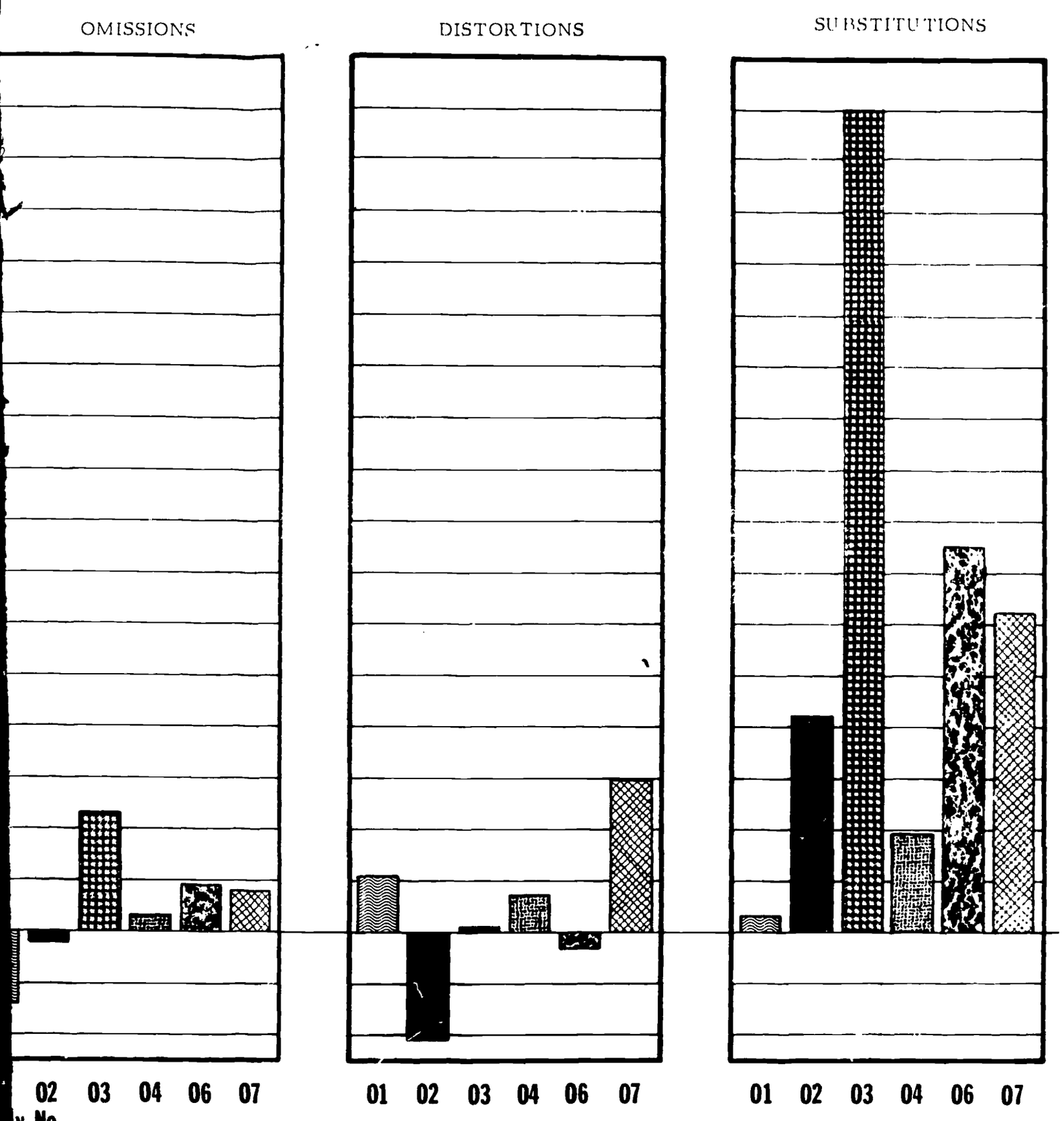
Difference favoring Sounds in Words
X: Length of Bar Above 0 Line



SSS - SWS = X

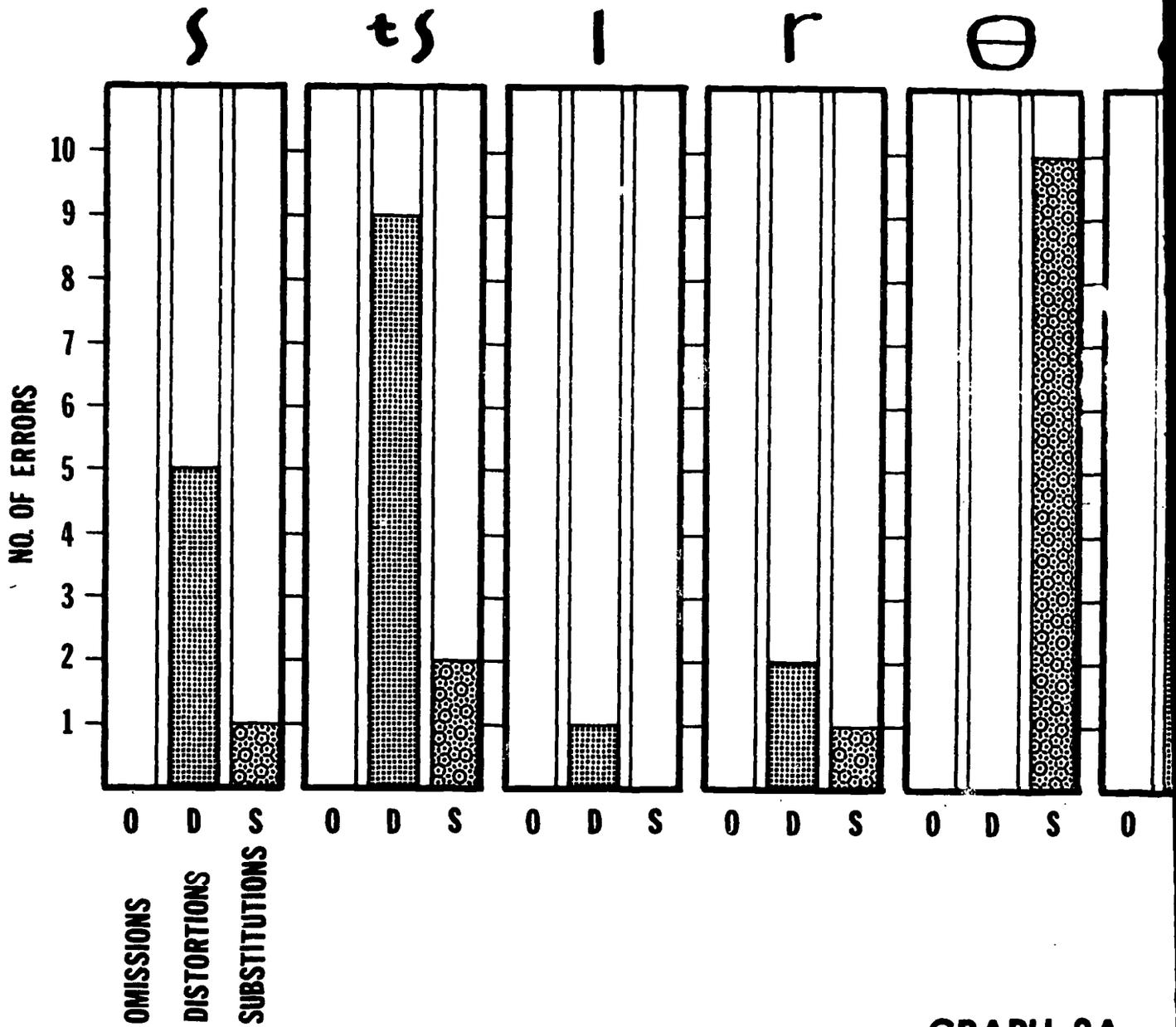
Difference favoring Sounds in Sentences
X: Length of Bar Below 0 Line

GRAPH 1C


OMISSIONS
DISTORTIONS
SUBSTITUTIONS
02 03 04 06 07
01 02 03 04 06 07
01 02 03 04 06 07
y No.

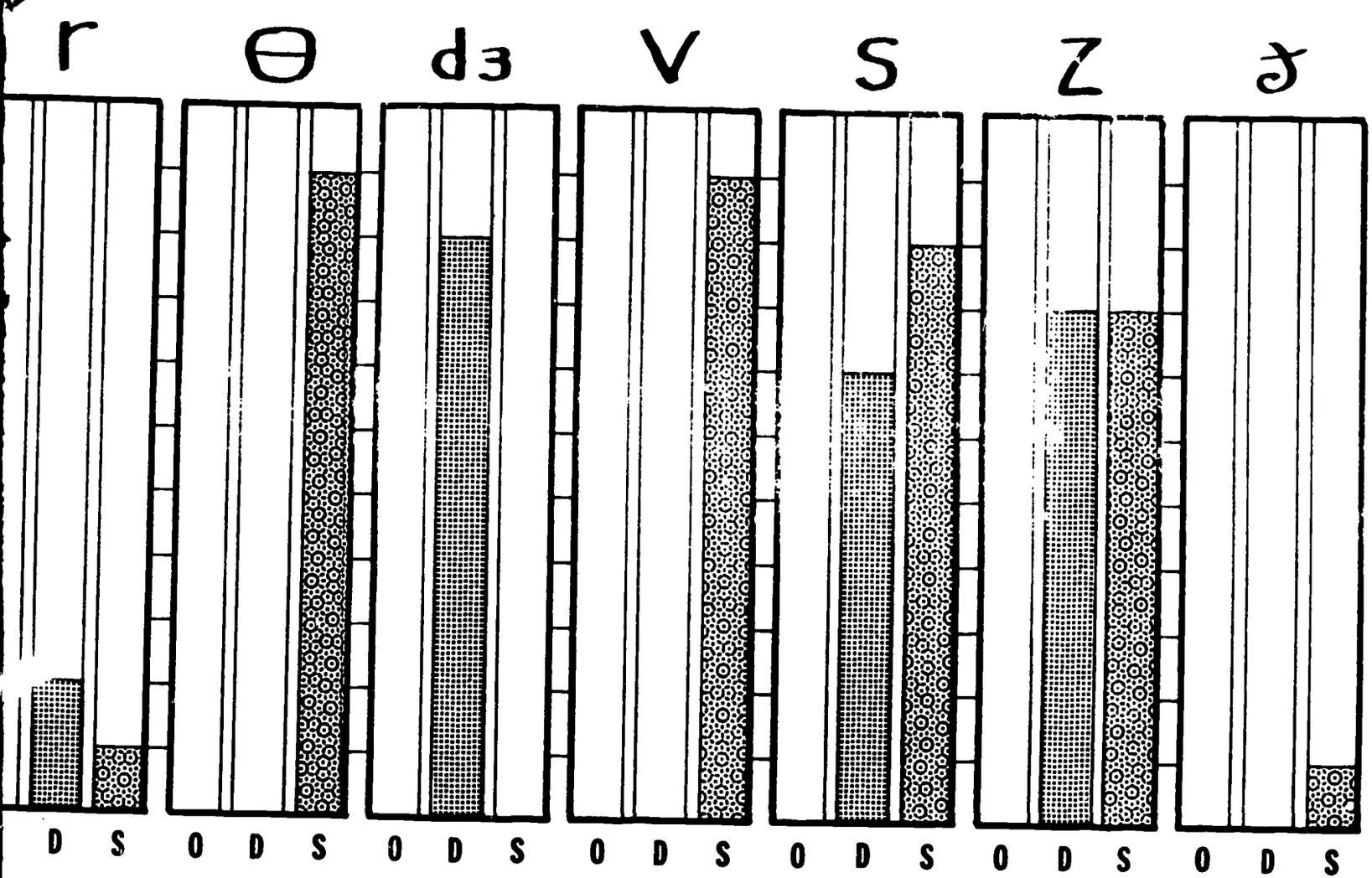
GRAPH 1C

NUMBER OF OMISSIONS, DISTORTIONS, A
FOR EACH OF THE TEN MOST COMMON
SCHOOL 01



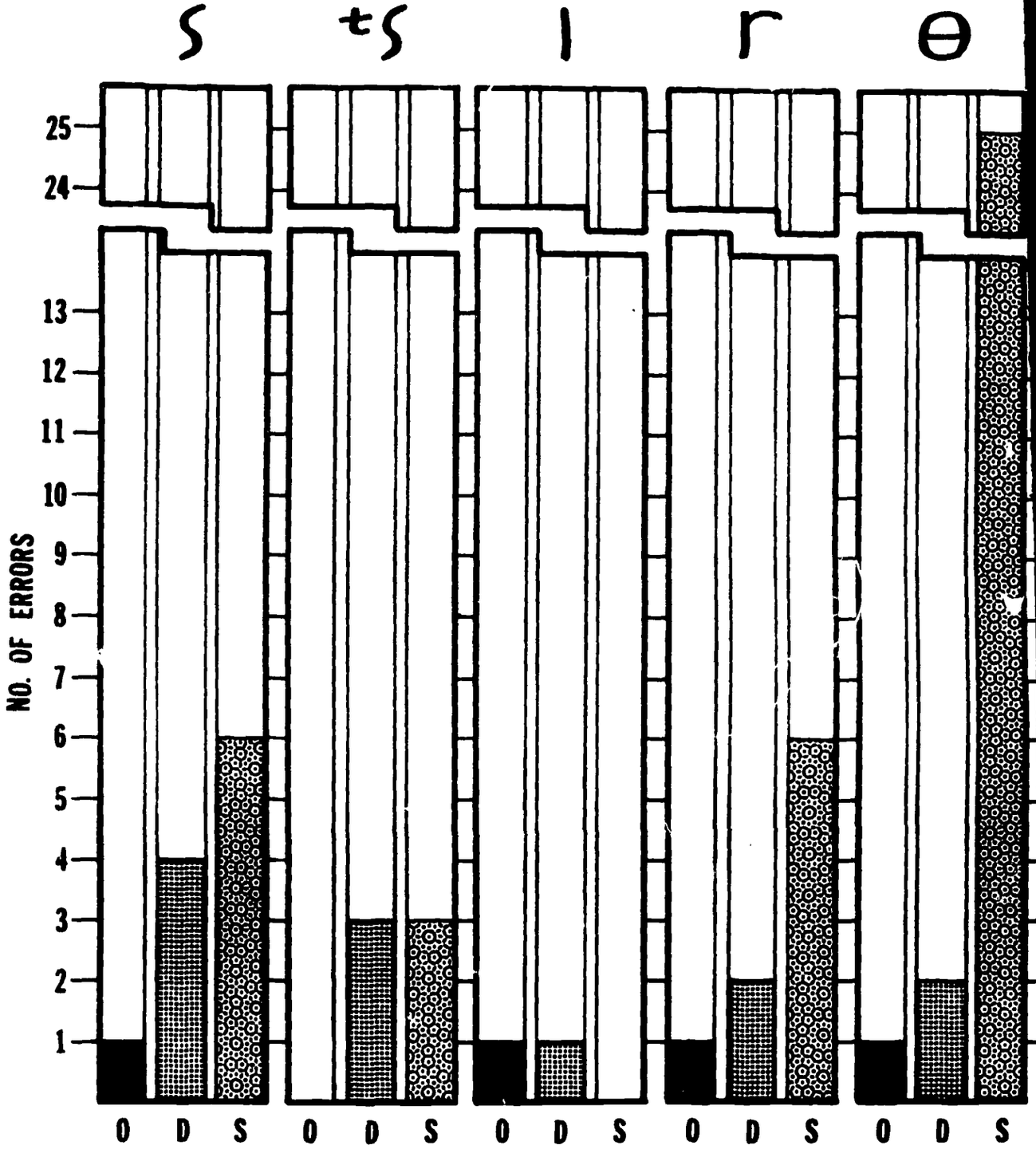
GRAPH 2A
(SCHOOL 01)

OF OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
CH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 01



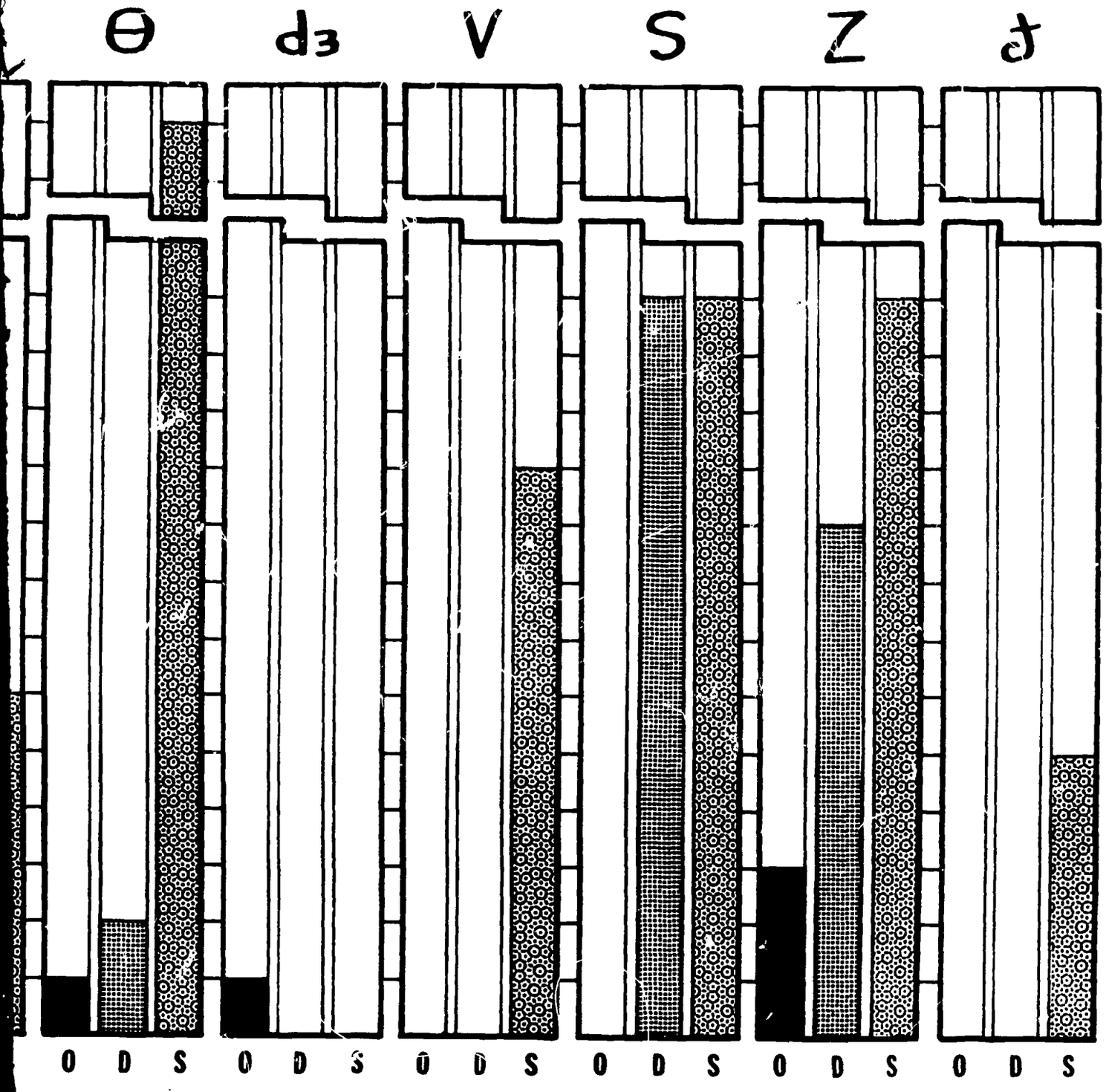
GRAPH 2A
(SCHOOL 01)

NUMBER OF OMISSIONS, DISTORTI
FOR EACH OF THE TEN MOST CO
SCHOOL 02



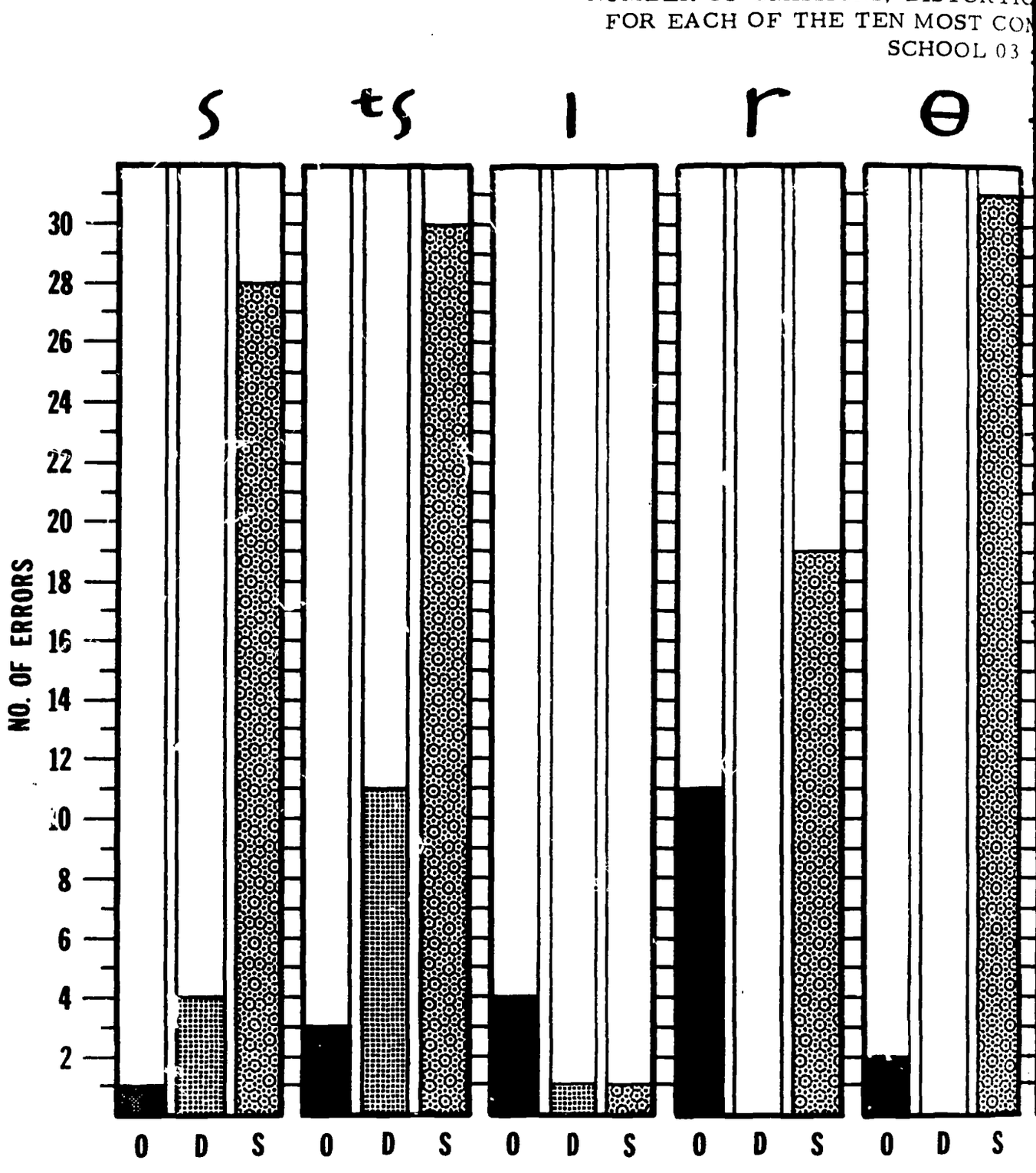
GRAPH 2B
(SCHOOL 02)

SIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
IE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 02



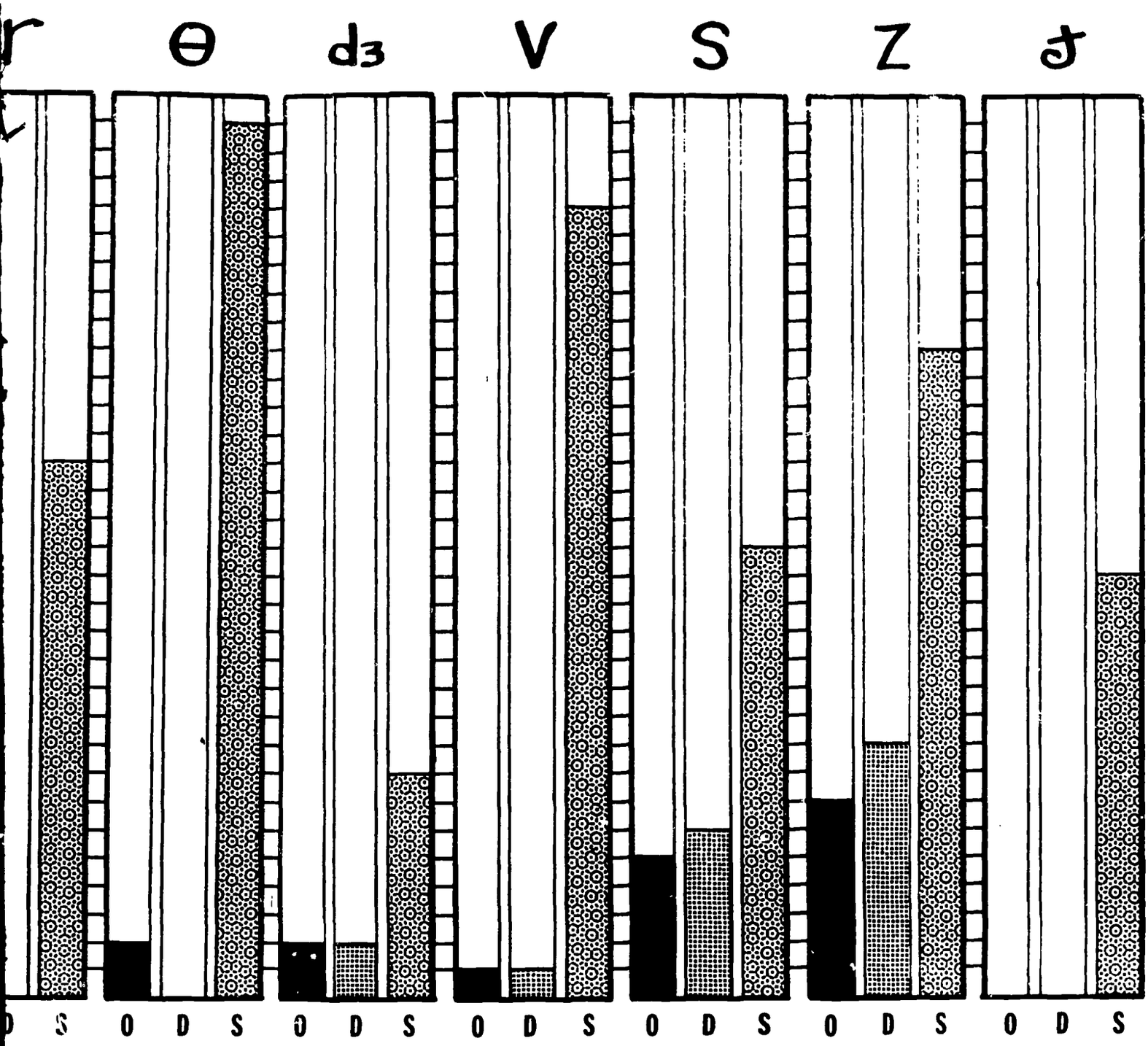
GRAPH 2B
OOL 02)

NUMBER OF OMISSIONS, DISTORTIO
FOR EACH OF THE TEN MOST CO
SCHOOL 03



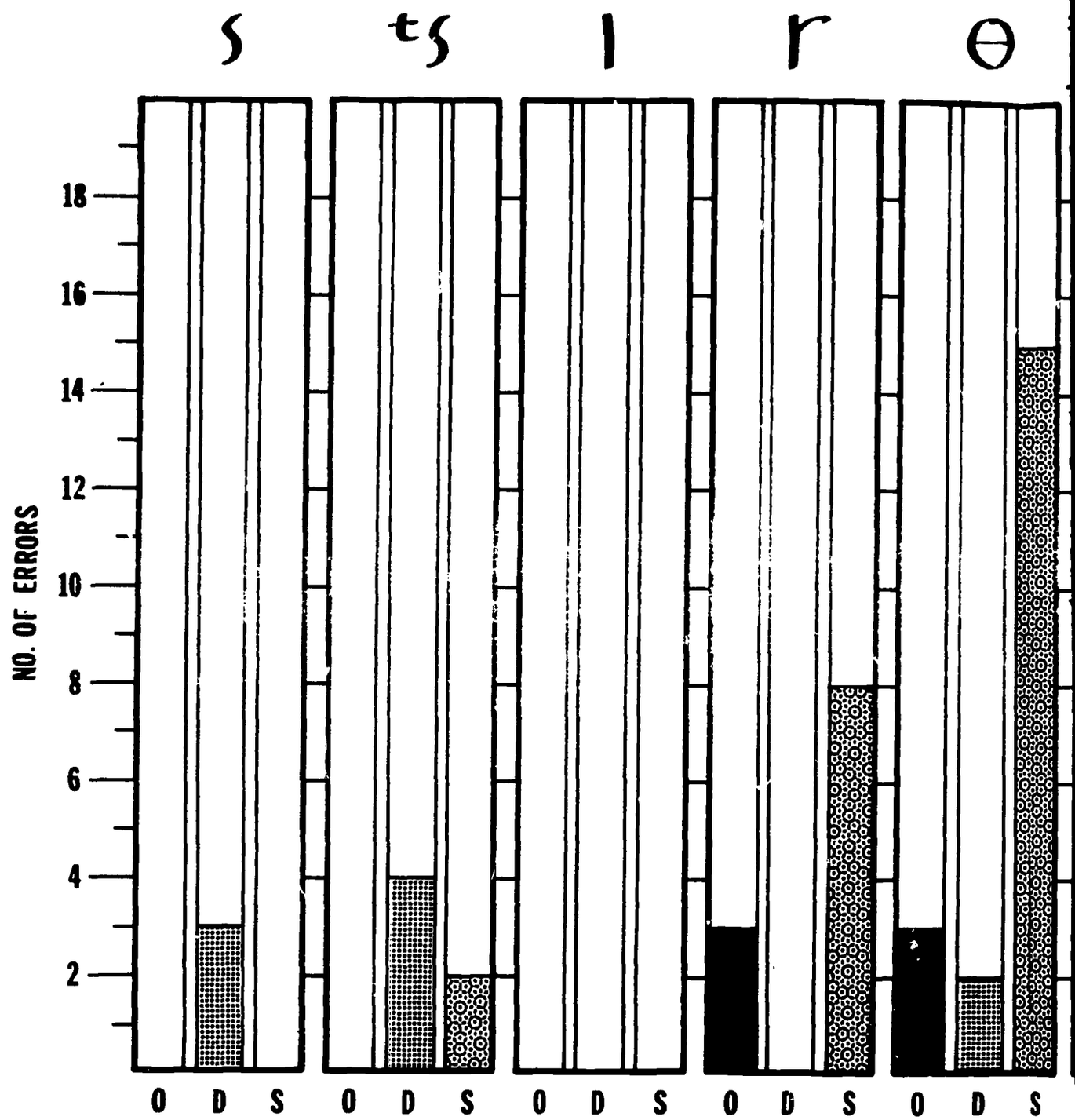
GRAPH 2
(SCHOOL

OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 03



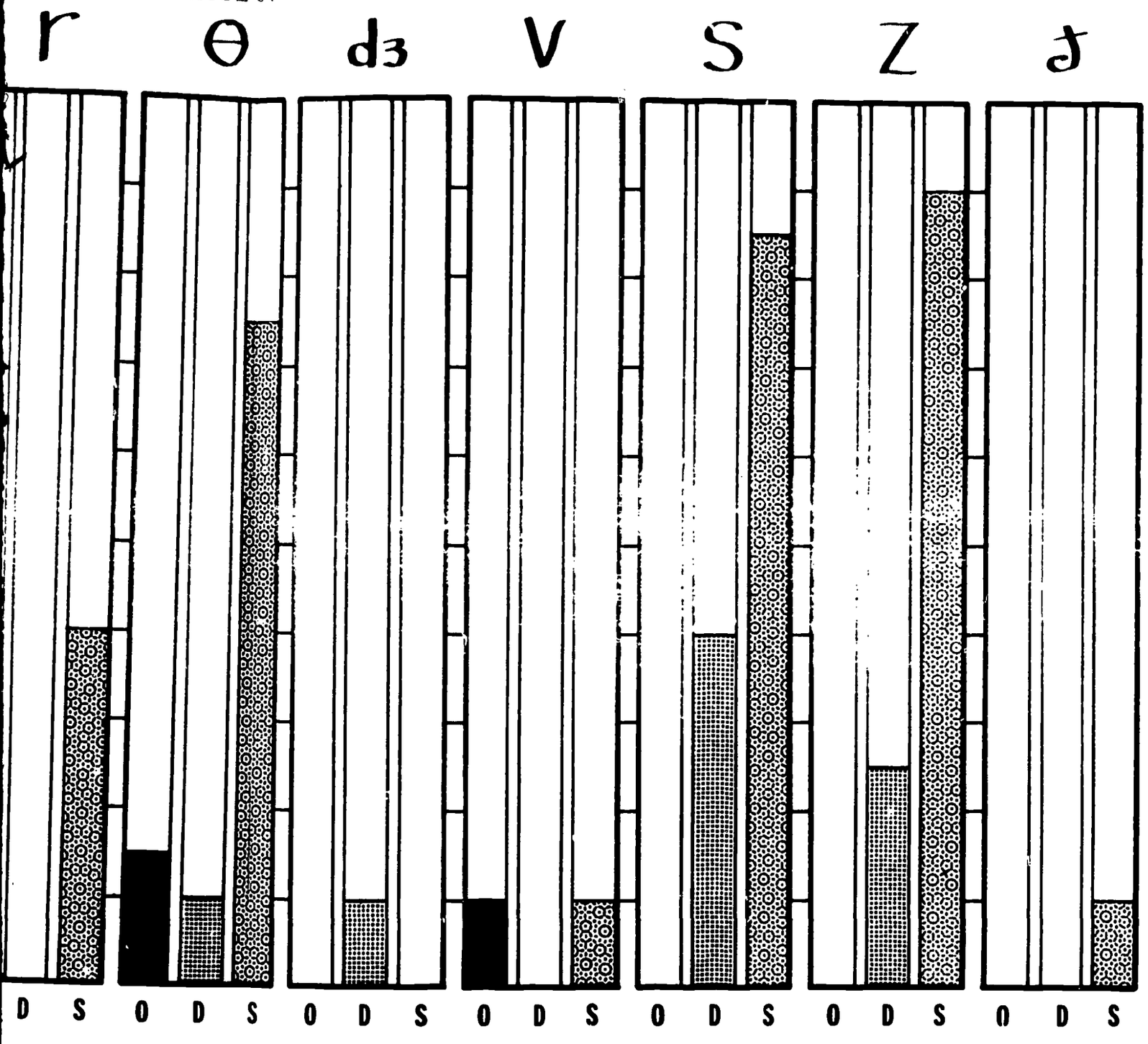
GRAPH 2C
(SCHOOL 03)

NUMBER OF OMISSIONS, DISTORTION
FOR EACH OF THE TEN MOST COM
SCHOOL 04



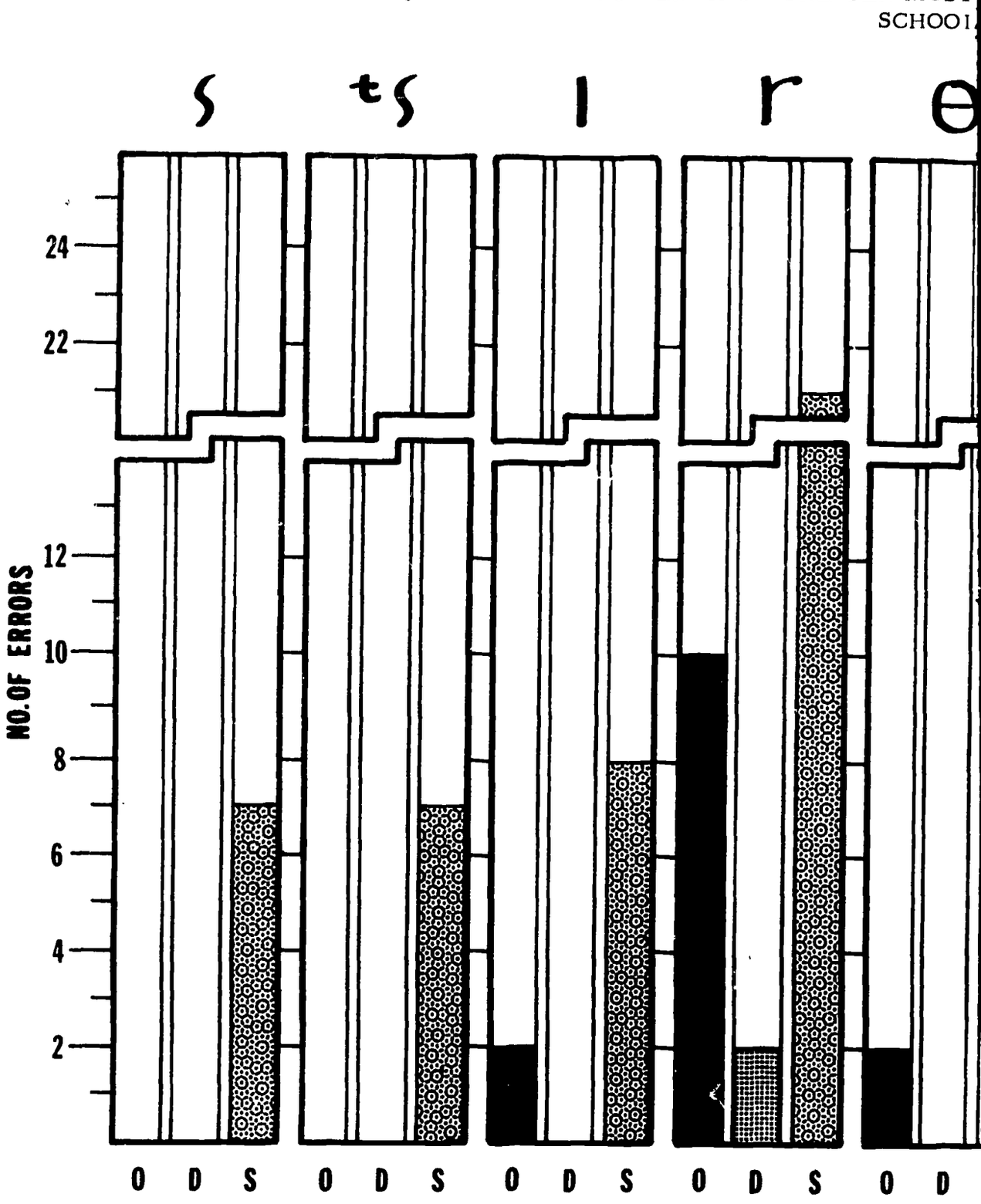
GRAPH 2
(SCHOOL

F OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
H OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 04



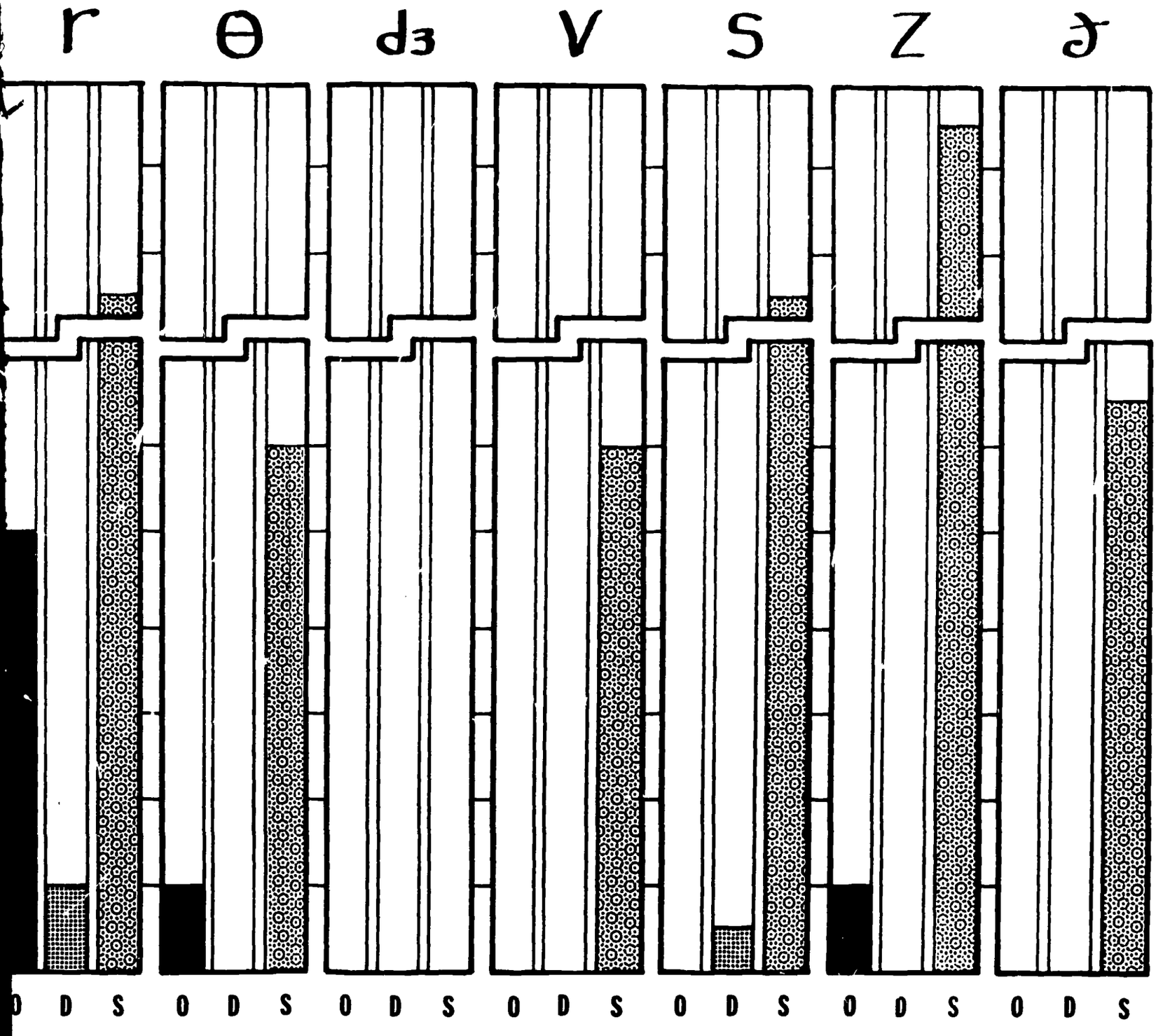
GRAPH 2D
(SCHOOL 04)

NUMBER OF OMISSIONS, DISTO
FOR EACH OF THE TEN MOST
SCHOOL



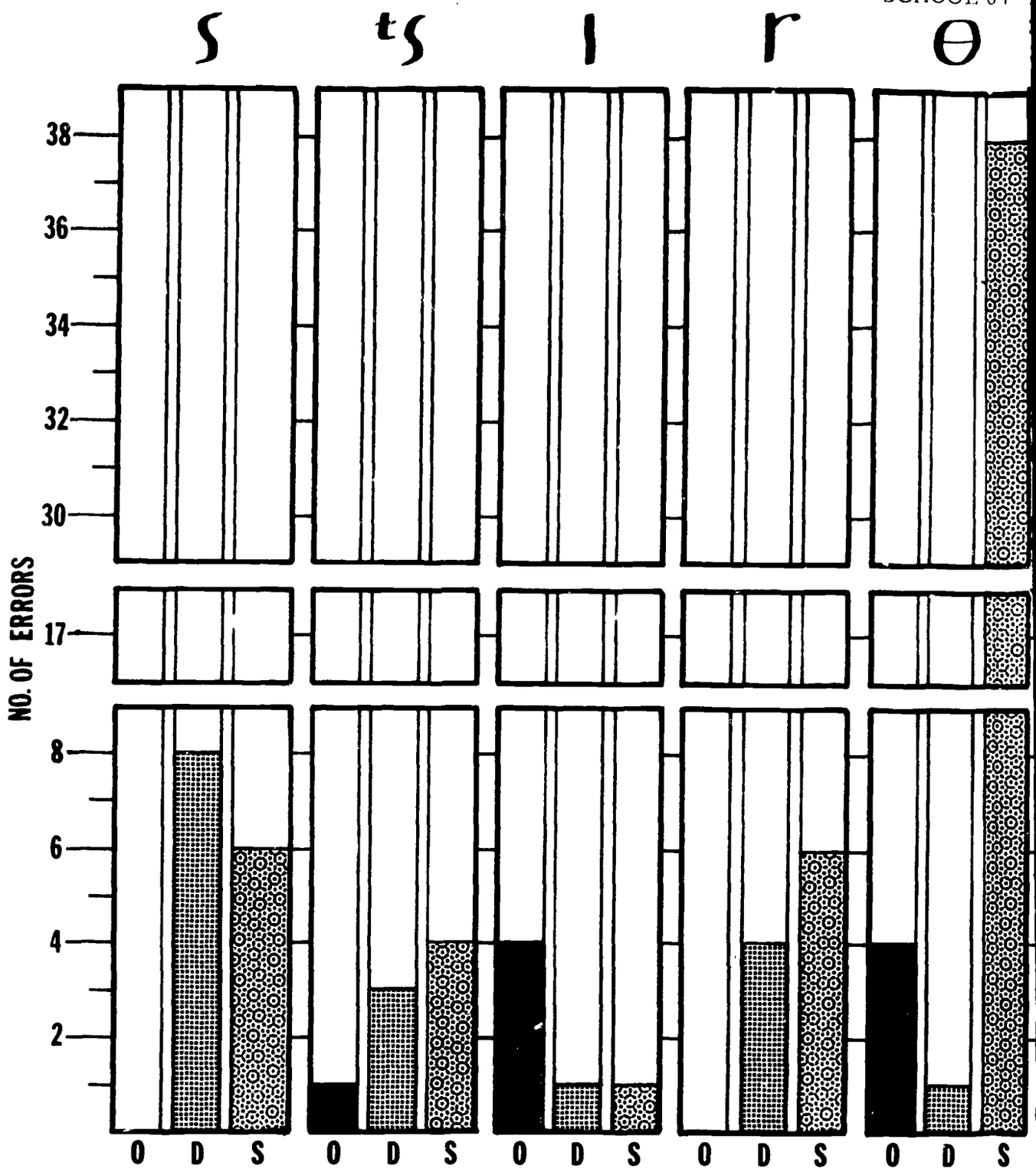
GRAPH
(SCHOO

OF OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
CH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 06



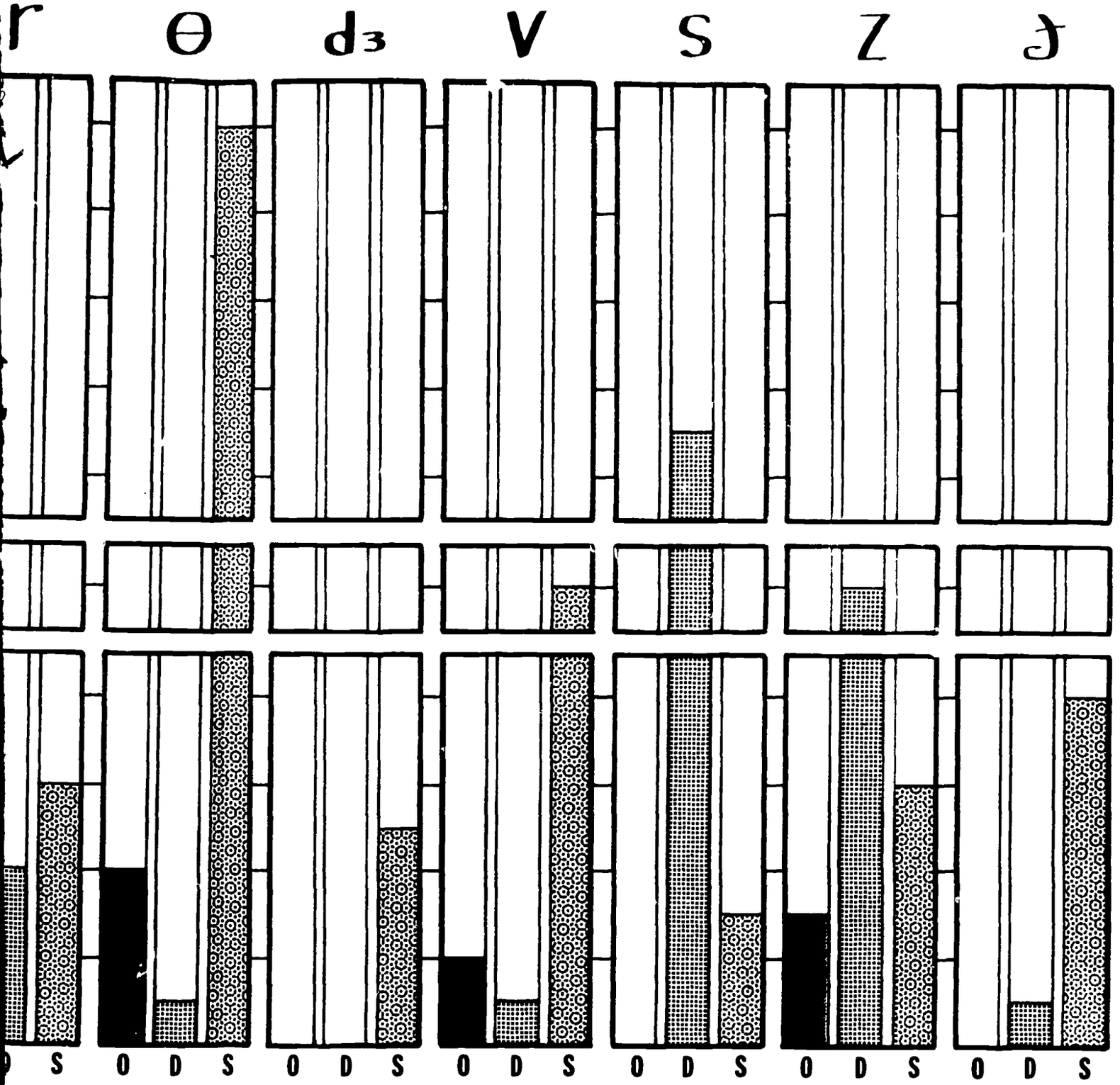
GRAPH 2E
(SCHOOL 06)

NUMBER OF OMISSIONS, DISTORTIO
FOR EACH OF THE TEN MOST COM
SCHOOL 07



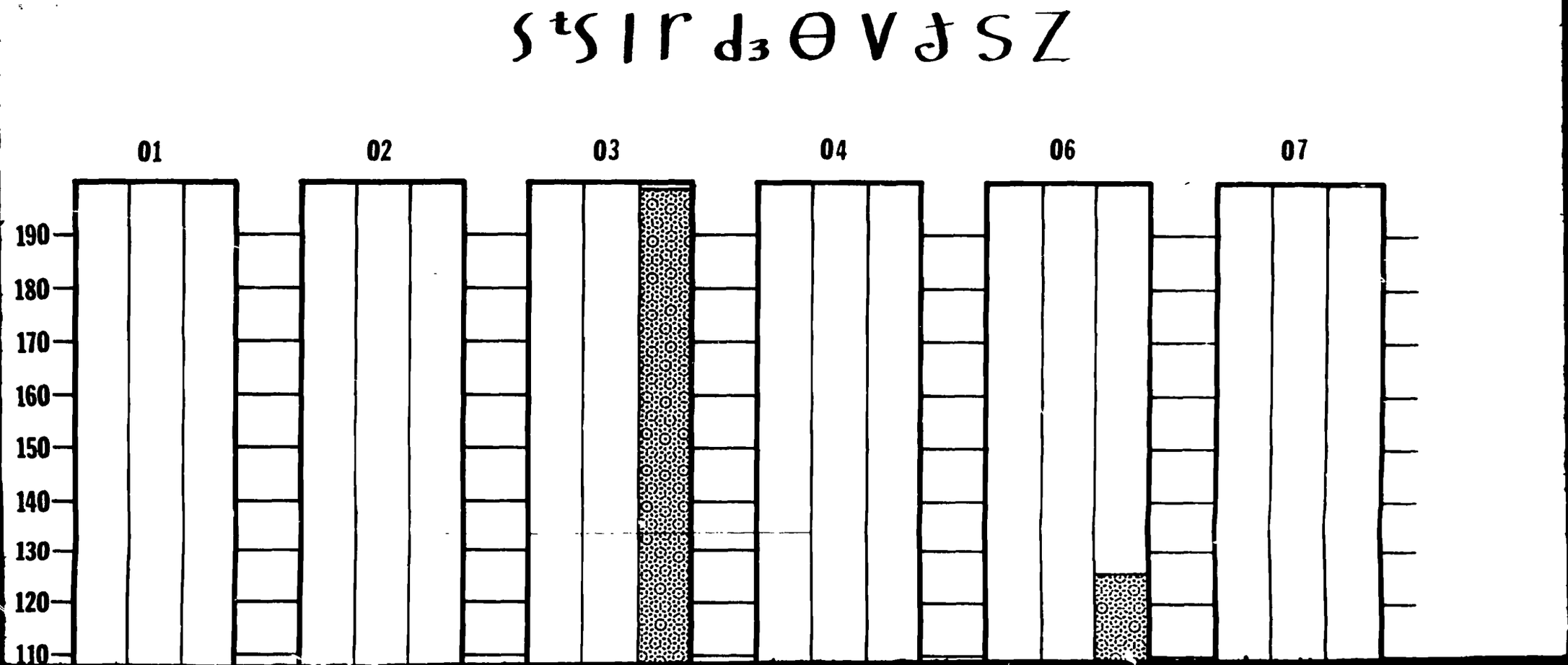
GRAPH
(SCHOO

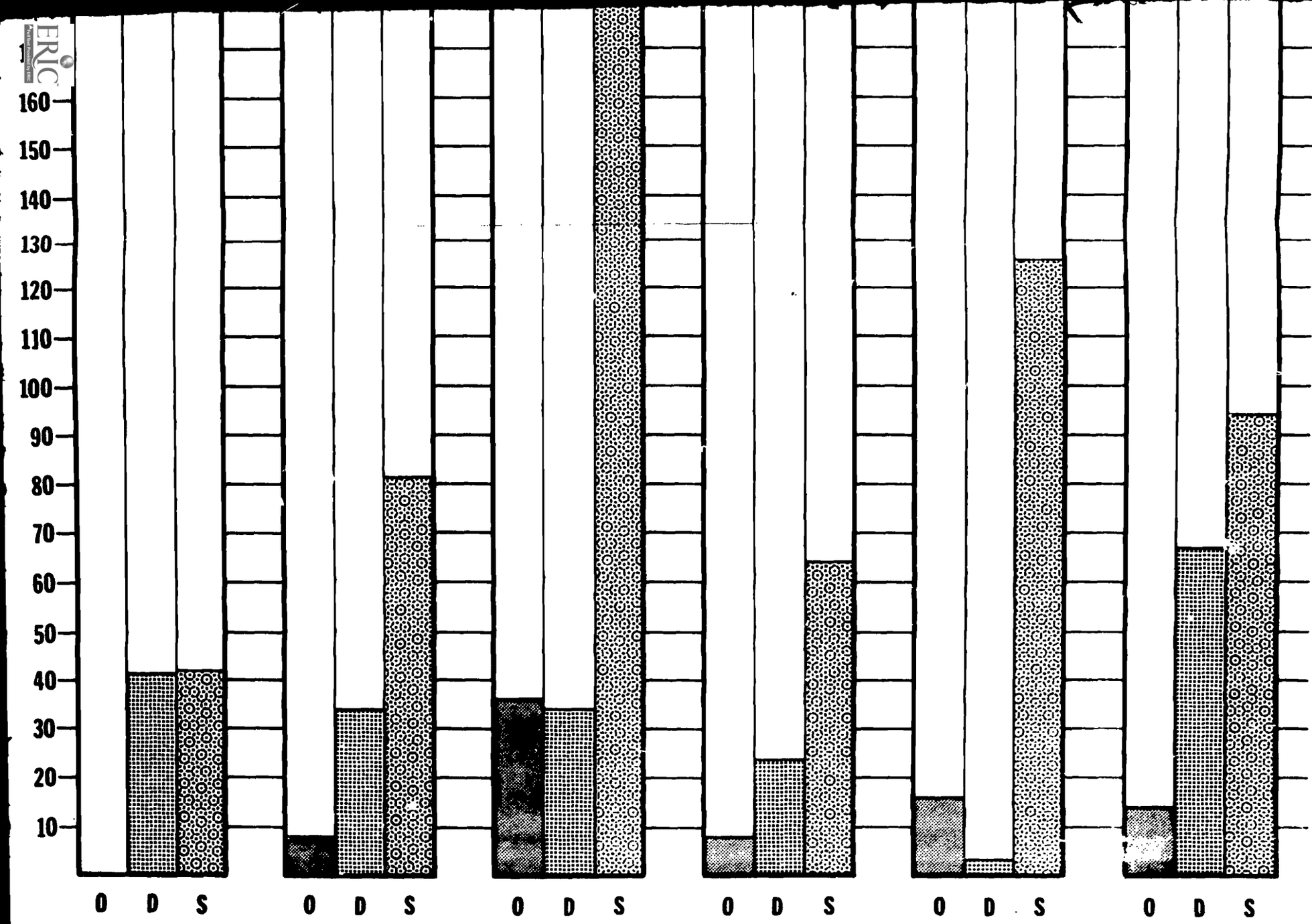
OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
F THE TEN MOST COMMONLY MISARTICULATED SOUNDS
SCHOOL 07



GRAPH 2F
(SCHOOL 07)

NUMBER OF OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS
FOR THE TEN MOST COMMONLY MISARTICULATED SOUNDS
(COLLECTIVELY), SHOWN BY SCHOOL




160
150
140
130
120
110
100
90
80
70
60
50
40
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10
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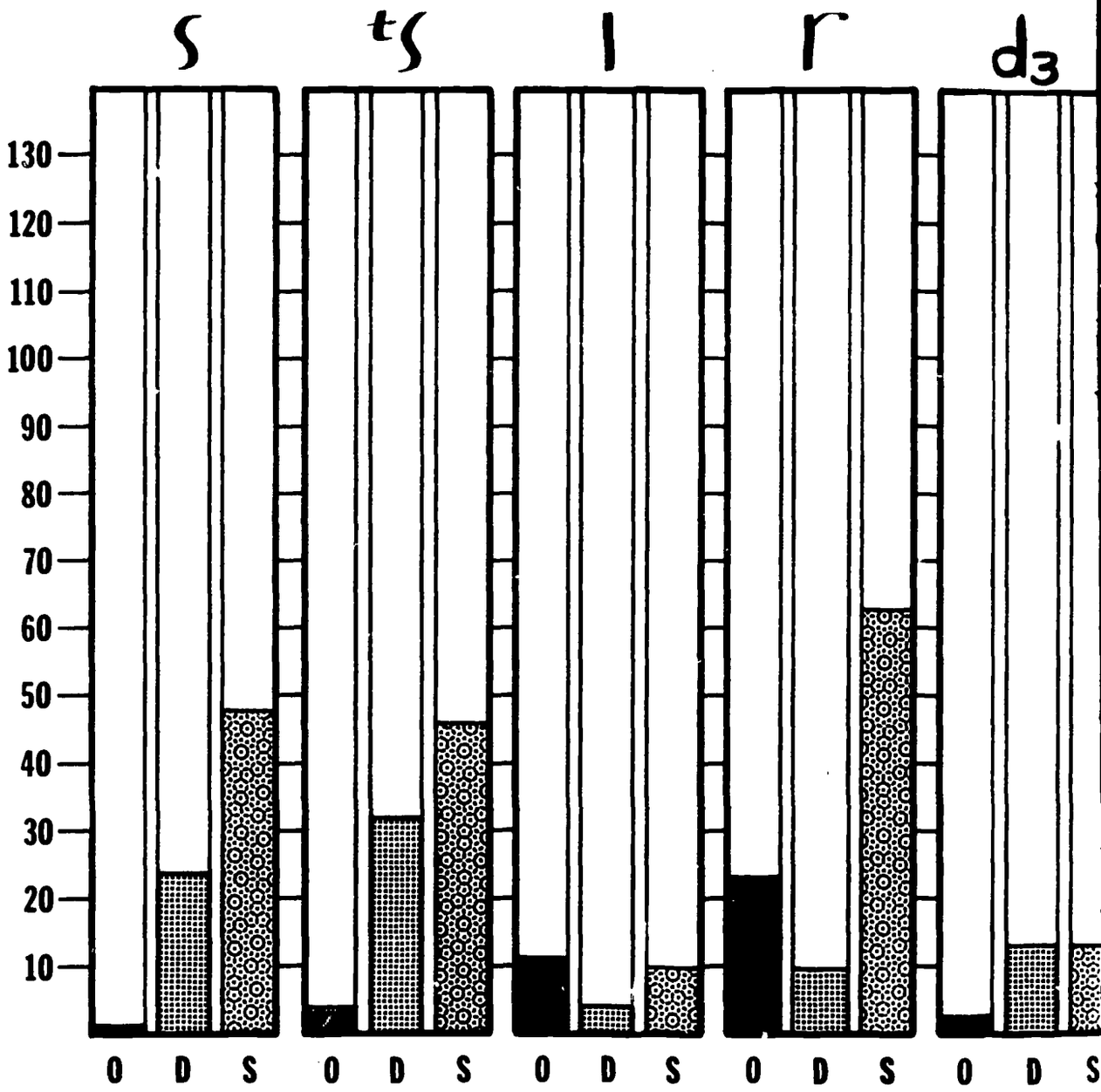
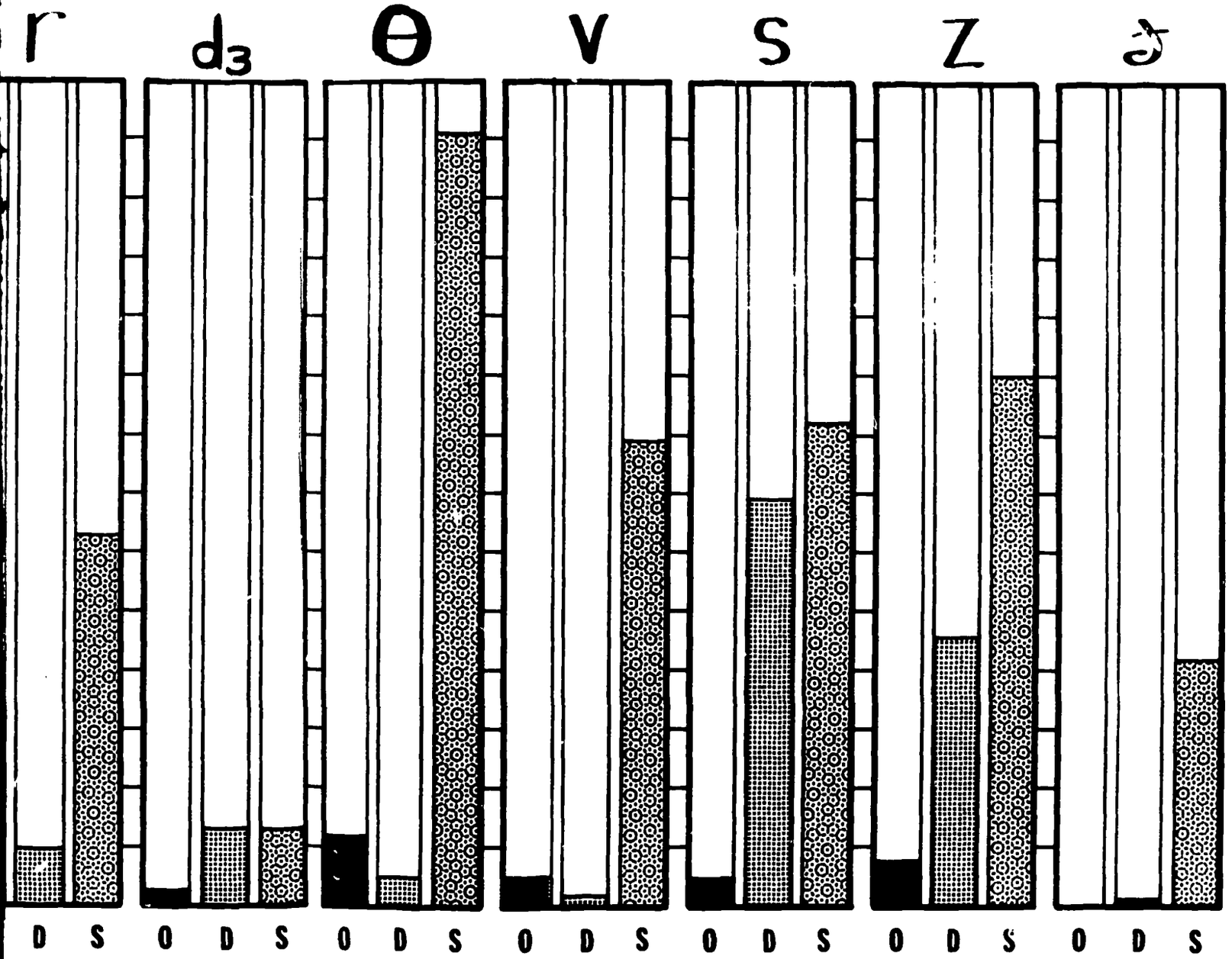
GRAPH 2G

NUMBER OF OMISSIONS, DISTORTI
FOR EACH OF THE TEN MOST C
COMBINED

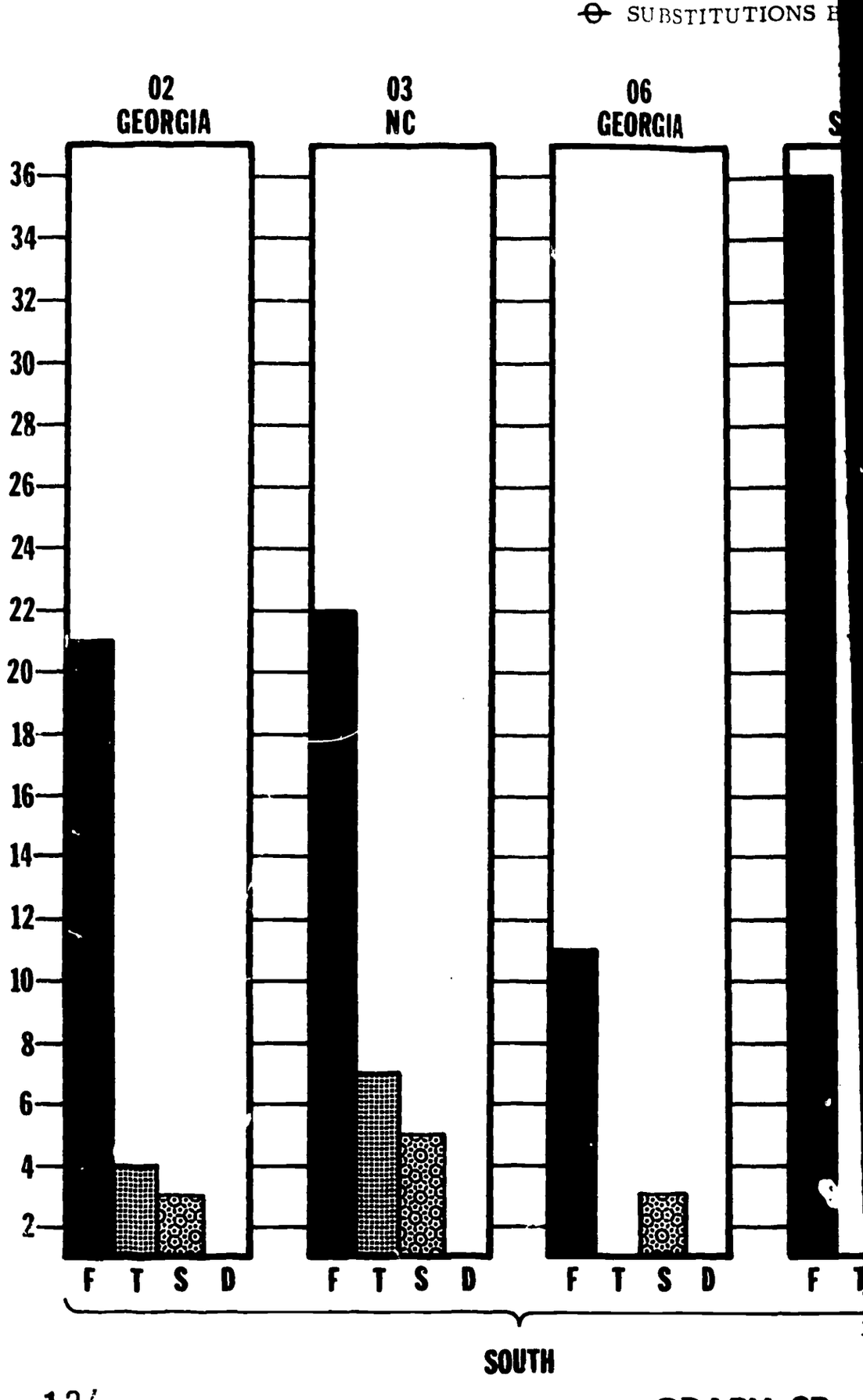


GRAPH

OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS PER SOUND
OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
COMBINED STUDY

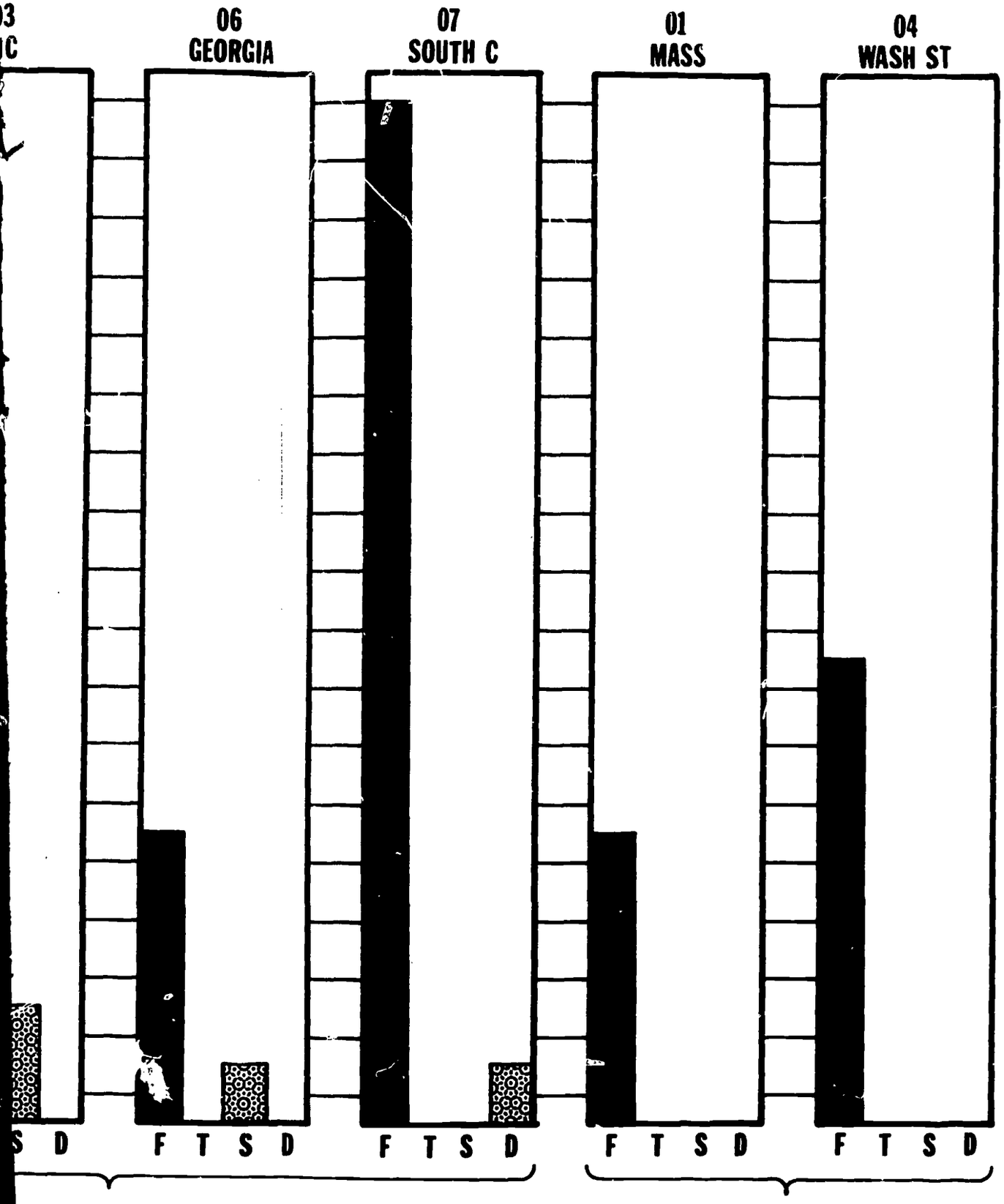


GRAPH 3A


SUBSTITUTIONS
02
GEORGIA
03
NC
06
GEORGIA
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
F T S D
F T S D
F T S D
F
SOUTH

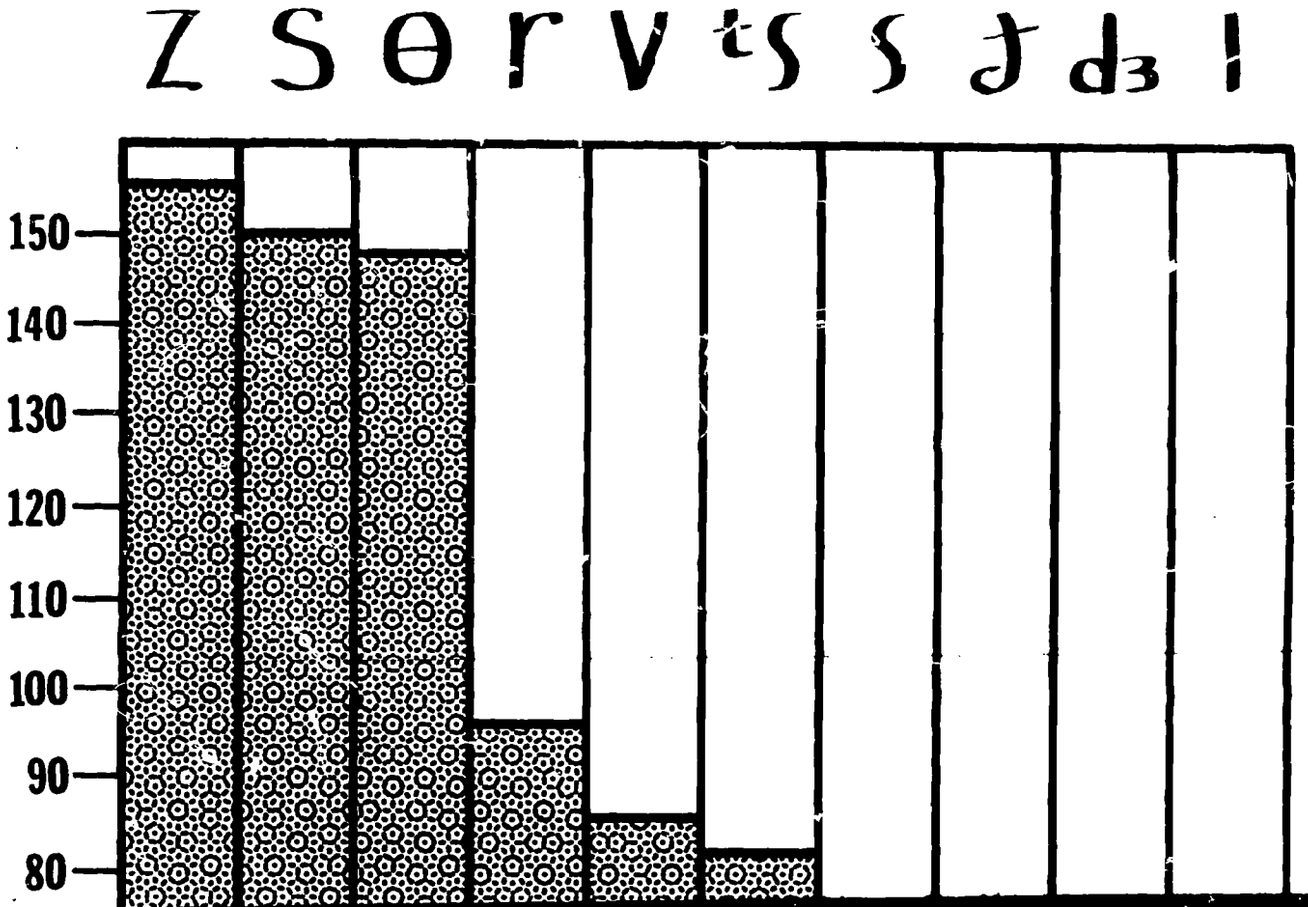
GRAPH 3B

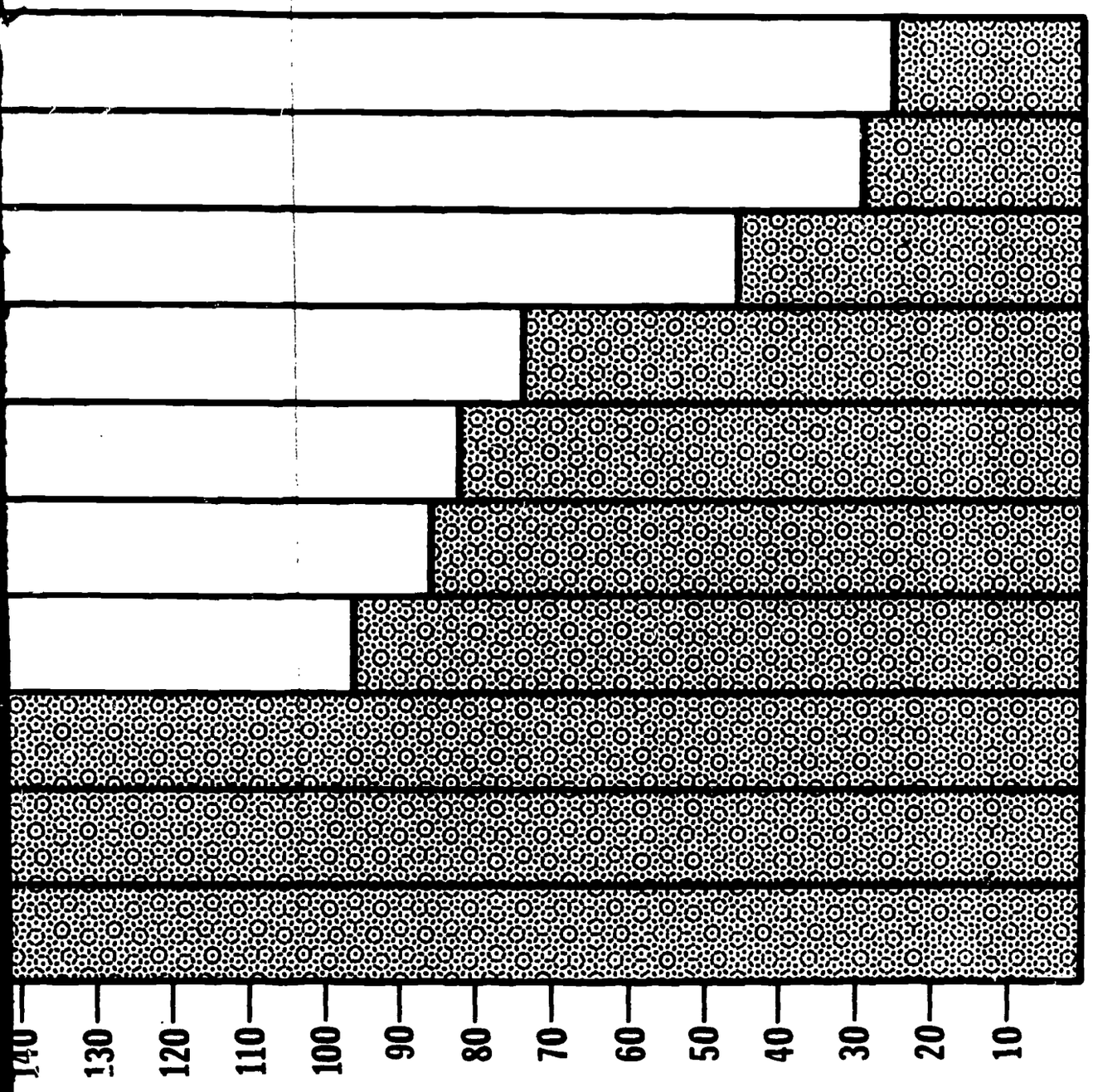
SUBSTITUTIONS BY REGION



GRAPH 3B

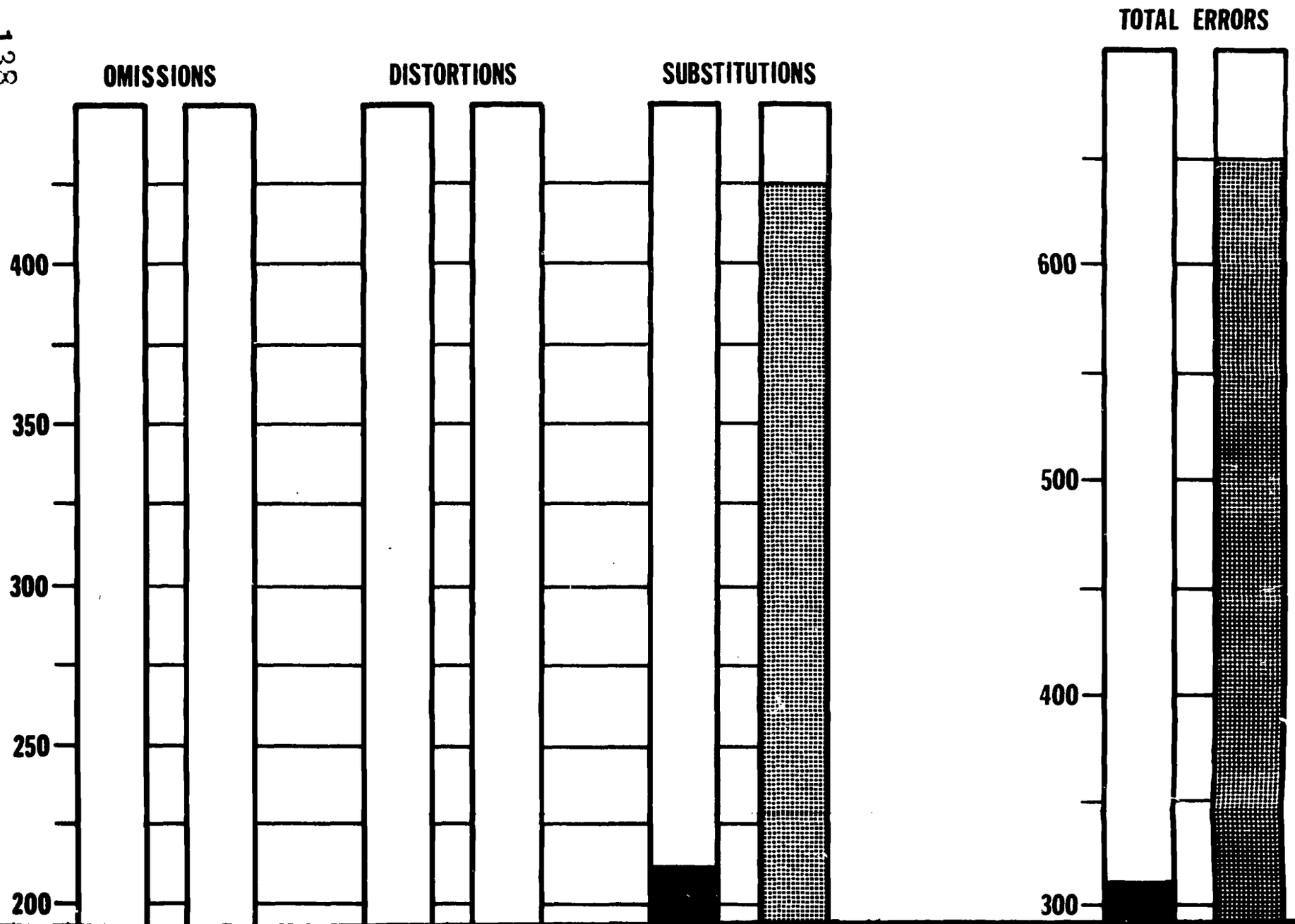
NUMBER OF ERRORS PER SOUND FOR EACH OF THE
TEN MOST COMMONLY MISARTICULATED SOUNDS
COMBINED STUDY





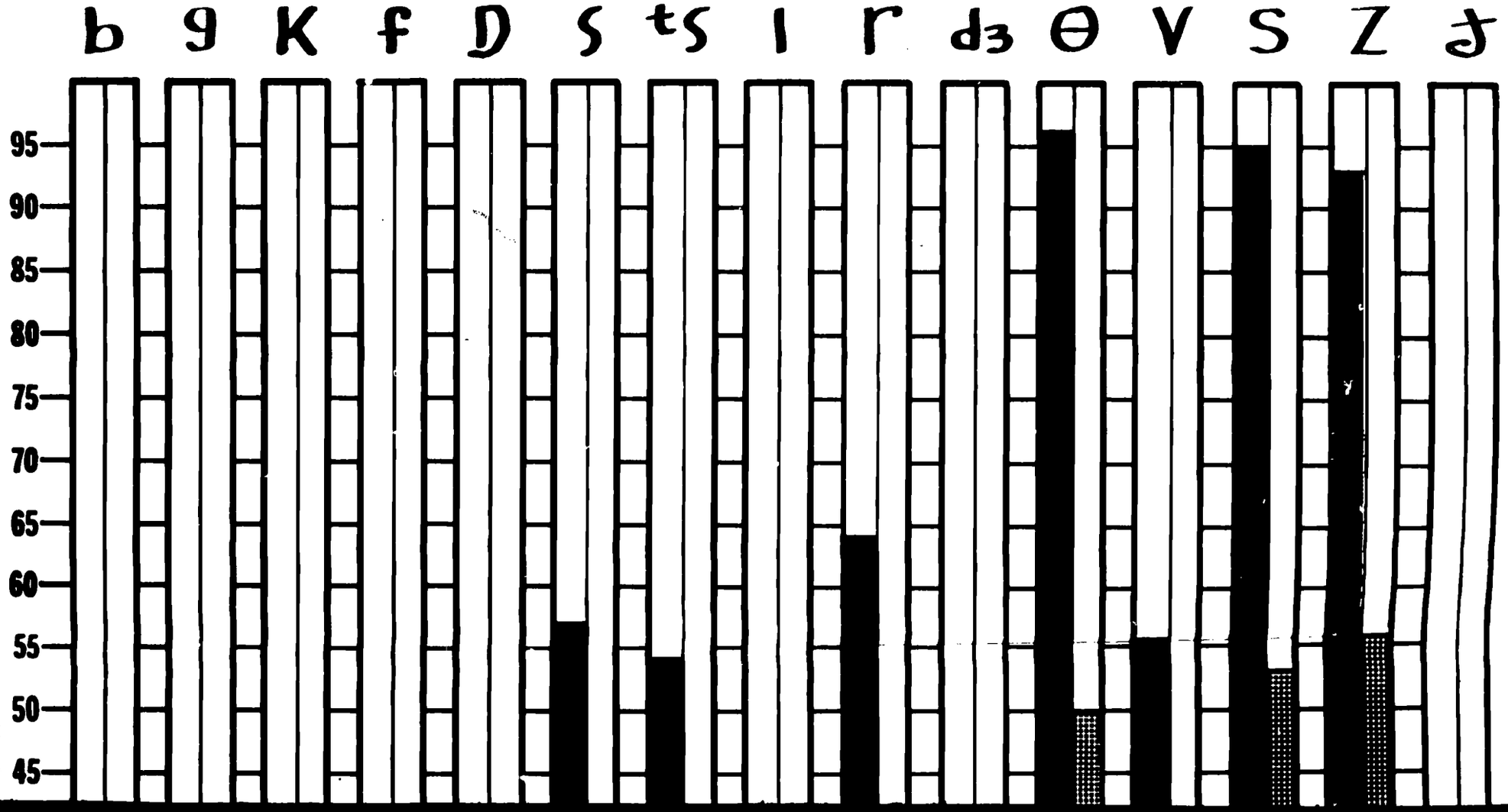
GRAPH 4

MALE MDC ERRORS VERSUS FEMALE MDC ERRORS, COMBINED STUDY



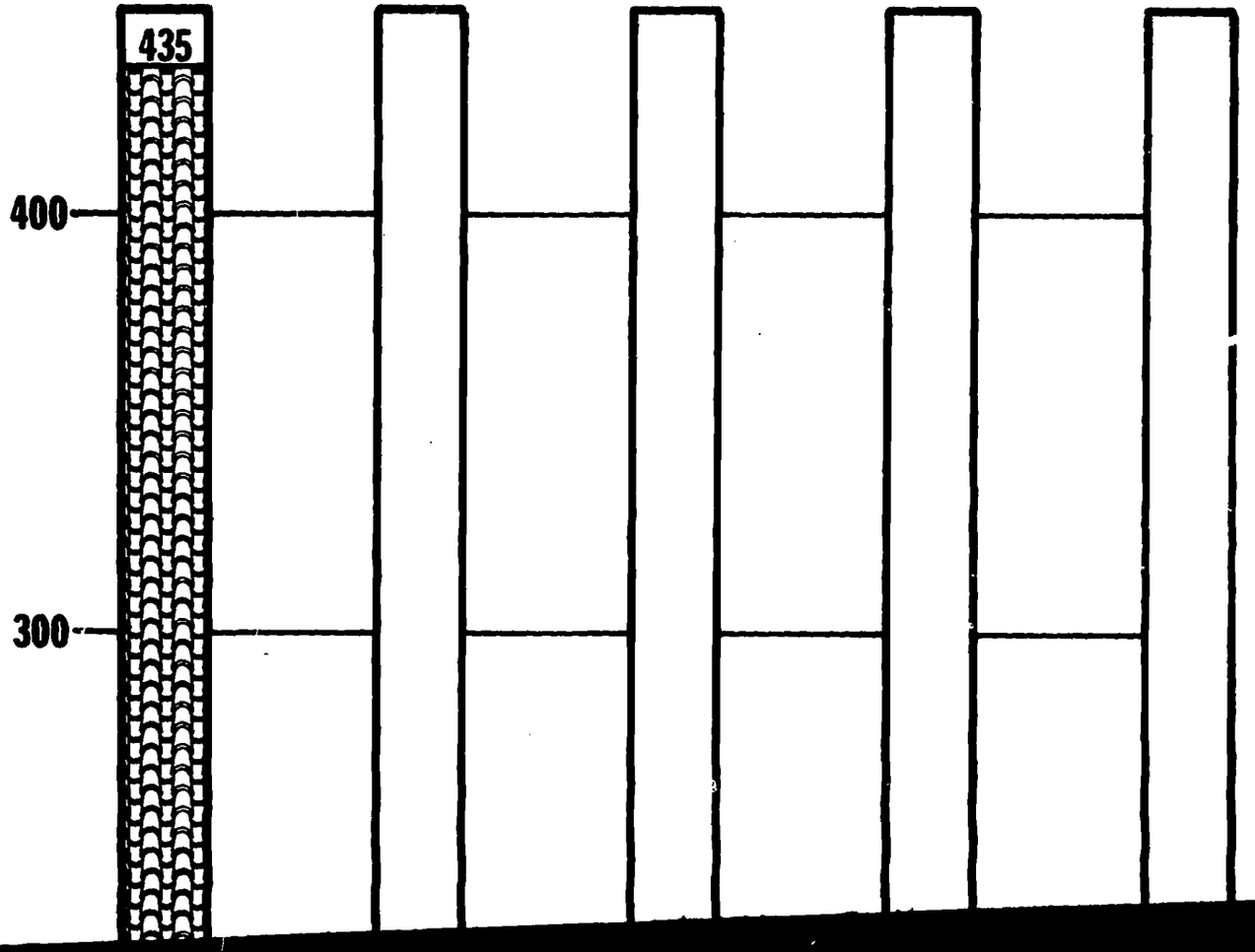
GRAPH 5

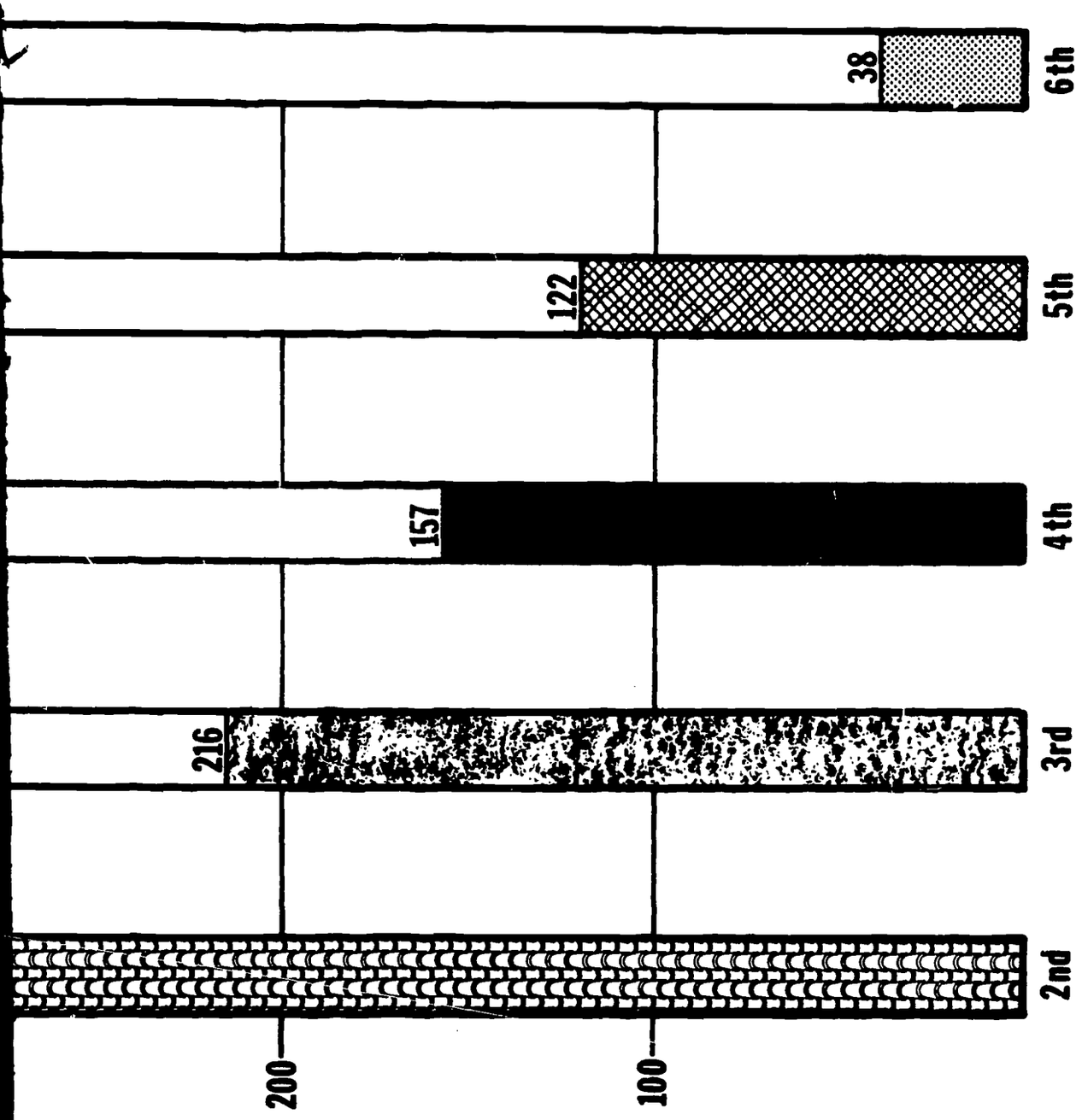
MALE MDC ERRORS VERSUS FEMALE MDC ERRORS FOR SPECIFIC SOUNDS
COMBINED STUDY



GRAPH 6

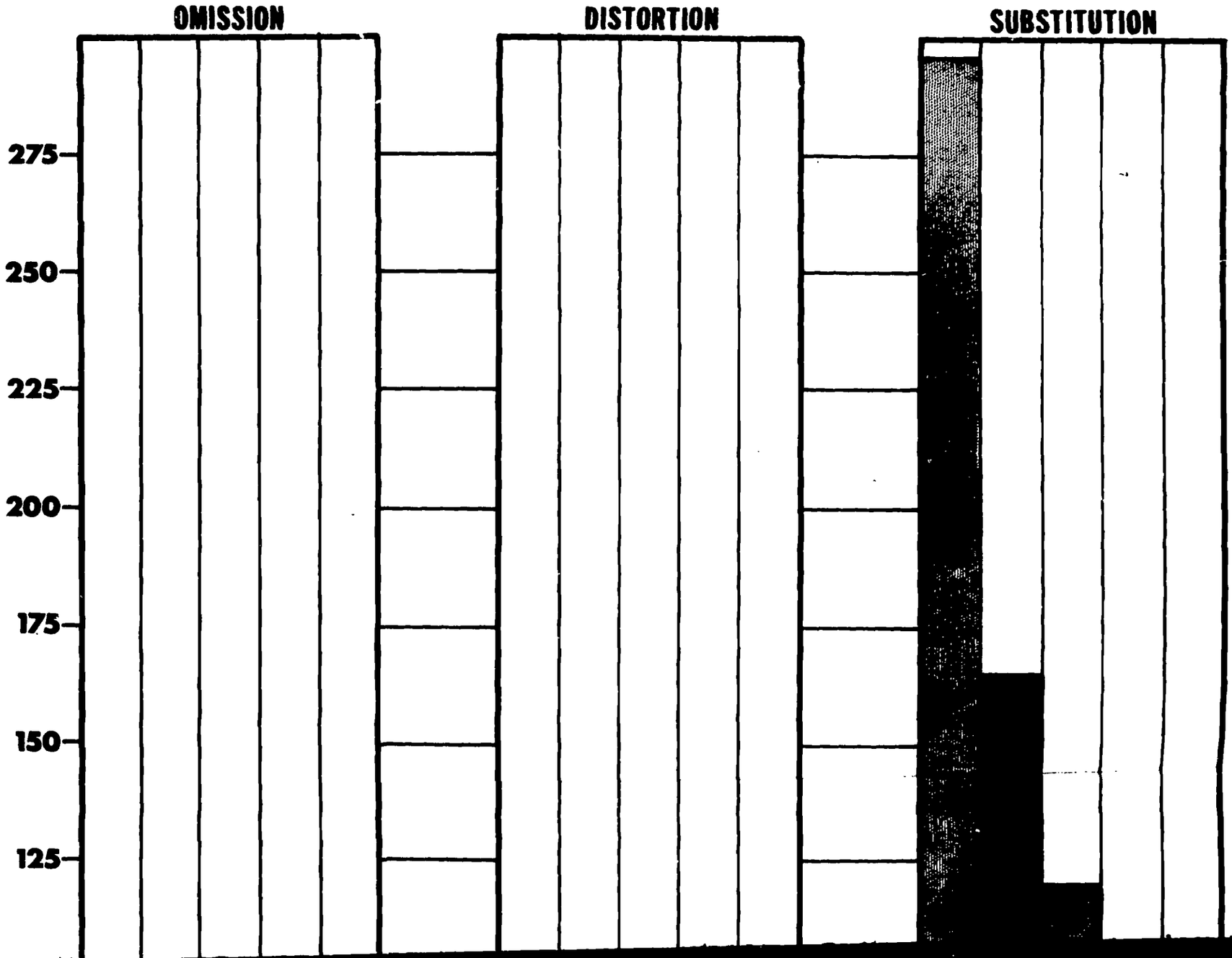
NUMBER OF TOTAL ERRORS BY GRADE
COMBINED STUDY

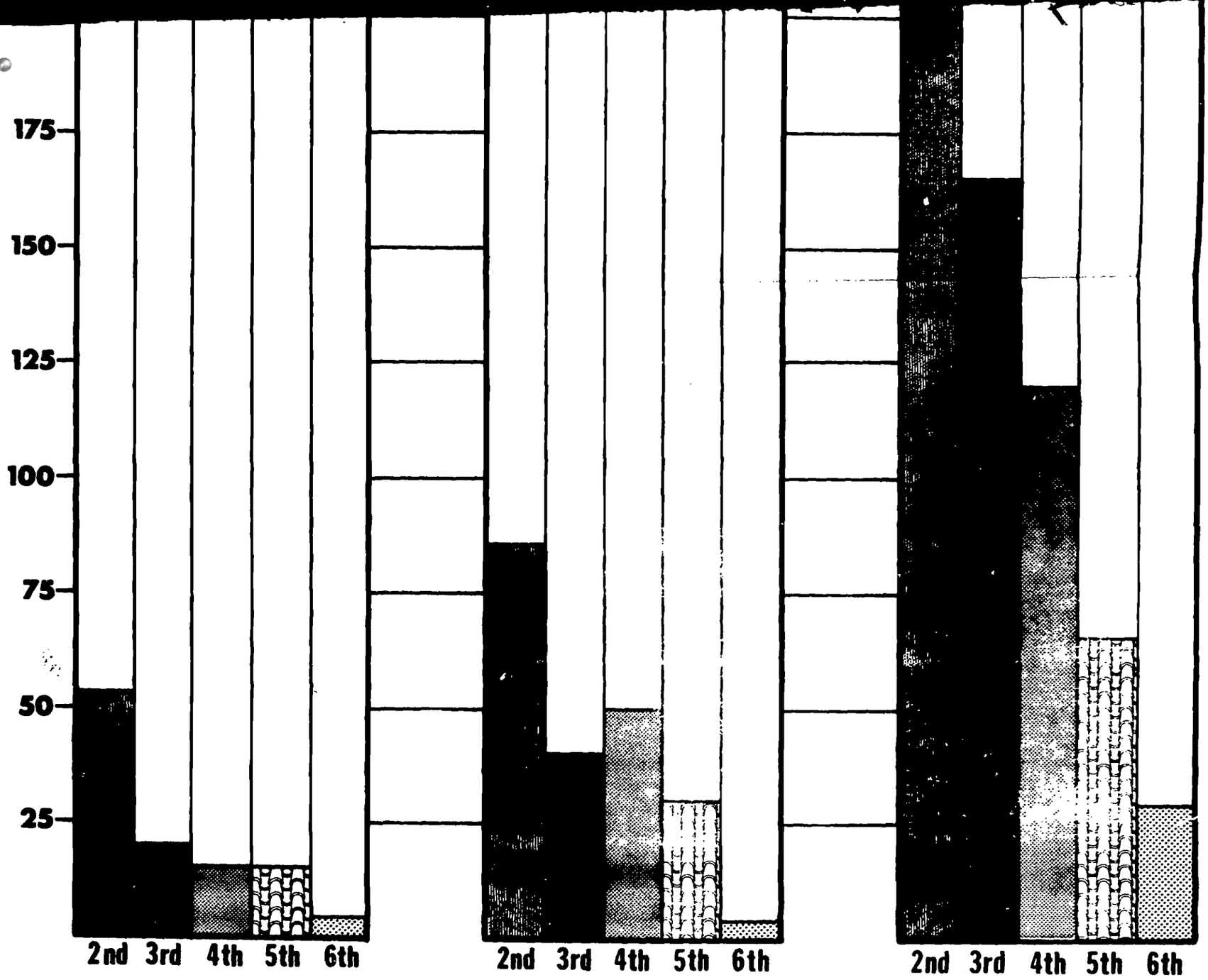




GRAPH 7A

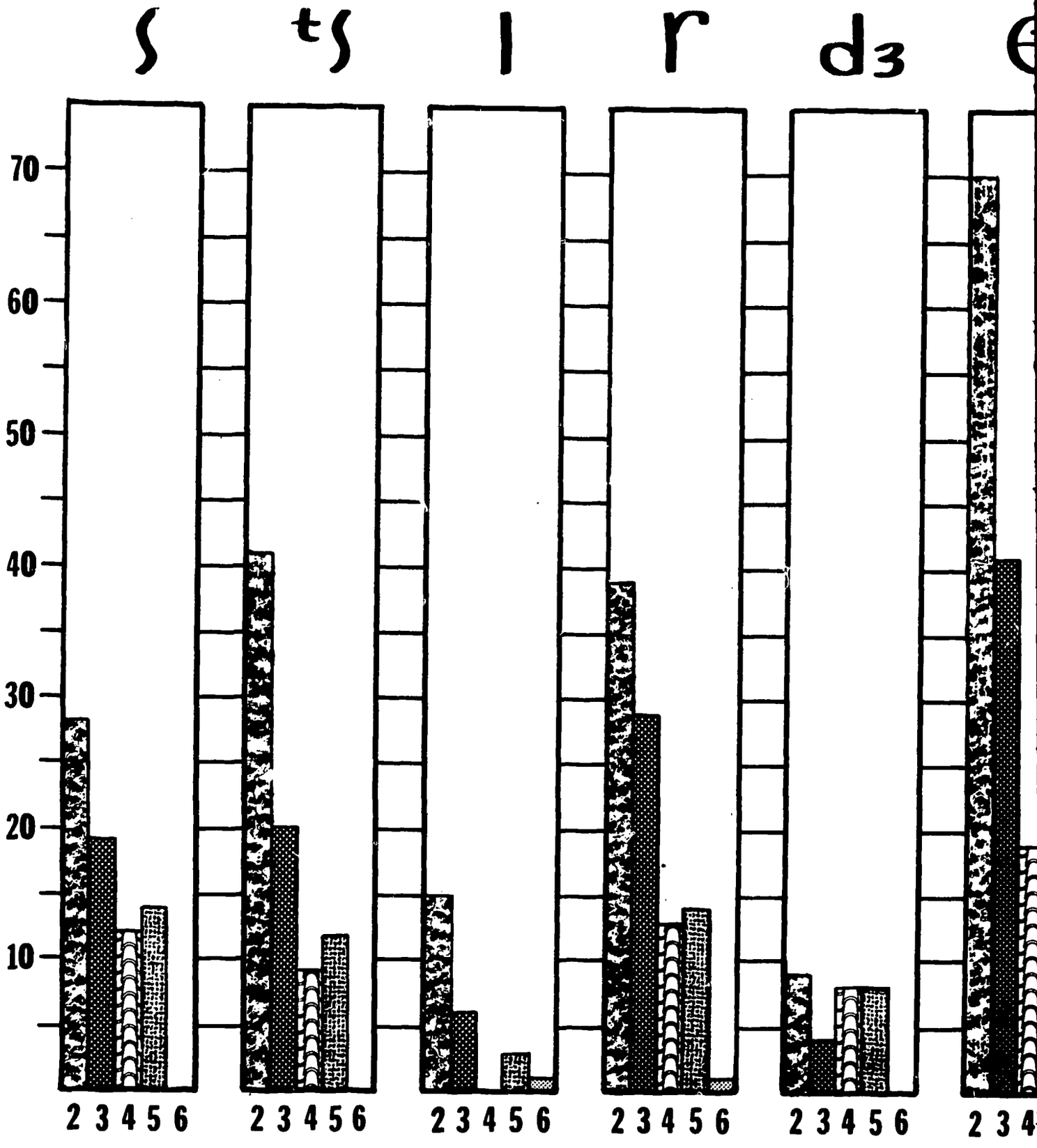
NUMBER OF OMISSIONS, DISTORTIONS, AND SUBSTITUTIONS
BY GRADE, COMBINED STUDY




175
150
125
100
75
50
25
2nd 3rd 4th 5th 6th
2nd 3rd 4th 5th 6th
2nd 3rd 4th 5th 6th

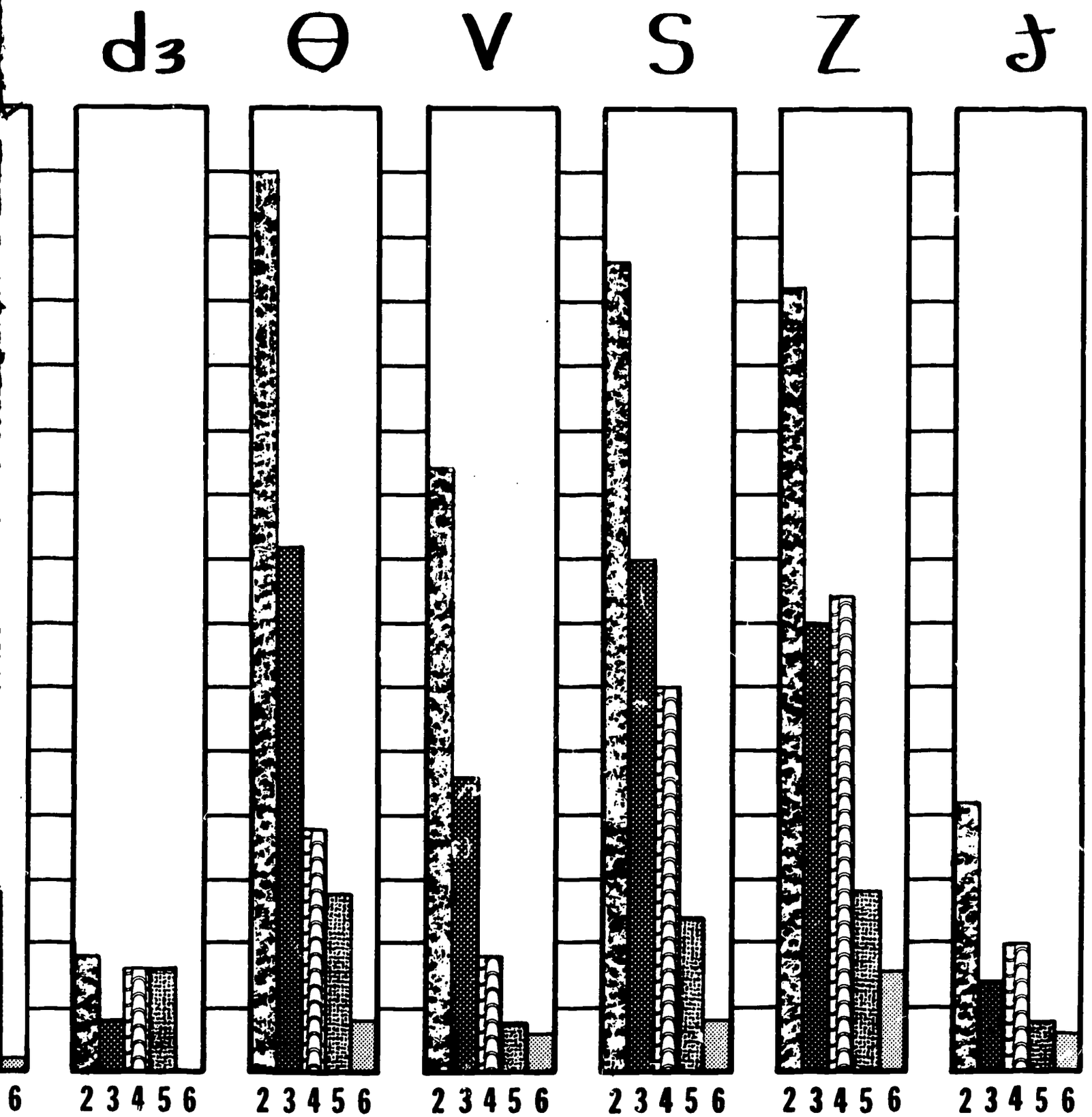
GRAPH 7B

NUMBER OF ERRORS PER SOUND FOR EACH OF THE TEN M
BY GRADE, COMBINED



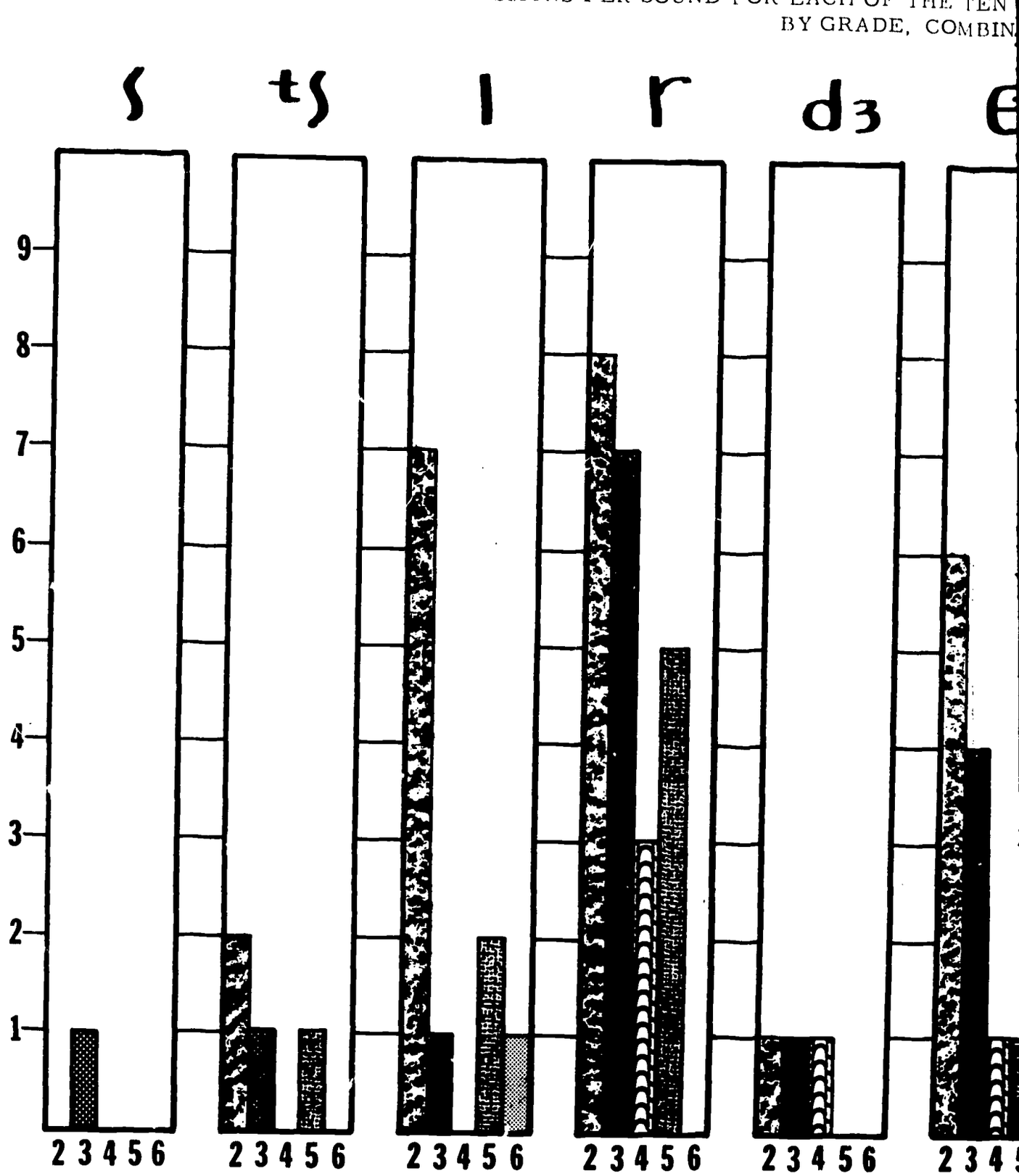
GRAPH 8A

) FOR EACH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
BY GRADE, COMBINED STUDY



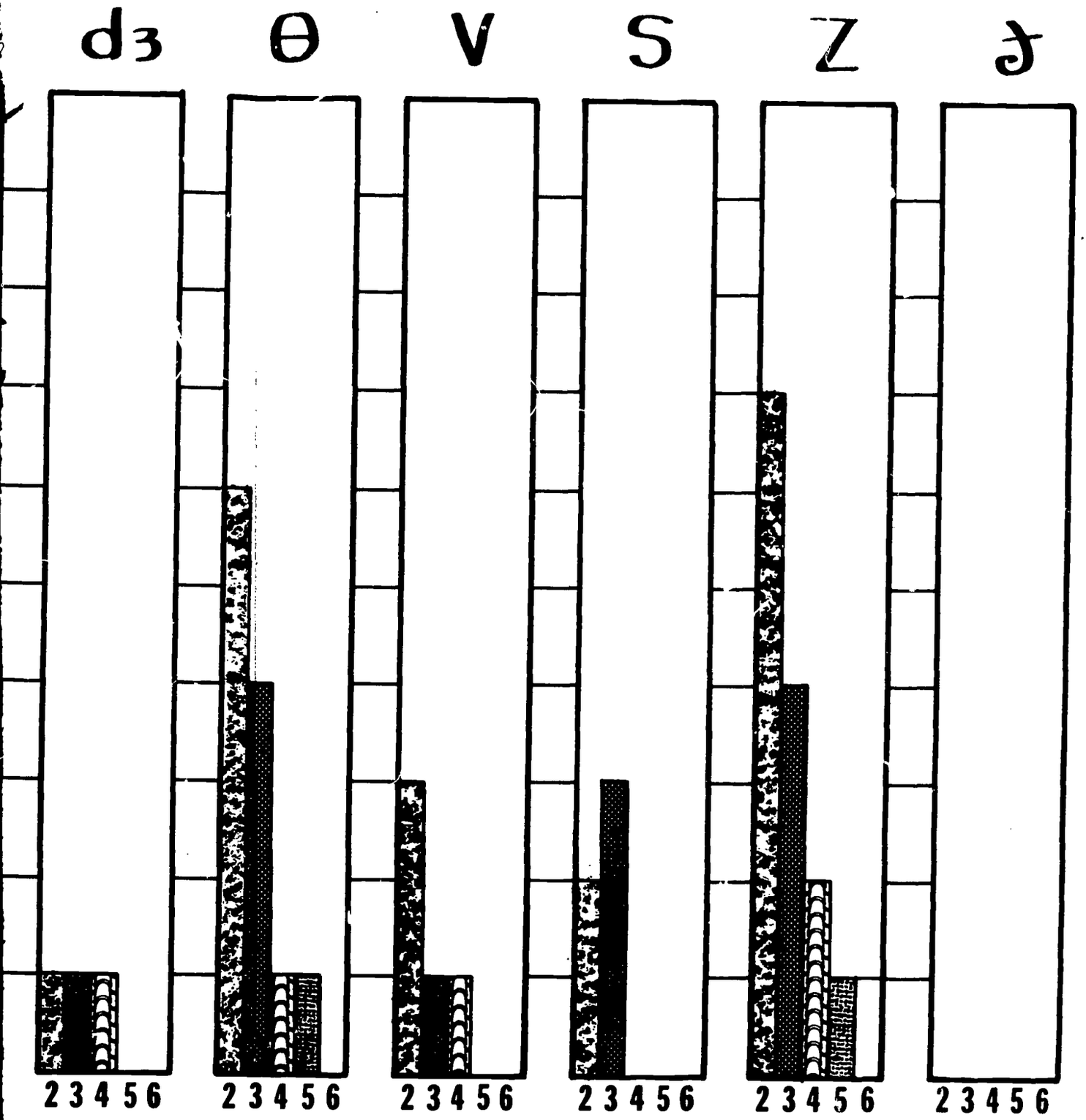
GRAPH 8A

NUMBER OF OMISSIONS PER SOUND FOR EACH OF THE TEN
BY GRADE, COMBIN



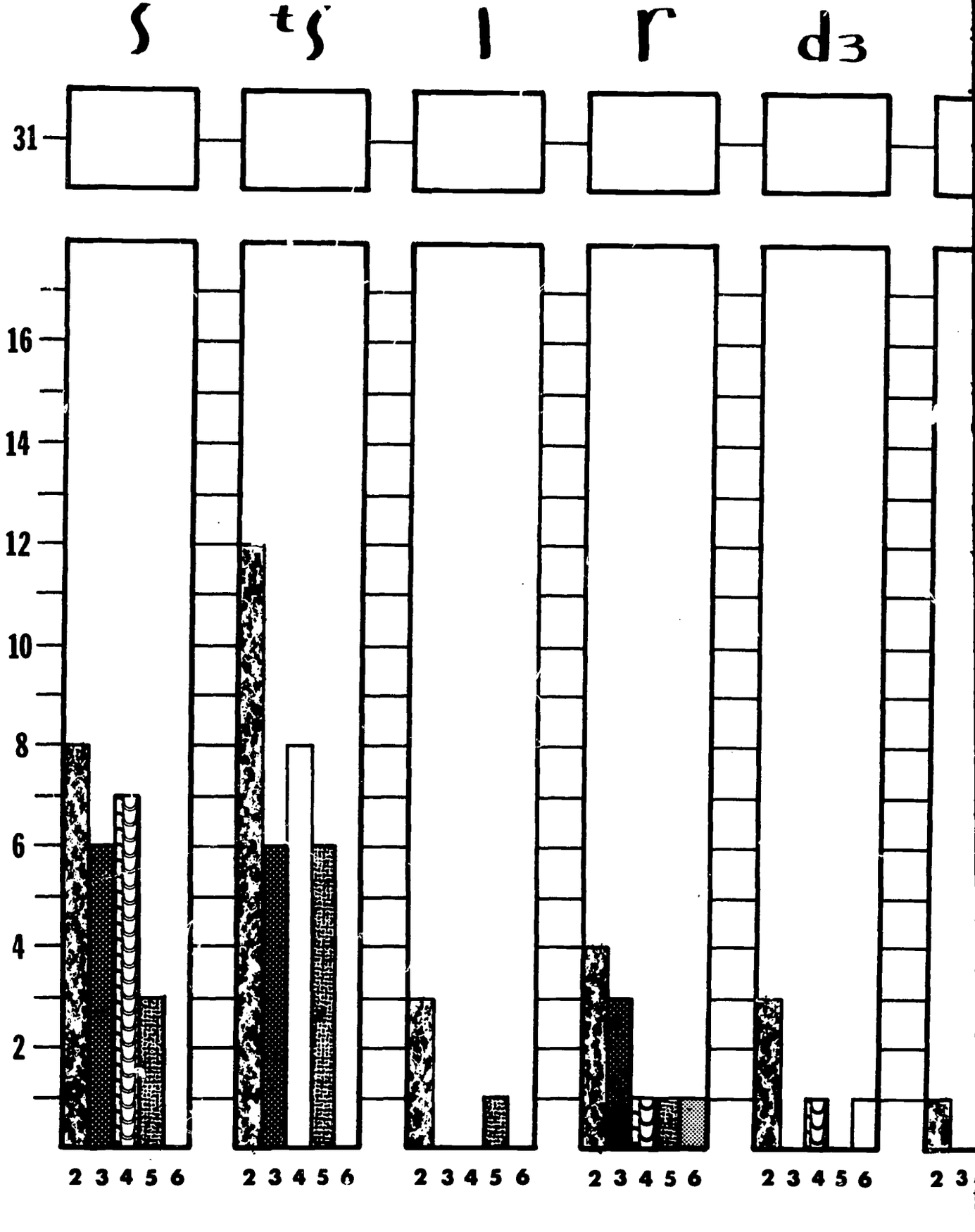
GRAPH 8B

FOR EACH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
BY GRADE, COMBINED STUDY



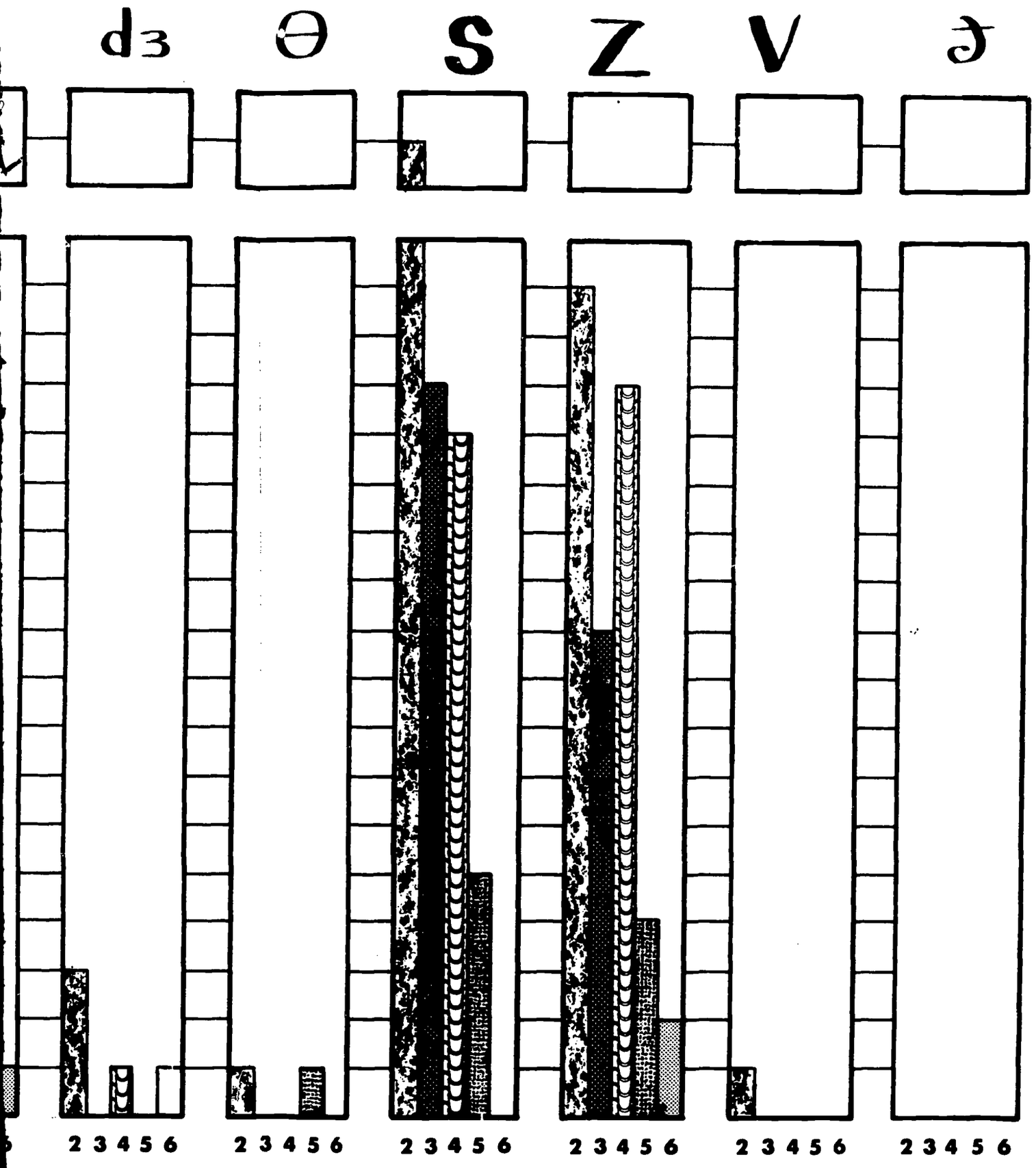
GRAPH 8B

NUMBER OF DISTORTIONS PER SOUND FOR EACH OF THE
BY GRADE, COMBIN



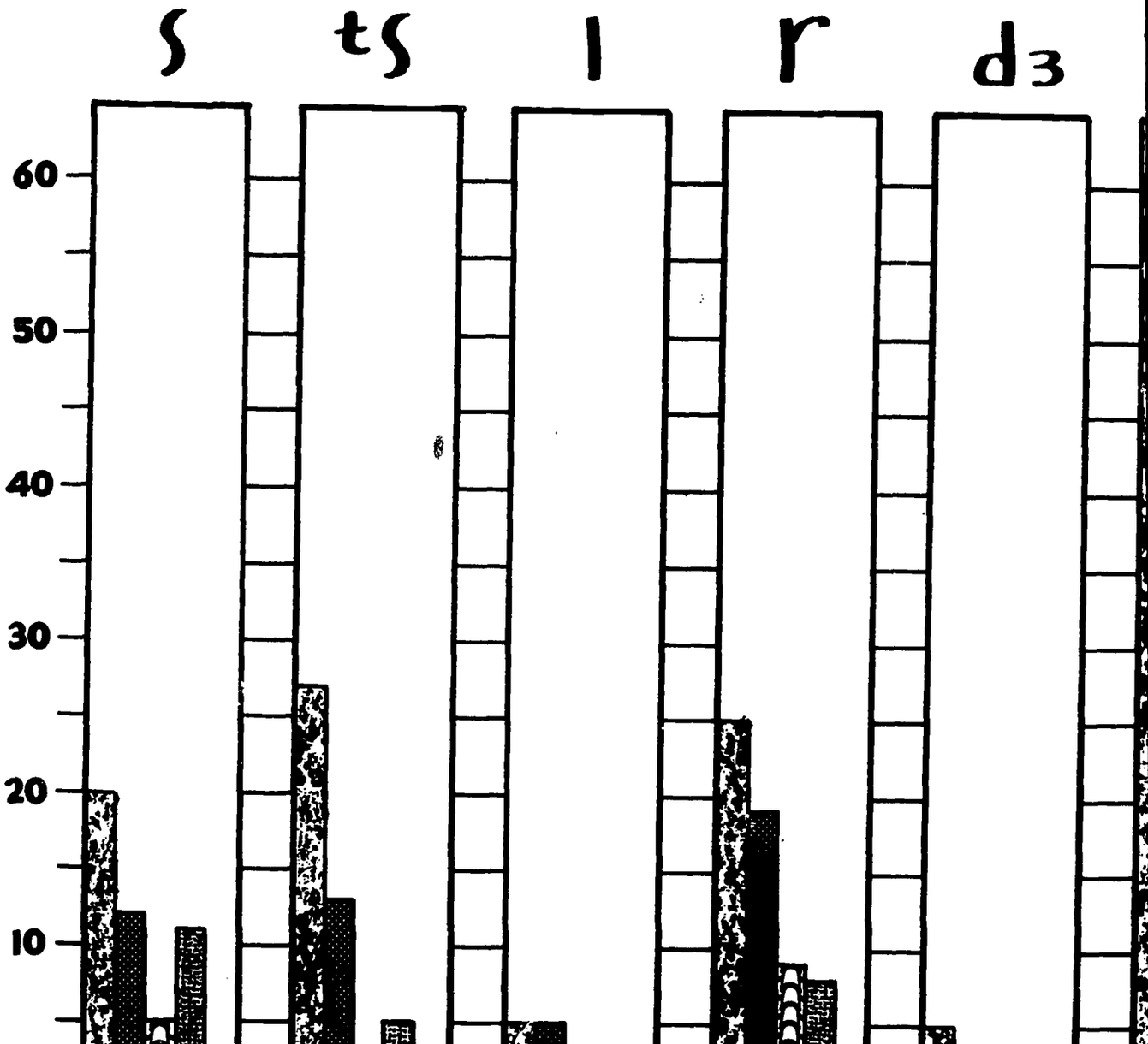
GRAPH 8

UND FOR EACH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
BY GRADE, COMBINED STUDY



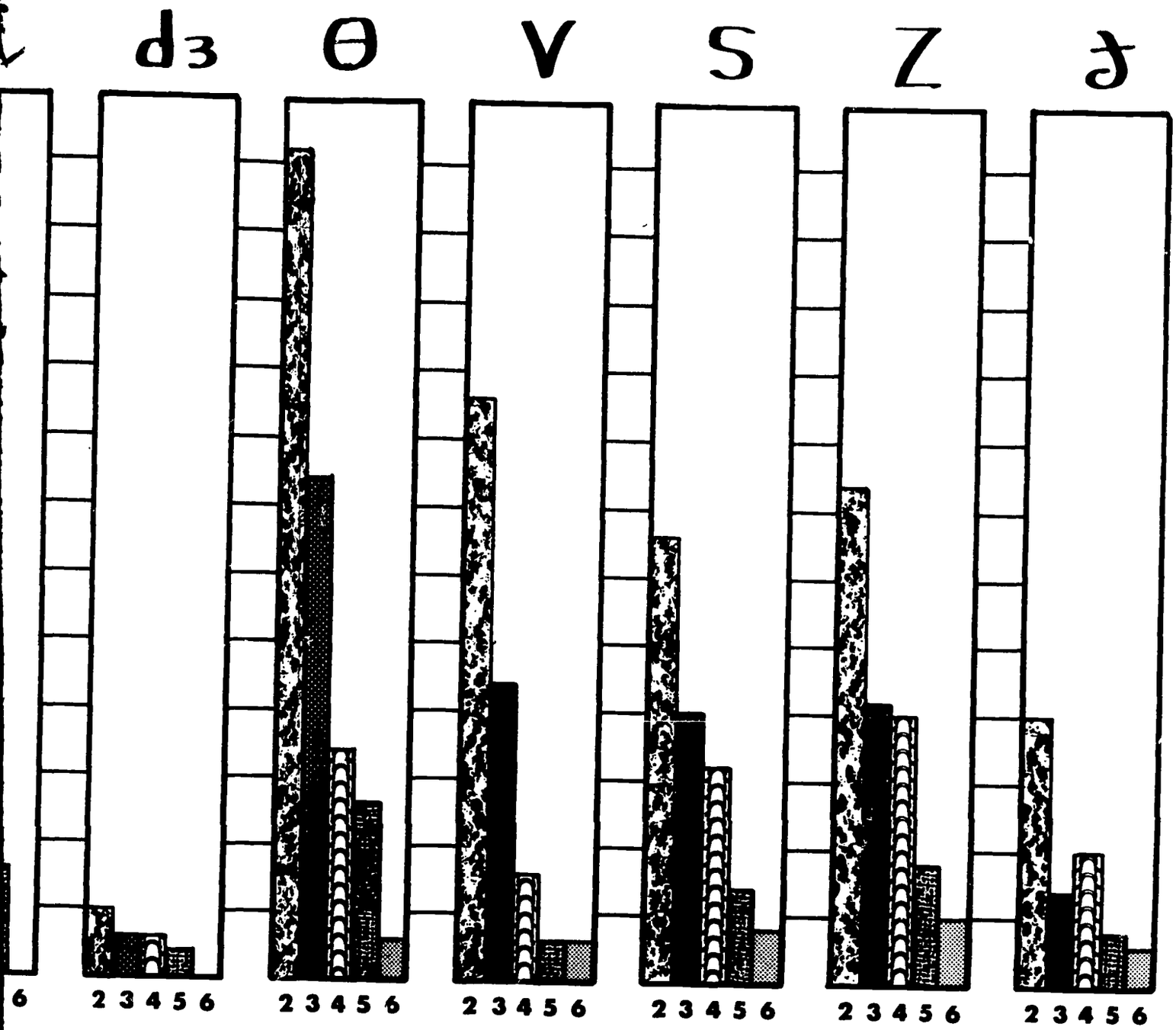
GRAPH 8C

NUMBER OF SUBSTITUTIONS PER SOUND FOR EACH OF T
BY GRADE, CON



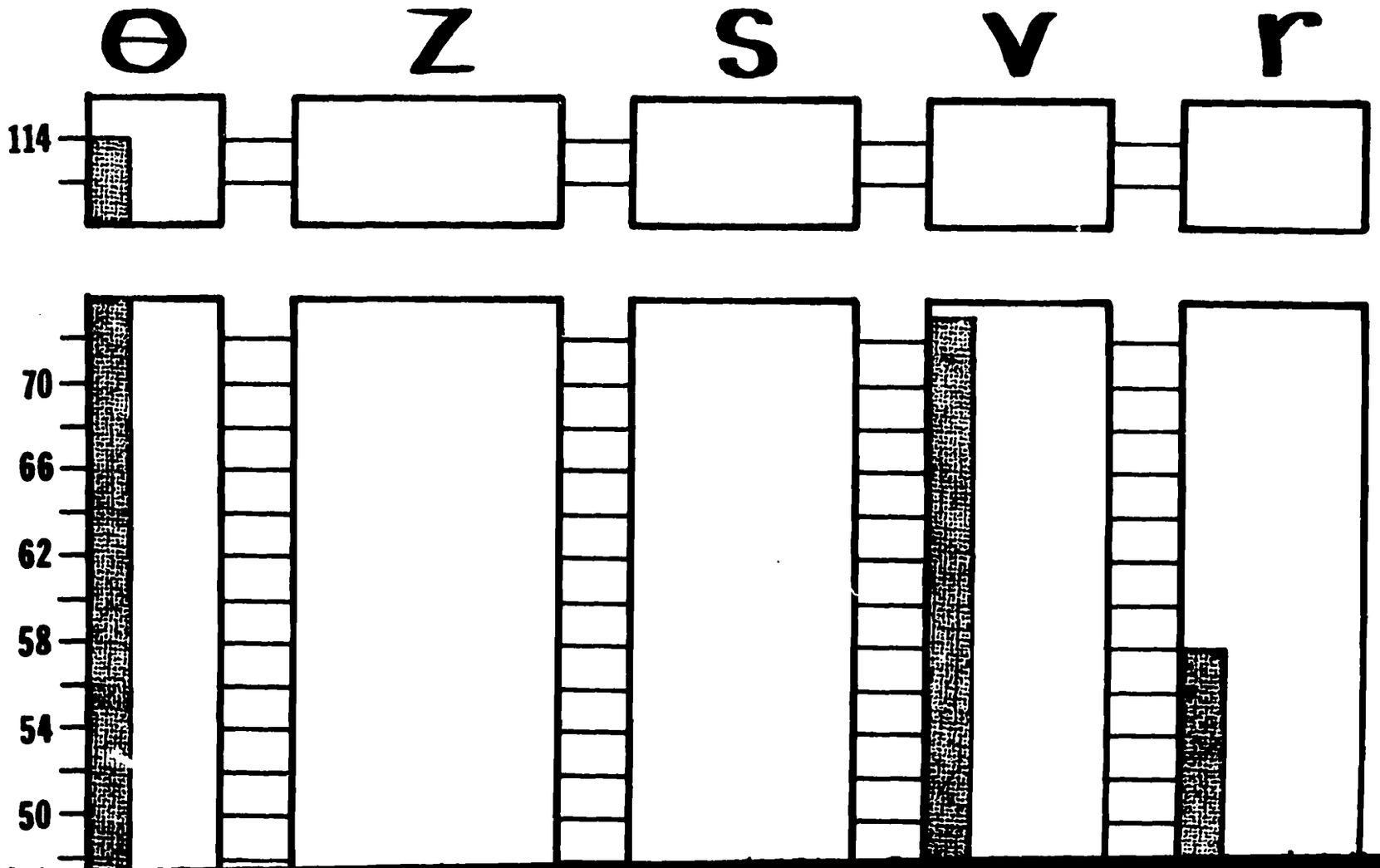
GRAPH

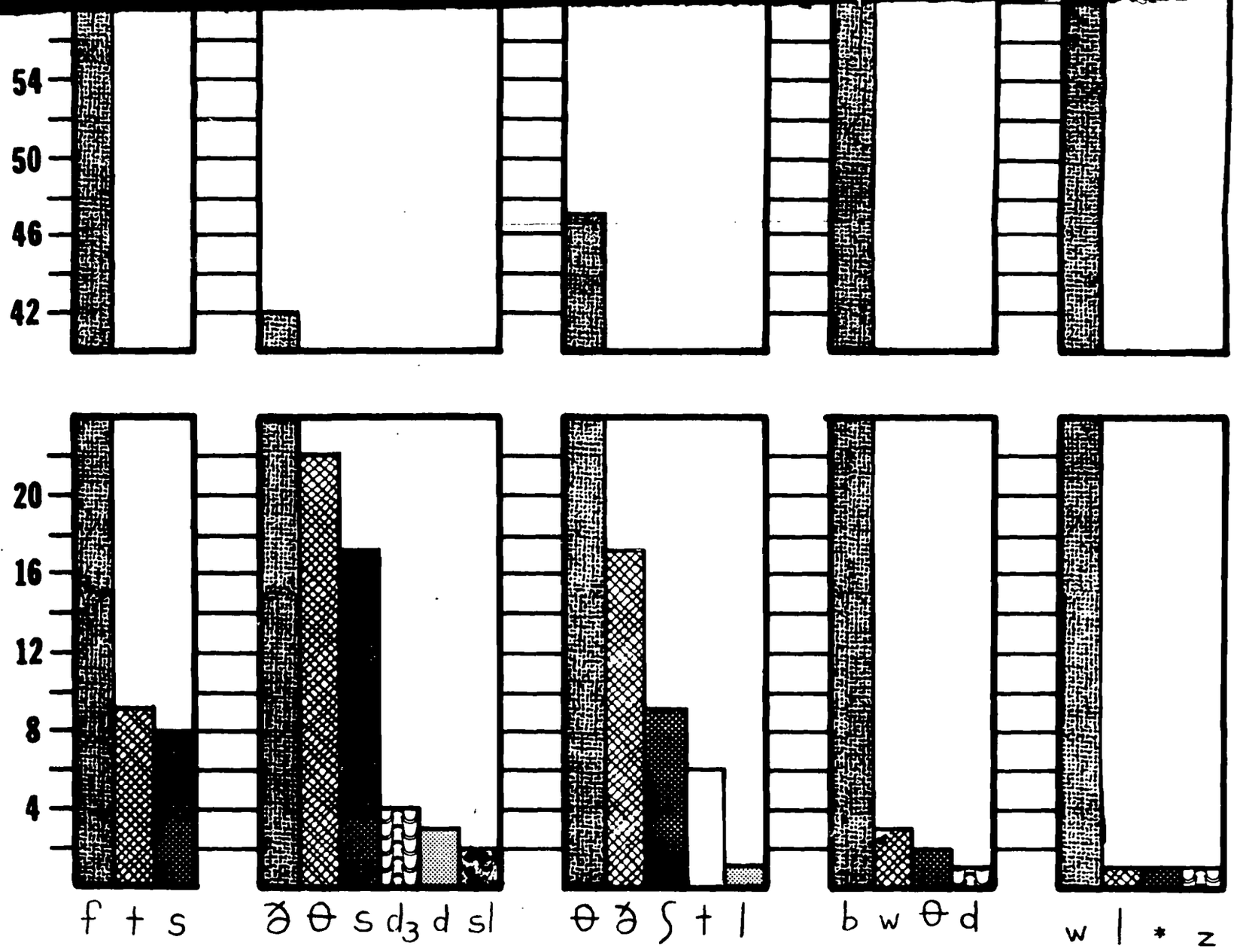
SOUND FOR EACH OF THE TEN MOST COMMONLY MISARTICULATED SOUNDS
BY GRADE, COMBINED STUDY



GRAPH 8D

FIVE SOUNDS MOST COMMONLY SUBSTITUTED BY OTHER SOUNDS
COMBINED STUDY

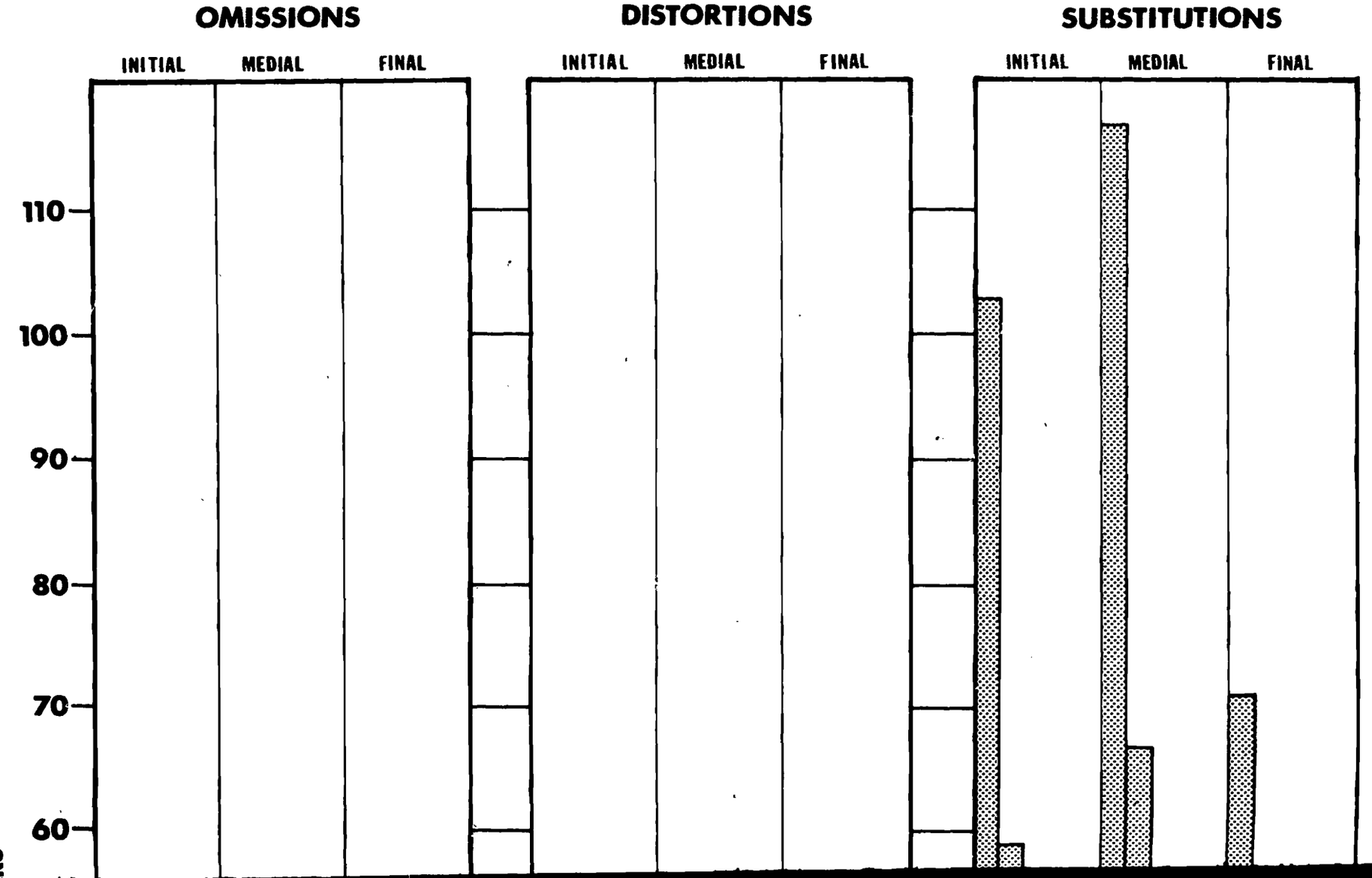


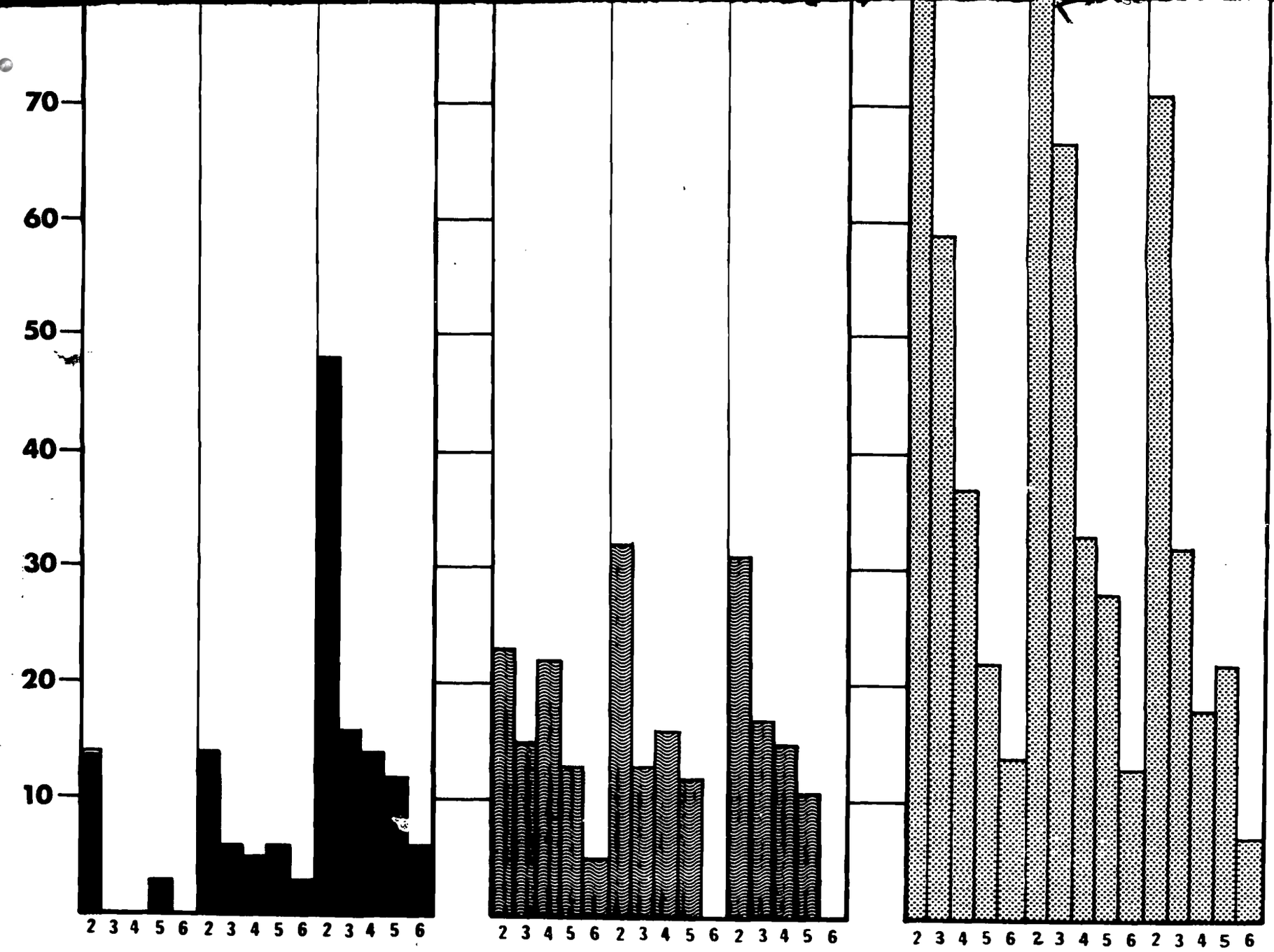


*
New England regionalism

GRAPH 9

POSITIONAL PLACEMENT OF ERRORS BY TYPE AND NUMBER
ON THE GOLDMAN-FRISTOE TEST OF ARTICULATION
BY GRADE, COMBINED STUDY




NUMBER OF ERRORS
70
60
50
40
30
20
10
2 3 4 5 6 2 3 4 5 6 2 3 4 5 6
2 3 4 5 6 2 3 4 5 6 2 3 4 5 6
2 3 4 5 6 2 3 4 5 6 2 3 4 5 6 2 3 4 5 6

GRAPH 10

Graph 1-A compares responses of the Sounds-in-Words Subtest (SWS) to the Sounds-in-Sentences Subtest (SSS). By comparing identical bars of the SWS column and the SSS column, almost invariably the SWS column is greater. The four exceptions are school 01 and 02 omissions and schools 02 and 06 distortions. School 01 appears to present the best agreement between SWS and SSS columns. Lines A and B and lines C and D represent deviations from the norm.

The over-all finding is a little surprising as more errors should be expected in the sentence test than in the word test. This expectation is supported by the literature, reported in Chapter 2, as well as by experience. These test results are contradictory to comparison data provided in the extracts of the test manual (Appendix B). Two possible explanations may be offered for this finding. First, SSS errors may be more difficult to record that SWS errors. Secondly, the words in the SSS were not elicited and the testing therapists may have failed to acknowledge this. The therapist may have to solicit a pronunciation in SSS by asking specific questions about the story sentences and as directed by the testing manual.

The possibility that this finding, as illustrated on graph number 1-A, is valid is, in consideration of the literature, unlikely.

Graph 1-B illustrates SWS versus SSS for combined studies. The graphic portrayal depicts that the difference is greater in substitutions than in omissions and distortions. A possible explanation is that there are considerably more errors in substitutions and hence, a greater possibility for therapist error. It should be noted that school 03 is largely responsible for the deviation. Therapists testing at other schools tend to be more consistent in their SWS and SSS differences, regardless of the type of error. School 03, therefore, may distort the findings somewhat.

Graph 1-C illustrates individual therapist differences on SWS and SSS. It is acknowledged, in most cases, that more errors are made in word subtests. Those graphic bars above the marking line are determined as follows: SWS errors minus SSS errors equal X. The difference is represented by the graphic bar above the marking line. The graphic bars below the marking line are determined as follows: SSS errors minus SWS errors equal X. The four exceptions cited under graph 1-A (schools 01 and 02 omissions and schools 02 and 06 distortions) are thus represented.

The shaded bar under the substitutions column (Graph 1-C) again represents school 03 and the difference noted by the therapist between SWS and SSS substitutions. While school 03 is not totally responsible for the substitution difference noted on graph 1-B, it does represent a significant portion of the difference.

The number of errors for the ten most commonly misarticulated sounds (ʃ, tʃ, l , r , θ, dʒ, v , s , z , and ʒ) are depicted in Graphs 2-A through 2-F. Each school is presented on an individual graph and each mispronounced sound is presented as the specific type of error--distortion, omission, or substitution. There were no additions recorded.

In each case, therapists found more substitutions than any other type of error. School 01, presented in Graph 2-A, stands out, however, as having nearly as many distortions as substitutions, as well as fewer total errors than any other school. The therapist at school 01 is the only therapist to record zero number of omissions; but she records the second highest number of distortions. School 03 (Graph 2-C) shows considerably more substitutions and omissions than any other school, as well as more errors for the ten most commonly misarticulated sounds than any other school. School 07 (Graph 2-F) stands out because of the large number of "s" sound distortions. It is possible that since school 07 records comparatively few "s" sound substitutions, the therapist is viewing as a distortion, an articulation disorder viewed by therapists at other schools as a substitution.

Graph 2-G combines the findings illustrated by Graphs 2-A through 2-F and is intended to present at a glance inter-therapist inconsistency.

Graph 3-A shows collectively that all sounds except "l" and "d_3" were recorded as substitutions more often than they were recorded as distortions or omissions. The graph also shows that the "s" sound was distorted more than any other sound. These findings are expected and conform to previous findings reported in the literature. The sound θ is recorded as the most often substituted sound. Graph 9 used in conjunction with Graph 3-A shows that of 131 recorded substitution errors on the sound θ, 114 of the errors were f/θ.

A hypothesis is addressed in Graph 3-B: Students attending schools in the south (02, 03, 06, and 07) will tend to make f/θ errors more frequently than students attending schools in the north (01 and 04). The data reflect that MDC tested while attending the southern schools did record more total θ errors, but that MDC attending schools in the north actually had a higher proportion of f/θ errors to other θ substitutions. The significance of this finding is unknown and further study is recommended. School 06 is a recently desegregated public school. The initial therapist screening at this school indicated a significantly lower incident rate (2.1%) of MDC speech articulation disorders in comparison to the CDC (4.5%) in attendance. This peculiarity is reported only at school 06. School 02, an integrated on-post DOD operated school,

located within a few miles of school 06, serves the same military population, but reports an incident rate of speech articulation disorders closer to the five percent average incident rate (4.8%).[95] School 06 reports a ten percent incident rate with regard to f/~~θ~~ substitutions among affected students.

Graph 4 illustrates the total number of errors for each of the ten most commonly misarticulated sounds. The rank order approximates that presented in the literature.[96]

Graph 5 shows that about twice as many errors were recorded for MDC boys than for MDC girls. Most studies show the ratio of boys to girls as 3:1 rather than 2:1. In this study, a larger percentage (4.2%) of the randomly selected girls had speech articulation disorders than is to be expected with regard to the literature.

In Graph 6, sex difference of the respondents is depicted for specific sounds. Boys were invariably poorer than girls except for the "l" sound in which girls were about equal. The explanation for this deviation is not known. The "l" sound is the only sound that is omitted more frequently than it is substituted or distorted (see Graph 3-A). It ranks tenth among the ten most misarticulated sounds

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[95]Table 12.

[96]Powers, p. 842.

(see Graph 4). On "b", "g", "k", and "f" sounds, the boys have notably more errors. All four sounds are early maturing sounds and problems with them are often considered developmental.

Boys had 68% of the errors compared to 32% for the girls. This figure is very close to the findings of Mills and Streit[97] who cite 62% and 38% respectively for the first three grades and 70% and 30% respectively above third grade. However, Mills and Streit's finding that girls were closest to boys in sigmastism (lisping or misarticulation of s, z, d_3, and $\int$) was not true of this study. Graph 6 indicates that l, $\eth$ and η provided the closest ratio of similarity of error.

Graph 7-A shows the total number of errors for each grade level. The number of errors decreases with the increase of chronological age (grade) in each case. In consideration of the disproportionate selection of respondents for each grade, the tested third graders, nevertheless, made one-half as many errors as the second graders. This is a greater decrease than that typically represented in the literature and in general agreement with the therapist screening reported on Table 14. The reduction of errors between

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[97] Powers, p. 850.

fifth and sixth graders is also very great.

Graph 7-B shows errors for each grade level broken down into type. The general pattern illustrated on Graph 7-A seems to hold true for error type as well, with two minor exceptions, fifth grade omissions and fourth grade distortions.

Graph 8-A illustrates the ten most often misarticulated sounds presented by grade level. For each sound, children make fewer errors as the grade level increases. An exception appears to be fifth grade with ʃ, tʃ, l, r, and dʒ. With a breakdown of this type, the N is reduced to the extent that two or three fifth graders with severe misarticulations may distort the findings. The sounds o, v, s, z, and ð were the only ones, apparently, in which sixth graders made errors.

Graph 8-B depicts the ten most often misarticulated sounds and how often they are omitted with respect to the child's grade. The total number of errors is so small that the picture is easily distorted by one or two students. The "r" sound is the most frequently omitted sound, followed by the "l" sound.

Graph 8-C offers a picture of distortions by grade level. The "s" sound is most frequently distorted; "z" ranks second.

In Graph 8-D we see second graders are the most frequent

offenders with regard to substitutions.

Graph 9 illustrates the five sounds most often substituted and which substitutions were made. Each of the five sounds appears to be substituted by a particular sound relatively often. It is expected that most of the uncommon substitutions were made by younger children; but this graph does not represent age. It is interesting, however, that each sound has a particular "favored" sound that is likely to be substituted for it. Yet, for each of the five sounds, that "favored" sound is different.

It is suggested by Wellman that omissions and substitutions decrease with age, while approximations or distortions increase. The findings of this study are not in agreement with Wellman in this respect, though they are in agreement with Wellman in relation to manner of articulation and place of articulation. Fricatives account for the majority of articulation errors in this study, as is the case in most speech articulation studies.[98]

Graph 10 illustrates the positional placement of errors by type and number recorded on the Goldman-Fristoe Test of Articulation

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[98] Powers, p. 847.

administered to the 412 children with all schools combined, but separated by grade.

A summation of the graphical data illustrates six significant findings:

1. Ratio of affected boys to affected girls is 2: 1 with regard to omissions and substitutions, but 3: 1 with respect to distortions. Data reported in the literature are inconsistent and a comparison cannot be formed.

2. Rank order of most commonly misarticulated sounds is consistent with the literature.

3. Number of errors decreases as students get older, regardless of error type or specific sound in question, which is consistent with the literature.

4. Rank order of error type (substitutions, distortions, and omissions) is consistent with the literature. See Table 15.

5. θ is the most common substitution; s is the most common distortion; and r is the most common omission.

6. Of the five most commonly substituted sounds, each appears to have a different sound that is favored for its substitution.

Though beyond the scope of this study, a total of 1, 369 Pearson r correlations were computed using all data reported in

	1972 GORDON	1942 ROE & MILISEN
1	(Z)	(θ)
2	(S)	(S)
3	(θ)	(t)
4	(r)	(ʤ)
5	(v)	(Z)
6	(tʃ)	(d3)
7	(ʃ)	(tʃ)
8	(ʤ)	(r)
9	(d3)	(ɣ)
10	(l)	(k)

TABLE 15

TEN MOST OFTEN MISARTICULATED SOU

IN RANK ORDER

1942 ROE & MILISEN	HALL 1938	1947 VAN RIPER
(θ)	(S)	(S)
(S)	(Z)	(Z)
(t)	(ʃ)	(θ)
(ʤ)	(tʃ)	(ʤ)
(Z)	(dʒ)	(r)
(dʒ)	(ʒ)	(ʒ)
(tʃ)	(ɱ)	(l)
(r)	(θ)	(tʃ)
(Y)	(r)	(dʒ)
(k)	( )	(ʃ)

TABLE 15

OFTEN MISARTICULATED SOUNDS

RANK ORDER

the coding guide. These findings are offered as a stimulation to further research.[99] When comparing number of test errors to the father's military grade or rank, a negative correlation -. 136 with the alpha significant at . 01% was produced indicating that as the father increased his grade or rank, his child produced a lower speech articulation score (less errors). This also indicates that as the father became older, his child produced a lower score. However, this finding requires further elaboration in that there was no significant difference between children of officers and enlisted men when compared with test scores. Taken together, these correlations indicate that older fathers had older children and that older children have a lower speech articulation disorder incident rate than do younger children. See Table 14.

The findings indicated that there is no significant correlation between speech articulation disorders and (1) familial placement, (2) number of houses in which the child lived (mean number of houses for a fourth grade child was 11), (3) the father's military occupational specialty, (4) the father's military grade or rank, (5) frequency of the child's separation from the father, or (6) the father's age.

This study reviewed the speech articulation disorder

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[99] See administrative annex.

incident rate reflected by approximately 20,000 MDC attending seven separate school systems located throughout the United States. Information provided by the school systems indicated a higher than normal incident rate of speech articulation disorders among MDC. Subsequently 412 MDC were selected for testing in conjunction with the Goldman-Fristoe Test of Articulation. Test results were then compared with factors involving the soldier-father's military records and the results displayed statistically and graphically in this chapter. Conclusions reflected by the data are presented in Chapter 5, Results and Conclusions.

Chapter 5

SUMMARY

This chapter presents a summary of the investigation, discusses the findings, and presents conclusions drawn from the data. Staff opinions based on the research are offered for the reader's consideration.

The purpose of the investigation was to examine the null hypothesis and also to treat four additional objectives. The null hypothesis was:

> There is no difference between the number of speech articulation disorders incident to military dependent children (MDC) in grades two through six whose fathers are geographically separated from the family unit at least fifty percent of the child's life and the number of speech articulation disorders incident to those military dependent children (MDC) whose fathers are geographically separated from their family unit less than fifty percent of the child's life.

The review of the literature focused on three general areas: learning disabilities peculiar to military dependent children; the effect of transience on student achievement in elementary grades;

and the causes of speech articulation disorders. The primary reference used as a measure of comparing speech articulation characteristics of MDC with a "civilian norm" was the Handbook of Speech Pathology and Audiology, edited by Lee Edward Travis.[100]

The method of procedure was designed to solicit information from seven participating public or Department of Defense school systems located throughout the continental United States. In each school system, at least 35% of the student population consisted of MDC in grades two through six. School officials reported the speech articulation disorder incident rate peculiar to their school system, determined by their speech therapists. The Goldman-Fristoe Test of Articulation testing packets were sent to each participating school system. The Goldman-Fristoe Test of Articulation was administered to sixty students proportionately selected from grades two through six. The sixty students were comprised of two groups of thirty students each. Group A was randomly selected from MDC not previously identified as having speech articulation disorders. Group B was randomly selected from MDC previously identified by therapist screening as having mild or serious speech articulation disorders. This method of selection weighed the population heavily toward affected students. Test results were scored

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[100]Lee Edward Travis (ed.), Handbook of Speech Pathology and Audiology (New York: Appleton-Century-Crofts, 1971).

as both true test errors and gross test errors. The resulting test scores were statistically compared to data from the personal data form completed by the soldier-father and to official military personnel records in order to determine if significant correlations relevant to the study's objectives existed.

Findings of the Investigation

To treat objective number one, the null hypothesis, MDC gross and true test error scores on the Goldman-Fristoe Test of Articulation were correlated against time of geographical separation of the father from his child. The correlation of the two variables was treated as continuous datum using the Pearson product-moment correlation coefficient (r). Reference Tables 4 and 5, Chapter 4.

The null hypothesis also was tested on a dichotomous basis involving the randomly selected population by dividing the population into two groups, using as a criterion the percentage of time the soldier-father was geographically separated from his child. Each child was considered to be geographically separated from his father more than or equal to fifty percent of the child's life or less than fifty percent of the child's life. Though the correlations were significant, they are primarily artifacts of the large population. Reference Tables 6 and 7, Chapter 4.

Objective number one also was treated with respect to the number of gross and true test errors on the Goldman-Fristoe Test of Articulation and separation of the soldier-father due to combat tours of duty in Vietnam using the Pearson product-moment correlation coefficient (r). Both correlations were significant. Reference Tables 8 and 9, Chapter 4.

The variable of time spent by the soldier-father assigned to duty in Vietnam also was treated by separating the tested MDC, using as a criterion the number of combat tours in Vietnam, and the datum was tested on a dichotomous basis. Children in Group X were separated from their fathers during one combat tour of duty in Vietnam. Children in Group Y were separated from their fathers during more than one combat tour in Vietnam. The gross and true test scores of Groups X and Y were compared. Reference Tables 10 and 11, Chapter 4.

Approximately 79 MDC of the tested group were not separated from their fathers for one complete combat tour in Vietnam. The father may not have been assigned to Vietnam, he may have been wounded or evacuated, or he may have become sick and evacuated before completing at least ten months of his twelve month tour of duty.

Objective number two was to sample more widely the incident rate of speech articulation disorders among MDC attending geographically

dispersed schools in order to eliminate the prejudice of one survey. This requirement was satisfied by reporting from seven school systems comprising 75 schools and approximately 20,000 MDC in grades one through six.

Objective number three was to determine if MDC have a higher than average, average, or lower than average speech articulation disorder incident rate. Findings of the third objective indicated that the speech articulation disorder incident rate among MDC approximated that of the general population as reported in the literature in every school system but two. The deviations were 14.5% and 2.1% versus the established norm of 5%. However, in two of the three schools in which CDC also were in attendance, the incident rate among MDC was almost three times greater than among the CDC. The exception was a recently desegregated rural school in which the MDC incident rate was about half the CDC rate.

Objective number four was to determine if the speech articulation disorder incident rate among MDC increases, remains the same, or decreases from grade two to six. The findings of objective number four reflect that the speech articulation disorder incident rate among the 20,000 MDC reported in this study decreases from grade two to six at all participating school systems, with only one exception (grade three, school 4b), which is attributed to the statistical impact on a comparatively small sample size.

Objective number five was to determine if the type of speech errors among MDC differ from the norm as determined by the civilian population. Findings of objective number five are reflected in Chapter 4 on Graphs 1 through 10 and on Table 15. Generally, the findings reflect that the type and frequency of speech articulation disorders among the tested MDC are in agreement with previous studies of CDC reported in the literature. There is a different level of disparity between boys and girls, however. This study reported a ratio of 2:1.

A total of 1,369 correlations were computed. These findings indicated that there is no significant correlation between gross or true speech articulation errors measured on the Goldman-Fristoe Test of Articulation and the following factors involving the MDC participating in this study:

(1) familial placement,

(2) number of houses in which the child lived,

(3) father's military occupational specialty,

(4) father's military rank or grade,

(5) frequency of the child's separation from the father, or

(6) father's age.

Other correlations comparing all the factors identified on the coding guide will require additional study for interpretation.

Limitations of this Study

a. The study pertained only to MDC, while it is recognized that a comparison between MDC and CDC would have been more valuable. However, the political-social climate during the period this study was conducted precluded military personnel from conducting a detailed investigation of civilian dependent children in conjunction with military dependent children.

b. The study was limited by a lack of control over the participating therapists and a lack of consistency among the therapists.

c. The study may have been limited because only one staff member was trained in the field of speech pathology. Other members of the staff were trained in special education, research, statistics, and administration.

d. In this study, it was discovered that inadvertently the chronological ages of officers' children were younger than those of the enlisted men's children.

e. Sixty children were tested in each school. Thirty children were randomly selected from children previously identified as having a mild or serious speech articulation problem. The remaining thirty children were randomly selected from children not previously identified as being affected with speech articulation disorders. Additionally, children were proportionately selected, as explained in the method of procedure, so that more second graders, as an

example, were tested than sixth graders. This procedure deliberately weighed the population heavily toward affected students. However, it must be recalled that the objective of the testing was not to determine the incident rate among MDC. The incident rate had been previously determined by therapist screening. The testing was designed to determine what other factors were held in common among affected MDC. The heavily weighed population permitted a much smaller testing population. The correlations between test scores and other factors determined commonalties reported in the findings.

f. This study reflects information collected during 1969 to 1972. This period presented more turmoil to many military families than did most other periods of the Vietnam War (1965 - present). As a result, these findings do not reflect the military family during more normal periods of family life.

g. The Goldman-Fristoe Test of Articulation is a comparatively new test with limited published reliability and validity data. The use of a second, more recognized test as a comparison was precluded to prevent over testing of the subjects. Nevertheless, the Goldman-Fristoe Test of Articulation is defended as an effective and reliable measuring device for this study.

h. This study was a cross-sectional study as opposed to a longitudinal study.

CONCLUSIONS

The findings presented in this study, the review of the literature, and observations by the research staff suggest eleven specific conclusions.

As noted in the treatment of objective number one, the null hypothesis, the data were treated under the assumption that they reflected continuous rather than discrete data. As a result, the two continuous variables (test scores and the time of geographic separation) were correlated using the Pearson product-moment correlation coefficient (r). The correlation was not significant. The null hypothesis also was tested on a dichotomous basis, in which case the correlation was significant. Though apparently a significant correlation, the level of significance should be regarded as an artifact of the large population (408) which permits the r^2 to fall within the one degree variance. Therefore, the null hypothesis was not rejected.

Additionally, the null hypothesis was treated with respect to the soldier-father's separation from his child due solely to time spent on combat tours in Vietnam. A Pearson product-moment correlation coefficient (r) was computed between the number of gross and true test errors and the time spent in Vietnam measured in months. The correlations reflecting both scores were significant, .106 and .171

respectively.

When tested on a dichotomous basis, the standard error of the means for both test scores was significant, .264 and .206 respectively. MDC in Group X were separated from their fathers for one combat tour; MDC in Group Y were separated from their fathers for more than one tour. The level of significance is not regarded as an artifact of the large population in this application.

The null hypothesis that there is no difference between the number of speech articulation disorders incident to MDC in grades two through six whose fathers are separated from the family unit during one combat tour in Vietnam and the number of speech articulation disorders incident to those MDC whose fathers are separated from the family unit during more than one combat tour in Vietnam was rejected as the second conclusion. However, the number of the father's combat tours in Vietnam can only be concluded as an associative factor and is not necessarily causative.

Findings drawn from the third objective pertaining to the incident rate of speech articulation disorders among MDC were inconclusive. The data reported in this study strongly suggest an area for further research using a longitudinal study. The results of this cross-sectional study indicate that MDC attending schools 01 and 4a, in grades two, three, and four only, have a speech articulation disorder incident rate three times as great as the CDC attending the same schools in

grades two, three, and four.

The third conclusion was that the speech articulation disorder incident rate among MDC decreases from grades two to six and falls well within the established "norm" reported in the literature by the time the student reaches grade five.

The type of speech disorders incurred by MDC during the testing was not peculiar in comparison to the type of errors made by CDC with respect to age, grade, sex, and frequency, as reported in the literature. The fourth conclusion was that affected MDC produce the same type of errors in order of frequency, type, and commonalty as do affected CDC.

The fifth conclusion was that there was no outstanding dialectal error recorded among MDC, or among MDC in specific school systems, distinguished by geographical location.

As a sixth conclusion, it is determined that the ratio of affected MDC boys to girls is 2:1. The literature does not provide consistent data from which to form a comparison.

Hypotheses indicating that the number of houses in which an MDC has lived, the father's military occupational specialty, the father's grade or rank, the frequency of the child's separation from the father, or the father's age affect a MDC's speech articulation disorders were rejected and form the seventh through eleventh conclusions.

DISCUSSIONS AND OPINION

The conclusions presented in this study reflect an association between the number of combat tours of duty spent by the soldier-father in Vietnam and the speech articulation disorder incident rate of the military dependent child. These findings do not represent a causal relationship. The cause may have been the separation of the father from his child; a transference of anxiety from the mother to her child; perhaps the impact of television reporting of the war; or a combination of numerous other factors.

Although it is normal procedure to make an assumption as to the characteristics of the data, that is, continuous versus discrete, this researcher felt obligated to report all observations. It may be considered that a certain point of "emotional saturation" is achieved when MDC are separated from their fathers for an undetermined but comparatively lengthy period of time, say in excess of twelve months. Therefore, the length of separation may not be considered as a continuous variable. In this light, the data were also tested on a dichotomous basis with the test scores and separation of the father by less than 50% of the child's life or more than 50% of the child's life, providing two MDC groups. It is beyond the competence of this study to determine if an "emotional saturation" considered in the dichotomous relationship does exist and,

if so, its impact on speech articulation disorders. Its consideration, however, is thought to be relevant. There may be a point at which duration of separation from the father, with respect to the child's chronological age, achieves "emotional saturation". A suggestion of this is discovered in the low incident rate of speech articulation disorders among the very few randomly selected MDC whose fathers were in Vietnam for four or five years. If this point can be further investigated using a longitudinal study, its implications for fatherless families would be important.

The military family is not a migratory family as defined in studies of migratory children, that is, primarily migratory agricultural families. The military family is more representative of the mobile family referred to by Dr. Margaret Mead, the noted anthropologist. Though highly transient, the military family is supported by optimum facilities during its relocation. The family's household goods are packed and shipped at no personal expense. Military personnel at the new location are assigned to receive and sponsor each new family. Supporting school systems are designed to readily accept a large influx of newly assigned school children. Military posts are administratively equipped to handle numerous family departures and arrivals on a daily basis. As a result, the impact of relocation is not as severe on the

military family as it is on the civilian family required to relocate a considerable distance. This statement, however, is dependent upon the military relocation system (or permanent change of station, as it is referred to by the military) operating effectively. In many instances, especially during the peak years of the Vietnam War, it did not operate effectively. Normally, the typical military family is relocated once every three years, during non-school months, and done so efficiently.

Related studies indicate that MDC do not suffer with regard to IQ or academic achievement by the fifth grade with respect to reading, mathematics, social studies, vocabulary, or school adjustment. MDC achievement in grades 1, 2, and 3 is slightly below average.[101] [102] [103] [104]

However, one study indicates that MDC of average intelligence or above average intelligence are at an even greater disadvantage if they receive their educational foundation (grades 1, 2, and 3) in DOD operated

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[101] Schmidt.

[102] Hand.

[103] Sinclair.

[104] Bud B. Khleif, "The Schooling Careers of Military Dependents: A Socio-Cultural Study" (available on microfiche or in hard cover from: Educational Resources Information Center, Document Reproduction Service, U. S. Office of Education, Washington, D. C. 20202. ED-044-756).

schools in Europe or the Pacific.[105]

During the Vietnam War, MDC were subjected in many instances to their soldier-father departing for the obvious dangers of combat in Vietnam, not once, but often two or three times. In many circumstances their fathers were wounded and medically evacuated to the United States. Certainly, every MDC knew of other fathers who were either seriously wounded or killed in service to their country. The war had additional impact upon military families attributable to the penetration of televised news into the living room. Wives and children of soldiers were presented with instant and graphic accounts of specific battles and their gory aftermath. It was not uncommon for the news media to bombard the viewing public with scenes of American soldiers being removed from the battlefield in body-bags or evacuated swathed in bandages. The point is, MDC had good cause for considerable anxiety. It is fair to state that the public opinion created by the news media toward the military did not create a sense of appreciation for the American soldier. Aware of the obvious dangers his father was confronting, the typical child could be expected to manifest emotional difficulty. It is suspected that some emotional disorders were manifested as speech articulation disorders. If this suspicion bears validity, the initial impulse may be to consider additional speech therapy for MDC in future,

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[105]Schmidt, p. 3.

similar situations. However, as undesirable as they are, it should be considered that speech articulation disorders are a comparatively healthy emotional manifestation and preferable to other more intensive manifestations. Speech therapy may well antagonize the child's situation by placing unnecessary corrective stress on a problem which may be outgrown with age or corrected by the return of the father. The solution is better approached by improved school counselling of MDC, military families, and teachers of MDC at every grade level. The child, family, and teacher should be guided in their preparation of dealing effectively with situations involving the military-father serving his country as a member of the armed forces. Probably the most important focal point is the valuable attribute referred to as the psychological presence of the father when he is physically absent. This is a key factor not available in the fatherless family. Military families by definition have a father member.

Another appropriate consideration is that of self-regulation on the part of the television news media. This researcher questions, as an example, the judgement of the program director that scheduled the showing of the removal of a deceased American pilot from his crashed helicopter, followed by the placement of his remains into a body-bag. Then the viewers of this early evening television news program saw the

members of the pilot's unit singing a fraternal drinking song as they toasted the event with their beer mugs. As sensationalism, it is inappropriate and an example of the insight inadvertently received by the children of military fathers.[106]

Many speech therapists working with MDC report regression to infantile perseveration among a sufficient number of affected children. Regression of this type is inconsistent with the literature. This study cannot substantiate these contentions, but the issue is raised as a topic for further study and for consideration of speech articulation disorders in light of emotional involvement.

There are about one half million military dependent children whose education and mental growth and health bear a direct relationship to their father's military service. In the past, it has been pure happenstance, the quality of the military family, and the individual dedication of uncounted teachers that have protected military children in their educational process. The Department of Defense has done little to assure quality education to military dependents. The Directorate of Dependent Education, staffed with fewer than a dozen members, primarily administers the funding of DOD operated schools. A curriculum, testing,

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[106]CBS Early Evening News, April 10, 1971.

or a monitoring effort are nonexistent. The quality of DOD operated schools is primarily a local post responsibility which is executed in direct proportion to the ability of the post commander. The D D operated schools located in the continental United States probably exceed the standards of adjacent public schools. However, testing, measurement, and achievement reporting are not uniform. Curriculum is not uniform and a relocating MDC child may, as a very real example, study the culture of Japan sequentially in fourth grade, again in fifth, and then again in sixth grade, after having previously lived in Japan for three years. A MDC may be required to learn several different methods of arithmetic as he proceeds from school to school. Though initially a learning handicap, this technique eventually provides considerable versatility; improvement in achievement is noted at about the sixth grade. This probably strengthens a "normal" or gifted child. However, the below "normal" child must incur an even greater handicap. Retarded children, who are totally dependent upon uniformity and reinforcement to acquire reading skills, are at a considerable disadvantage as they move from one curriculum to another.

RECOMMENDATIONS

The solution to correcting speech articulation disorders among

MDC is directly dependent upon first establishing a manageable program. The recommendations that follow are a step in that direction. Speech articulation disorders are not able to be treated efficiently without first treating the cause.

1. The primary recommendation is that the Department of Defense relinquish executive agency responsibility for education of military dependents to the Department of Health, Education, and Welfare, to insure academic proficiency comparable to that afforded civilian children in the United States.

2. Uniform report cards should be used for MDC, regardless of other local report cards, which might also be used. All MDC should be reported on a standardized HEW school record form to indicate academic grades and measurement scores.

3. All MDC world-wide should be tested for academic achievement on a periodic basis using uniform intelligence and achievement measurement tests, under the auspices of the Department of Health, Education, and Welfare, and the results should be recorded on a standardized HEW school record form.

4. After establishing executive agency responsibility, HEW should direct a speech correction program for MDC.

5. HEW should fund additional research directed toward the investigation of MDC education.

6. Research pertaining to MDC should be cross-indexed under the sub-category "military dependent education."

7. These recommendations, pertaining to one of the largest school populations in our nation, may encourage a needed standardization of school records throughout the United States. Use of the standard HEW forms could be required prior to the release of funds granted to local schools for MDC in attendance in conjunction with Public Laws 81-815 and 81-874. The additional administration of two systems of school records might encourage local schools to utilize a standardized HEW school record form for all attending children.

SUGGESTIONS FOR FURTHER RESEARCH

In speech articulation, or any other academic subject area, further research could be directed toward:

a. MDC compared to CDC in same school.

b. Longitudinal studies of MDC.

c. Army MDC compared to Navy, Air Force, Marine Corps, or Department of State MDC/CDC.

d. Remedial reading.

e. Emotional disturbance and speech articulation or remedial reading.

f. Regressive speech patterns of affected MDC.

g. Speech therapy programs for transient MDC.

h. Repetition of the method of procedure used in this study, substituting a different test of articulation.

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APPENDIX A

GOLDMAN-FRISTOE TEST OF ARTICULATION

SCORE SHEET

SOUNDS-IN-WORDS SUBTEST

KEY WORDS

Plate 1 — 5 21 — h ou s e
Plate 2 — 13 9 — t ele ph one
Plate 3 — 8 1 — c u p
Plate 4 — 7 3 — g u n
Plate 5 — 3 9 — k n i f e
Plate 6 — 4 10 — w in d ow
Plate 7 — 7 35 — wa g on . . . wh eel
Plate 8 — 8 — chic k en
Plate 9 — 22 1 — z i pp er
Plate 10 — 21 22 22 — s ci ss or s
Plate 11 — 10 8 12 16 — d uc k . . . y e ll ow
Plate 12 — 20 — v acuum
Plate 13 — 2 15 — m at ch es
Plate 14 — 16 — l amp
Plate 15 — 14 20 — sh o v el
Plate 16 — 17 — ca r
Plate 17 — 17 6 — r a bb it
Plate 18 — 9 14 — f i sh ing
Plate 19 — 15 15 — ch ur ch
Plate 20 — 23 — fea th er
Plate 21 — 1 21 23 23 — p en c ils . . . th is or th at
Plate 22 — 17 13 18 — ca rr o t . . . oran g e
Plate 23 — 19 13 6 6 19 — ba th t u b . . . b a th
Plate 24 — 19 11 11 — th umb . . . f ing er . . . r ing
Plate 25 — 18 — j umping
Plate 26 — 18 — pa j amas
Plate 27 — 30 24 — pl ane . . . bl ue
Plate 28 — 25 14 — br u sh
Plate 29 — 26 2 — dr u m
Plate 30 — 27 7 — fl a g
Plate 31 — 3 28 — Sa n ta Cl aus
Plate 32 — 29 2 34 — Chr ist m as tr ee
Plate 33 — 31 16 — squ irre l
Plate 34 — 32 10 — sl eeping . . . be d
Plate 35 — 33 20 — st o v e

SOUNDS-IN-WORDS RESPONSE MATRIX

	INITIAL	MEDIAL	FINAL
1 p			
2 m			
3 n			
4 w			
5 h			
6 b			
7 g			
8 k			
9 f			
10 d			
11 ŋ			
12 j			
13 t			
14 ʃ			
15 tʃ			
16 l			
17 r			
18 dʒ			
19 θ			
20 v			
21 s			
22 z			
23 ð			

STIMULABILITY RESPONSE MATRIX

	SYLL.	WORD	SENT.
1 p			
2 m			
3 n			
4 w			
5 h			
6 b			
7 g			
8 k			
9 f			
10 d			
11 ŋ			
12 j			
13 t			
14 ʃ			
15 tʃ			
16 l			
17 r			
18 dʒ			
19 θ			
20 v			
21 s			
22 z			
23 ð			

NAME _____ AGE _____ GRADE _____ SCHOOL _____

TEACHER _____ DATE _____ EXAMINER _____

COMMENTS _____

BLENDS

	SYLL.	WORD	SENT.
24 bl			
25 br			
26 dr			
27 fl			
28 kl			
29 kr			

BLENDS

	SYLL.	WORD	SENT.
30 pl			
31 skw			
32 sl			
33 st			
34 tr			
35 hw			

GOLDMAN–FRISTOE TEST OF ARTICULATION

BY RONALD GOLDMAN, Ph.D. AND MACALYNE FRISTOE, M.S.

American Guidance Service, Inc. Publishers' Building, Circle Pines, Minnesota 55014

2-250-669

A BAD NIGHT FOR JERRY

(Plate 36) **Jerry** is **playing** with his **drum, ball** and **wagon.** He is making too **much noise.** His mother makes him stop. It is time to take a bath. (Plate 37) Jerry is **taking** a **bath.** Oh, no! He **loses** the **soap.** He cannot find it because it is outside the bathtub. See the **soap.** It is on the **floor.** (Plate 38) Now he is **brushing** his teeth with his toothbrush. Look, he spills **toothpaste** on his brand new **blue pajamas.** (Plate 39) Nothing else can happen tonight, thinks Jerry. He **yawns** and reaches to turn out the new **yellow light.** Oh, no! He knocks over the **yellow light.** (Plate 40) After a bad night, Jerry is finally **sleeping.** His daddy **covers** him with the **sheet.** Whoops! His foot rips the **sheet.**

KEY WORDS

(Plate 36)

18 17 J e rr y

30 pl aying

26 dr um

16 ba ll

7 wa g on

15 mu ch

22 noi s e

(Plate 37)

8 ta k ing

19 ba th

22 lo s es

21 s oap

27 fl oor

(Plate 38)

25 14 br u sh ing

19 too th paste

24 bl ue

18 pa j amas

(Plate 39)

12 y awns

12 16 y e ll ow

16 l ight

(Plate 40)

32 sl eeping

20 co v ers

14 sh eet

JACK AND RICKY

(Plate 41) **Jack** and **Ricky** should be in school. Instead they are **going fishing.** Ricky is in such a rush that he drops his **glasses,** and gets his **shirt** caught in the **zipper** of his jacket. (Plate 42) They fish from the old **bridge.** All of a sudden they hear a loud noise. Oh! It's only the **dog chasing** a **squirrel.** (Plate 43) Jack and Ricky **catch** thirteen **fish.** Count: 1...2...3... **four** ... **five** ... 6 ...7...8...9...10...11...12... **thirteen! They laugh** because they are **very, very, very** happy (Plate 44) They think that no one will catch them. They sneak back and hide under the **house.** Oh, no! Jack's **mother** finds them!

(Plate 41)

8 Jac k

17 R icky

7 g oing

9 f ishing

21 gla ss es

14 sh irt

22 z ipper

(Plate 42)

18 bri dg e

7 do g

15 ch asing

31 squ irrel

(Plate 43)

8 15 c at ch

14 fi sh

17 fou r

20 fi v e

19 th irteen

23 th ey

9 lau gh

20 v ery

(Plate 44)

21 hou s e

23 mo th er

SOUNDS-IN-SENTENCES RESPONSE MATRIX

FOLD BACK ALONG THIS LINE TO COMPARE THE SUBTEST PERFORMANCES

	INITIAL	MEDIAL	FINAL
1 p			
2 m			
3 n			
4 w			
5 h			
6 b			
7 g			
8 k			
9 f			
10 d			
11 ŋ			
12 j			
13 t			
14 ʃ			
15 tʃ			
16 l			
17 r			
18 dʒ			
19 θ			
20 v			
21 s			
22 z			
23 ð			

BLENDS

24 bl		30 pl	
25 br		31 skw	
26 dr		32 sl	
27 fl		33 st	
28 kl		34 tr	
29 kr		35 hw	

APPENDIX B

RELIABILITY AND VALIDITY OF THE GOLDMAN-FRISTOE TEST OF ARTICULATION

Appendix B

Reliability and Validity of the Goldman-Fristoe Test of Articulation

Excerpts from:

Goldman, Ronald and Macalyne Fristoe, Goldman-Fristoe Test of Articulation (Instruction Manual). Circle Pines, Minnesota: American Guidance Service, Inc., 1969, pp. 15-21.

TECHNICAL DATA

Several studies which provide estimates of the reliability and validity of the *Goldman-Fristoe Test of Articulation* have been completed. The results of these studies are presented in the following sections.

Reliability

Three aspects of reliability have been assessed for the *Goldman-Fristoe Test of Articulation.* These are test-retest reliability, inter-rater reliability, and intra-rater reliability. *Test-retest reliability* refers to consistency in results when the same subject is tested on two different occasions. *Inter-rater reliability* refers to consistency in results when several judges evaluate the same performance by a subject. *Intra-rater reliability* refers to consistency in results when one judge evaluates the same performances on two different occasions.

For the purposes of this discussion, reliability is defined as the consistency with which the same response is recorded for each sound in each position. This is more meaningful in an inventory of speech sound production than statements of reliability based on the *total* number of sound errors recorded on each test, because, even though the total number of error sounds may be the same on two tests, the sounds judged to be error sounds could be com-

Appendix B (continued)

pletely different from one test to the other. Therefore, in evaluating reliability the number of agreements on the type of sound produced or on the presence of an error was determined for each cell in the subtest matrices. The number of agreements found for each cell is compared with the possible number of agreements for that particular cell to determine the percentage of agreement.

Test-Retest Reliability

Thirty-seven articulatory defective children between the ages of four and eight were tested by eight experienced speech pathologists who met the academic requirements for the Certificate of Clinical Competence in Speech Pathology issued by the American Speech and Hearing Association. The children tested represented a wide range of articulatory involvement. Table 1 shows the distribution of the percentage of total responses recorded as error sounds for each subject on the initial administration of the Sounds-in-Words and Sounds-in-Sentences Subtests. Since the Sounds-in-Sentences Subtest was designed to assess only those sounds most likely to be defective while the Sounds-in-Words Subtest was designed to assess almost all consonant sounds, a higher percentage of error would be anticipated for the Sounds-in-Sentences Subtest responses. The difference between the medians for the two subtests supports this assumption. The median percentage of error on the Sounds-in-Words Subtest was 47, as contrasted with a median percentage of 67 on the Sounds-in-Sentences Subtest.

Each subject was tested twice by the same examiner with one week intervening between tests. Comparisons were made between test and retest findings with reference to presence or absence of error in production of each speech sound. The median agreement for the Sounds-in-Words Subtest was 95 percent. The median agreement for the Sounds-in-Sentences Subtest was 94 percent. Comparisons were similarly made of the specific type of speech sound production recorded — substitution, distortion, omission, addition, or correct production. Here agreement is obviously more difficult. The median agreement for the Sounds-in-Words Subtest was 89 percent. The median agreement for the Sounds-in-Sentences Subtest was 86 percent. The percentage of test-retest agreement on the two subtests for presence of error and for type of speech sound production is given for each sound in each position in Tables 2 and 3. Test-retest reliability information on the Stimulability Subtest has not been obtained.

Table 1
Distribution of errors for the 37 subjects

Percentage of responses judged to be error sounds	Frequency	
	Sounds-in-Words Subtest	Sounds-in-Sentences Subtest
0- 9	0	5
10-19	6	0
20-29	2	1
30-39	3	2
40-49	11	2
50-59	4	5
60-69	4	4
70-79	5	3
80-89	2	6
90-99	0	8
100	0	1

Inter-Rater Reliability

Inter-judge reliability in evaluating articulation using the Sounds-in-Words Subtest was examined. Recorded test responses of four subjects representing mild to severe articulation problems (11 percent errors to 72 percent errors) were evaluated by six judges. These judges had had at least one semester of experience in using the Goldman-Fristoe Test in addition to more extensive experience in using other tests of articulation. The number of agreements on presence or absence of error was determined for each sound, and the median percentage of agreement as recorded in Table 4, was 92; the median percentage of agreement on type of production was 88. In Table 5 inter-rater agreement for each subject is presented to show how well judges agreed on different degrees of severity of misarticulation.

Inter-rater reliability information on the Sounds-in-Sentences Subtest has not been obtained.

Intra-Rater Reliability

Intra-rater reliability was determined for the Sounds-in-Words Subtest by having six judges listen to the recorded articulation test responses for four children with articulatory disorders ranging from mild to severe (11 percent errors to 72 percent errors). Experienced speech clinicians meeting the qualifications described above were used. The median percent of agreements was 91 percent for presence or absence of error and 91 percent for type of production. The results of this study are shown in Table 6.

Intra-rater reliability information on the Sounds-in-Sentences Subtest has not been obtained.

Appendix B (continued)

Table 2

Test-Retest Agreements: Sounds-in-Words Subtest

(In Percentages)

Sound	Presence of Error			Type of Speech Sound Production		
	Initial	Medial	Final	Initial	Medial	Final
1. p	100	100	95	100	95	92
2. m	100	89	100	97	78	97
3. n	100	100	95	100	95	92
4. w	100			95		
5. h	100			100		
6. b	100	100	97	97	95	97
7. g	100	95	100	100	92	92
8. k	97	89	100	97	83	95
9. f	92	97	97	89	89	92
10. d	100	100	100	92	95	100
11. ŋ		95	97		95	89
12. j	92			86		
13. t	95	100	100	92	95	86
14. ʃ	95	95	89	89	86	78
15. tʃ	89	86	89	81	81	78
16. l	92	78	100	83	76	95
17. r	95	86	86	95	83	81
18. dʒ	100	95	95	95	89	73
19. θ	92	89	95	81	83	92
20. v	95	89	97	92	83	83
21. s	100	89	92	89	81	83
22. z	95	92	95	89	86	86
23. ð	97	89		86	78	
24. bl	97			97		
25. br	89			89		
26. dr	92			92		
27. fl	95			92		
28. kl	95			95		
29. kr	83			81		
30. pl	95			89		
31. skw	86			83		
32. sl	83			81		
33. st	81			79		
34. tr	86			83		
35. hw	92			92		

Appendix B (continued)

Table 3

Test-Retest Agreements: Sounds-in-Sentences Subtest

(In Percentages)

Sound	Presence of Error			Type of Speech Sound Production		
	Initial	Medial	Final	Initial	Medial	Final
7. g	100	97	97	97	92	94
8. k	100	97	100	100	97	97
9. f	94		94	86		89
12. j	97			97		
14. ʃ	86	84	94	85	81	83
15. tʃ	83		86	76		82
16. l	100	83	100	100	78	94
17. r	97	94	100	89	94	86
18. dʒ	100	94	92	95	86	86
19. θ	94	83	89	89	83	81
20. v	93	86	97	93	78	86
21. s	86	86	94	74	70	80
22. z	94	93	89	86	85	83
23. ð	100	83		91	69	
24. bl	97			94		
25. br	92			92		
26. dr	92			92		
27. fl	83			83		
30. pl	91			88		
31. skw	83			70		
32. sl	92			89		

Appendix B (continued)

Table 4

Inter-rater Agreements: Sounds-in-Words Subtest

(In Percentages)

Sound	Presence of Error			Type of Speech Sound Production		
	Initial	Medial	Final	Initial	Medial	Final
1. p	88	96	88	88	92	83
2. m	100	71	96	100	67	83
3. n	100	92	96	100	92	92
4. w	100			100		
5. h	100			100		
6. b	100	100	88	100	100	88
7. g	79	92	96	79	92	96
8. k	92	92	92	88	92	83
9. f	100	100	96	100	100	96
10. d	100	100	88	100	88	88
11. ŋ		96	75		88	75
12. j	100			96		
13. t	96	92	75	96	92	75
14. ʃ	88	92	88	75	92	88
15. tʃ	96	88	83	79	88	67
16. l	92	96	75	92	96	75
17. r	92	96	83	83	96	75
18. dʒ	88	83	92	88	75	71
19. θ	92	92	83	79	83	83
20. v	75	96	92	67	96	92
21. s	78	100	96	78	100	96
22. z	83	100	83	79	100	83
23. ð	62	96		62	96	
24. bl	88			88		
25. br	100			92		
26. dr	88			88		
27. fl	96			96		
28. kl	92			75		
29. kr	96			83		
30. pl	100			96		
31. skw	100			83		
32. sl	100			75		
33. st	100			92		
34. tr	88			88		
35. hw	75			75		

Appendix B (continued)

Table 5

Median Inter-rater Agreements by Subject: Sounds-in-Words Subtest

(In Percentages)

Subject	Degree of Misarticulation	Presence of Error	Type of Speech Sound Production
1	Mild (11 percent error)	100	100
2	Moderate (33 percent error)	100	100
3	Moderate (36 percent error)	83	83
4	Severe (72 percent error)	100	83

Table 6

Intra-rater Agreements: Sounds-in-Words Subtest

Sound	Presence of Error			Type of Speech Sound Production		
	Initial	Medial	Final	Initial	Medial	Final
1. p.	91	100	96	87	100	91
2. m	96	91	91	96	87	87
3. n	100	83	100	100	83	96
4. w	100			100		
5. h	100			96		
6. b	100	100	96	100	100	96
7. g	78	100	96	74	91	96
8. k	96	96	91	83	96	87
9. f	100	100	96	100	100	91
10. d	100	100	100	100	96	100
11. ŋ		96	83		74	83
12. j	96			91		
13. t	96	96	70	96	96	70
14. ʃ	83	96	87	70	91	87
15. tʃ	87	91	83	70	87	70
16. l	74	87	78	70	83	74
17. r	91	91	96	87	91	91
18. dʒ	78	83	83	74	83	78
19. θ	70	87	91	65	70	83
20. v	65	87	91	61	87	91
21. s	76	96	87	76	96	83
22. z	96	88	88	91	88	88
23. ð	83	91		78	91	
24. bl	96			96		
25. br	100			91		
26. dr	91			91		
27. fl	96			96		
28. kl	96			91		
29. kr	96			91		
30. pl	100			91		
31. skw	96			83		
32. sl	91			78		
33. st	91			91		
34. tr	91			91		
35. hw	83			83		

Appendix B (continued)

Validity

Two major guiding principles were employed to contribute to content validity: logical methods of test construction and a representative collection of items. While each utterance is unique, studying and evaluating each utterance of an individual would be beyond the bounds of economy. Instead we must rely on habits of speech and sample production of any given sound, rather than attempt the impossible task of studying it exhaustively. An in-depth study of a given sound in various sound environments has its place in the speech program (McDonald, 1964), but the time and patience required of both clinician and client limit the utility of such an extensive type of evaluation. The collections of items used in this test to assess speech sound production assure its content validity: the Sounds-in-Words Subtest was designed to sample all but one of the consonants that appear in our spoken language, the Sounds-in-Sentences Subtest taps a smaller sample of phonemes — those most likely to be misarticulated, and the Stimulability Subtest examines sounds known to be misarticulated.

Since the Sounds-in-Words Subtest assesses somewhat different skills from those assessed in the Sounds-in-Sentences Subtest, it is to be expected that a comparison will show less correspondence between the results of these two subtests than would a test-retest comparison using the same subtest. While subjects with severe articulation problems would obviously perform poorly on both subtests, the performances of subjects with moderate articulation defects or subjects in a transitory stage of speech sound development (with or without the aid of therapy) will differ more sharply from one subtest to the other, so less agreement would be expected to occur. While the testing of the 37 children cited in Table 1 (page 16) was primarily to study test-retest reliability, the results of the two subtests were compared for agreement on the presence or absence of error (86 percent agreement); and for agreement on the type of speech sound production (72 percent agreement). Neither of these values exceeds the lowest found for any test-retest value, thus demonstrating that the two subtests are measuring different aspects of articulatory development.

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APPENDIX C

LETTER OF PROPOSAL

Appendix C

Letter of Proposal

10 November 1970

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Reference is made to our telephone conversation of 16 October pertaining to speech articulation disorders among military dependent children.

I am on active duty with the United States Army and have been fortunate in being able to pursue graduate work. My interest in the area of speech articulation disorders stems from my graduate work at an accredited college.

During a recent survey of a local school system which serves the military, I discovered what I believe to be a noteworthy problem affecting military dependent children. I have enclosed a copy of that survey for your information but ask that it not be revealed to your local school system until my entire project is completed.

The survey of the Ayer, Massachusetts, school system indicated a speech articulation disorder incident rate among military dependent children 3.5 times greater than the national average, while the civilian dependent contemporaries at the same school enjoy an incident rate lower than the national average. I indicated some possible causes: separation of the family unit, bicultural marriages, and the child's missing his grandparents. In any event, I think you will agree that a more comprehensive study requires a larger sampling base with respect to students and geographical dispersion of the school systems.

I would like to ask the cooperation of your office and that of your post's supporting school system in assisting me to address this project. Specifically, I need the enclosed form completed and returned to me no later than 15 December. Several copies of the form are provided in the event that your post is served by more than one public elementary school. If the completed form indicates a high incidence of speech articulation disorders (over 5% of the student

Appendix C (continued)

body), I would like to visit your post during May and meet with the school system's speech correctionist. I would like his cooperation in randomly selecting 30 affected children and 30 nonaffected children and administering a standardized speech articulation test (Goldman Fristoe Test of Articulation) to all 60 children. After identifying all 60 children with their fathers, I would then like permission to check the personnel files of all 60 fathers in order to complete reports for data processing. All families will remain anonymous after the data is extracted. After the data is accumulated from all the participating school systems, comparisons between the affected children and their father's grade, unit, and time of separation from the family will be made to determine a correlation.

You will receive a copy of the completed project in August 1971. Most importantly, it will be a beginning to determine if military dependent children do have special learning disabilities caused by army life. If they do, then studies such as this substantiate the necessity for more appropriate federal impact funding.

Thank you for your attention to this matter. I am looking forward to your reply and return of the enclosed form.

Sincerely,

DON E. GORDON
Major, USA

Enc.
as

APPENDIX D

SPECIAL FORM # 1: SPEECH ARTICULATION REPORT

SPECIAL FORM #1: SPEECH ARTICULATION REPORT

For Project: "Speech Articulation Disorders Among Military Dependent School Children"

PLEASE RETURN NO LATER THAN 15 DECEMBER 1970

Name of School: _____

Address: _____

Telephone Number: _____

Person Completing Form: _____

.....

Total number of students enrolled in grades one through six.

Grade 1 _____	Grade 4 _____	
Grade 2 _____	Grade 5 _____	TOTAL:
Grade 3 _____	Grade 6 _____	_____

.....

Total number of military dependent children (federally funded) enrolled in grades one through six. _____

Total number of civilian dependent children (nonmilitary) enrolled in grades one through six. _____

.....

Total number of students selected by the school's speech correctionist (pathologist, therapist, etc.) in his normal screening of the school population that he feels are able to benefit from speech correction. (See * on following page.)

	Military Dependent	Civilian Dependent
Grade 1	_____	_____
Grade 2	_____	_____
Grade 3	_____	_____
Grade 4	_____	_____
Grade 5	_____	_____
Grade 6	_____	_____

Appendix D (continued)

* The terms serious and moderate disorders are open to interpretation. This survey should not include children with a defect so slight that it does not attract the attention of others besides the speech correctionist. Do not include diagnosed mentally retarded children, children with constitutional disorders such as cleft palate, children with voice problems, or children who only stutter.

.....

If there are any questions, please feel free to write or to call me at (617) 796-3540 during 0730-1530 hours EST.

Thank you very much for your attention and cooperation in this matter.

DON E. GORDON
Major, USA

Please return your report by 15 December 1970 to:

Major Don E. Gordon
137 Walnut Street
Fort Devens, Massachusetts
01433

APPENDIX E

LETTER SENT WITH TESTING PACKET

Appendix E

Letter Sent With Testing Packet

(date)

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Dear _____:

I am writing to your office requesting assistance in compiling data relevant to the number of military dependent children attending your school system who were affected with speech articulation disorders. Information provided by your school system and others participating in the project, encompassing 15,000 military children, revealed a speech articulation disorder incident rate higher than that of the civilian children attending the same or adjacent school systems.

An in-depth study at one participating school system strongly suggested among some military dependent children a direct involving relationship between the articulation problem and prolonged geographical separation of the soldier-father.

The final step of this study requires administration of the Goldman-Fristoe Test of Articulation to sixty randomly selected military dependent children in each of the school systems participating in this survey.

I would like to ask your continued cooperation in helping me to complete this project by having your school speech therapist administer the articulation test within your school system. I certainly recognize the sizable effort involved in this task and the many demands placed upon the time of yourself and your staff. Completion of this aspect of the project will, however, culminate two years of independent effort and hopefully provide some insight into the education of the military dependent child.

As noted in previous correspondence, each participating school system will receive a copy of the final study. Every child and parent will be treated anonymously and each school system will

Appendix E (continued)

2

be identified by a coded designator revealed only to the school concerned and the project director.

I have enclosed a complete testing kit, copies of a personal data sheet to be distributed to parents, and an information sheet for the school speech therapist. Return of the material is requested prior to (date).

Thank you very much for your cooperation in this matter.

Sincerely,

Don E. Gordon
Major, USA

Enc.
as

APPENDIX F

PERSONAL DATA SHEET DISTRIBUTED TO PARENTS

Dear Parents:

I would like to ask your cooperation in helping me to complete a study I am undertaking concerning military dependent children. All participants will remain anonymous. After receipt of the information requested below, names will be deleted. If you agree to participate in this study, and I hope you will, please complete the form and return it to your child's school as soon as possible.

Upon my request, the speech therapist of your local school system will be administering the Goldman-Fristoe Test of Articulation to sixty randomly selected military dependent children. Your child's name was selected by lottery from among two groups--one group of children receiving speech correction and one group not receiving speech correction. (Selection of a child from the latter group in no way indicates he has a speech problem.) Ultimately this study will include 15,000 military dependent children attending school throughout the United States with an objective of determining if military duty separation of the soldier-father affects the speech articulation incident rate of his child.

Thank you for your cooperation.

Sincerely,

Don E Gordon

Don E. Gordon
Major, USA

(LAST) (FIRST) FATHER'S NAME	RANK/ GRADE	MOS	AGE

Years of active service _____

Dates of separations by months and years that father was separated from child during child's life. (List only separations of one month or longer.)

mo. yr. - mo. yr.		TOTAL MONTHS OF SEPARATION:

Indicate by * if Vietnam.

Child born number _____ in a family of _____ children.

Child lived in _____ houses during past _____ years of father's service.

APPENDIX G

INSTRUCTION SHEET FOR TEST ADMINISTRATOR

INSTRUCTION SHEET FOR TEST ADMINISTRATOR

Your assistance in administering the Goldman-Fristoe Test of Articulation to sixty randomly selected military dependent children attending your school system has been requested in order to help culminate a two year study of speech articulation disorders among this group of children. Your time and effort in this matter are greatly appreciated.

The following instructions are provided to clarify administrative questions pertaining to the testing procedure. If any questions remain unanswered, please telephone Major Gordon, collect, at (617) 796-4328 prior to May 5, 1971.

Special Instructions

1. Review the Goldman-Fristoe Test of Articulation material and the testing manual accompanying the testing kit.

2. Randomly select 45 military dependent children in grades two through six who have been previously identified through therapist screening as having serious or moderate speech articulation disorders. Select an additional 45 military dependent children in grades two through six who have not been previously identified as having speech articulation disorders. Select all 90 children according to the grade ratio and within the age brackets illustrated below whenever possible. If there is an insufficient number of affected children in grade six, as an example, the therapist should feel free to select other children from the next lowest grade. Omit any children identified as mentally retarded by school records and any children who stutter or who have clinical abnormalities affecting speech such as cleft palate.

Grade	Span of Chronological Age	Number to be Selected
2	6yrs 8mos - 8yrs 8mos	15
3	7yrs 8mos - 9yrs 8mos	13
4	8yrs 8mos - 10yrs 8mos	10
5	9yrs 8mos - 11yrs 8mos	5
6	10yrs 8mos - 12yrs 8mos	2

In school systems having more than one elementary school, it is preferred that children be selected from several schools; however, this is not mandatory. At some military posts children are assigned to schools by virtue of the father's grade or rank due

to the social segregation of military housing areas. In this instance please insure that about eleven per cent of the samplings are officers' military dependent children.

3. After selecting the students proposed to participate, distribute the personal data questionnaires to their parents. The questionnaire is not considered to be an infringement on personal privacy.

4. Upon return of the personal data questionnaires, select 30 students each from the affected group and the non-affected group. (Hopefully 60 of the 90 questionnaires will be returned.) If less than 30 parents in each group respond, still proceed to the next step using only those children whose parents responded.

5. Administer the level 2 (see page 8 of the testing manual) Sounds-in-Words Subtest and both portions of the Sounds-in-Sentences Subtest. Do not administer the Stimulability Subtest. Score the level 2 testing in accordance with instructions illustrated in figure 6, page 13, of the testing manual. Do not be concerned with indicating dentalized or nasalized production or glottal stop which are illustrated as "additional markings" in the manual.

6. Please follow the testing procedure specifically as outlined in the testing manual. All children may be tested on one day or during any combination of days during the period of April to May 1971, but preferably only during the morning hours.

7. Upon completion of the testing procedure, attach the child's score sheet to his father's personal data sheet. You may at your discretion delete or obliterate the names of both father and child before the material is returned. In any event, all names will be obliterated by the project director upon return of the material.

8. Please complete page four of this handout.

9. Place testing kit, scored material, personal data sheets, and the completed page four of this handout back into the shipping carton. Use postage free indicia label and return to project director. It is requested that all material be returned prior to May 31, 1971.

Explanation of Project Procedure

Upon return of the test results from your school and other participating school systems, group scores will be evaluated to determine a mean and standard deviation. The population is defined as MDC-affected and MDC-nonaffected which creates two groups.

An attempt is made to determine the correlation between two variables, the Goldman-Fristoe Test of Articulation score and the percentage of time the soldier-father was geographically separated from the tested child. This variable will be expressed on a continuum based on percentage of time of separation in segments of ten per cent and the test score. The test score will be established by subtracting one point from a maximum score of 100 for each error of articulation recorded by the therapist. The Pearson r permits evaluation of both variables.

Because of the size of N (population), the scattergram method will be used to compute the Pearson r. The frequency distribution will be constructed on the scattergram. The Y-axis will represent raw scores of the Goldman-Fristoe Test of Articulation and the X-axis will represent the percentage of time the soldier-father was separated from the child. After obtaining the value of the Pearson r, the significance of the r will be tested by making a ratio of the deviation to a standard deviation.

Children in the upper two standard deviations with respect to high number of articulation errors recorded on the test will be correlated with fathers in the upper two standard deviations with respect to longest amount of separation. Children in the lower two standard deviations with respect to the number of errors on the test will be correlated with fathers in the lower two standard deviations with respect to the shortest amount of separation. Data obtained from the correlations will be used to present findings relevant to the following null hypothesis:

> There is no difference between the number of speech articulation disorders in military dependent children (MDC) in grades two through six whose fathers are geographically separated from the family unit at least fifty per cent of the child's life and in those military dependent children (MDC) whose fathers are geographically separated from their family unit less than fifty per cent of the child's life.

Upon completion of the project, a copy of the project results will be provided each school system participating in the study. This is not an evaluation of individual school systems; all participating schools will be identified in the study only by a coded designator.

To be completed by speech therapist administering or supervising administration of the Goldman-Fristoe Test of Articulation.

1. NAME _____

2. Test was administered during the period _____ (dates)

3. I am ( ) am not ( ) certified in accordance with the requirements for the Certificate of Clinical Competence in Speech Pathology issued by the American Speech and Hearing Association. (This answer is not construed to reflect upon the competence of the speech therapist.)

4. Undergraduate training completed in speech therapy (pathology, correction, etc.):

   _____
   Course

   _____
   Institution

5. Graduate training completed in speech therapy (pathology, correction, etc.):

   _____
   Course

   _____
   Institution

6. Years of experience in the field of speech therapy _____

7. Years of experience at present school in speech therapy ____

8. Please use space below to indicate any comments:

_____

_____

_____

_____

_____

_____

_____

APPENDIX H

CODING GUIDE

CODING GUIDE

Coding instructions for transfer of information collected in "Survey of Speech Articulation Disorders Among Military Dependent Children" in accordance with Department of Health, Education, and Welfare Grant, Project Number 1-A-036.

Information is to be transferred from Special Form Number 5 to data processing punch cards as indicated.

ITEM	PROCESSING CARD COLUMN	CODES AND DEFINITIONS	LOCATION ON SPECIAL FORM NO. 5	REMARKS
Subject's serial identification	1, 2, 3	Column 1 = hundreds 2 = tens 3 = ones	UPPER RIGHT CORNER	
Subject's grade	4	Line 0 = no info 1 = grade 1 2 = grade 2 3 = grade 3 4 = grade 4 5 = grade 5 6 = grade 6 7 = other 8-9 not used	GRADE LINE	
Subject's sex	5	Line 0 = no info 1 = male 2 = female 3-9 not used	SEX LINE	
Subject's chronological age	6	Line 0 = no info 1 = age 6 2 = age 7 3 = age 8 4 = age 9 5 = age 10	AGE LINE	

		6 = age 11 7 = age 12 8 = age 13 9 = other		
Subject's School Code	7	Line 0 = no info 1 = School 1 2 = School 2 3 = School 3 4 = School 4 5 = School 5 6 = School 6 7 = School 7 8 = School 8 9 = Other	SCHOOL LINE	Each participating school is identified by a code to preclude identification.
Years of military service of subject's father	8	Line 0 = 4 years 1 = 5 years 2 = 6 years 3 = 7 years 4 = 8 years 5 = 9 years 6 =10 years 7 =11 years 8 =12 years 9 =13 years	FATHER LINE SERVICE POSITION	Fathers having less than four years service were not considered in survey.
	9	Line 0 =14 years 1 =15 years 2 =16 years 3 =17 years 4 =18 years 5 =19 years 6 =20 years 7 =20+ years 8-9 not used	"	"

Duration of separation of father from subject measured in months	10	Line 0 = 6 to 8 months 1 = 9 to 11 months 2 = 12 to 14 months 3 = 15 to 17 months 4 = 18 to 20 months 5 = 21 to 23 months 6 = 24 to 26 months 7 = 27 to 29 months 8 = 30 to 32 months 9 = 33 to 35 months	FATHER LINE SEPARATION POSITION	
"	11	Line 0 = 36 to 38 months 1 = 39 to 41 months 2 = 42 to 44 months 3 = 45 to 47 months 4 = 48 to 50 months 5 = 51 to 53 months 6 = 54 to 56 months 7 = 57+ months 8-9 not used	"	
Military grade or rank of subject's father	12	Line 0 = E5 1 = E6 2 = E7 3 = E8 4 = E9 5 = 03 6 = 04 7 = 05 8 = 06 9 = warrant officers	FATHER LINE RANK POSITION	
Military occupational specialty designation of subject's father	13	Line 0 = no info 1 = MOS group 1 2 = MOS group 2 3 = MOS group 3 4 = MOS group 4 5 = MOS group 5 6 = officers 7 = warrant officers 8-9 not used	FATHER LINE MOS POSITION	All Army MOSs divided into five categories combat, intelligence, clerical, skills, and medical.

Age of subject's father	14	Line 0 = 24 to 25 years 1 = 26 to 27 years 2 = 28 to 29 years 3 = 30 to 31 years 4 = 32 to 33 years 5 = 34 to 35 years 6 = 36 to 37 years 7 = 38 to 39 years 8 = 40 to 41 years 9 = 42 to 43 years	FATHER LINE AGE POSITION
"	15	Line 0 = 44 to 45 years 1 = 46 to 47 years 2 = 48 to 49 years 3 = 50 to 51 years 4 = 52 to 53 years 5 = 54 to 55 years 6 = other 7-9 not used	"
Number of siblings in subject's family	16	Line 0 = no info 1 = 1 child 2 = 2 children 3 = 3 children 4 = 4 children 5 = 5 children 6 = 6 children 7 = 7 children 8 = 8 children 9 = 9 children	CHILD LINE POSITION 2
Subject's familial placement	17	Line 0 = no info 1 = first (oldest) 2 = second 3 = third 4 = fourth 5 = fifth 6 = sixth 7 = seventh 8 = eighth 9 = ninth	CHILD LINE POSITION 1

Errors recorded on Goldman-Fristoe Test administered to subject	18	Line 0 = no errors 1 = 1 error 2 = 2 errors 3 = 3 errors 4 = 4 errors 5 = 5 errors 6 = 6 errors 7 = 7 errors 8 = 8 errors 9 = 9 errors or more	G-F LINE
Number of houses in which subject lived during his life	19	Line 0 = 1 to 5 houses 1 = 6 to 7 houses 2 = 8 to 9 houses 3 = 10 to 11 houses 4 = 12 to 13 houses 5 = 14 to 15 houses 6 = 16 to 17 houses 7 = 18 to 19 houses 8 = 20 to 21 houses 9 = over 21 houses	HOUSE LINE
Amount of time subject's father was assigned to duty in Vietnam	20	Line 0 = 1 day to 6 months 1 = 7 to 12 months 2 = 13 to 18 months 3 = 19 to 24 months 4 = 25 to 30 months 5 = 31 to 36 months 6 = 37 to 42 months 7 = 43 to 48 months 8 = over 48 months 9 = no service in RVN	VIETNAM LINE
Subject is or is not affected with speech articulation disorder previously identified by school speech therapist	21	Line 0 = no info 1 = affected 2 = not affected 3-9 not used	AFFECTED/ NONAFFECTED LINE

Number of "true" errors recorded on Goldman-Fristoe Test of Articulation	22	Line 0 = no errors 1 = 1 error 2 = 2 errors 3 = 3 errors 4 = 4 errors 5 = 5 errors 6 = 6 errors 7 = 7 errors 8 = 8 errors 9 = 9 or more errors	Number of individual errors on Goldman-Fristoe Test of Articulation without regard to repetition
Chronological point child was separated from father	23 (age 1) 24 (age 2) 25 (age 3) 26 (age 4) 27 (age 5) 28 (age 6) 29 (age 7) 30 (age 8) 31 (age 9) 32 (age 10) 33 (age 11) 34 (age 12)	Line 0 = father in Vietnam 1 = father not in combat but separated 2-9 not used	LOWER RIGHT MARGIN RED=VIETNAM BLACK=OTHER
Is child adopted or a stepchild	35	Line 0 = yes 1-9 not used	CENTER LOWER MARGIN
Frequency of separation of father from child	36	Line 0 = never 1 = 1 separation 2 = 2 separations 3 = 3 separations 4 = 4 separations 5 = 5 separations 6 = 6 separations 7 = 7 separations 8 = 8 separations 9 = 9 or more separations	LOWER LEFT MARGIN

230

If column 19 indicates 1-5 houses, this column indicates whether 1,2,3,4, or 5 houses

37

Line 0 = no info
1 = 1 house
2 = 2 houses
3 = 3 houses
4 = 4 houses
5 = 5 houses
6-9 not used

HOUSE LINE

7

LAST ITEM