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ABSTRACT

The data and findings of a four-year study designed to organize a battery of psychological tests for assessing the vocational adjustment of adult deaf and to establish the validity of the individual tests, as well as provide some information regarding their most economic and productive potential use, are presented. The study population was all possible adult deaf in the State of Oregon. The criteria for selection were: between 24 and 54 years old, with a pure tone hearing loss of at least 50 decibels in their unaided superior ear, and employable for three years prior to being contacted for inclusion in the study. A total of 483 adult deaf participated in the study. The tests used were the General Aptitude Test Battery, Bender Visual Motor Gestalt Test, Hearing Loss, Weingarten Picture Inventory, Closure Flexibility (Gottschaldt) Test, Gates Reading Survey, Craig Lipreading Inventory, Oregon Manual Communication Test, Berger Block Test, and Holdt Speech Characteristics Test. Norms for employable deaf adults for the tests used are provided. A minimum test battery is supplied. Results of the study show that the adult deaf participate cooperatively in research programs, are less competitive than the hearing population, show wide individual differences, differences among the employable deaf in personal history and test behavior are related to differences in work adjustment, and vocational adjustment is facilitated by identifying practical occupational objectives. Fifty tables provide the study data, and 39 plots are given of profiles of subject and test score variables. The report concludes with 14 appendixes and 154 references. (DB)

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OREGON VOCATIONAL RESEARCH PROJECT

EFFECTIVE VOCATIONAL GUIDANCE OF THE ADULT DEAF

Project No. RD-2018-S

NOVEMBER 1972

FINAL REPORT

EFFECTIVE VOCATIONAL GUIDANCE OF THE ADULT DEAF

The Oregon Vocational Research Project

June 1, 1966 - August 31, 1970

- Edited By -

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Foreword

This is a statistically oriented study. It was designed and then conducted by collecting large amounts of data from a sizable sample of deaf persons, who were meticulously screened through a set of well defined standards before being enrolled in the study. In this sense the study report follows the study approach in moving through a sequence from identifying study subjects, selecting, and in part, inventing a battery of data-collection devices, applying the devices to the subjects, analyzing the data, drawing inferences from the analyzed data, and evolving study conclusions.

Because the practicing counselor working with the adult deaf may not be completely familiar with the general requirements of sampling theory or with the statistical procedures used in the data analysis program, this study report includes substantive information about these procedures as they are employed in the text. The counselor may then decide how much consideration he wants to give to the sample-selection and data-treatment techniques in understanding the results and conclusions. The point, of course, is that while the findings are presented in terms of a sample of deaf persons and their behaviors and personal attributes, there is ample documentation available about the processes by which the findings were developed from the study. Hopefully, then, the norms, indices and recommendations provided in this study for use in the counseling relationship with deaf adults will be understood as emerging from a study planned to conform with conventional scientific practice for developing such information for professional use. The counselor may ultimately then decide how much faith to place in the findings either with regard to his global commitment to the general problem area of working with the deaf, or with regard to the individual deaf client with whom he expects to be working.

The report is organized beginning with the familiar descriptive data on the deaf adult found in many studies. It then provides some straightforward test norms and simple validity measure and ultimately turns to more complex multivariate statistical findings. It is hoped that this order of things will encourage the counselor to become increasingly comfortable with our reliance on data analysis as a prerequisite to study conclusions. It would also be our hope that in this sequence of presentation, moving slowly from the familiar to the more complex, the counselor will come to recognize that the data, and their accompanying inferences, tend to develop greater specificity, and to focus more and more precisely on more limited clusters of deaf adults - in a word - providing data as we go along, which should facilitate ever greater individualization in the counseling process. Thus, the precision and utility which various forms of study data ultimately demonstrate will, in our view, be determined by the counselor's willingness to work through the study and apply the findings with discrimination as his individual client responsibilities vary.

This brings us to a prevailing criticism of statistically based studies; i.e., that they drain the meaning and richness from people and events so that the therapist or counselor interested in employing the output from such studies stands in danger of becoming machine-like in his personal-service-response to the client. We trust that we have not in any way produced data which will straight-jacket the performance of even the most imaginative counselor. Instead, we perceive our work as making more clear the vast realm of options open to the vocational counselor working with the deaf. We believe further, that we have attached relevant cues to those options, which should help the counselor exercise more productive judgments in his decisions with and for his client. We would, in fact, contend that these data should expand in many instances the range of options open for the counselor's consideration.

While the effort in producing any study product is principally the responsibility of the project director, it goes without saying that the untiring and passionate effort of Ted Holdt in giving direction to the day to day operation of the project, as well as the regular guidance and creative influence of Rolfe LaForge have contributed beyond the call of duty to the project effort. Their devotion and investment is inscribed in each idea, in each inference which characterize this work. Special recognition needs to be given to George Johnston and Don Sheridan who served ardently and faithfully as project examiners contacting, testing, and comforting clients and performing miracles in comforting the staff with their optimism and irrepressible purposefulness. Appreciation is extended also to Glen Hitchcock, Research Analyst, Mental Health Division, and to Paul Kerr, Supervisor of Occupational Analysis & Testing, Employment Division, for their many hours of selfless data treatment and companionship, and to Marvin Clatterbuck, Director, School for the Deaf, for his hospitality in housing our project office and his frequent counsel in working with the deaf community.

We have also been blessed with a bevy of efficiently productive and insightful secretaries whose contributions have been too numerous and too critically important to this work to recognize in detail. Among those we want to give special thanks to include Nadine Glienke, Oregon Vocational Research Project; Juanita Olson, Oregon Vocational Rehabilitation Division; and Loretta Smith, Albert Einstein Medical Center, Philadelphia.

There is also a wish to extend our gratitude to Dr. Gaylord Thorne, Associate Research Professor, Oregon College of Education, for his inspiring support of this project through a number of administrative changes in the State of Oregon's support program, and to Norm Silver, Administrator, Oregon Vocational Rehabilitation Division, for permitting the use of Division facilities for preparation of the project's final report. We want to give particular thanks to Carl Haugerud, Deputy Administrator, Oregon Vocational Rehabilitation Division, for his unstinting interest, work and friendship from the early to the final moments on this project.

And finally, recognition is due to the directorship and staff of the many agencies which shared a common interest as well as their offices and their non-confidential file information with us, and, above all, to the many deaf and partially deaf who participated in our screening operation and who patiently and lovingly became invested with us in this work.

Los Angeles, California
November 1972

David G. Berger, Ph.D.

PREFACE

The Oregon State Board of Control, the agency which was responsible for administration of the Oregon State School for the Deaf, initiated in 1962 a new service to assist in the employment placement of graduates of the Oregon School for the Deaf. Such employment placement services had never before existed.

As a result of this effort, other State agencies such as the Employment and Vocational Rehabilitation Departments began to review the needs of the adult deaf and to develop appropriate vocational placement and training services.

These efforts involved education of employers to recognize the potential of deaf persons as well as direct placement of the deaf into the employment market. It was found that many employers held primitive notions concerning the disability of deafness and the work capability of deaf persons.

After a period of years, Oregon employers began to gain a better understanding of deafness and, as a result, they were willing to provide wider employment opportunities. As more jobs became available, counselors and employment specialists were given the responsibility of matching deaf individuals to positions requiring specific skills. However, this effort was hampered due to the lack of effective guidance instruments specifically designed for the deaf.

In 1965, a statewide conference was attended by interested agencies and employers to discuss problems associated with employment of the deaf. From this conference grew support for a project to develop improved means to assess the vocational placement and adjustment of the deaf. A grant application was ultimately approved by the Social Rehabilitation Services, U. S. Department of Health, Education and Welfare, supporting this project for a three-year period, extending from 1966 through 1969.

The results of this project have been judged as extremely successful. This can be directly attributed to the interest and cooperation of hundreds of deaf persons in both Oregon and Washington as well as to the dedicated researchers and staff who conducted the study.

It is sincerely hoped that the data and findings contained in the report will be useful and beneficial to persons and agencies involved in the vocational placement of the deaf and that researchers and practitioners will be encouraged to initiate further research to insure best possible programming of services for the deaf.

Carl A. Haugerud, Administrator, Special Schools Division
and Project Financial Officer

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CHAPTER 1

THE PROBLEM

A. Current Employment Status

There has been widespread unrest and criticism during the last decade for society's continuing failure to provide equal social and vocational opportunity for all elements of the population. Clearly, the rhetoric of promise is wearing thin; and the ultimate response to the call to equal opportunity remains essentially in doubt for many groups, including those characterized by youth or advancing age, by black skin pigmentation, by Oriental and Indian lineage, by shortcomings in intelligence or by visible physical deficiencies. Students of the social scene caution that to neglect people and deprive them of their dignity is to forfeit their trust and sap their vitality (61, 63). In the same vein, it is warned that to deny people adequate opportunity to develop their role as productive community members is to foster tedium and a bondage to indenture. Some groups have reacted to such deprivation, with boisterous and militant demands for redress. Others groups have clearly chosen to abandon their strivings, and to seek the sanctity of pauperage. Still others, such as the deaf, suffer their deprivation stoically, retreat into the solace of mutual isolation on the periphery of the community, and maintain hope of a better day to come.

The deaf adult as a member of one such allegedly deprived minority group finds his sensory deficit an ever-present barrier to equal social, educational and occupational participation in community affairs. Under these conditions his general feelings of competence and well-being may become impaired to the point where his prospect of effective social and vocational performance will be distorted or denied, and where his socioeconomic and psychosocial roles are deeply influenced. For those deaf who manage to find social relations in the hearing world, the quality of those relations are generally superficial, if not debasing. For those who find work, the evidence suggests underemployment with poor pay (76, 121) and, in too many instances, uninspiring, if not stultifying work situations. Thus, opportunity for personal advancement for too many employable deaf is next to unattainable, while freedom to develop skill, initiative and talent is severely limited not only in direct social and vocational pursuits, but also in the realm of adult education.

Accordingly, while the present report is focused on personal factors relating to employment of adult deaf persons, it should in no way be taken to suggest that the investigators are insensitive to the social problems deaf adults experience in competing for work, or for economic advancement, or for social recognition in the hearing community. On the contrary, the investigators would argue that it needs to be understood that prolonged, avertible deprivation of equal work opportunity in any constituted group of persons rarely persists beyond temporary periods of economic or industrial reorganization, unless the employment problem has its roots deeply entwined in the very educational and social fabric of the community. We believe, then, that the social distance and alienation which exist between the deaf and hearing publics, if left unchecked, will likely expand and further accentuate the gulf between the deaf person's desire and his opportunity for social, educational and vocational involvement. John A. Sessions (123) has predicted that unless vocational counselors develop an understanding of employment trends, and their implications for deaf clients, that approximately seventy percent of deaf persons would be unemployed by 1976, while the remaining thirty percent would be frozen in various unskilled and menial jobs.

B. The Need for Information

Information is the master key to decision making. The choices which confront us in our everyday lives, which market to shop in, which recording of a symphony to purchase, which University to apply to, or which horse to bet on, are ultimately resolved by one or another type of information. Sometimes the information is highly intuitive, and will, over a long series of experiences, likely result in irregular or disappointing returns. However, when information is sufficiently robust in amount, and premised on systematic and objective observation, so that it becomes trustworthy to the touch over time, it will generally prove useful in helping to pinpoint more productive decisions.

In the case of deaf persons, the amount of information available to them and about them, is increasing steadily. Educational and vocational training programs for deaf students have been initiated recently in Community Colleges in New Orleans, St. Paul, and Seattle. In 1968, the first class was enrolled in the National Technical Institute for the Deaf in Rochester, New York. Beyond these newly developed educational training experiences for deaf persons, there are a variety of specialized instructional programs springing up on campuses across the country in which future workers with the deaf are being prepared to understand both the vocational and social disaffections in the deaf community. The time has come now to begin to think about the manner in which the information being accumulated can best be deployed. If we truly expect to move deaf persons closer to the center ring of American life, we need to work imaginatively to develop this store of information into a verifiable body of knowledge about the struggle of the deaf for personal expression and interdependence with the hearing community. Such information should be used to guide planning, and to instill confidence in both the deaf and the hearing communities, so that progress in integrating minority groups, such as the deaf, can be made within reasonable time and cost limitations, and so that the product of such integration is advantageous to all.

This project is dedicated to this end.

In general, this project is designed to enhance the level and quality of information about those behavioral strengths, deficiencies, and peculiarities of the deaf which may have relevance for their work performance. It is also designed to evolve and perfect more adequate vocational guidance instruments and techniques in the service of more creative and beneficial training opportunities and job placement for the deaf.

The task of fashioning useful vocational appraisal instruments is a complex one. Myklebust (92) has suggested that, "an individual's vocational life is an integral part of his total abilities, interests, motivations, and personal adjustment." To be able to comprehend even a fraction of these dimensions, and to guess at the way in which they converge and couple within each individual, is to pose a task of prime magnitude for any practitioner or scholar. What is clear, is that we need to know a great deal more about the precise nature of any given hearing handicap--how it affects people in broad perspective, how it manifests itself in extreme or atypical cases, how it influences its host over time from early childhood, through adolescence, and early and full maturity, and how it responds to variations in personal experience. In a word, we need to find ways to assess and understand deafness as a physical, social, and psychological condition varying in its consequences for different individuals, and for a given individual over time.

Three principal approaches to constructing legitimate vocational tests for use with the deaf have been followed (52). One is to harness instruments standardized on hearing persons. Such an instrument might be useful if the purpose of testing were to learn how the deaf perform on tasks designed for assessing hearing persons. That is, tests which are standardized on hearing populations could be employed to identify congruencies, as well as specific deficits or increments in test behavior of deaf persons; to determine the variability among the deaf with respect to these tests; to learn how deficits in deaf persons' performance or behavior respond to retraining experiences, and to ascertain how age, sex, type of schooling, language training, and age of onset relate to test performance and disabilities. Placing the deaf person in a test condition in which he is asked to handle test materials designed for hearing persons, is by all odds likely to hamper his test performance. This approach to test construction will, therefore, generally yield a measure of achievement--portraying the deafs' on-the-spot capacity to handle tasks organized and defined for hearing persons. For the purpose of appreciating the various behavioral handicaps of the deaf, this approach is clearly not only useful but, indeed, essential.

A second approach would be to standardize or modify for use with the deaf, test instruments originally designed for hearing populations. That is, norms could be established for deaf persons on tests developed for hearing persons. In most instances, this also requires changes in test directions, as well as modifications in test materials and response channels. It is then possible to contrast the performance of deaf persons on the original form of the test, with deaf individuals' performance on the so-called revised-for-the-deaf format of the test, to determine whether the modified form permits a more comprehensive picture of deaf potential. Norms for the deaf on the modified test can then also be produced. Care must be exercised, however, in interpreting the relative performance of the deaf on the modified test as against hearing persons on the original test. That is, these two sets of norms should not be used interchangeably in competitive recruitment or selection for educational, training, or vocational programs.

The third approach to testing deaf persons is to tailor prototypic test instruments specifically for the deaf. The challenge here is to build instruments specific to the task of assessing the behavior potentials of the deaf. Instruments constructed for this purpose should be designed to place in focus the influences of the hearing handicap, while controlling or avoiding the intrusion of those influences on the totality of the test performance of the deaf. This is not to suggest that the influence of the handicap is denied objective appraisal. It is to suggest, rather, that the handicap should be revealed in its true character, but that it should be held in relative perspective, so that it does not saturate the total test situation. Furthermore, the deaf person should have full opportunity to comprehend the task, and to respond in a medium or manner consistent both with the specific demands of the task, and insofar as possible, within the repertory of response patterns with which he is most facile. This approach should give better opportunity for the expression of potential behaviors--the full scope of the deaf individual's released and generally dormant capacities.

The experience of professional workers with the deaf is patently consistent in pointing to language as the major nemesis in the accurate appraisal of behavior potentials in the deaf. Given this orientation, the evidence has accumulated to pinpoint those special intellectual processes which involve abstraction and reasoning as the primary areas of thinking and expression in which deaf individuals tend to falter (61, 96, 114, 135).

In this sense, then, we would expect that unless tests are constructed with substantial interest in the communication problems of the deaf, and with regard for the element of language as it occurs in the processes of reasoning and abstraction, that test results would be apt to reflect a much wider range of deviance of disability among deaf persons than might be justified. There is, indeed, evidence (65) that, when language is controlled, deaf children perform as ably as hearing children with abstract tasks, and in the ability to generalize to verbal labels. It has also been demonstrated that the verbal capacity, and the verbal associative capacity of deaf adolescents and adults were essentially undistinguishable from those of normals, when developmental achievement was held constant. Corresponding concerns have been expressed in applied vocational work with the deaf. For example, doubts have been raised by Williams and Vernon (152) and Myklebust (92) about the "demonstrated" inferiority of the deaf on tests of manual dexterity. Williams and Vernon have also admonished counselors of the deaf about the less than discrete use of interest tests with their usual heavy loading in verbal content. Levine (80) has summarized the situation succinctly in her comment, "Not to know the language problem of the deaf is not to know the deaf." We would suggest that not to employ experience judiciously in building, administering and interpreting vocational tests for the deaf, is not to employ the deaf.

C. Other Psychometric Studies of the Deaf

Psychometric evaluation of the deaf has had a long and productive history. We will refer only briefly to those features of this history which are relevant antecedents to the data to be presented herein. For the reader seeking more complete compilation, the work of Edna Levine (81) and Helmer Myklebust (92) are recommended.

Pintner is generally credited with moving the academic problems and their corollary test results on deaf children into the table of contents of educational handbooks. Working from his early studies in 1916 and 1917 (106, 108) to 1928, when he, Day and Fusfeld (109) performed a survey of the children in the American School for the Deaf, an impression of the deaf child gradually emerged in which the child was generally regarded as two or three years retarded on intelligence examinations, and perhaps three and one-half years academically delayed. Present evidence is not consistent with one of these notions. Myklebust (92) points out, that when individual performance tests are used, the deaf earn average IQ scores essentially competitive with the hearing population. Davis and Silverman (28) assert, however, that the scholastic deficits posited by Pintner cannot be denied. Nonetheless, they believe this situation is not unexpected in light of the very profound handicap which deafness imposes. They suggest further that the deaf child simply learns at a slower rate than the hearing child, with the sluggish progress in the intermediate grades creating the greatest slack in the learning curve.

From this preliminary program of research to the present scene, a vast body of literature has, in fact, become available. For example, with respect to measuring intelligence in the deaf, work has been reported with the Binet-Simon test (107), the Drever-Collins Performance Scale (30), the Goodenough Draw-a-Man Test (9, 103, 125), the Grace Arthur Performance Scale (15), the Arthur Point Scale (9), Raven's Progressive Matrices (95), the Chicago Non-Verbal Examination (78, 92), the Primary Mental Abilities Test (137), and various forms of the Wechsler Scales (28, 80, 92). In addition, work is reported with the problem of measuring social maturity in the deaf (13,15,140), with mechanical ability (127), with vocational interest patterns (48, 92), with achievement test performance (32,78), with personality testing (2,48,80,86), and with aptitude tests (11,76).

To set the stage for the work of this present study, we will refer to a limited selection of the more pertinent findings. The

Primary Mental Abilities Test based on Thurstone's (137) factor theory of intellectual measurement was employed by Treacy (140) in the examination of deaf children. The total (average) intelligence quotient found was 94.70, which is within the normal range, but suggests that many individuals were below that range. The five factor scores for the deaf youngsters studied ranged from an average of 80.19 on verbal meaning, to 94.84 on reasoning, 98.38 on number ability, 104.22 on perceptual speed, and 106.86 on space perception. Clearly, the deaf child was least adequate in his handling of verbal material, and generally performed creditably, in comparison with hearing children, on the remaining factor elements of the test. Myklebust (92) reports a study in which he used the Chicago Non-Verbal Examination with 86 deaf children. Bearing in mind that this instrument was standardized on both deaf and hearing children, the results for these 86 deaf children yielded an average IQ of 102.0. Myklebust has also reported work on the Wechsler Bellevue Scale with 85 deaf adolescents ranging from twelve to fifteen years old. Interestingly, the average verbal IQ score reported was 66.5 in contrast to the average performance IQ score of 101.8. The brutal bridle of faulty language function which hangs over the head of the deaf could be no more clearly depicted.

With regard to academic achievement testing in the deaf, Babbidge (4) reports that of almost one thousand students who left residential schools in the 1963-64 school year, no age-class earned as high a median as seventh grade achievement. Poorest scores were found in the traditional deficit areas for deaf students in paragraph meaning, wood meaning, and in arithmetic reasoning or problem solving.

While most authorities proclaim against the use of interest tests, Myklebust (92) documents a study with the Kuder Preference Record on which 61 deaf college students were evaluated. The results of this study reveal essential stability in interest patterns in both sexes from the Freshman to Senior years in college. In further analysis of this data, interest patterns, when combined across the four college years, and examined by each sex independently, prove quite fascinating. Males responded most positively to literary, clerical, social service, computational, and artistic interests. Females revealed a strong disposition for computational, scientific, mechanical, literary, and social service interests. The author calls attention, then, to the apparent reversal in normal interest patterns of the two sexes among the deaf, and alludes to the possible nexus between psychosocial adjustment and interest patterns as an important test finding. He speculates, "apparently deafness from early life makes it more difficult to identify with the typical socio-cultural role for each sex" (92). While there doubtless is virtue in such speculation, it would appear important also to consider these data for their direct implications for the vocational adjustment of the deaf. What complications in placement, in job satisfaction, in job performance, and job tenure are suggested by such findings?

This review of the use of psychometric instruments with deaf individuals should surely make reference to contemporary interest in aptitude testing, and particularly to the interest of counselors of the deaf in the General Aptitude Test Battery (GATB). This test is used widely across the country solely through the auspices of State Employment Offices. The Battery yields nine aptitude scores which can be easily transposed into percentile scores based on a very substantial hearing sample (43). The preliminary work with the GATB on groups of deaf subjects is slowly being organized and disseminated. Boatner (11) reports the results of the Battery with 44 members from a larger sample of 177 deaf. George Lavos (79), in a personal communication, has shared with us his findings, based on 164 deaf students. Kronenberg and Blake (76) have in turn reported findings for 190 deaf persons. The results of these studies are summarized in Table 1. Perhaps the most striking aspect of these findings with the GATB is the marked fluctuation in the percentile scores across test factors. These scores represent the deaf as persistently inferior on certain aptitudes--the general (12th-18th percentile), verbal (9th percentile), and numerical scores (15th-23rd percentile)-- and, in the main, as performing much like normal hearing examinees on the balance of the tests. It is important to remember in this connection that we are appraising here the performance of deaf examinees on test norms established for hearing subjects. We shall return to this data and expand on these findings in Chapter 4.

These remarks in terse review of the work published in connection with psychological testing of the deaf help us begin to formulate an overview of our problem. It seems evident that the deaf, indeed, react differently to tests, which is as expected, and is, in a sense, a measure of the validity of the tests. It should also be recognized that such differential tests responses might be at the same time both facilitating and disruptive to the careful student who is trying to comprehend behavior of the deaf. Thus, the distinctive and unexpected elements of the test behavior of the

TABLE 1

Average and Percentile Scores from Three Studies of the GATB In Application to Deaf Persons

Test Factor	Boatner N=44		Lavos N=177		Kronenberg & Blake N=190	
	Score	%ile	Score	%ile	Score	%ile
G (General)	81	18	81	18	76	12
V (Verbal)	73	9	74	9	73	9
N (Numerical)	83	20	85	23	78	15
S (Spatial)	101	52	105	60	96	41
P (Form Perception)	110	69	112	75	102	53
Q (Clerical Perception)	95	40	104	58	95	40
K (Motor Coordination)	97	44	106	62	102	53
F (Finger Dexterity)	106	62	110	69	85	22
M (Manual Dexterity)	112	73	104	58	101	52

deaf need to be methodically cataloged for the understanding they may give us of the mentality and personality of the deaf; but they must also be, somehow, brought under check or control so that their latent power to distort the total impression we derive from the deaf individual's test performance can be deflected or dampened. If we are to exert such control, our testing program should be planned to tap, with maximum fidelity, the behavioral peculiarities of the deaf, and to also employ a sensitive filter so that limitations in one area of test performance (i.e., language limitations) do not readily spill over and pollute the process of inquiry into other areas. The test program and materials for the psychological testing of the deaf--the methodology to be observed--must, therefore, be organized to supply each deaf subject the best possible opportunity to understand why he is being tested; the benefits which might yield from his full and active participation, the properties of the test material; how he is expected to interact with the material; what constraints exist on this interaction (time, space, response channel); and how his response is to be treated.

Another point, which our review of the literature suggests, is that psychological testing for the deaf should, perhaps even more than for hearing persons, be broad gauge. Williams and Vernon have, in fact, suggested that in working with a deaf client, "a psychological evaluation should consist of measures, in part or entirely, of the following kinds of information: (1) intelligence; (2) personality; (3) educational achievement; (4) communication skills; (5) aptitudes; and (6) interests." (151).

Employing a broad range of testing materials generally implies an extended commitment of time. Thus, as we expand the time demands on the deaf, we will want to reduce the stress of these demands by assuring a test setting which sustains a constant and adequate level of heat and light, controls against interruptions resulting from normal office traffic and phone messages, well-spaced rest periods to drain fatigue and anxiety, a sequence of test materials ordered so as to facilitate the interest and ease of the examinee, and an examiner who knows his test material thoroughly, is proficient and versatile in communicating with the deaf, and who uses his material and communication skills in the service of achieving a relaxed and productive interaction with his clients.

D. Difficulty in Working with the Deaf

A research program designed to work with large numbers of adult deaf clients must countenance a large number of problems which the deaf learn to live with daily. In addition, there are ubiquitous problems which any major research undertaking might face in conducting studies involving people who work, sleep, recreate, loaf, eat, and then are asked by strangers to cooperate in a study which, might seem not only remotely disagreeable, but perhaps, perfectly senseless.

We shall have more to say later about the methods that were used in identifying candidates for study, and the complementary methods developed for eliciting cooperation of candidates. Suffice to indicate at this point that the deaf are not among the most hospitable people to unattached outsiders asking for help with unconventional tasks. In a sense, unless hearing persons possess certain credentials, the deaf will appear to be solitary and reclusive. What are some of these credentials? One is kinship. Another is long-term investment in, or affiliation with the affairs of agencies serving the deaf. Generally, some token evidence of such affiliation is also required, such as the ability to communicate manually. Just being friendly will not generally do it.

The staff for this project was selected with great care. They were persons who had long term association with the deaf. Also, all possible effort was made to recruit persons who were not only knowledgeable about the deaf community, but who were at home with the multiple communication systems of the deaf, who had the capacity for interpersonal objectivity and compassion, and above all who had reputations for purposeful diligence. Yet, it was noted in the course of this study that deaf persons quite often initially expressed a reluctance to participate in the testing program. The underlying reasons for this reluctance were found to be many and diverse. The most prominent resistance to cooperation stemmed from lack of understanding of the purposes and objectives of the study. Many indicated apprehension or suspicion that an attempt was being made to victimize them in some manner. All too often these suspicions were rooted in previous experiences they may have had with salesmen or other persons, who had taken advantage of their inability to understand purchase agreements and the like. In some instances, it was possible to allay such suspicions with the explanation that the study was being conducted under the joint sponsorship of Federal and State agency support. Business cards and official letterheads were also helpful material evidence of the project's credibility. Great care was given to explaining the purpose of the study in terminology which the deaf client could comprehend. Further, precautions were taken to avoid the use of words or signs that the subject might find objectionable or offensive. For example, since the sign for "research" is very similar to the sign for "nosy", the word "research" was fingerspelled and explained in order to dispel any idea the subject might have that the project representatives were being unduly inquisitive about their personal affairs. Some subjects expressed concern that the personal information obtained and the test results might be revealed to other deaf persons. Some subjects also expressed the fear that the test results would be revealed to their employers, and that their job situations might thereby be adversely affected. Others were concerned that revealing certain information would affect their credit rating.

At an early stage of each initial interview, explanation was made of the federal law relating to confidentiality of all information in regard to participants. In this way, the subject was assured that, when he agreed to participate in the project, he would be designated in our files by a number rather than by name, and that he would, therefore, lose personal identity in our records. On frequent occasions a deaf person seeking employment gained the impression that the testing program was for the purpose of assisting him to find a job, or perhaps to find a better job. Another frequent statement was that the subject had been taking tests all his life and had never received any benefit or help. The query "Why should I do this to help other deaf people that I don't even know?" was not uncommon. Occasionally, a subject declined to participate because of purported objections of wife, husband, relative, or friend. Miscellaneous objections were also expressed; for example, that they did not have the time, that tests made them nervous, that they were not able to read well, etc.

In some instances, several interviews were necessary to secure cooperation. In this connection, the vital importance of high level of manual communication competency, and an <u>understanding</u> of the psychological implications of the condition of deafness, are strongly emphasized. Sincerity and friendliness during the initial interview, and the testing sessions, were invaluable in the effort to generate motivation, and to establish rapport and confidence.

Much of the testing had to be scheduled in the evening or on weekends. A number of props were found effective in promoting participation. For example, an appointment card was issued when the appointment was made. As a rule, appointments were scheduled about two weeks in advance. This card listed the project staff representative's name, and the date, time and place of the appointment. It also provided the project phone number in the event that the appointment could not be kept. Reminder or alerting letters were dispatched about a week before appointments to further prompt the deaf person of his pending appointment. A call to the person's home a day in advance of the appointment was also found useful in increasing the probability of an appointment being honored. In some few instances, the interviewer went to the deaf person's home, and found him there, apparently having forgotten the appointment. Invariably this worked out well with the subject joining the interviewer and returning to the testing office. On occasion, after a deaf person failed to keep the scheduled appointment, the interviewer followed through and visited with him some days later. When mention of the missed appointment was made, the interviewer generally inquired why the client had not contacted him to cancel the appointment. Frequently the response was that there was no purpose in notifying the interviewer inasmuch as the failure to appear was, in and of itself, sufficient announcement. We also found our program under first-hand examination from time to time by a deaf husband or wife whose spouse was also deaf. Only after this front-runner came through the test experience unscathed, would the other partner agree to be seen. At times, a request for participation in the testing program came after a friend had been enrolled and examined. It was not unusual in such instances to receive an urgent communication from a deaf person asking, if not demanding, that an appointment for testing be made without delay.

Another problem encountered with the deaf persons contacted in this study was their belief that the job marketplace was, in a sense, an arena of preordained and fixed positions. They were often single-minded in their conviction that the positions open to the deaf were extremely limited, so that any effort to study their test behavior, and its implications for positions in the working community was not only foolish, but time thrown away. Any effort to alter this perception of the working world as a place in which skills, interests, and experience were negotiable ingredients in contending for desirable positions was denied or severely resisted. Tyler has addressed this point in connection with general tactics in the counseling process. She argues that "experience has taught us that a person is likely to be as ignorant of his own assets as he is of job characteristics" (144). It would appear, then, that the counselor working with the deaf will need to be sensitive to this faulty perspective of the vocational world, as well as the deaf individual's limited vision of his role in that world.

E. Focus of Current Project

This study is designed to meet a long standing need--to organize a battery of psychological tests, which, on face value, seem to have utility for assessing the vocational adjustment of adult deaf, and to then establish the validity of the individual tests as well as some information regarding their most economic and productive potential use.

What are the requirements of a study designed to fulfill this need? First, it was important to define terms like deafness, work, onset, adult, employability, etc. It was also important to identify a large population of deaf persons in Oregon, and to establish a register in which the various attributes of the population are tabulated and catalogued. Such a register would have many implications beyond this project. For example, it could serve as a reference for other studies in which the characteristics of small samples of one hundred or fewer deaf cases could be compared with the Oregon Register. Another possible application would be to study existing service utilization patterns of deaf persons in public and private agencies. And clearly, it would be worthwhile to conduct a census of the deaf periodically to determine how stable the population of deaf persons in Oregon may be with regard to socio-demographic variables over time. A third requirement of the study was that the tests cover a broad spectrum of tasks and a range of material. It also was important to pay particular attention to the introductory and direction components of each test to assure their clarity for deaf subjects. And, perhaps as vital as anything, was the requirement that the tests be administered by trained examiners, scored by responsible persons, and the data treated by competent analysts.

The work for this project was undertaken in 1966 by a team made up of a social scientist, an audiologist, a rehabilitation specialist, two teachers of the deaf who served as interviewers and test examiners, and two secretaries. From time to time, additional part-time staff has been employed in secretarial, data processing, subject contact, and data analysis work. Three consultants were also recruited and used extensively. The project was housed in the Oregon State School for the Deaf in Salem, Oregon. The population to be studied was the entire population of adult deaf in the State. The time perspective for completing the work was three years.

CHAPTER 2

THE METHOD OF STUDY

A. The Sample

As already indicated, this study was designed to identify and recruit for the testing program all possible adult deaf in the State of Oregon. Individuals recruited were qualified for inclusion in the study by passing through a two-stage screening process. The first screening operation involved completing the basic personal data form, which was generally distributed through the mails to each candidate before he was seen for the introductory interview and first testing session. The second stage was transacted during the initial fact-to-face interview.

Persons enrolled in the study were characterized by the following attributes: (1) they were between 24 and 54 years old; (2) they had a pure tone hearing loss of at least fifty decibels in their unaided superior ear; and (3) they were to be employable for a period of three years before being contacted for inclusion in the study.

Age was important in screening because the study was intended to concentrate on persons who were available for work over a previous time interval of three years. In the case of the lower age limit of 24 years, this meant that the candidate was expected to be available as far back as his 21st year--a very reasonable probability. This probability would, of course, have been reduced if we had accepted younger persons (less than 24) into the study. As for the upper age limit, the boundary was set at 54 years to exclude persons for whom the risk of multiple physical deterrents to employment might be heightened.

Setting a definition for deafness is not an easy task. For the purpose of this project, all candidates actively under consideration were evaluated using pure tone audiometry. The equipment used for this work was a Beltone portable audiometer (Model 110, 3 - See Appendix 1). The examination did not incorporate a bone conduction test. Because the audiometer was transported regularly to various areas of the State, a Rudmose Electro-Acoustic Ear (Model RA 106A - See Appendix 2) was used to maintain the reliability of the Beltone instrument. Persons tested with hearing losses of fifty decibels or greater in their superior ear were qualified for inclusion in the study. For these persons the actual db loss for both ears was recorded.

The issue of defining employability of study candidates was the most knotty definitional aspect of the screening procedure. Inasmuch as the culture imposes somewhat different pressures on the two sexes with respect to employment, it was decided to use distinct definitions of employability for men in contrast to women. An adult male between 24 and 54 years old who, by available evidence, was physically and mentally capable of obtaining and continuing in gainful employment over the three-year period before his screening evaluation was designated as employable. For adult females between the same age limits, the definitional requirements were somewhat more elaborate. To begin with, the standards regarding professed health--physical and mental--were followed much as with male candidates. In addition, it was deemed important that a woman's social and family responsibilities supported and justified a realistic need or expectation for gainful employment. Such condition was to be expressed in at least one concrete effort to secure gainful employment during the last three months before her consideration for inclusion in the study. Thus, if a woman were looking after a household and assuming the very legitimate role of homemaker without any demonstrated interest in securing or retaining a remunerated work relationship, then, by the terms of the definition observed in this program of study, she was unemployable.

To pursue, for a moment, our interest in employment (in distinction from employability) it will be seen later in this report that, at the point of enrollment in the study, a deaf employable person was classified as employed or unemployed. Further, the matter of employment was investigated for the period of the previous three years. It was, therefore, necessary to define additional terms in order to arrive at a working statement of employment history. Two operational terms were composed for this purpose. Gainful employment was defined, for the recording of work experience, as working a minimum average of 24 hours per week for salary, training, or income, or to be enrolled in an accredited University or College carrying at least three-quarters of a normal class program. A second definition was used to assess the number of months an enrolled individual worked during the three-year period. For this effort an employed month was defined as any month in which an individual was paid or earned income for at least 100 hours, or its equivalent.

Given these defining criteria for selecting persons for this study, it was anticipated that there would be approximately 600 employable adult deaf in Oregon admitted into the study. This, then, was the target population to be identified and studied.

B. Techniques Used for Identification and Discovery of the Deaf Population

It was recognized at the outset of this study that it would be necessary to use every possible resource for identifying and locating deaf persons. The resources used in the effort to develop a register of deaf persons for the purposes of this study are as follows:

1. Schools

The roster of former students at the Oregon State School for the Deaf was reviewed to secure the names and last known addresses of all former students who would have reached the age of 24 years by March 1, 1970. The Tucker-Maxon School, a day school for the deaf in Portland, Oregon, also provided the names and addresses of all former students who would have reached the age of 24 years by March 1, 1970.

2. Churches

Clergymen of all denominations throughout the State who conduct services for the deaf provided names and addresses of all deaf persons known to them.

3. Public Agencies

The Oregon Division of Vocational Rehabilitation provided names of all deaf clients, former and current.

Hearing and Speech Centers in Portland and in Eugene, Oregon, made their client files available to the project staff. These files contained the name, address, age, and level of hearing loss of each client. Using these files the project staff, with due caution about the confidential nature of the information, was able to select deaf persons who met the age and level of hearing los ...teria established for inclusion in this st... nce project funds were limited, it was decided not to perform a more current audiometric examination for those persons who appeared in the files of these Centers whose hearing loss was reported to be less than fifty decibels in their more adequate ear. It was reasoned, in this regard, that such individuals would in most instances have returned to the Center for subsequent evaluation and advice if their hearing had further deteriorated. In this case they would have, indeed, been found in our file search.

Law enforcement agencies in the smaller towns in Oregon assisted by providing the names of deaf persons in their community. We found that law enforcement personnel in small rural communities were usually aware of the identity of any deaf persons residing in their area.

Post Office Department personnel in smaller towns throughout the State were contacted in an effort to secure information in regard to deaf persons residing in such areas.

4. Employers

Employers known to hire deaf persons cooperated by providing names and addresses of all deaf employees, former and present.

5. Private Organizations

Goodwill Industries of Portland, Oregon and in Eugene Oregon, provided a list of the names of all deaf persons to whom they had provided remedial services.

6. News Media

Major newspapers throughout the State published news releases about the research project describing its nature and purposes with an appeal to readers to forward names and addresses of all hearing impaired persons to the project offices.

One of the most respected TV stations in the Northwest aired a thirty-minute panel discussion program to explain the nature and objectives of the project to secure the cooperation of viewers. This panel discussion was conducted orally and manually. Two participants were deaf persons with intelligible speech who are recognized leaders of the deaf in Oregon. The two other panel members have been involved in the education of the deaf for a combined total of over forty years and are well known to the deaf community. This program proved of value not only to the immediate or short-term yield of names and addresses of deaf persons, but also in its long-term effect in relation to overcoming the reluctance many viewers may have had in regard to participating in the program. Many of the deaf persons who were contacted later indicated that they had viewed the program and that it had been an influence in their willingness to cooperate with the project staff. Since most deaf persons are TV fans, this proved a most effective media.

Eighty of the 83 radio stations in the State of Oregon carried frequent spot programs over a period of a month as a public service with a plea to listeners to send names and addresses of deaf persons known to them to the project office. In addition, a nationally known beverage manufacturer contributed a substantial part of his commercial time, twice daily for one month, to publicize the study.

7. <u>Deaf Individuals</u>

All deaf persons who participated in the program were requested to provide names and addresses of additional deaf persons.

8. <u>Staff Referrals</u>

Some staff members provided names and addresses of deaf adults known to them. In an unrecorded number of instances, staff members through alert observation were able to spot deaf persons in a variety of settings, such as stores, restaurants, bowling alleys, etc.

It was inevitable that the utilization of this wide range of informational resources would yield an extensive duplication of names and also the names of many deaf persons who did not meet one or more of the criteria for participation in the project. A complete report of the yield of each of the aforementioned resources appears in Table 2.

After compiling a list of the names and addresses obtained through the various sources enumerated, the State was divided into geographical areas to facilitate the contacting, scheduling, and testing procedures. An effort was then made to interview and test all persons living within each of these areas before moving to another area; the obvious purpose being to hold staff travel time and costs to a minimum. In spite of these efforts, it was necessary to revisit a number of areas of the State where deaf persons resided who were somehow not identified in the previous pass through the area.

A copy of a form letter explaining the project was mailed to each prospective subject. The letter was accompanied by a brief questionnaire and a reproduction of a letter prepared by the Superintendent of the Oregon State School for the Deaf and by the President of the Oregon Association for the Deaf (see Appendix 3). We also include in Appendix 3 a letter to the deaf in Washington written by the President of the Washington Association and employed in working with Sample III. An addressed, postage-free return envelope was also enclosed for the convenience of the prospective participant, and a case file was organized and a number assigned at the time the letter was mailed. After having received a number of replies from deaf persons residing in an area, the research staff tried to contact the home of the individuals by telephone to schedule an appointment. As already defined, a variety of techniques including appointment cards, alerting letters and phone calls were used to enhance the response rate. When the staff member went into an area for the purpose of testing persons he had scheduled by telephone, he also attempted to contact personally those deaf persons residing in that area whose home could not be reached by telephone. In the event an individual failed to respond to the first letter of inquiry, a second questionnaire, accompanied by another letter of explanation, was sent to the potential subject (see Appendix 4).

It frequently was possible to determine by telephone when an individual did not meet the criteria that were adopted for participation in the project. Thus, a large percentage of prospective subjects could be eliminated from the list at this preliminary contact level. The initial personal interview resulted in the elimination of additional prospective subjects.

Considerable attrition occurred, therefore, from the initial list of persons reported as being deaf to the compiling of the final list of persons who met the criteria.

An effort was also made to contact those persons to whom a second inquiry was sent, but who had failed to reply. A significant percentage of these persons were eventually contacted and scheduled for testing. Many of these individuals commented that the reason they had not returned the forms was that they were, for various reasons, averse to filling out forms of any kind. In some instances, several interviews were necessary in order to persuade an individual to cooperate. On some occasions persons who refused on initial interview voluntarily contacted the project office to indicate a willingness to take the tests. This was often reported to be the result of having discussed the program with deaf friends who had taken the test and who had convinced them that they also should do so.

Approximately 85 percent of the test sessions were held during evening hours or on weekends and holidays since a large percentage of qualified persons were employed during the day. In the case of married deaf couples, where the spouse was employed, it was convenient to work with both during evening hours. This afforded the field staff time to contact homes of additional prospective participants during their "free" daytime hours. In this way it was possible in some instances to arrange with a member of the deaf person's family for an evening interview with the deaf person.

In those instances in which it was necessary for the subject to travel 25 miles or more to reach one of the project's testing stations, reimbursement was made for the cost of travel and an evening meal. This provision proved helpful in securing the cooperation of those who resided in areas remote from available testing facilities.

C. Criterion Measures of Occupational Adjustment

It should be recognized from the outset that whether we are concerned with deaf or hearing workers there is no single simple measure or index of satisfactory work performance on which competent authorities agree. If we reflect briefly on this the reason becomes immediately evident. Suppose we were interested in defining performance standards for persons employed in a given type of work such as bus drivers. Clearly, the position duties and corresponding performance criteria would vary for the cross-country driver as against the local driver, just as they would, doubtless, vary for drivers of military buses and drivers of school buses. It is also evident that if we attempt to establish common criteria for judging success in job performance for a variety of types of work--bus driver, school teacher, vocational counselor, physician, window washer--the complexities of finding meaningful common denominators of competence would be magnified beyond those encountered in thinking about a single type of work. In this sense, the the immediate, intuitive standards which may appear to be most useful for judging work performance on a given job become increasingly less appropriate as the scope of the assessment task broadens to include more diverse positions. For example, while the number of units of work performed might be a realistic index of worker adequacy or success in production-line operations, it would, on the face of it, be an irrelevant standard for school teachers or bus drivers. Similarly, while certain job tasks place significant weight on the regular exercise of safety and care practices, such as would be true of bus drivers, these performance attributes would not generally be highly valued in establishing performance standards of success for fighter pilots.

A variety of possible measures of vocational achievement were at one time or another considered for inclusion in this study: proficiency ratings by supervisors, promotion or advancement histories, job satisfaction, attitudes toward one's employer, and peer appraisals. All were discarded. Two measures were adopted as provisional indices of vocational adjustment for adult deaf. As pilot work proceeded, four additional indices were added and integrated into the data collection program before the research was officially begun. The two original criterion measures are defined now.

1. <u>Criterion Measure I</u>: <u>The Extent of Employment</u>

Perhaps the first question one might raise in appraising the work performance of another is whether the observed individual has worked at all. The informational return can, however, be made notably more descriptive, and certainly more fertile as research datum, if, instead of asking whether the individual has worked, we define a time interval of "at risk" behavior, and calibrate the amount or proportion of that interval the subject was known to have worked. For our purposes, then, we reviewed retrospectively each study subject's work history for a period of three consecutive years and recorded as a continuous measure (from 0 to 36) the number of months during which he was gainfully employed. As previously defined, an employed month was a month during which a study subject was gainfully employed for a total of at least 100 hours. Since the study sample was composed of deaf persons who were at least 24 years old, it is very unlikely that the individuals under study were in any sense socially inhibited or deterred from assuming employment--including the productive role of student--over the previous three-year period. In this sense, then, each study subject could be defined on this criterion measure to reflect the number of gainfully employed months he reported over the past three-year period.

2. Criterion Measure II: The Type of Employment

The original study plan provided for a second criterion by which vocational adjustment was to be appraised, i.e., the current type of work on which the deaf adult was occupied. The job title for each study subject was, therefore, coded in terms of an Occupational Category appearing in the Dictionary of Occupational Titles classification system (29). For the purpose of distinguishing types of vocational adjustment among adult deaf, the first digit of the classification system was used as follows:

First Digit	Occupational Categories
0-1	Professional, Technical and Managerial
2	Clerical and Sales
3	Service
4	Farming, Fishery, Forestry and related
5	Processing
6	Machine Trades
7	Bench Work
8	Structural Work
9	Miscellaneous

3. Criterion Measure III: Current Monthly Pay Rate

Additional criteria were developed out of contact between project staff and vocational experts consulted during the pilot phase of the project. One such measure was Current Monthly Pay Rate which was labeled Criterion Measure III. This measure was also taken to serve as a pragmatic index to the social recognition accorded the study subject in the working world. Monthly earnings had to be adjusted, however, for atypical or irregular working schedules. This was done to adjust income reported to a standard unit work period so that all reported income could be scaled for comparable intervals of "time on the job". What was, in fact, done was to adjust the income for the most recent month employed to an average monthly work period for the type of work in the individual's local working community at the time. This generally turned out to be a 170-hour work month. The major liability with this criterion measure was that it could not be used meaningfully for employable deaf persons who were not working at any time during the entire 36-month retrospective observation period.

4. Criterion Measure IV: Employment Status at Time of the Study Contact

A fourth criterion measure was Employment Status at Time of the Study Contact, i.e., whether the subject was employed at the moment. This was a simple index recorded dichotomously as "yes" or "no". The major complication here was in those few instances when an individual was between jobs. In such cases, there was typically a brief period of work interruption before undertaking a job which was fully pledged and secure. Such persons were classified as working. Perhaps it should be restated at this point that students were classified as employed if they qualified by the previously determined definition for treating student work status.

5. Criterion Measure V: Number of Jobs Held During the Preceding 36-Month Period

A fifth criterion measure was Number of Jobs Held During the Preceding 36-Month Period. A deaf person moving at the time from one job to another either within an organization or between organizations was credited with two jobs.

6. Criterion Measure VI: Complexity Demands of Current Position

A final criterion measure grew out of contact with Mr. Paul Kerr, Supervisor, Occupational Analysis and Testing, Oregon State Employment Division. Interest developed here in connection with the last three digits of the DOT Code. These three digits are concerned with the highest functional complexity a given job requires. Three kinds of functioning are described: the worker's functioning in relation to data, to people and to things. In deliberation with Mr. Kerr, it was reasoned that while Criterion Measure (CM) II was concerned with the occupational title of a deaf person's position, the complexities of a work assignment could vary appreciably within a given title. To illustrate, within the title "Machine Trades Occupations" a given position such as machine shop foreman would make very exacting demands requiring a high level of training and skill. Conversely, a position such as a hopper filler, similarly classified as a "Machine Trade" on the DOT first digit, could make modest demands on the incumbent requiring little training, skill or intelligence. To cope with this limitation in CM II, Kerr evolved a system of six clusters of work assignment complexity based on the last three digits of the DOT Code. These six clusters were forged jointly out of the data of this study and out of a large scale factor analysis study of interests of 129 worker trait groups. The six clusters emerging from Kerr's work are outlined in the Kerr Complexity Chart and elaborated in greater detail in Chapter 5. The final criterion measure, VI, evolved for this study was labeled Complexity Demands of Current Position.

This study was then formulated to employ and assess the usefulness of six criterion measures herein summarized:

CM I:	Extent of Employment
CM II:	Type of Current Employment (Occupational Category)
CM III:	Current Monthly Pay Rate
CM IV:	Employed-Unemployed at Contact
CM V:	Number Jobs Held
CM VI:	Complexity Demands of Current Position

As the project moved into operation, and as the research team worked through a pilot study, and a number of preliminary test runs with data, it seemed that there would be different levels of usefulness for the six criterion measures. For example, CM I was showing itself to be an extremely useful measure revealing information on virtually all deaf persons enrolled in the study and yielding great variability in the data reported. On the other hand, it was becoming all too apparent that CM II, IV, and V were differentially useful with men and women. Clearly because many more women were unemployed than men, these three measures were much more applicable to the study of deaf males than to deaf females. One interesting innovation in thinking about the project came out of this preparatory work. The idea occurred to the staff that since non-continuous measures such as CM II and CM VI could not be handled in the planned regression studies (one phase of the intended analysis of data) that they could possibly be useful moderator variables. That is, it was decided to try to use Type of Employment (CM II) and Complexity Demands of Current Position (CM VI) individually as stratifying variables for studying relationships between predictor variables and the four remaining criterion measures within strata. By stratifying the analyses in this way, it was hoped, of course, to enhance the general level of prediction and to produce results more relevant for the task of counseling deaf clients in their vocational adjustment. As the study developed, it became clear that this was a useful strategic notion, not only with regard to these stratifying measures, but also with respect to other stratifying variables which came to light as work progressed and data accumulated.

D. <u>The Process of Validation</u>

We now describe the proposed research design with particular attention to the general relationship to be examined between the predictor and criterion measures. While initial emphasis was placed on the task of organizing useful indices of vocational adjustment for the adult deaf, this project was also

THE KERR COMPLEXITY CHART

Cluster Name	Cluster Code	DOT hierarchical Function			
		Area Cluster	Symbol	Complexity Level	Explanation
Manual and Manipulating	001	Data	0	8	No relationship
		People	0	8	No relationship
		Things	1	4	Manipulating
				5	Tending
				6	Feeding - offbearing
				7	Handling
Machine Operating and Hand Tool Work	002	Data	0	7, 8	No relationship
		People	0	8	No relationship
		Things	2	1	Precision working
				2	Operating - controlling
				3	Driving - operating
Routine Clerical (Classifying Computing)	100	Data	1	3	Compiling
				4	Computing
				5	Copying
				6	Comparing
		People	0	8	No relationship
		Things	0	8	No relationship
Inspecting, Checking, Testing	101	Data	1	3	Compiling
				5	Copying
				6	Comparing
		People	0	8	No relationship
		Things	1	4	Manipulating
				5	Tending
				7	Handling
Crafts, Precision Machine Operating, and Related	102	Data	1	2	Analyzing
				3	Compiling
				5	Copying
		People	0	8	No relationship
		Things	2	0	Setting - up
				1	Precision working
				2	Operating controlling
Education and Guidance	220	Data	2	1	Coordinating
				2	Analyzing
		People	2	0	Mentoring
				1	Negotiating
				2	Instructing
		Things	0	8	No relationship

aimed at identifying components of the deaf individual's personal history and life experience, as well as elements of his psychological test performance which might vary with or relate to his aforementioned vocational adjustment. In this sense, the project was designed to assess the potential relationship between a cluster of background and behavioral variables in a deaf adult, and any one of the work adjustment criteria, i.e., (1) his capacity for developing and retaining an active role in the working community; (2) his capacity for achieving different remuneration levels through gainful employment; and (3) his capacity for sustaining a productive work performance in one or another class of vocational pursuits, etc. By means of the research design a series of hypothetical statements were to be tested to estimate or predict success in employment. This process, by which an attempt is made to determine the connection between test performance and personality makeup on one hand and vocational adjustment on the other hand, is customarily referred to as a process of validation.

In order to understand and evaluate the validating procedure used in this study, the major approaches to validity in the scientific investigation of vocational success need elucidation. Two principal types of validity studies have been generally pursued, i.e., studies of predictive validity and studies of concurrent validity. Predictive validity studies most often are organized to collect information about personality variables and test performance with the hope of predicting future vocational adjustment success. Such studies are commonly conducted with students, trainees, or job applicants whose vocational success can only be conjectured about or predicted from immediate information. These studies require forebearance until a period of elapsed time passes, during which the subjects have the opportunity to demonstrate their vocational wares and either support (validate) or refute the predictions. Concurrent validity studies are typically undertaken where information regarding vocational adjustment is already available concurrently with, or at the same time that personal background information and test behavior are appraised. As a rule, these studies are performed with established employees using their long-term vocational histories as evidence for occupational success. In the purest sense, then, the idea of prediction does not seem to be a suitable term to characterize this type of validation process, since the criterion measure is at hand. However, because the validating model used in this study was the concurrent process, and because most writers apply the term "prediction" to both types of validity investigations (27, 44, 85, 149), the various study subjects attributes and test scores used in this study are subsumed under the term "predictors".

The correlation between one or a combination of predictors and a criterion measure of vocational success is called a validity coefficient. An uneducated guess, or a clearly uninformed prediction to vocational success would be expected to yield a validity coefficient which is not significantly different from zero. Cronbach (27) advises that validity coefficients generally do not rise much above 0.60. Predictive approaches and concurrent approaches to validity are limited in their magnitudes by somewhat different influences. Predictive validity studies are limited, among other reasons, because of the passage of time between the collection of predictor data and the accumulation of vocational achievement data. Concurrent validity research programs suffer in the main from the fact that the variability of the study population is inevitably restricted with some attrition in numbers from those who have survived and remained so employed. Correlations based on populations whose variability has been restricted, are prone to be of lesser magnitude.

One additional admonishment may be helpful. Validity coefficients do not by themselves imply anything about casual influences; they only indicate that two or more events or conditions appear as mutual occurrences with their intensities correlated. These remarks are offered as caveats in the service of encouraging a critically objective attitude toward the study findings.

E. Predictors to Occupational Adjustment

A large amount of information was collected as uniformly as possible on all study subjects, in a prescribed order by rigorously defined and observed methods. The data so collected were stored as systematic units of observation or testimony. A typical unit of observation would be a score on a performance test or personality questionnaire. A unit of testimony would be illustrated by the information--age as reported. These units are to be treated in later sections as the predictors which will be related to one another and to the criterion measures of vocational success. For the moment, our task is limited to enumerating the predictors.

Four classes of predictor data were distinguished: (1) personal attributes of the subjects; (2) hearing-related data about the subjects; (3) household and personal property data about the subjects; and (4) test performance information. These classes are simply one convenient way to present and discuss the predictors. A mathematically derived class structure for the predictors will be discussed later in the report.

1. Personal Attributes

Sex: the sex of the subject was recorded.

Age: the reported age of the subject at his last birthday.

Nativity: the State of birth was recorded as Oregon, Washington, or elsewhere.

Marital Status: the current marital status was recorded as single, married, divorced, separated, widowed, or unknown.

Number of Marriages: the number of times the subject was married was recorded.

Multiple Handicaps: information was recorded on the presence, absence, or lack of knowledge about the subject's physical condition with respect to sensory problems (other than auditory), motor dysfunctions, allergic disabilities, convulsive disorders, cardiac handicaps, respiratory infirmities, gastric incapacities, or other chronic ailments or disease processes which might conceivably interdict against the adult deaf individual's desire to work.

Handedness: laterality was recorded as right or left depending on the hand a subject used most prominently throughout the evaluation period.

Ethnic Group: each subject's race, as reported, was recorded within the following racial category structure -- Caucasian, Black, Oriental, American Indian, Other, Unknown.

Years in School Before College: recorded as the number of years of school attendance before entering college. For subjects not going to college, this was recorded as the total number of years of schooling.

Education: the number of grades of school work completed was recorded for each subject. In many instances this was reported as an approximation since years of attendance in schools for deaf children are not always translatable into grade equivalents. Nevertheless, whenever grade achievement was reported, it was used directly.

Formal Occupational Training: for deaf adults enrolled in the study any formal occupational training program completed was reported.

Additional Training, First Choice: each subject was asked during the interview what, if any, kind of vocational training he would currently like to have.

Additional Training, Second Choice: each subject was given an opportunity to register a second choice.

Thus, insofar as possible, thirteen items of personal biographical information were collected and classified for each qualified deaf adult enrolled in the study.

2. Hearing Related Data

Age at Onset: the reported age at which the subject's hearing deficit was said to have occurred.

Cause of Deafness: each study subject was asked during the interview to define the prevalent cause of his deafness. These data were tabulated without classification or coding just as reported.

Type of Academic School Program: a number of academic options are open to deaf youngsters, such as residential schools, day schools, day classes and public schools. The pre-college educational history of each adult registered on this study was reviewed for the particular option in which he spent most of his school time.

Number of Deaf - Family of Origin: this figure was recorded for the family composed of the subject's parents and the siblings born to the union of those parents. The number of siblings was also recorded.

Parental Deafness: this information was recorded independently for each natural parent.

Number of Deaf - Conjugal Family: this figure was recorded for subjects who were, at one time or another, married. It was based on the persons in his nuclear family, other than the study subject, who were deaf, including spouse and progeny. If more than one marriage was consummated, the most recent one was considered for the record. The number of children resulting from this marriage was also recorded.

Spouse Deafness: this was reported for the current spouse if the subject was married.

Hearing Loss - Left Ear: the decibel loss (ISO) in the left ear was reported from the audiometric examination.

Hearing Loss - Right Ear: the decibel loss (ISO) in the right ear was reported from the audiometric examination.

There were nine bits of information regarding deaf-related experience documented as far as possible for each study subject.

3. Household and Personal Property Data

Home Ownership: each study subject was questioned in connection with his residence at the time. Information was collected as to whether he owned or rented his quarters. If he rented, he was asked if he was living as a boarder or under some other arrangement.

Phone Ownership: the study subjects were each asked whether they were supporting a phone within their own residence or household.

Access to Automobiles: this question was asked to determine whether an operating motor vehicle was used to any extent by the study subject.

Hearing Aid Ownership: the study subject was asked whether he owned an aid in operating condition or in a condition which would warrant repair.

There were, therefore, four kinds of information collected about the private property, possessions and utilization of such conveniences by adult deaf persons.

4. Test Performance Data

Hearing Aid Used: particular encouragement was given to study subjects who owned hearing aids in working order to bring them to the two testing sessions. Whenever aids could appropriately be used, the examiner instructed the subject to employ them. On other elements of the test battery, the use of an aid was not permitted, as with the audiometric examination, so that the examiner was obliged to deny their use during certain components of the information collection program. Study subjects were characterized as either using or not using a hearing aid during those portions of the two examination periods when they were advised to employ them to facilitate their performance.

Attitude toward Interview and Testing: the staff examiner reported two impressions of the attitude of each subject with whom he worked. One impression was with respect to the interview exchange; the second was about the subject's reaction pattern during the testing session. A three point scale was used for each of these impressions ranging from extremely cooperative, through average, to extremely uncooperative.

GATB: The General Aptitude Test Battery (43) was administered during the first testing session along with a non-reading measure of the GATB Aptitude G (Intelligence). The GATB was developed by the United States Employment Service (USES) and has been used since 1947 by State employment service offices. This test has also been released by the USES for use in 87 foreign countries*. "Because of its extensive research base, the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance". (Manual for the USES General Aptitude Test Battery, Section III: Development - 1970).

The non-reading measure of aptitude G was derived through the use of three subtests from Cattell's Culture Fair Intelligence Test (18) and one of the tests from the GATB. All tests were specially weighted so that the overall corrected score corresponds to the score for the GATB Aptitude G. In the material that follows this aptitude has been called Culture Fair "g".

The nine aptitudes measured by the GATB and the non-reading measure of aptitude G are listed below. The letter used as the symbol to identify each* aptitude and the part or parts of the GATB measuring each aptitude are also shown, as are the tests for the Culture Fair "g".

Aptitude	Tests
G--Intelligence	Part 3--Three-Dimensional Space Part 3--Vocabulary Part 6--Arithmetic Reason
V--Verbal Aptitude	Part 4--Vocabulary
N--Numerical Aptitude	Part 2--Computation Part 6--Arithmetic Reason
S--Spatial Aptitude	Part 3--Three-Dimensional Space
P--Form Perception	Part 5--Tool Matching Part 7--Form Matching
Q--Clerical Perception	Part 1--Name Comparison
K--Motor Coordination	Part 8--Mark Making
F--Finger Dexterity	Part 11--Assemble
F--Finger Dexterity	Part 12--Disassemble
M--Manual Dexterity	Part 9--Place Part 10--Turn

* Personal Communication, Oregon State Employment Division

"g"-Culture Fair	Cattell's Culture Fair: Test 1-Figure Series Test 2-Figure Classification Test 3-Matrices GATB: Part 7-Form Matching

Corrected scores on the GATB are expressed on the individual aptitude factors around a mean of 100 with a standard deviation of 20. The GATB Development manual for 1970 uses stability coefficients (Test-retest) in determining SEms which range from .91 for G, V, N, to .65 for F (Finger Dexterity).

The Culture Fair Intelligence Test Scale 2, Form A, was developed by R.B. and A.K. Cattell. The subtests are designed to be free of language requirements (i.e., they are non-reading tests). The complete non-reading measure of Aptitude G (Culture Fair "g") should be used in the same way as the reading measure of Aptitude G (GATB). Ideally then, a mean of 100 and a standard deviation of 20 should be expected.

The Bender Visual Motor Gestalt Test: This test is made up of nine cards each imprinted with a design. The cards are presented one at a time to a subject who is asked to copy them on a piece of unlined paper. The test was introduced in 1938 by Bender (8) and has been a mainstay of clinical batteries over the years in application with children as well as adults. The test performance was assessed by the method of Pascal and Suttell (99). This method yields a single raw score which is convertible to a standard score. Test-retest reliability as reported by Pascal and Suttell on 44 subjects was .71. For the purpose of checking the reliability with which this test was scored in the research office, three members of the project staff scored the initial eighty protocols independently. The three individual correlations for that work were .84, .85, and .87. All subsequent protocols were scored by a single project staff member.

The Weingarten Picture Interest Inventory: is an instrument developed by Kurt Weingarten to appraise an individual's pattern of vocational interest and to identify the specific vocational fields which may be most commonly associated with any given pattern of interest. Because vocational interests are depicted pictorially on the test, the configuration of interests revealed by an individual's choices in responding to the test are thought to be essentially free of verbal influences and uncontaminated by familiarity with specialized vocational terms. Nine scores are obtained from each test performance, including six "field of interest" scores: (1) interpersonal service, (2) natural, (3) mechanical, (4) business, (5) esthetic, (6) scientific; and three supplemental scores: (1) verbal, (2) computational, and (3) time perspective. Scores for each of the nine scales are reportable as raw scores and percentile scores.

Reliability coefficients for 85 twelfth grade boys were calculated and reported (103) by test-retest product moment correlations and range from .93 in the business field to .92 in the field of natural interest. With regard to the supplementary scales, the correlations for the computational interest were reported to be .83 and for verbal and time perspective .76.

Closure Flexibility (Concealed Figures): is a test designed by L. L. Thurstone and T. E. Jeffrey (20) and is a modification of the original Gottschaldt Figures material. We often refer to this test as the Gottschaldt Figures Test. It is designed to measure the capacity to perceive a figure or drawing accurately and to retain it despite a series of distracting influences. There are 49 items in Form A of the test as published by the Industrial Relations Center in Chicago. Each item presents a standard figure arrayed to the left in a row of five figures. The four figures to the right are generally more intricate and convoluted than the standard. The task is to determine which of the four contrast figures contains within it the imbedded likeness of the standard.

Both standard scores and percentiles are derived from raw scores and are reported for this test. Almost without exception the total range of standard scores falls between 20 and 80 on this test. The average standard score is fifty with a standard deviation of ten. Pemberton (100) reports a split-half reliability of .94.

Gates Reading Survey Form I: was submitted for copyright by Arthur Gates (41) in 1958 as a shortened form of the original Basic series of reading tests. It consists of three subtests, a speed and accuracy test, a reading vocabulary test and a level of comprehension test. The tests are designed to be used with children in grades three (second half) to ten. For the purpose of this study attention was given exclusively to the reading comprehension subtest. This decision was made to conserve test time, and was based on the contention that reading speed and accuracy, as well as reading vocabulary will be integral aspects of other test elements in the battery. The score reported on reading comprehension was documented as a raw score, a grade score and an age score.

The Craig Lipreading Inventory: is a test developed by William Craig (25) to appraise the ability of the deaf to speech-read. The test material consists of stimulus information conveyed on a 16 mm color motion picture film. The information is of two types: words and sentences, so that the test is organized into a word recognition subtest and a sentence recognition subtest. The word recognition form is prepared in a test booklet in which four pictorial and written word options are displayed for each of the 33 stimulus words projected by a performer reciting the words at a controlled exposure rate in the motion picture film. Using this multiple choice format the subject selects the option he believes was "said" or presented on the screen. The format is much the same for the 24 sentences in the sentence subtest. The scoring for the test yields two scores: one for the 33 item word subtest and one for the 24 item sentence subtest.

The Oregon Manual Communication Test: the purpose of this test is to estimate the ability of deaf persons to "send" and "receive" communication by means of manual signs. Fingerspelling is prohibited throughout the test.

Subtest I, the sign recognition test, is presented to the deaf subject by means of a 16 mm color motion picture. The picture displays a performer signing, at eight-second intervals, fifty common words. The subject, seated twelve feet from the projection screen, is asked to underline the correct words on the answer sheet (See Appendix 10).

Subtest II, the signing ability test, is made up of 25 words which are displayed one at a time on flash cards. The subject is instructed to produce the correct sign for each word and is given whatever time seems indicated. The stimulus material for the two subtests is presented only once and each correct response is given two points toward a subtest "reading" score and four points toward a subtest "signing" score.

The Berger Block Test: this is an original instrument developed by one of the investigators for this research to measure the communication skills of the deaf. Test material is made up of four series of geometric wooden blocks. One series is the three inch cube series; a second is the two inch cube series; the third series consists of cylinders three inches tall and three inches in diameter; while the forth and last series is made up of cylinders whose basic height and diameter dimensions are two inches. Each of the five blocks representing the four series is distinguished by a different letter, A through E. Thus, for the three inch cube series one wooden block has a large "A" printed on each of its six surfaces; another has a large "B" on each of its six surfaces; on down to the fifth cube in the three-inch series which has a large "E" on each of its sides. The five smaller or two inch cubes are similarly differentiated by the letters "A: through "E". The cylindrical wooden blocks have their indentifying individual letters on the top and bottom surfaces of each block as well as four of the same letter of the alphabet interspaced at quadrant distances along the curved surface of the block form. Four of the blocks were also fitted with lead inserts which were not visually evident but which notably increase the weight of the block. These "loaded" blocks are the large "A" cube, the small "B" cube, the large "E" cylinder, and the small "D" cylinder--one in each series. The blocks are arranged in prescribed order before each task on a laminated plastic template with the identifying alphabetic label inscribed on the plastic to assume correct ordering. When in place, the twenty blocks are aligned in block series horizontally and staggered vertically by alphabetics (See Appendix 11).

Four subtests were proposed in assessing communication function. Subtest I involved sixteen tasks, each conveyed to the subject by visual written instructions. Subtest II involved fourteen tasks all of which are administered to the deaf study subject by a visual presentation on a screen synchronized with a sound track. The visual element in the presentaion combines dual stimulation from the performer on the screen. Thus, this visually projected oral presentation produces visual oral movement speech reading clues, as well as concurrent manual signing. Subtest III is similar to Subtest II other than for the omission of the sound track. Again, there are fourteen tasks. Subtest IV was included for use with the deaf who have functional residual hearing and is limited to the presentation of sound track instructions for fourteen tasks. Subjects were encouraged to use hearing aids when available for this test.

The items across tests are equated for difficulty. For example, in one subtest the task may direct the subject to pick up a large square "B" block, while in another subtest the task may be to pick up a small round "C" block. The subtest tasks are graduated in difficulty combining in various nuances the variables of shape, size, alphabetic designation, weight, number, position and geometric pattern deployment. A preliminary scoring system was developed to credit proper identification (selection) of materials and accurate placement or movement of materials. The four subtests were administered in rotational order sequences as the normal flow of study subjects was processed. The test materials involving the template, the twenty blocks in "ready" position, and a Fairchild projector are placed before the subject.

All visual stimulus materials are temporally triggered by a cassette inserted into the Fairchild apparatus with the visual image projected onto a self-contained screen. A fiften-second time limit was observed during which the subject was free to record his response to each task. Recording forms as well as a scoring manual were designed for handling the test results.

The Holdt Speech Characteristics Test: this test, developed by one of the investigators, contains a list of fifty words which is approximately phonetically balanced and which includes almost all phonemes. The test is administered individually by presenting fifty 3" X 5" flash cards each serving to expose one of the stimulus words.

The deaf subject is seated before a table which supports a uni-directional microphone eighteen inches from the subject's side of the table. The deaf subject is instructed to speak the test words directly into the microphone. The microphone conveys the electronic impression onto a tape which feeds through a recorder at a measured constant volume for all words for all subjects. Fifteen seconds is provided as a recovery period between the subject's enunciation of the word and the preparatory signal for the next flash card.

Four speech intelligibility scores are derived on listening to each deaf subject's recording of the standard fifty words. These scores represent four dimensions of verbal communication: intelligibility, pitch, volume, and duration. A scale for scoring the tape production of each subject's delivery of each word was developed. Intelligibility was scaled on a decile scale calibrated from zero to one hundred. The other three dimensions were individually rated on a five point scale. The judgments were made by two types of judges. One was an experienced teacher of the deaf. This judge was selected to provide an estimate of the differential comprehensibility of the speech of deaf adults as it would indeed impress a person familiar with the characteristic speech pattern of the deaf. The other type of judgment was made by paid university students who were previously unexposed to the speech of the deaf. To maintain the lack of sophistication, the level of inexperience in this assignment, the student judges were replaced after two 2-hour listening stints.

By June, 1968, fifty-six subjects' speech productions had been rated in this way. Their ratings were intercorrelated to study the degree of rater agreement. A high degree of agreement characterised the ratings. The inter-rater correlations on intelligibility ranged from .84 to .96, with a median of .88. On the other three characteristics the correlations were somewhat lower: the medians for pitch, volume, and duration, respectiviely, being .77, .74, and .77. The characteristics pitch and volume correlated in the .5 to .6 range but were almost independent of intelligibility and duration. Ratings of duration correlated approximately .3 with ratings of intelligibility. Further, there appeared to be a difference of approximately 12 to 14 points in the average intelligibility ratings assigned; the experts on the average assigning intelligibility ratings around 66; novices around 53. There were very slight differences between the two sets of raters in the average ratings on volume and duration with no systematic differences on pitch. Based on these findings, it was decided to use only one expert and one novice for the remainder of the study.

<u>Identification of Interviewer-Examiner</u>: the final information tabulated from the interview-testing session with each subject was the identification of the staff worker who conducted the program. Two workers were so involved, one a hearing worker,

another a deaf individual who lost his hearing at the age of five years.*

In reviewing the test performance data, the reader will recognize that many important details of test standardization and test techniques have been omitted or discussed superficially. For those who seek more precise information regarding these matters, there are, of course, the publishers' manuals and the supporting literature found therein. Also, in a subsequent section considerable information is presented about special instructions used in working with deaf adults as well as modifications in the testing program which were dictated by the pilot work. Finally, test materials used in the study, as well as all test performance data, are on file in the Vocational Rehabilitation Division, 680 Cottage Street, N.E., Salem, Oregon 97310.

F. <u>Pilot Work</u>

The work undertaken in this project was premised on the belief that the quality of the interaction between the deaf client and the test examiner contributes to the adequacy of the information which emerges from the process of vocational assessment. In order to promote the accuracy of appraisal of the deaf individual's vocational ability and potential, the test situation was structured to facilitate optimal comprehension and candor between the examiner and examinee. The first effort to attain this objective was to conduct a pilot study.

The pilot program was designed to alter, where necessary, tests constructed for use with hearing subjects so that they could be more appropriately used to appraise the potential of deaf adults for vocational productivity. Before the mainstream of the study was begun, the investigators administered the GATB, the Bender Gestalt, the Gottschaldt Figures, and the Weingarten tests (all of which were standardized on hearing subjects) to a group of 25 deaf adults who were not to be used in the formal study population. The plan of the pilot study was to employ each test in strict conformance with the pre-

*The test data were examined for examiner variance and found to be essentially free of such influence.

scribed directions taken from the manual for administering the test. The examiners recorded indications of limitations in the instructions, reviewed their experience with one another and with other examiners of the deaf to generate an "improved" approach to the test situation. These innovations were then adopted for the regular study. Twenty-five cases were selected at random from the first 225 adult deaf examined in the regular study to compare their performance with the pilot study subjects. While statistical tests of significance were not made between the performance of the two groups, the regular study group rather consistently demonstrated more proficient test behavior than the pilot group.

What were the major innovations in testing methods learned from the pilot work? To begin, the pilot study revealed that the GATB was a poor choice as an introductory experience to the test battery. The intense structure of this test seemed to elicit frequent evidence of anxiety and stress, excessive blocking, awkwardness, and fumbling--particularly on manipulative components of the test when it was employed as the "lead off" test. To reduce the risk of such "test shock" the sequence of testing was adjusted for the formal or regular study program. The Craig Lipreading Inventory was placed first in the order of tests. This test, it will be remembered, is administered with the use of a 16 mm motion picture film exhibiting a performer of pleasing appearance whose color tones are generally subdued and soft. In the pilot study the film seemed to have a reassuring, if not calming, impact on the examinee.

The pilot study observations also suggested that it would be advantageous not to administer tests in successive order which require the same basic type of response, i.e. verbal response; written response, manual signing response, etc. It was also found important to convert, insofar as possible, negatively phrased directions--"don't pick up the block until"--to positively couched directions--"pick up the block when". Also, whenever appropriate, it was decided to have the examiner convey the performance instructions both by oral and manual communication. The two media were to be used simultaneously. In this sense the examiner's instructional message was designed to provide the examinee full opportunity to utilize his total abilities in speech reading, manual communication, and any functional residual hearing he might possess. It was also found during the pilot work that flashing the room lights could be employed both as starting and stopping signals for test purposes.

Perhaps, the most critical information taken from the pilot work was, however, the inference that the level of language in the test instructions was, too often, incompatible with the deaf individual's capacity to comprehend the task. To adequately test the potential level of performance of any hearing or deaf individual the well-trained examiner will want to feel that he has satisfactorily communicated the task to the examinee. That is, both parties have to feel that the task is sufficiently well defined before the examinee is given authorization to proceed with the test proper. This process requires keen perception and patience on the part of the examiner. More than this, it requires a warm and trusting relationship between the examiner and his client. This relationship permits either individual to raise questions about the immediate interaction so that additional information can be made available, or so that erroneous information may be withdrawn from the test situation. We found that many deaf are strenuously reluctant to admit their failure to understand. In practice then, the project examiners were trained to be continuously sensitive to the deaf adult's ability to comprehend the nature of the individual test format. Each test subject was given ample opportunity to demonstrate that he truly understood each test operation. This meant that it was often necessary to scale down the level of language until the examinee understood the task he was to perform.

G. Testing Room Facilities

Testing room facilities were closely inspected to assure that there would be no obvious distractions present to interfere with test performance. Objects such as pictures or other decorative wall hangings, as well as unnecessary items of equipment were removed from view.

As previously mentioned, an effort was made to secure appropriate test room facilities in each major population area in the State. Most frequent use was made of the local offices of the State Department of Employment. The Hearing and Speech Centers in Portland and Eugene similarly granted the use of their test room facilities during non-business hours. The Portland Public School System provided test room facilities at Portland's Washington High School. Tucker-Maxon Day School for the Deaf in Portland, Oregon, also cooperated with the project staff by providing testing room facilities. Church facilities were also made available in many communities. In several instances space for testing was provided by the County Court. Tektronixs, Inc., of Beaverton, Oregon, not only granted the use of their test room facilities but also granted their deaf employees reimbursed leave during regular working hours to take the tests. Tektronixs also granted the use of test room facilities for the testing of spouses, other relatives and friends of employees. Goodwill

TESTING PROGRAM SCHEDULE

SESSION I

Operation	Time Consumed Per Subject	Reference
1. Audiometric	1. 10 minutes	1. General use
2. History	2. 15 minutes	2. Original format (See Appendix 5)
3. Craig Lipreading Inventory	3. 18 minutes	3. Craig's correspondence
4. Oregon Manual Communication Test I	4. 10 minutes	4. Original format
5. GATB - Parts 8-12	5. Two hours and forty minutes*	5. U.S. Dept. of Labor Administration and Scoring - 1965
6. Culture Fair	6. 30 minutes	6. Scale 2 - Form A - 1957 Institute for Personality & Ability Testing
7. Weingarten Picture Inventory	7. 48 minutes	7. California Testing Bureau - 1958

* A ten-minute recess was invariably taken during operation 5 and 6.

SESSION II

Operation	Time Consumed Per Subject	Reference
1. Oregon Manual Communication Test II	1. 10 minutes	1. Original format
2. Holdt Speech Characteristics	2. 10 minutes	2. Original format
3. Gottschaldt Closure Figure Test	3. 12 minutes	3. University of Chicago, 1965
4. Gates Reading Survey	4. 20 minutes	4. Teachers College Columbia University, 1960
5. Bender Gestalt	5. 20 minutes	5. American Ortho-Psychiatric Ass. 1938
6. Berger Block Test	6. 45 minutes	6. Original format
7. Questionnaire and Release Form	7. 15 minutes	7. Original format

Industries of Portland, Oregon, granted the use of their Evaluation Center for the testing of their deaf clients.

In the Seattle area, where testing was done in the last year of the project, the facilities of the Hearing and Speech Center, the State Department of Employment and the Seattle Community College were used in the testing program.

H. Test Administration

At the outset of each session a special effort was made to generate a level of motivation, which would produce the highest possible level of response in the examinee. To accomplish this, the examiner explained the purposes and objectives of the study, with emphasis on the hoped-for impact that the study could have on the employment status and lives of other deaf persons. An authorization form for contacting the subject's employer was used and may be seen in Appendix 6.

Approximately seven hours were required to administer all components of the experimental battery. This was accomplished in two testing sessions, with an interval of 14 days (or as near thereto as scheduling permitted). Testing was distributed over two sessions to avoid the dual elements physical fatigue and psychological boredom. Also, the components used in the first session were administered to groups of as many as four persons. In instances where the first session appeared to require excessive time, the Weingarten Picture Inventory and the Culture Fair were shifted to the second session. The second session was always administered as individual tests. Rest periods were taken at appropriate times during each testing session. Such periods provided an opportunity for the examiner to "visit" with the examinee. The information obtained in such informal discourse provided project records with considerable background and demographic material -- all recorded later out of view of the examinee. Experience in the pilot program had taught that deaf persons are less inclined to discuss personal information if they know that their remarks are being recorded.

Frequently, examinees objected to returning for the second test session. When this occurred the examiners could only exercise tactful persuasion to urge the further cooperation of the examinee. This was a very important responsibility, since the data collected during the first testing session were to be interrelated with data from the second.

A check list was used to record attitudes of the examinee during both the initial interview and the testing sessions. A preponderant majority of the subjects indicated that they had found the experience interesting and would repeat it if requested to do so. Most subjects indicated that they would be willing to recommend that their friends cooperate with the project staff. Approximately three percent indicated that they would not like to repeat the performance. However, despite these feelings they indicated that they would recommend the project to their friends.

A lengthy information sheet (see Appendix 6) was used after the second testing session. This was completed by the examiner, usually during the course of casual post-test discussion.

Data Sheet 1 (see Appendix 8) illustrates the format used in preparing information for computer storage and ultimate retrieval.

The general cautions that were observed in the administration of all components of the experimental battery are as follows:

1. An attempt was made to generate each subject's sincere interest and to develop reasonable levels of personal motivation.

2. The purposes and objectives of this study were explained to the subject in comprehensible terminology.

3. An effort was made to establish a high level of confidence and rapport. Assurances of confidentiality of all information were made. Attitudes communicating a sense of "pressure" were carefully avoided. Scheduling of subjects for testing was arranged with consideration for the convenience of the subject.

Failure to observe the foregoing cautions resulted, in a few instances, in inability to secure the cooperation of a deaf candidate for study. In some instances, when one of the field staff felt he was not achieving the desired level of cooperation, he withdrew from further contact with the individual and turned the necessary information over to another staff member for processing.

CHAPTER 3

LAUNCHING THE STUDY

A. Historical Perspective

All research programs develop a menology of events which too often get brushed aside in the telling of the experience. The experience with this project is probably no more, nor no less cluttered with humorous, or disconcerting, or gratifying or hairbrained incidents than that of any other research project. However, sometimes an unexpected confluence of events can be of such magnitude as to exert a profound influence on a research report. Such is our story.

As previously mentioned, this project was designed as a three year program officially launched on June 1, 1966. By the end of the second year (May, 1968), some 225 deaf persons had been processed through the study. Three things were apparent at the time. The process of recruiting deaf persons outside major metropolitan areas, and the process of encouraging deaf who were disinclined to cooperate were much more time consuming than we had anticipated. It was also evident that, no matter how meticulously we might comb the State, we would not be able to find the proposed target population of 600 qualified deaf adults available and willing to be tested. Moreover, it was obvious that the deaf in Oregon were not employed in certain D.O.T. occupational categories in adequate number. Mindful of these limitations, the project staff decided to request supplementa support for an additional two-year period. The purpose of this additional effort was to complete work with the stragglers in Oregon, and to move the study into the more heavily industrialized area of Tacoma-Seattle (Pierce and King Counties). This area offered opportunity, with its greater population concentration to prospect for a sizable return in a brief period of time. It was also assumed that the distribution of deaf persons across occupational categories in Washington might provide the study with much needed representation, particularly in structural and processing types of work.

Some months later the principal investigator, who at that time was living out of Oregon, and the Oregon State Board of Control (which was the sponsoring agency for the project, and was, itself, in the process of being dismantled as a State agency) received notification that the application for supplemental support was approved. On the basis of this heartening information, the project staff established an office in the State of Washington. Contact was also firmly established with a number of Washington agencies which serve the deaf along the Tacoma-Seattle axis. The hope here was, of course, to use their files in locating about 200-300 adult deaf who could be tested within the two-year period.

The fourth year of the project, and the first year of the supplemental program, got underway well enough. Project secretaries were dispatched to Seattle to enumerate the population for screening and testing. As soon as the first volley of names became available, one project examiner moved to Seattle to launch the full scale testing operation. The other examiner joined him for two days a week while continuing with the mop-up operation in Oregon. <u>Since the plan was to test all eligible deaf adults in the Tacoma-Seattle community, no effort was made to organize a probability sample.</u>

One day in February, 1969, notice arrived announcing that the granting agency was looking forward to the final project report by June, 1970.

After some hectic phone communication, it was learned that the supplemental period approved was for but one year through May, 1970, rather than for two years as had been requested. The details of the communication failure are not crucial here. It is sufficient to indicate, that in the period of transition from the defunct Board of Control operation, the newly constituted accounting office which received notice of the supplemental grant approval -- not being familiar with such forms, or with the project request for a two-year supplement -- simply notified the project staff that approval for the supplemental application had been received.

Testing in Washington and Oregon was discontinued in February, 1970. The additional year's work permitted the increment of 24 cases to the Oregon population. The final count was 399 persons enrolled from the study's home State. In addition, there were 84 persons tested in Washington. The Washington data is limited in its usefulness by the sorrowful fact that it in no way can be construed as a meaningful sample. Thus, apart from secondary applications to be made with these data, the information collected in Washington has, in fact, far less utility for this study report than that which was planned when the two-year supplement was undertaken.

It may also be useful, at this time, to remark on the cost of operating a large scale research program such as this. Such information may be of value to other investigators planning large scale studies with the deaf. Average cost per subject tested was significantly greater than was originally anticipated by the planning committee and by the research team. A number of factors contributed to this cost.

Travel costs were much greater than anticipated, since it was found necessary to make personal contact with many of the adult deaf who were identified as being potential subjects. That is, it was not as often possible to schedule individuals for testing through direct telephone contact with them or with a member of their family as had been suggested by the planning committee. Several attempts to make personal contact were necessary before many candidates could be reached, and then, not infrequently, it was found, that after having made contact, the individual did not meet the criteria, which had been established for participation in the project.

The vast distances between populated areas in the State of Oregon also made it impractical for the field staff to return to home base each night. As a result, they remained in the area in which they were working for a week or two at times, again escalating costs.

It should also be recalled that it was necessary to return to the same area to complete the second session of the testing program. It will be remembered that the components of the experimental battery which were administered during the first testing session were given at one time to as many as four persons, whereas those components administered during the second session of the program were administered on a one-to-one basis. Accordingly, it was not possible to administer the second round of tests to more than two persons in an evening. Such costs would, of course, be considerably less in more densely populated states.

The cost of equipment, as well as its maintenance also exceeded estimates, as did the cost of computer support.

B. <u>The Deaf Population Studied</u>

Project staff had a grand total of 1690 contacts with persons referred for study. From the Recruitment Ledger, we note that

1208 persons were contacted in Oregon and 482 persons were contacted in Washington. The term "contact" was used differently in the two states. In Oregon contacts were initiated by: (1) issuing a letter of invitation to a resident of the State, or (2) direct personal contacts or visits to a potential study subject's home. The letter approach was employed with 79 percent of the Oregon population, while personal contact was employed with 21 percent of the population contacted, In Washington the mails were not used at all in reaching candidates for study. Accordingly, a contact was defined as a name taken from the file of an agency working with the deaf, and/or a name of a person referred by a candidate examined by a project field agent. Of the 482 contacts available for interview in Washington, only 38 percent (line 6 - Ledger) had been approached directly for participation in the study at the time the study was abruptly terminated.

Of the 1690 persons referred, either in Oregon or Washington 29 percent (line 8), or 483 adult deaf were qualified for and participated in the study. This report is, therefore, based on two subsamples which, when aggregated, total to 399 deaf persons in Oregon, and a nondescript sample of 84 deaf in Washington. As previously mentioned, the latter group cannot be safely treated as a sample from which inference about a population of deaf persons can be made.

The findings for the completed testing reported in the Ledger provide some interesting leads into how investigators may best gain the cooperation of deaf adults in such studies. Although personal contact, the approach where the project agent approaches the potential study subject directly, was used sparingly in Oregon (21 percent of the contacts), it produced 39 percent of the deaf who participated in the testing program (line 14 ÷ line 9) in that State. Or, from the point of view of the 255 deaf adults approached by means of personal contact in Oregon, 61 percent were successfully tested (line 14 ÷ line 4). In contrast, the approach, by way of a mailed letter, was the major tack followed in Oregon, being employed with 79 percent of the identified contacts. Yet, this approach yielded only 23 percent (line 10 ÷ line 9) of the deaf who completed the test battery. Or, from the point of view of the 953 deaf adults who were contacted initially through the mails, the success rate was only 9.7 percent (line 10 ÷ line 3). Thus, the probability of producing a successfully tested deaf adult was about six times more likely through personal contact (61 percent) than by the mailed letter route (10 percent) in Oregon. The results in

RECRUITMENT LEDGER

Line	Operation	Number	Percent	Line Calculations
(1)	I. Total Study Contacts of Residents from Oregon and Washington	1690		
(2)	A. Oregon Contacts	1208	71.5%	(2)÷(1)
(3)	1. Initial Mail Contacts	953	78.9%	(3)÷(2)
(4)	2. Initial Personal Contacts	255	21.1%	(4)÷(2)
(5)	B. Washington Contacts	482	28.5%	(5)÷(1)
(6)	1. Personal Contacts	183	38.0%	(6)÷(5)
(7)	2. Contacts Pending at Project Termination	299	62.0%	(7)÷(5)
(8)	II. Testing Completed*	483	28.6%	(8)÷(1)
(9)	A. Oregon Residents	399	33.0%	(9)÷(2)
(10)	1. Initial Letter Only	92	9.7%	(10)÷(3)
(11)	2. Initial Letter Plus Personal Contact	12	1.3%	(11)÷(3)
(12)	3. Initial Letter Plus Follow-Up Letter	73	7.7%	(12)÷(3)
(13)	4. Initial Letter Plus Follow-Up Plus Personal Contact	66	6.9%	(13)÷(3)
(14)	5. Initial Personal Contact - No Letter	156	61.2%	(14)÷(4)
(15)	B. Washington Residents	84	45.9%	(15)÷(6)
(16)	1. Initial Personal Contact - No Letter	84	100.0%	(16)÷(15)
(17)	III. Referrals Disqualified	495	29.3%	(17)÷(1)
(18)	A. Oregon Residents (In Order of Recording Priority)	451	37.3%	(18)÷(2)

* 15 persons were tested during the initial testing session in Oregon and failed to participate in the second session. They are not included in the Ledger entries. The ultimate decision to discard these 15 cases was made on the basis of the undesirable influence of missing data from the second test session on statistical correlations to be computed in subsequent data treatment.

RECRUITMENT LEDGER

Line	Operation	Number	Percent	Line Calculations
	III. Referrals Disqualified - Continued			
(19)	1. Deceased	34	7.5%	(19)÷(18)
(20)	2. Moved	45	10.0%	(20)÷(18)
(21)	3. Age	249	55.2%	(21)÷(18)
(22)	4. Employability	54	12.0%	(22)÷(18)
(23)	5. Hearing Loss	69	15.3%	(23)÷(18)
(24)	B. Washington Residents (In Order of Recording Priority)	44	24.0%	(24)÷(6)
(25)	1. Moved	1	2.3%	(25)÷(24)
(26)	2. Age	41	93.2%	(26)÷(24)
(27)	3. Employability	2	4.5%	(27)÷(24)
(28)	IV. Oregon Residents Not Located -- Letter Returned	185	19.4%	(28)÷(3)
(29)	A. Initial Letter Only	162	87.6%	(29)÷(28)
(30)	B. Initial Letter Plus Follow-Up Letter	23	12.4%	(30)÷(28)
(31)	V. Oregon Residents No Response	173	18.1%	(31)÷(3)
(32)	A. Initial Letter	20	11.6%	(32)÷(31)
(33)	B. Initial Letter Plus Follow-Up Letter	153	88.4%	(33)÷(31)
(34)	VI. Refused Personal Contact	154	37.4%	$\frac{(34)}{(4)+(7)}$
(35)	A. Oregon Residents	99	38.8%	$\frac{(4)-(14)}{(4)}$
(36)	B. Washington Residents	55	30.0%	$\frac{(6)-(16+24)}{(6)}$

Washington, where no mailed letter approach was developed, and where only direct personal contacts were employed, tended to confirm the superiority of the direct contact approach. Within the time limitations of the Washington study, it was found that 46 percent of the deaf approached directly for participation, proved to be successful test subjects. This figure is almost five times the rate of success with the letter approach in Oregon.

The careful reader will recognize that these findings, in comparing the level of success between the mailed letter approach and the personal approach, are only suggestive. What is clearly needed to draw the desired contrast regarding the two approaches to the deaf, is a study in which the allocation of subjects to the two conditions is made by the controlled requirements of an experimental design. Nevertheless, despite the limitations in the approach to recruitment taken in this study (catch, as catch can) it seems reasonable to conclude, that for the recruitment purposes of this study, personal contact was much more effective than the impersonal procedure of a mailed invitation to participate.

The data reported in the Recruitment Ledger also gave us information both about the failure experience with mailed questionnaires, and about the reasons why some adults who were successfully contacted failed to be enrolled in the study. With regard to the mailed questionnaires, as employed in Oregon, 19 percent failed to reach the deaf person and were returned to the project office (line 28). A comparable proportion of those who were sent a letter of invitation to participate (18 percent - line 31) apparently received the material but failed to respond to the invitation. In general, it would appear that there is little purpose in following up these "failures to respond" to a letter with a second letter of invitation. There is, however, apparently some value in following up with a personal contact, lending support again to the differential value of this direct approach to the deaf.

The Ledger likewise reveals how adequately each of the five screening criteria functioned in detecting study candidates who were, in fact, not qualified for the study. It is important to keep in mind that the five criteria were applied to each study candidate in the sequence depicted in the Ledger. That is, each potential enrollee in the study was qualified, first, by being located alive at the time of testing. In Oregon, we found 34 individuals referred for study who were deceased when the project agent attempted to involve them. Each of the remaining four criteria trimmed the list of candidates further, with age being the most effective screening or selection device. This finding strongly suggests that investigators planning to organize age-defined samples of adult deaf for future studies would do well to try to question the age of each referred or contacted subject at the time of the first interaction or communication with the investigation staff. Such preliminary screening could clearly save considerable clerical, postage and travel cost. This conclusion was verified in convincing style in the Washington study, where 93 percent of the contacted adult deaf, who were disqualified, washed out on the age criterion.

The experience with referrals of deaf persons for assessment in this study may also be examined from the point of view of where the referrals originated and by what frequency they were received. Study records indicate that each deaf person who was referred and successfully tested, was referred to the study office an average of 2.64 times by participating agencies or persons. The most fertile source of successfully tested referrals was fraternal organizations, which provided 38.3 percent of the successfully appraised referrals. Other fecund sources of productive referrals were other deaf persons (23 percent), and religious institutions (16 percent).

C. The Adequacy of the Oregon Population Studied

The major study results are reported in connection with the Oregon samples of 375 and 399 deaf persons. For the purpose of enumerating the Oregon Register of Adult Deaf these two samples are considered coactively. The question that needs to be faced in appraising the value of the Register is, How well do these samples represent the total population of adult deaf in the State who could have qualified for this study?

Since the larger sample of 399 persons in Oregon available at the end of the fourth year is merely a time extended elaboration of the initial sample of 375 deaf in Oregon, the answer to the above question will be explored in terms of the larger sample. If we assume that the sampling net spread by the Investigators for locating members of the adult deaf target population was a fairly fine and efficient one, and if we also assume that the four-year study period provided adequate time to sweep the net through the State, it may then be presumed that a large proportion of those deaf, who could have been identified, "caught up", and referred for study under favorable conditions, had, in fact, been referred. Based on these assumptions, the 1208 candidates contacted in Oregon by the study staff can be thought of as essentially the basic referral population from which virtually all qualified adult deaf in the State could, at the time, be culled.

It is also known that 451 Oregonians (Ledger, line 18) were disqualified from the study. Since 457 (lines 28, 31 and 35 in the Ledger) adult deaf were never fully screened, the disqualification rate should legitimately, in fact, be based on the 751 deaf persons with whom active communication was pursued (1208-457). If we calculate the rate of disqualification on this base of 751 persons (451 ÷ 751) we find that 60 percent, or three out of every five candidates, referred and actively screened, were disqualified from the sample! Clearly the referral or contact process had attracted a surfeit of inappropriate-for-study names.

Going back then to the original problem the referral pool of candidates numbered 1208 adults from which 451 were disqualified, and 399 fully interviewed and examined. The residual 358 were not actively reviewed and could wrongly be considered, en toto, as sampling failures. However, based on our experience we can assume with confidence that some members of this inactive subset of 358 cases would have been disqualified, if they had been fully interviewed and screened. Our calculations have suggested that 60 percent of those who were actively reviewed were disqualified. Using a more conservative estimate of about 50 percent, we would judge that of the 358 referrals not carefully screened, perhaps 179 would have been disqualified. This would fix our estimate at 179 qualified adult deaf in Oregon who would have participated in the study if they had been screened. This estimate -- coarse and approximate as it may appear -- does place the number of deaf in the State who would qualify for the study at 578 (399 + 179 = 578), or just below the approximately 600 deaf adults in the target population estimated in the plan for the study. If we now ask about the proportion of the estimated, qualified deaf in Oregon which was fully evaluated in the course of this study, we arrive at the figure of 69 percent (399 ÷ 578), success in reaching qualified persons in the State. This suggests that slightly better than two out of every three, who should have been studied, were studied. The investigators are unable, of course, to estimate the extent to which the examined sample adequately reflects the total sample. What they can say with assurance, however, is that it would have taken resources far beyond those available to bring into the tested sample any significant proportion of the 31 percent who we have estimated could have qualified for the study, and who were not included.

D. The Four Samples

Data were collected in two waves. Wave one occupied the first three years' work, incorporating 375 completely interviewed and tested cases in Oregon. Wave two, conducted during the fourth year of the project, was bifocal in that it stretched across Washington and Oregon, bringing 84 subjects into the study from Washington and 24 from Oregon. The data, so collected, have been organized into four samples as follows:

Sample I - the persons in Sample I constitute the first three-year sample of 375 Oregon adult deaf. N = 375

Sample II - the persons in Sample I plus the 24 Oregon adult deaf who were completed in the fourth year of the study. N = 399

Sample III - the persons tested in Washington during the fourth year of the study. N = 84

Sample IV - the persons in Sample II plus the persons in Sample III. N = 483

Table 2 reports the number of persons in each of the four samples for whom background data are available. It also documents the average, standard deviation, and in some cases the frequency distribution, for variables tabulated. This was done wherever possible for each of the four samples. In some cases, certain data were not available, either because they were not collected, or because they could not be analyzed for a given sample within the project's operating budget.

E. The Oregon Register

For the purpose of composing the Oregon Register, information from both Sample I and Sample II is relevant. It should be remembered that these samples of 375 and 399 deaf persons were between 24 and 54 years of age, who had a hearing loss of at least fifty db in their superior ear, and were employable by the definition adopted for this study. It should also be reiterated that the groups of 399 deaf approximate about two-thirds of those who might have qualified in the State of Oregon for inclusion in the study. Mindful of these factors, the data in Table 2 can now be considered in detail.

TABLE 2

Demographic Characteristics of the Fou
Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
1. Sex:				
Male	204 (54.4%)	220 (55.1%)	53 (63.1%)	273 (56.5%)
Female	171 (45.6%)	179 (44.9%)	31 (36.9%)	210 (43.5%)
2. Age:				
Number	375	399	84	483
Average	37.1	37.1	33.8	36.5
Standard Deviation	9.7	9.7	8.0	9.5
3. Age at Onset:				
Number	371	394	82	476
Average	4.0	3.9	2.5	3.6
Standard Deviation	7.4	7.2	4.9	6.9
4. Education:				
Number	367	391	84	475
Average	1.6	1.6	1.5	1.6
Standard Deviation	.9	.9	.7	.8
Educational Code				
No Credit = 0	9 (2.5%)	Not Available	Not Available	10 (2.1%)
Grade School = 1	194 (52.9%)	" "	" "	254 (53.5%)
High School = 2	121 (33.0%)	" "	" "	158 (33.3%)
Bachelor's Degree=3	22 (6.0%)	" "	" "	31 (6.5%)
Master's Degree = 4	20 (5.5%)	" "	" "	21 (4.4%)
Doctorate = 5	1 (0.3%)	" "	" "	1 (0.2%)
Unknown = 6	0 (0.0%)	" "	" "	8 (1.7%)
5. Type of School:				
Residential	375	Not Available	Not Available	483
Yes	291 (77.6%)	" "	" "	392 (81.2%)
No	84 (22.4%)	" "	" "	91 (18.8%)

TABLE 2
(Continued)
Demographic Characteristics of the Four Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
5. Type of School (Continued):				
Day School	373	Not Available	Not Available	481
Yes	71 (19.0%)	" "	" "	92 (19.0%)
No	302 (81.0%)	" "	" "	389 (81.0%)
Day Classes	374	" "	" "	482
Yes	59 (15.8%)	" "	" "	88 (18.3%)
No	315 (84.2%)	" "	" "	394 (81.7%)
Public School	372	" "	" "	480
Yes	119 (32.0%)	" "	" "	146 (30.0%)
No	253 (68.0%)	" "	" "	334 (70.0%)
6. Telephone (Access):	373	397	84	481
Yes	208 (55.8%)	221 (55.7%)	34 (40.5%)	255 (53.0%)
No	165 (44.2%)	176 (44.3%)	50 (59.5%)	226 (47.0%)
7. Employed:	375	399	84	483
Yes	296 (78.9%)	314 (78.7%)	67 (79.8%)	381 (78.9%)
No	79 (21.1%)	85 (21.3%)	17 (20.2%)	102 (21.1%)
8. Pay Rate (Monthly):				
Number	281	297	57	354
Average	$476.09	$475.36	$611.18	$497.23
Standard Deviation	$172.93	$173.40	$177.84	$180.91
9. Number of Jobs:				
Number	373	397	84	481
Average	1.3	1.3	1.8	1.4
Standard Deviation	.9	.9	1.1	1.0
Reported Number None	46 (12.8%)	Not Available	Not Available	50 (10.4%)

TABLE 2
(Continued)
Demographic Characteristics of the Four Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
9. Number of Jobs (Continued):				
One	220 (59.0%)	Not Available	Not Available	270 (56.1%)
Two	76 (20.6%)	" "	" "	110 (22.9%)
Three	18 (4.8%)	" "	" "	36 (7.5%)
Four	7 (1.9%)	" "	" "	8 (1.7%)
Five	5 (1.3%)	" "	" "	5 (1.0%)
Six	0 (0.0%)	" "	" "	0 (0.0%)
Seven	1 (0.3%)	" "	" "	2 (0.4%)
10. Months Worked:				
Number	360	383	83	466
Average	26.0	26.0	28.8	26.5
Standard Deviation	14.2	14.1	11.4	13.7
Reported Number				
0-9	75 (20.8%)	Not Available	Not Available	89 (19.1%)
10-24	41 (11.4%)	" "	" "	55 (11.8%)
25-35	37 (10.3%)	" "	" "	54 (11.6%)
36	207 (57.5%)	" "	" "	268 (57.5%)
11. Type of Residence:				
Number	375	399	84	483
Average	1.6	1.6	1.7	1.6
Standard Deviation	.8	.9	.6	.8
Residential Code				
Own Home	220 (58.7%)	Not Available	Not Available	262 (54.2%)
Rent	122 (32.5%)	" "	" "	178 (36.9%)
Room and Board	5 (1.3%)	" "	" "	6 (1.2%)
Other	28 (7.5%)	" "	" "	37 (7.7%)

TABLE 2
(Continued)
Demographic Characteristics of the Four Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
12. Automobile (Access):	375	399	84	483
Yes	316 (84.3%)	334 (83.7%)	70 (83.3%)	404 (83.6%)
No	59 (15.7%)	65 (16.3%)	14 (16.7%)	79 (16.4%)
13. Number of Marriages:				
Number	373	396	84	480
Average	.9	.9	1.0	.9
Standard Deviation	.6	.6	.9	.6
Reported Number				
None	69 (18.5%)	Not Available	Not Available	97 (20.2%)
One	268 (71.8%)	" "	" "	330 (68.8%)
Two	29 (7.8%)	" "	" "	42 (8.8%)
Three	7 (1.9%)	" "	" "	9 (1.9%)
Four	0 (0.0%)	" "	" "	1 (0.2%)
Five	0 (0.0%)	" "	" "	1 (0.2%)
14. Number of Deaf in Family of Origin:				
Number	372	393	84	477
Average	.6	.6	.6	.6
Standard Deviation	1.1	1.1	1.2	1.1
Reported Number				
None	257 (69.1%)	Not Available	Not Available	334 (70.0%)
One	63 (16.9%)	" "	" "	70 (14.7%)
Two	27 (7.3%)	" "	" "	36 (7.5%)
Three	14 (3.8%)	" "	" "	23 (4.8%)
Four	5 (1.3%)	" "	" "	7 (1.5%)
Five	2 (0.5%)	" "	" "	2 (0.4%)
Six	4 (1.1%)	" "	" "	5 (1.0%)

TABLE 2
(Continued)
Demographic Characteristics of the Four Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
15. Number of Deaf in Conjugal Family:				
Number	373	394	83	477
Average	.7	.7	.8	.7
Standard Deviation	.8	.8	.7	.7
Reported Number				
None	150 (40.2%)	Not Available	Not Available	190 (39.9%)
One	194 (52.0%)	" "	" "	249 (52.2%)
Two	16 (4.3%)	" "	" "	22 (4.6%)
Three	8 (2.1%)	" "	" "	11 (2.3%)
Four	5 (1.3%)	" "	" "	5 (1.0%)
16. Handedness:				
Right	328 (90.6%)	350 (90.7%)	75 (89.3%)	425 (90.4%)
Left	34 (9.4%)	36 (9.3%)	9 (10.7%)	45 (9.6%)
17. DOT, First Digit:				
Professional, Technical and Managerial	46 (15.9%)	Not Available	Not Available	54 (14.4%)
Clerical and Sales	39 (13.4%)	" "	" "	64 (17.1%)
Service Occupations	30 (10.4%)	" "	" "	37 (9.9%)
Farming, Fishery, and Forestry	1 (0.3%)	" "	" "	1 (0.3%)
Processing Occupations	16 (5.5%)	" "	" "	17 (4.5%)
Machine Trades	53 (18.3%)	" "	" "	67 (17.9%)

TABLE 2
(Continued)
Demographic Characteristics of the Four Samples

Variable	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
17. DOT, First Digit (Continued):				
Bench Work	48 (16.5%)	Not Available	Not Available	53 (14.1%)
Structural Work	27 (9.3%)	" "	" "	35 (9.3%)
Miscellaneous	30 (10.4%)	" "	" "	47 (12.5%)
18. DOT, Digits 4-6.				
Data				
Number	Not Available	308	67	375
Average	" "	5.6	5.1	5.5
Standard Deviation	" "	2.6	2.4	2.6
People				
Number	" "	308	67	375
Average	" "	7.2	7.7	7.3
Standard Deviation	" "	2.0	1.2	1.9
Things				
Number	" "	308	67	375
Average	" "	4.6	4.9	4.7
Standard Deviation	" "	2.7	3.1	2.8

The larger sample contains 220 employable men and 179 employable women. This indicates that about 55 percent of the employable deaf in Oregon defined by the project's selection criteria are men, while only 45 percent are women. This distribution varies somewhat from the official estimation of the sex distribution for the Oregon population for 1965. In the Oregon State Board of Census Population Bulletin (P-10), the forecast for 1965 was that there would be an almost equal division of men (49.4 percent) and women (50.6 percent) between the ages of 25 and 54 in the State. Women were therefore underrepresented in the study sample of deaf adult employables. The average age of these deaf adults enrolled in Oregon is 37 years, with about two-thirds of the group ranging roughly from 27 to 47 years old. As reported for this sample of 399 individuals, the average age of onset of the hearing disability was 3.9 years. The shape of this distribution was severely skewed. As a matter of fact, 35 percent of the deaf in this sample reported being born deaf. Another seventeen percent lost their hearing by their first birthday; another fourteen percent by their second birthday; an additional seven percent by age three; and five percent more by age four. Thus, 73 percent of the sample, was for all purposes, deprived of its hearing by the time it reached the age of four. And finally, 75 percent of the sample (300 persons) reported themselves as deaf by the time they were five years old. This is a particularly pertinent statistic, since it reflects the proportion of the Oregon sample which was prelingually deaf.

An interesting sidelight, not reported in Table 2 is that 35 percent of the larger Oregon sample testified to owning a hearing aid. However, only 22 percent used an aid in one or both of the testing sessions. It should be said that this was observed despite the special effort made by the project staff to encourage the use of an available aid.

Moving on in characterizing the sample, the average academic achievement of the 399 deaf was short of a high school certificate or diploma. Further, from Sample I it appears that 78 percent of the deaf were in residential schools sometime during their academic careers. With regard to day schools, 19 percent were at one time associated with this type of program; while about 16 percent were involved in day classes during their school years. In addition, 32 percent had had some experience in public school programs.

As for access to a phone, 56 percent of the sample did report a phone within convenient reach. In the area of vocational history, 79 percent of the employable deaf studied were employed, while 21 percent were, at the time of the study interview, unemployed. For those working at all during the previous 36 months, their most recent monthly pay rate was 475 dollars. Further, the average number of jobs held during the period of the 36-month review was 1.3 jobs. From the smaller sample of 375 adult deaf in Oregon, we learn that 21 percent worked under ten months during the entire interval of the last three years, and of those who worked at all (327) we find 79.4 percent holding less than three positions over the three year reporting period. Also, the employable adult deaf studied in Oregon were employed an average of 26 of the 36 months period of record.

With regard to personal property, the model arrangement for the adult deaf in Oregon was to own their own home, rather than to rent or to board in a group or family setting. As for the use of automobiles, 84 percent of the sample had a motor vehicle readily accessible.

Insofar as family life is concerned, the data on the Oregon employable deaf in Sample I are more informative than the data in Sample II, given the limitation in funds to portray more fully the Sample II distribution. From Sample I we learn that 72 percent of the deaf adults in the study were married but once. Multiple marriages were somewhat rare, with only eight percent married twice and two percent married three times. These figures are much like the data reported for Sample IV, the composite sample, suggesting, that for those adult deaf interviewed, about seventy percent were established in a single marriage, with about twenty percent unmarried, and the balance of ten percent involved in multiple marital affiliations. Adult deaf, as studied in Oregon, were raised in families of origin in which they were, in 69 percent of the sample, reportedly the only deaf person within the nuclear family (see Sample I). While 31 percent of the cases were born to, or raised in families which had at least one other deaf person, less than seven percent of the sample had more than two other deaf members in their families of origin. These latter figures may, of course, be limited by family size. Regarding the comparative situation with the family of procreation (conjugal family), Sample I again provides the most useful information. The typical adult deaf person in the sample lives in a conjugal family with one other deaf individual. It should be noted that forty percent live in a family in which no other person is deaf. These data need, however, to be understood in terms of the fact that about twenty percent of the adult deaf studied in Oregon were never married.

We also learned that 90.7 percent of the deaf were right-handed. According to Wile (150), the proportion of left-handedness in the general population varies in creditable reports from two to thirty percent, with four to six percent the most widely reported figure. The 9.3 percent reported for left-hand preference here may be on the high side of this most usual range.

In summarizing these findings, it may be useful to describe a profile of the typical employable deaf adult from Oregon enrolled in this study.

1. The typical person is male.

2. He is 37 years old.

3. He has achieved something more than a grade school, but less than a high school education.

4. He has attended residential school more frequently than other school programs.

5. With respect to property and the use of modern conveniences, he is most likely to be a home owner, as well as to have (not necessarily own) an automobile within easy access. He can also reach a phone if he does not, in fact, have one is his residence.

6. He is most likely to be married, but not likely to be married more than once.

7. He is likely to be born in a family where he was the sole deaf person, and to live in a conjugal family with one other deaf person.

8. He is given to left-handedness slightly more than might be expected.

Because this study is concerned most fundamentally with the vocational adjustment of adult deaf persons, we have delayed examination of the DOT vocational characteristics of the Oregon sample to this point at the end of this section, where it can be given due emphasis. The first digit of the DOT code will be used for our present discussion of the vocational adjustment of the deaf.* To begin, we want to refer to the DOT first digit information in Table 2 (variable 17). It should be noted that we have data reported for only two samples, (I-IV). Thus, for the purpose of describing vocational adjustment among the deaf in Oregon, Sample I will serve as our immediate data source. Of the 375 persons in the sample, it was possible to identify a codable occupation in 290, or 77 percent of the cases. It was clear, then, that many deaf persons did not have a consistent work history associated with a given type of occupation. Nevertheless, when an occupational category was identified, the adult deaf were found in greatest number in the machine trades, bench work, professional and managerial roles, and clerical-sales activities. They are numerically fewer in farming and associated occupations and in processing work. The more critical data for appraising vocational adjustment of the deaf in Oregon are, however, the comparative data to be examined for hearing persons in the State. Table 3 was organized from two sources. The data on the left for the employed hearing population of the State during 1967 were derived from State Employment Division Report (54). The data on the right are presented again from Sample I in the Oregon study. In interpreting data in Table 3 one should be aware of some biasing factors, most important of which may be the more narrow age range in the deaf sample; probable differences in formal educational experience and achievement in the two groups; and the different time slices depicted by data in the two arrays. With these limitations clearly in mind, attention is called to what appears to be meaningful differences between the two groups. To begin, it seems clear that the deaf are underemployed in professional and managerial occupations, and in clerical and sales work. There is also a tendency toward under-representation of the deaf in service occupations. Deaf persons are, on the other hand, overly concentrated in the machine trades and bench work, and to some lesser extent in processing occupations. As suggested by the literature, cited earlier in this report, the distribution of deaf throughout the employment market-place is, indeed, indicative of differential opportunity and a corresponding adjustment to

* Attention is called in passing to variable 18 in Table 2 where the data is summarized for the three DOT digits' analysis developed by Kerr. These data are not to be overlooked, but will be examined at a later point in this report.

TABLE 3

OREGON EMPLOYMENT BY DOT CATEGORY

Occupations	DOT	Hearing Population			Deaf Population	
		N	%		N	%
Professional, Technical, Managerial	0-1	148,007	22.73		46	15.86
Clerical Sales	2C 2S	106,069 53,437	16.29) 8.21)	24.50	39	13.45
Service	3	90,829	13.95		30	10.35
Farming, Fishery, Forestry, and Related Occupations	4	4,445	.68		1	.34
Processing	5	23,169	3.56		16	5.52
Machine Trades	6	55.075	8.46		53	18.27
Bench Work	7	20,907	3.21		48	16.55
Structural Work	8	56,454	8.67		27	9.31
Miscellaneous	9	92,708	14.24		30	10.35
TOTAL		651,100	100.00		290	100.00

that differing opportunity. The nature of this adjustment evidently takes many forms. We have seen, for example, that unemployment plagues 21 percent of those deaf who are employable. This finding deserves further elaboration.

For 1968 the Oregon Division of Employment reported an average unemployment rate of 3.81 per 100 residents of the State covered by State unemployment insurance provisions. Approximately ten percent of the labor force operates outside these statutory provisions. Mr. Paul Kerr, of the Research and Statistics Section of the Division of Employment, has suggested that, if this group of persons were included in the official State employment statistics, the total unemployment estimate might be elevated perhaps .5 percent, to a rate of 4.3 percent. The twenty-one percent figure of unemployment computed in this study for adult employable deaf is in this context lamentably, if not wretchedly, excessive for any group of employable persons.

We have also seen that the deaf cluster in certain occupational categories in adjusting to employment opportunities. Our evidence indicates that this adjustment results in the deaf adult taking work at a lesser pay rate than that of the hearing population. It will be recalled that the average monthly pay rate for Oregon employed deaf as defined in Sample II was $475. Mr. Kerr advises that the average monthly pay in 1968 for Oregon's work force, other than those employed in professional and managerial positions, was $616. If the excluded groups of professional and managerial people were to be incorporated in this figure, it would visibly raise the average. The monthly differential would then likely come closer to two hundred dollars above the income of the deaf persons enrolled in Sample II -- a considerable if not shameful disparity.

CHAPTER 4

TEST PERFORMANCE OF THE ADULT DEAF IN OREGON

A. Preamble to Data

Table 4 reports test data for each of the four study samples. Description of the performance of the deaf on the tests used in the study will, however, be restricted in most connections to the 399 deaf in Sample II, because these data are considered more representative of a known population than are the combined Oregon and Washington data. The number of deaf in Oregon who successfully completed each element in the test battery varies from 355 persons (89 percent) to all of the 399 deaf accredited for testing. The results should therefore be representative of the sample of adult Oregon employable deaf persons studied.

B. The General Aptitude Test Battery

The GATB results will be examined first in Table 4. Each aptitude score is reported as a standard score on a scale which has a mean of 100 and a standard deviation of 20. The scoring of the test performance followed established scoring procedures for the hearing population. The data as documented here, therefore, project the performance of the deaf against standards developed for the hearing population. For General Learning Ability (G), the 393 deaf tested in Oregon on this measure earn an average score of 86.5, or 13.5 standard score points lower than the average hearing subject. The standard deviation for G (19.4) is, however, virtually identical with that found for hearing subjects. On verbal Aptitude (V) the deaf appear to be even less proficient than on General Learning Aptitude, with an average score of 82.8. This performance places them almost one standard deviation below the hearing population on this test factor. It can be seen that the performance of the deaf on Numerical Aptitude (N) also suffers noticeably with an average score of 84.9 These three aptitudes are the most deficient performance indices portrayed on the GATB for the Oregon deaf. It should also be remarked that the numerical performance (N) of the deaf sample is the most variable among these three markedly affected aptitude areas. In contrast, the deaf population tested exceeds the hearing population by about three-quarters of a standard deviation on Clerical Perception (Q). Worth mentioning also is the elevated standard score of 109.8 on the Form Perception (P). Further, variability on Q and P tend to be on the high side, suggesting that a significant proportion of the deaf earned conspicuously favorable scores

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
General Aptitude Test Battery					
General	Number	369	393	84	477
	Average	87.1	86.5	89.8	87.1
	Standard Deviation	19.4	19.4	18.5	19.3
Verbal	Number	369	393	84	477
	Average	83.3	82.8	81.0	82.5
	Standard Deviation	16.6	16.5	14.9	16.2
Numerical	Number	369	393	84	477
	Average	85.4	84.9	89.8	85.8
	Standard Deviation	23.1	23.0	21.1	22.8
Spatial	Number	375	399	84	483
	Average	106.2	105.8	114.4	107.3
	Standard Deviation	20.0	20.1	19.6	20.0
Form Perception	Number	375	399	84	483
	Average	110.5	109.8	118.4	111.3
	Standard Deviation	25.3	25.4	21.7	25.0
Clerical	Number	369	393	84	477
	Average	115.7	115.2	122.3	116.5
	Standard Deviation	21.4	21.4	20.2	21.4
Eye-Hand Coordination	Number	375	399	84	483
	Average	104.8	104.5	107.0	104.9
	Standard Deviation	20.5	20.5	17.4	20.0

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
General Aptitude Test Battery (continued)					
Finger Dexterity	Number	375	399	84	483
	Average	96.3	96.4	100.1	97.0
	Standard Deviation	24.6	24.7	23.4	24.5
Manual Dexterity	Number	374	398	84	482
	Average	98.6	98.3	111.8	100.6
	Standard Deviation	25.5	25.5	27.2	26.3
Culture Fair "g"	Number	375	399	84	483
	Average	92.9	92.6	100.5	93.9
	Standard Deviation	18.2	18.4	15.2	18.1
Bender Gestalt					
Raw Score	Number	374	398	84	482
	Average	37.0	36.3	24.0	34.2
	Standard Deviation	25.5	25.5	15.6	24.5
Standard Score	Number	374	398	84	482
	Average	70.9	70.0	57.0	67.8
	Standard Deviation	27.0	27.5	15.9	26.3
Hearing Loss Test					
Left Ear	Number	375	399	84	483
	Average	98.2	98.4	98.4	98.4
	Standard Deviation	16.5	16.3	14.8	16.0
Right Ear	Number	375	399	84	483
	Average	98.5	98.5	98.5	98.5
	Standard Deviation	15.8	15.8	16.3	15.9

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
Hearing Loss Test (continued)					
Better Ear	Normal	375	399	84	483
	Average	94.8	94.9	95.2	95.0
	Standard Deviation	17.0	16.9	16.2	16.8
Weingarten Raw Scores					
Interpersonal	Normal	373	397	84	481
	Average	19.0	18.9 (16.9)	19.2	18.9
	Standard Deviation	7.0	7.0 (6.5)	7.4	7.0
Natural	Normal	373	397	84	481
	Average	21.0	20.9 (30.0)	19.4	20.7
	Standard Deviation	11.6	11.6 (13.3)	10.0	11.4
Mechanical	Normal	373	397	84	481
	Average	20.9	20.9 (24.9)	20.7	20.9
	Standard Deviation	8.6	8.6 (7.7)	8.3	8.6
Business	Normal	373	397	84	481
	Average	32.1	32.0 (21.0)	32.5	32.1
	Standard Deviation	11.3	11.3 (11.1)	10.4	11.2
Esthetic	Normal	373	397	84	481
	Average	21.2	21.1 (18.3)	21.2	21.1
	Standard Deviation	6.8	6.8 (7.0)	6.9	6.8
Scientific	Normal	373	397	84	481
	Average	18.1	18.1 (19.6)	19.4	18.3
	Standard Deviation	6.2	6.2 (7.7)	6.8	6.4
Verbal	Normal	373	397	84	481
	Average	11.6	11.5 (8.5)	12.1	11.6
	Standard Deviation	4.8	4.8 (4.4)	4.4	4.8

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
Weingarten Raw Scores (continued)					
Computational	Normal	373	397	84	481
	Average	13.6	13.6 (11.2)	14.7	13.8
	Standard Deviation	5.4	5.4 (5.1)	4.9	5.3
Time Perspective	Normal	373	397	84	481
	Average	9.1	9.0 (7.1)	9.5	9.1
	Standard Deviation	3.4	3.3 (3.1)	3.8	3.3
Gottschaldt Standard Score	Normal	374	398	84	482
	Average	46.4	46.0	49.8	46.7
	Standard Deviation	8.5	9.1	9.1	9.2
Gates Reading Comprehension Raw Score	Normal	374	398	84	482
	Average	23.7	23.2	21.8	23.0
	Standard Deviation	11.6	11.8	11.1	11.7
Grade Score	Normal	374	398	84	482
	Average	5.8	5.6	5.4	5.6
	Standard Deviation	2.9	3.0	2.8	2.9
Age Score	Normal	374	398	84	482
	Average	10.1	10.8	10.8	10.8
	Standard Deviation	3.1	3.1	2.9	3.1
Craig Lipreading Inventory words	Normal	374	398	84	482
	Average	72.4%	72.1%	68.7%	71.5%
	Standard Deviation	18.4	18.3	18.6	18.3

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
Craig Lipreading Inventory Sentences	Normal	373	397	84	481
	Average	73.5%	73.0%	70.8%	72.6%
	Standard Deviation	22.7	22.9	23.3	23
Oregon Manual Communication Test Reading	Normal	353	377	84	481
	Average	79.4	79.5	92.3	81.9
	Standard Deviation	32.2	31.9	11.8	29.7
Signing	Normal	374	398	84	482
	Average	68.5	68.0	81.8	70.4
	Standard Deviation	33.6	33.6	20.7	32.1
Berger Block Test I Identification	Normal	374	398	84	482
	Average	33.9	33.4	33.4	33.4
	Standard Deviation	17.7	17.9	17.6	17.9
Test II Identification	Normal	374	398	84	482
	Average	33.5	33.4	35.4	33.7
	Standard Deviation	13.4	13.5	11.6	13.2
Test III Identification	Normal	374	398	84	482
	Average	28.4	28.3	31.1	28.8
	Standard Deviation	16.6	16.5	13.7	16.1
Test IV Identification	Normal	374	398	84	482
	Average	4.7	4.6	3.3	4.4
	Standard Deviation	12.2	12.1	8.6	11.5
Berger Block Total I - IV Identification	Normal	374	398	84	482
	Average	99.7	98.8	103.2	99.6
	Standard Deviation	42.8	43.1	39.9	42.5

TABLE 4

Test Means and Standard Deviations of Four Deaf Samples

Test Item	Statistic	Sample I N = 375	Sample II N = 399	Sample III N = 84	Sample IV N = 483
Holdt Speech Characteristics (Expert)					
Intelligibility	Normal	337	355	73	428
	Average	77.4	77.2	72.6	66.4
	Standard Deviation	22.7	22.4	22.1	22.4
Pitch	Normal	337	355	73	428
	Average	3.0	3.0	3.0	3.0
	Standard Deviation	.5	.5	.4	.5
Volume	Normal	337	355	73	428
	Average	2.9	2.9	2.9	2.9
	Standard Deviation	.5	.5	.4	.5
Duration	Normal	337	355	73	428
	Average	3.0	3.0	3.0	3.0
	Standard Deviation	.3	.3	.1	.3
Holdt Speech Characteristics (Novice)					
Intelligibility	Normal	337	355	73	428
	Average	61.5	61.0	57.1	60.4
	Standard Deviation	29.3	29.2	30.0	29.2
Pitch	Normal	337	355	73	428
	Average	3.0	3.0	3.0	3.0
	Standard Deviation	.5	.5	.6	.5
Volume	Normal	337	355	73	428
	Average	2.8	2.8	2.9	2.8
	Standard Deviation	.5	.5	.5	.5
Duration	Normal	337	355	73	428
	Average	2.9	2.9	2.9	2.9
	Standard Deviation	.4	.4	.3	.4

on these tests. The S, K, F, and M scores were generally within the range of the average for these aptitudes as designated by the standard score values for hearing persons. The one remaining score, the Culture Fair "g", was 92.6, again somewhat lower than obtained for hearing subjects. Nevertheless, the "g" score eclipses the G score earned by the deaf. It would appear then, the "g" seems to provide a more favorable estimate of intellectual functioning in the deaf than does G. The reader will also remember that GATB test scores were summarized for three studies of the Deaf in Table 1. Generally, scores reported from the Oregon sample compare favorably with the other three samples, in that the Oregon average score exceeds the comparable average scores reported in the three studies eighteen times; equals the scores of the other studies two times, and falls below the other study scores seven times. The Oregon adult deaf score is uniformly superior to the scores in other studies in General Learning Ability, Verbal Aptitude. Spatial Aptitude, and Clerical Perception. It is consistently lower than reported in the other three studies only on Manual Dexterity. These findings are in general agreement with the pilot study work which prefaced the Oregon Study. It should be recalled that this work indicated that the testing approach used in the Oregon study of the deaf tended to yield somewhat superior scores than were found with the standard testing techniques developed for the testing of the hearing. It may also be of interest to note that no more than six deaf refused to participate with the verbal aspects (G, V and N) of the GATB. This suggests, of course, that the verbal subtests, as administered were, with few exceptions, meaningful experiences for deaf adults.

C. The Bender Visual Motor Gestalt Test

The Bender Gestalt raw average score was 36.3, which converts to an average standard score of 70.0 (scores are inversely related to competence). This standard score, unlike its counterpart on the GATB, is designed to be distributed around an average of fifty with a standard deviation of ten. Accordingly, the deaf adults in this study performed on the Bender Gestalt in a convincingly inept fashion in contrast to hearing persons. The standard deviation of 27.5 attests to the fact that many adult deaf in the Oregon sample demonstrated dramatically disorganized response tendencies on this test. Again, this test was administered to deaf adults without trouble. That is, only one subject out of the large Oregon sample was unable to perform on the instrument.

D. Hearing Loss

The evidence on hearing loss is quite clear. By and large the data reveal a group of persons who are profoundly deaf, with the vast majority exhibiting a loss of more than 70 db in both ears. There is little to choose from in comparing the average db loss in the two ears. Also, the findings suggest that when significant loss (greater than 50 db) is found in both ears the "better" ear has little to recommend it over the less able ear.

E. The Weingarten Picture Inventory

Nine Weingarten scores are presented in Table 4. On the dimension of Interpersonal interests, the deaf average score was 18.9. From the Picture Interest Inventory answer sheet (McGraw Hill, 1958) a score of nineteen on the interpersonal dimension falls at the 70th percentile for hearing subjects. On the Natural interest dimension, the Oregon average of 20.9 is located at the 40th percentile on the norms for the hearing population. In contrast with the hearing population, the Oregon deaf average score also falls at the 30th percentile on Business interest; at the 70th percentile on Esthetic interest; the 40th percentile on Scientific interest; at the 70th percentile in Verbal pursuits; the 60th percentile on Computation; and the 60th percentile on Time Perspective. To facilitate comparison with the hearing population, Table 4 also reports, in parentheses, averages and standard deviations for hearing persons on each interest dimension. This information is found beside the corresponding data from Sample II. In the Table the adult deaf, as portrayed on the Weingarten Picture Interest Inventory have impressively high business interests supported by secondary regard for interpersonal service occupations and esthetic interests. One interest area -- mechanical -- is patently low. With respect to the applicability of the test to the Oregon deaf, it may be said that only two deaf persons failed to respond intelligently to the test as administered, so that, in light of experience on this project, the admonishment so often heard against routine testing of interest patterns among the deaf now seems unjustified.

F. The Closure Flexibility (Gottschaldt) Test

On the Gottschaldt Figure Closure test it was found that virtually all deaf were able (398) to handle the test material. Their performance on this test, was however almost .4 of a standard deviation below the hearing population.

G. The Gates Reading Survey

Reading comprehension as measured on the Gates, was found to be at the mid-year level of the fifth grade (5.6). This means, that the deaf as a group, in this Oregon sample were performing at a reading comprehension level of 10.8 years. The ceiling on this test is 17.10 years. Again, only one member of the sample was unwilling to try to cope with the test material, so that the Gates Reading Comprehension test, as administered, is well within the capacity of properly instructed and prepared deaf adult examinees.

H. The Craig Lipreading Inventory

Contrasting normative data for hearing persons were not available for the two parts of the Craig Lipreading Inventory. In the Oregon sample the Words subtest was performed with 72 percent average accuracy. The Sentence segment of the Craig was handled with 73 percent average accuracy. Variation was somewhat greater on sentences than on words, although the actual scores ranged from zero to 100 percent on both. As with previously reviewed test instruments, both elements of the test proved to be easily within the scope of the competence of adult deaf.

I. The Oregon Manual Communication Test

The deaf revealed an interesting distinction in their capacity to handle reading (manual receiving) and signing (manual sending) functions. Twenty-two persons (six percent) were unwilling to tackle the reading or receiving task, while only one deaf subject balked at the signing (sending) portion of the test. The distribution curves for these two tests were U-shaped, with many adult deaf failing to achieve even the most modest level of satisfactory communication, with many displaying highly developed communication skills both in reading and signing, and with relatively few deaf scoring between the extremes. Thus the level of mastery of signing seems to be bi-modal, with the adult deaf either doing very well or rather poorly in both receiving and sending of information manually

J. The Berger Block Test

The Berger Block Test data reported in Table 4 in four Identification subtest scores, and a total Identification score. The other experimental test scores developed -- the five Movement scores -- were found to be so closely correlated with Identification that they were considered redundant and were discarded.

K. The Holdt Speech Characteristics Test

This test was the final test in the study battery, and was, of course designed as another in a series of communication instruments. Noteworthy is the fact that 44 subjects, or 11 percent of the sample, were unable to perform on this test. This was, however, not because the test materials or task format alienated subjects. It was rather in large measure a matter of delay in receiving project equipment necessary for this test. The project staff, in the face of such delay, had decided, early in the project, to avoid further hindrance to progress and additional stress on the operating time table, and opted to proceed without the Speech Characteristics component of the program. As things turned out, the final months f the project were cramped by the rush of the abbreviated time schedule and the reduction in expected funds, so that it was not possible to relocate these 44 subjects and administer the Speech Characteristics Test as had been planned.

The impression gleaned from this discussion of the basic test data is that the tests were administered quite successfully with modest resistence from the deaf to any one test, with essential scorability of the deaf subject's test response, and with adequately meaningful variance in the test response.

L. Test Norms For Adult Deaf

The counselor working with the deaf will doubtless desire additional normative information, beyond that available in Table 4, on which to appraise the test performance of his clients. Furthermore, much of the data reported in this Chapter to this point is presented with an accent on contrasting the Oregon deaf with hearing persons. Counselors must inevitably also be concerned with relating a given deaf individual's vocational test performance with the performance of a population of peers - i.e. other employable adult deaf. In this sense, counselors obviously need a set of vocational test norms for adult deaf clients.

Table 5 permits the counselor to transform a deaf client's raw scores on each test element of the study battery to standard scaled values. These values make it possible to (1) compare a deaf adult's performance on any single test with his performance on any other test used in the study, and (2) to place the deaf client's test performance more precisely in general comparative reference with a large sample of deaf. Two details about these transformed scores need to be made clear. First, while the investigators had planned to normalize the test distribution, the lack of funds at the time the project was terminated militated against this. Second, because rather profound differences were found between the sexes on the Weingarten Interest Profile, it was decided to establish separate transformed scores for each sex for this test.

For this purpose, then, Table 5 lists an array of raw scores on each test as constructed for the 399 deaf adults evaluated in Sample II. Beside each raw score listed for each test is the corresponding standard score and a percentile rank to which the raw score may be converted. The percentiles are presented only for raw scores earned by the deaf in Sample II. The standard scores are so derived mathematically that the average standard score for the deaf is 100 on each test. Similarly, each test's standard score distribution has a standard deviation of 20. For the deaf client, who produces a raw score, whose standard score, or percentile rank is not listed in Table 5, the counselor will want to interpolate between reported raw scores to derive the equivalent values. Table 5 incorporates information for 31 tests each portrayed in an independent subtable (5.01 - 5.31) with male and female standards defined on the nine interest scales. In effect the counselor of the deaf now has norms available for deaf adults on vocationally oriented psychological tests constructed originally for hearing subjects, as well as on tests built specifically for deaf adults.

How does the counselor use the normative information in Table 5? Suppose we examine four subtables to draw some potential inferences. We will focus on Tables 5.01, 5.10, 5.20, and 5.30.

Table 5.01 provides norms for the GATB-G. The counselor of the adult deaf can locate his client's raw score in this Table to determine the associated standard score and percentile ranking. A raw score of 86 on G would then be translated into a standard score of 100, which by definition is the average standard score. A raw score of 86 on this subtest is also that score which falls at the fifty-second percentile. In this connection then a raw score of 86 is a better score than 52 percent of the adult deaf produced in this study on the G factor. Similarly, a raw score of 67 is convertible to a standard score of 80, which is one standard deviation below the average standard score. This Table also informs us that an individual who earns a raw G score of 67 has done better on this factor than 18 percent of the adult deaf. Or, the Table imparts the knowledge that the deaf individual who produces a G score of 106, places one standard deviation above the average, and exceeds 83 percent of the adult deaf with respect to this factor. The score on this factor can be meaningfully compared by the relative standard score values, or by percentile ranks for two adult deaf examinees, or for one adult deaf individual who has been subjected to repeated testing.

Table 5.10 reports analogous normative information for the Culture Fair "g" factor. In this subtest the average standard score of 100 is equated with a raw score of 93, a score which is superior to 49 percent of the adult deaf scores earned. It can also be seen that a raw score of 74 can be transformed to a standard score of 80, which is, in turn, one standard deviation below the average. Also, a raw score of 111 can be interpreted as a standard score or 120, or one standard deviation above the deaf adult average standard score. In terms of inter-test standard score comparisons the raw scores of 86, 67, and 106 on the G factor are respectively equivalent to the raw scores of 93, 74, and 111 on the "g" factor.

Comparable scores can be defined from Table 5.20, the Time Perspective Dimension of the Weingarten Picture Interest Profile. For male adult deaf a raw score of eight is equal to a standard score of 100. For female adult deaf a raw score between ten and eleven has the same property. The reader should now be able to identify without hesitation the percentile ranks for these raw scores.

Table 5.30 reports normative data for the Speech Characteristics Test, as administered and evaluated by an expert teacher of the deaf. Here a raw score between seven and eight can be translated into an average standard score. A raw score of ten is one standard deviation above the average, while a raw score between five and six is one standard deviation below the adult deaf average.

The thirty-one tables subsumed in the series of Tables under the numerical title 5, provide the counselor with a comprehensive reference for judging the performance of adult deaf on a broad range of vocational tests. The frame of reference in this Chapter has been almost exclusively with the adult deaf. In the case of the Interest Inventory results, the frame of reference was specified somewhat more narrowly by the sex of the examinee. It should be evident that there has been no attempt to relate test performance, as yet, to vocational performance. This will be undertaken in the succeeding chapters.

TABLE 5.01
Norms For Deaf Employable Adults, GATB-G

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
40	52		90	104	58
41	53		91	105	59
42	54		92	106	60
43	55		93	107	62
44	56	1	94	108	64
45	57	1	95	109	66
46	58		96	110	68
47	59		97	111	70
48	60		98	112	72
49	61		99	113	74
50	62	1	100	114	75
51	64	2	101	115	76
52	65	2	102	116	78
53	66		103	117	79
54	67	3	104	118	80
55	68	4	105	119	81
56	69	5	106	120	83
57	70	6	107	121	84
58	71	6	108	122	85
59	72	8	109	123	87
60	73	8	110	124	88
61	74	9	111	125	89
62	75	10	112	126	89
63	76	12	113	127	91
64	77	15	114	128	91
65	78	16	115	129	92
66	79	17	116	130	93
67	80	18	117	131	93
68	81	19	118	132	94
69	82	21	119	133	95
70	83	24	120	134	96
71	84	25	121	135	96
72	85	27	122	137	96
73	86	30	123	138	97
74	87	31	124	139	97
75	88	32	125	140	98
76	89	35	126	141	98
77	90	37	127	142	99
78	91	38	128	143	
79	92	41	129	144	
80	93	42	130	145	
81	94	44	131	146	
82	95	44	132	147	
83	96	47	133	148	
84	97	48	134	149	
85	98	50	135	150	
86	100	52	136	151	
87	101	53	137	152	
88	102	56	138	153	
89	103	57			

TABLE 5.02
Norms For Deaf Employable Adults, GATB-V

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
61	74	1	106	128	89
62	75		107	129	
63	76	2	108	131	92
64	77		109	132	93
65	78	6	110	133	
66	80	10	111	134	
67	81		112	136	
68	82	16	113	137	
69	83		114	138	
70	84	24	115	139	95
71	85		116	140	
72	87	33	117	142	95
73	88		118	143	
74	89	41	119	144	96
75	91		120	145	
76	92	50	121	146	
77	93		122	148	
78	94	56	123	149	96
79	95		124	150	
80	97	61	125	151	97
81	98		126	153	
82	99	64	127	154	98
83	100		128	155	
84	101	66	129	156	99
85	103		130	157	
86	104	70	131	159	
87	105		132	160	
88	106	72	133	161	
89	108		134	162	
90	109	76	135	163	
91	110		136	165	
92	111	78	137	166	
93	112		138	167	
94	114	80	139	168	
95	115		140	170	
96	116	82	141	171	
97	117		142	172	
98	118	84	143	173	
99	120		144	174	
100	121	85	145	176	
101	122		146	177	
102	123	87	147	178	
103	125		148	179	
104	126	87	149	180	
105	127		150	182	

TABLE 5.03

Norms for Deaf Employable Adults, GATB-N

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
29	51		69	86	29
30	52		70	87	31
31	53		71	88	31
32	54	1	72	89	32
33	55		73	90	35
34	56		74	91	35
35	57		75	91	37
36	58		76	92	38
37	58		77	93	40
38	59	1	78	94	41
39	60		79	95	42
40	61	1	80	96	44
41	62	2	81	97	45
42	63	3	82	97	47
43	64		83	98	47
44	64	4	84	99	49
45	65	4	85	100	50
46	66	5	86	101	52
47	67	6	87	102	53
48	68	6	88	103	56
49	69		89	104	57
50	70	7	90	104	59
51	71	7	91	105	59
52	71	8	92	106	60
53	72		93	107	61
54	73	9	94	108	62
55	74	9	95	109	64
56	75	11	96	110	65
57	76	11	97	110	67
58	77	12	98	111	69
59	77	13	99	112	72
60	78	17	100	113	73
61	79	18	101	114	75
62	80	19	102	115	76
63	81	21	103	116	79
64	82	21	104	117	80
65	83	23	105	117	81
66	84	25	106	118	82
67	84	27	107	119	83
68	85	28	108	120	

TABLE 5.03
(Continued)
Norms for Deaf Employable Adults, GATB-N

Raw Score	Standard Score	Percentile
109	121	86
110	122	86
111	123	89
112	124	
113	124	90
114	125	
115	126	90
116	127	90
117	128	91
118	129	92
119	130	93
120	130	
121	131	93
122	132	94
123	133	95
124	134	95
125	135	97
126	136	
127	137	97
128	137	98
129	138	98
130	139	
131	140	
132	141	
133	142	98
134	143	99
135	143	99
136	144	
137	145	
138	146	99
139	147	
140	148	99
141	149	
142	150	
143	150	
144	151	
145	152	
146	153	
147	154	
148	155	
149	156	

TABLE 5.04
Norms For Deaf Employable Adults, GATB-S

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
58	52		106	100	
59	53		107	101	53
60	54		108	102	
61	55	1	109	103	
62	56		110	104	60
63	57		111	105	
64	58		112	106	
65	59	2	113	107	
66	60		114	108	65
67	61		115	109	
68	62	4	116	110	
69	63		117	111	71
70	64		118	112	
71	65	5	119	113	
72	66		120	114	75
73	67		121	115	
74	68	9	122	116	
75	69		123	117	
76	70		124	118	84
77	71		125	119	
78	72	12	126	120	
79	73		127	121	87
80	74		128	122	
81	75	14	129	123	
82	76		130	124	90
83	77		131	125	
84	78	18	132	126	
85	79		133	127	93
86	80		134	128	
87	81		135	129	
88	82	24	136	130	
89	83		137	131	95
90	84		138	132	
91	85	29	139	133	
92	86		140	134	97
93	87		141	135	
94	88	32	142	136	
95	89		143	137	98
96	90		144	138	
97	91	37	145	139	
98	92		146	140	
99	93		147	141	99
100	94		148	142	
101	95	43	149	143	
102	96		150	144	99
103	97		151	145	
104	98	48	152	145	
105	99		153	147	

TABLE 5.05

Norms For Deaf Employable Adults, GATB-P

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
46	50		91	85	22
47	51		92	86	23
48	51		93	87	25
49	52		94	88	26
50	53		95	88	28
51	54	1	96	89	28
52	55	2	97	90	29
53	55	2	98	91	29
54	56	2	99	92	31
55	57		100	92	31
56	58		101	93	34
57	59	2	102	94	35
58	59		103	95	37
59	60	3	104	95	39
60	61	3	105	96	41
61	62		106	97	42
62	62		107	98	46
63	63		108	99	46
64	64	3	109	99	48
65	65	4	110	100	50
66	66	4	111	101	53
67	66	5	112	102	55
68	67	6	113	103	57
69	68	6	114	103	57
70	69	7	115	104	60
71	70	8	116	105	60
72	70	9	117	106	63
73	71	10	118	106	64
74	72	11	119	107	65
75	73	11	120	108	66
76	73	12	121	109	68
77	74		122	110	69
78	75	13	123	110	70
79	76	14	124	111	72
80	77	15	125	112	73
81	77	16	126	113	74
82	78		127	114	75
83	79	16	128	114	76
84	80	17	129	115	77
85	81	17	130	116	78
86	81	18	131	117	79
87	82	19	132	117	80
88	83	20	133	118	82
89	84	20	134	119	83
90	84	21	135	120	84

TABLE 5.05
(Continued)
Norms for Deaf Employable Adults, GATB-P

Raw Score	Standard Score	Percentile
136	121	85
137	121	86
138	122	87
139	123	89
140	124	90
141	125	91
142	125	91
143	126	92
144	127	
145	128	92
146	128	93
147	129	93
148	130	94
149	131	94
150	132	94
151	132	95
152	133	95
153	134	96
154	135	96
155	136	97
156	136	
157	137	97
158	138	
159	139	98
160	139	98
161	140	98
162	141	
163	142	99
164	143	
165	143	

TABLE 5.06

Norms for Employable Deaf Adults, GATB-Q

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
66	54		111	96	
67	55	1	112	97	45
68	56		113	98	47
69	57		114	99	49
70	58		115	100	52
71	59	1	116	101	
72	60	2	117	102	
73	61		118	103	54
74	62		119	104	57
75	62	3	120	104	60
76	63		121	105	
77	64	3	122	106	63
78	65	4	123	107	65
79	66	4	124	108	67
80	67	4	125	109	69
81	68	5	126	110	73
82	69	6	127	111	
83	70		128	112	76
84	71	7	129	113	78
85	72		130	114	
86	73	9	131	115	80
87	74	10	132	116	
88	75	12	133	117	82
89	76		134	118	84
90	76	12	135	118	85
91	77	13	136	119	87
92	78		137	120	
93	79	16	138	121	87
94	80	18	139	122	89
95	81		140	123	
96	82	19	141	124	90
97	83	22	142	125	90
98	84	24	143	126	91
99	85	25	144	127	92
100	86	27	145	128	
101	87	30	146	129	92
102	88		147	130	
103	89		148	131	93
104	90	32	149	132	
105	90	33	150	132	94
106	91		151	133	94
107	92	36	152	134	95
108	93	38	153	135	96
109	94	40	154	136	96
110	95	43	155	137	

TABLE 5.06
(Continued)
Norms for Deaf Employable Adults, GATB-Q

Raw Score	Standard Score	Percentile
156	138	97
157	139	
158	140	
159	141	
160	142	
161	143	97
162	144	98
163	145	98
164	146	99
165	146	
166	147	99
167	148	
168	149	
169	150	
170	151	
171	152	99
172	153	
173	154	
174	155	
175	156	99
176	157	

TABLE 5.07

Norms for Deaf Employable Adults, GATB-K

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
46	43		99	95	38
47	44	1	100	96	
48	45		101	97	44
49	46		102	98	
50	47		103	99	48
51	48	1	104	99	
52	49		105	100	52
53	50		106	101	
54	51		107	102	55
55	52	2	108	103	
56	53	2	109	104	58
57	54		110	105	
58	55	3	111	106	62
59	56		112	107	
60	57	3	113	108	65
61	58		114	109	
62	59	3	115	110	69
63	60		116	111	
64	60	4	117	112	72
65	61		118	113	75
66	62	4	119	114	
67	63		120	115	81
68	64	5	121	116	
69	65		122	117	83
70	66	6	123	118	
71	67		124	119	86
72	68	6	125	120	
73	69		126	121	89
74	70	7	127	122	
75	71		128	123	90
76	72	9	129	124	
77	73		130	125	92
78	74	10	131	126	
79	75		132	127	93
80	76	11	133	128	
81	77		134	129	95
82	78	14	135	130	
83	79		136	131	96
84	80	16	137	132	
85	81		138	133	97
86	82	18	139	134	
87	83	21	140	135	97
88	84		141	136	
89	85	22	142	137	98
90	86		143	138	
91	87	25	144	138	99
92	88		145	139	
93	89	27	146	140	
94	90		147	141	
95	91	30	148	142	99
96	92		149	143	99
97	93	35	150	144	
98	94				

TABLE 5.08

Norms For Deaf Employable Adults, GATB-F

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
21	39		71	79	13
22	40		72	80	14
23	41		73	81	15
24	41		74	82	17
25	42	1	75	83	17
26	43		76	83	18
27	44		77	84	20
28	45	1	78	85	20
29	45		79	86	22
30	46		80	87	24
31	47		81	88	26
32	48		82	88	28
33	49	2	83	89	29
34	50		84	90	31
35	50		85	91	32
36	51	2	86	92	33
37	52	3	87	92	34
38	53		88	93	35
39	54		89	94	36
40	54		90	95	38
41	55	3	91	96	39
42	56	3	92	96	40
43	57		93	97	43
44	58	3	94	98	45
45	58	4	95	99	48
46	59		96	100	50
47	60	4	97	100	52
48	61	4	98	101	53
49	62		99	102	55
50	62		100	103	56
51	63		101	104	57
52	64		102	105	59
53	65	5	103	105	60
54	66		104	106	62
55	67	6	105	107	64
56	67	6	106	108	66
57	68	6	107	109	
58	69	7	108	109	69
59	70	7	109	110	69
60	71	7	110	111	72
61	71	8	111	112	72
62	72	8	112	113	75
63	73	8	113	113	76
64	74	9	114	114	78
65	75		115	115	80
66	75	10	116	116	81
67	76	11	117	117	82
68	77	11	118	117	83
69	78	11	119	118	84
70	79	12	120	119	85

TABLE 5.08
(Continued)
Norms For Deaf Employable Adults, GATB-F

Raw Score	Standard Score	Percentile
121	120	86
122	121	87
123	122	88
124	122	88
125	123	89
126	124	90
127	125	90
128	126	90
129	126	91
130	127	91
131	128	92
132	129	92
133	130	93
134	130	93
135	131	94
136	132	95
137	133	96
138	134	
139	134	96
140	135	97
141	136	
142	137	97
143	138	98
144	139	
145	139	98
146	140	
147	141	99
148	142	99
149	143	99
150	143	

TABLE 5.09

Norms For Deaf Employable Adults, GATB-M

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
21	39		71	79	13
22	40		72	79	14
23	41	1	73	80	14
24	42		74	81	14
25	43	1	75	82	15
26	43		76	83	16
27	44		77	83	17
28	45		78	84	18
29	46	2	79	85	19
30	46		80	86	20
31	47	2	81	86	21
32	48		82	87	22
33	49		83	88	23
34	50		84	89	25
35	50		85	90	26
36	51		86	90	28
37	52		87	91	30
38	53	2	88	92	33
39	54		89	93	34
40	54		90	94	36
41	55		91	94	36
42	56		92	95	37
43	57	3	93	96	40
44	57	4	94	97	42
45	58		95	97	43
46	59	4	96	98	45
47	60	4	97	99	47
48	61	5	98	100	47
49	61		99	101	48
50	62	5	100	101	51
51	63		101	102	53
52	64	5	102	103	54
53	65	6	103	104	56
54	65	6	104	104	59
55	66		105	105	60
56	67	6	106	106	62
57	68		107	107	65
58	68	6	108	108	65
59	69	7	109	108	66
60	70	7	110	109	69
61	71		111	110	70
62	72	8	112	111	71
63	72	8	113	112	72
64	73	8	114	112	73
65	74	9	115	113	75
66	75	9	116	114	76
67	75	10	117	115	77
68	76	11	118	115	79
69	77	12	119	116	80
70	78	12	120	117	82

TABLE 5.09
(Continued)
Norms For Deaf Employable Adults, GATB-M

Raw Score	Standard Score	Percentile
121	118	84
122	119	84
123	119	85
124	120	87
125	121	88
126	122	88
127	123	89
128	123	89
129	124	90
130	125	90
131	126	91
132	126	92
133	127	93
134	128	94
135	129	94
136	130	94
137	130	95
138	131	96
139	132	96
140	133	96
141	134	97
142	134	
143	135	98
144	136	98
145	137	98
146	137	
147	138	99
148	139	
149	140	99
150	141	
151	141	99
152	142	
153	143	
154	144	
155	144	

TABLE 5.10
Norms For Deaf Employable Adults, Culture Fair-g

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
41	44	1	87	94	40
42	45		88	95	41
43	46	1	89	96	42
44	47		90	97	44
45	48		91	98	45
46	49	2	92	99	47
47	51		93	100	49
48	52	2	94	102	52
49	53	2	95	103	54
50	54		96	104	55
51	55	2	97	105	57
52	56	3	98	106	59
53	57		99	107	61
54	58	3	100	108	62
55	59		101	109	65
56	60	3	102	110	67
57	61	3	103	111	69
58	62	4	104	112	72
59	64	4	105	114	74
60	65	4	106	115	76
61	66	5	107	116	78
62	67	5	108	117	80
63	68	6	109	118	82
64	69	7	110	119	83
65	70	8	111	120	84
66	71	8	112	121	85
67	72	9	113	122	
68	73	9	114	123	87
69	74	11	115	124	89
70	76	11	116	125	90
71	77	12	117	127	93
72	78	13	118	128	94
73	79	15	119	129	95
74	80	16	120	130	95
75	81	18	121	131	96
76	82	20	122	132	96
77	83	22	123	133	97
78	84	23	124	134	98
79	85	24	125	135	98
80	86	26	126	136	
81	87	28	127	137	
82	89	31	128	138	98
83	90	32	129	140	99
84	91	34	130	141	99
85	92	36	131	142	99
86	93	38	132	143	

TABLE 5.11

Norms For Deaf Employable Adults, Bender Gestalt*

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	71	1	50	111	78
1	72	2	51	112	79
2	73	2	52	112	80
3	74	2	53	113	82
4	75	3	54	114	82
5	75	3	55	115	
6	76	4	56	115	83
7	77	5	57	116	84
8	78	7	58	117	85
9	79	9	59	118	
10	79	10	60	119	86
11	80	11	61	119	87
12	81	13	62	120	87
13	82	14	63	121	88
14	82	15	64	122	89
15	83	16	65	123	90
16	84	18	66	123	90
17	85	21	67	124	
18	86	22	68	125	91
19	86	25	69	126	92
20	87	27	70	126	92
21	88	29	71	127	
22	89	32	72	128	93
23	90	35	73	129	
24	90	38	74	130	
25	91	41	75	130	
26	92	43	76	131	
27	93	44	77	132	94
28	93	46	78	133	95
29	94	48	79	134	95
30	95	50	80	134	
31	96	52	81	135	
32	97	54	82	136	95
33	97	56	83	137	95
34	98	58	84	137	96
35	99	59	85	138	96
36	100	60	86	139	
37	101	62	87	140	
38	101	63	88	141	
39	102	64	89	141	96
40	103	65	90	142	96
41	104	67	91	143	
42	104	68	92	144	
43	105	71	93	144	97
44	106	72	94	145	97
45	107	73	95	146	
46	108	74	96	147	
47	108	75	97	148	
48	109	76	98	148	
49	110	77	99	149	97

* It should be kept in mind that Bender Gestalt scores are inversely related to competence.

TABLE 5.11
(Continued)
Norms For Deaf Employable Adults, Bender Gestalt

Raw Score	Standard Score	Percentile
100	150	97
101	151	98
102	152	
103	152	98
104	153	
105	154	
106	155	
107	155	98
108	156	
109	157	98
110	158	
111	159	
112	159	
113	160	
114	161	
115	162	
116	163	
117	163	99
118	164	
119	165	
120	166	

TABLE 5.12

Weingarten Interest - Interpersonal
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	49		8	51	1
1	53		9	54	2
2	56	1	10	58	2
3	59	2	11	61	3
4	62		12	65	5
5	65	3	13	68	6
6	69	4	14	71	8
7	72	6	15	75	11
8	75	11	16	78	15
9	78	16	17	81	20
10	81	21	18	85	26
11	85	25	19	88	30
12	88	34	20	91	35
13	91	39	21	95	44
14	94	45	22	98	52
15	97	52	23	101	58
16	101	58	24	105	62
17	104	62	25	108	69
18	107	68	26	112	73
19	110	73	27	115	79
20	113	77	28	118	83
21	116	80	29	122	90
22	120	84	30	125	93
23	123	86	31	128	94
24	126	89	32	132	94
25	129	93	33	135	96
26	132	95	34	138	97
27	136	96	35	142	98
28	139	97	36	145	99
29	142	97	37	148	99
30	145	99	38	152	
31	148		39	155	
32	152		40	159	
33	155				

TABLE 5.13

Weingarten Interest - Natural
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	64		1	64	1
1	65		2	66	2
2	67	1	3	68	2
3	68	3	4	70	4
4	70	4	5	72	8
5	72	7	6	74	10
6	73	10	7	76	12
7	75	11	8	78	16
8	76	15	9	81	21
9	78	17	10	83	27
10	79	21	11	85	30
11	81	24	12	87	34
12	83	27	13	89	38
13	84	29	14	91	39
14	86	31	15	93	43
15	87	33	16	95	44
16	89	36	17	97	48
17	90	42	18	99	51
18	92	45	19	101	55
19	94	47	20	103	59
20	95	48	21	106	63
21	97	49	22	108	69
22	98	50	23	110	71
23	100	51	24	112	75
24	102	53	25	114	78
25	103	57	26	116	80
26	105	59	27	118	83
27	106	61	28	120	85
28	108	63	29	122	87
29	109	65	30	124	89
30	111	67	31	126	92
31	113	69	32	128	93
32	114	72	33	130	
33	116	74	34	133	94
34	117	77	35	135	95
35	119	79	36	137	96
36	121	82	37	139	97
37	122	85	38	141	
38	124	87	39	143	
39	125	90	40	145	98
40	127	92	41	147	98
41	128		42	149	
42	130	94	43	151	
43	132	96	44	153	99
44	133		45	155	

TABLE 5.13
(Continued)
Weingarten Interest - Natural
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
45	135		46	158	
46	136	97	47	160	
47	138				
48	140	98			
49	141				
50	143				
51	144				
52	146				
53	147				

TABLE 5.14
Weingarten Interest - Mechanical
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	32		2	53	1
1	35		3	57	
2	38		4	60	1
3	40		5	64	2
4	43		6	68	4
5	45		7	71	4
6	48		8	75	9
7	51	1	9	78	15
8	53	2	10	82	22
9	56		11	86	29
10	59	2	12	89	37
11	61	4	13	93	47
12	64	6	14	97	52
13	66	8	15	100	56
14	69	10	16	104	64
15	72	11	17	107	72
16	74	14	18	111	76
17	77	15	19	115	80
18	80	17	20	118	84
19	82	20	21	122	86
20	85	22	22	126	90
21	87	27	23	129	93
22	90	30	24	133	94
23	93	34	25	136	96
24	95	36	26	140	98
25	98	45	27	144	
26	101	51	28	147	99
27	103	58	29	151	
28	106	62	30	155	
29	108	66	31	158	99
30	111	73	32	162	
31	114	79	33	165	
32	116	81	34	169	
33	119	84	35	173	
34	122	89			
35	124	92			
36	127	94			
37	129	95			
38	132	96			
39	135	97			
40	137	98			
41	140	99			
42	143				
43	145				

TABLE 5.15
Weingarten Interest - Business
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	50	1	6	39	1
1	52		7	41	
2	53		8	43	
3	55		9	45	
4	57		10	47	
5	59		11	49	2
6	60		12	51	
7	62	1	13	53	2
8	64	3	14	55	
9	66	3	15	57	
10	67	4	16	59	3
11	69	5	17	61	
12	71	7	18	63	3
13	73	10	19	65	
14	74	11	20	67	6
15	76	14	21	69	7
16	78	15	22	71	10
17	80	18	23	73	10
18	81	21	24	75	13
19	83	23	25	77	15
20	85	26	26	79	17
21	87	30	27	81	20
22	88	33	28	84	24
23	90	36	29	86	25
24	92	39	30	88	28
25	94	41	31	90	32
26	95	43	32	92	33
27	97	47	33	94	38
28	99	49	34	96	43
29	101	54	35	98	44
30	102	57	36	100	48
31	104	60	37	102	52
32	106	62	38	104	56
33	108	65	39	106	58
34	109	69	40	108	62
35	111	73	41	110	68
36	113	75	42	112	72
37	115	77	43	114	78
38	116	78	44	116	79
39	118	81	45	118	83
40	120	84	46	120	86
41	122	86	47	122	87
42	124	87	48	124	89
43	125	89	49	126	91
44	127	92	50	128	95

TABLE 5.15
(Continued)
Weingarten Interest - Business
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
45	129	94	51	130	97
46	131	95	52	132	97
47	132	95	53	134	98
48	134	96	54	136	99
49	136	96	55	138	
50	138	97			
51	139				
52	141				
53	143	98			
54	145				
55	146				

TABLE 5.16

Weingarten Interest - Esthetic

Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	40		7	54	1
1	43		8	57	1
2	46		9	60	2
3	49		10	63	2
4	52		11	66	4
5	55		12	69	6
6	58	2	13	72	10
7	61		14	75	13
8	64	2	15	78	16
9	67	3	16	81	19
10	70	5	17	84	25
11	73	7	18	87	29
12	76	12	19	90	32
13	79	14	20	93	39
14	82	21	21	96	44
15	85	26	22	99	53
16	88	32	23	102	58
17	91	39	24	105	65
18	94	46	25	108	68
19	97	52	26	111	73
20	100	57	27	114	79
21	103	65	28	117	82
22	106	68	29	120	85
23	109	73	30	123	87
24	112	76	31	126	90
25	115	82	32	129	93
26	118	84	33	132	95
27	121	88	34	135	97
28	124	89	35	138	
29	127	91	36	141	
30	130	92	37	144	98
31	133	94	38	147	99
32	136	96	39	150	99
33	139	97	40	153	
34	142		41	156	
35	145		42	159	
36	148	98	43	162	
37	151	99			
38	154				
39	157				

TABLE 5.17

Weingarten Interest - Scientific

Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	38		4	58	1
1	42		5	61	2
2	45		6	64	3
3	48		7	68	3
4	51	1	8	71	5
5	55		9	74	10
6	58	1	10	77	13
7	61	2	11	81	20
8	64	3	12	84	26
9	67	4	13	87	33
10	71	6	14	91	36
11	74	7	15	94	44
12	77	13	16	97	50
13	80	15	17	100	59
14	84	22	18	104	62
15	87	28	19	107	70
16	90	37	20	110	78
17	93	44	21	114	81
18	96	50	22	117	83
19	100	58	23	120	86
20	103	63	24	123	88
21	106	68	25	127	91
22	109	73	26	130	92
23	113	77	27	133	94
24	116	81	28	136	96
25	119	84	29	140	97
26	122	89	30	143	98
27	126	91	31	146	
28	129	94	32	150	98
29	132	95	33	153	99
30	135	96	34	156	99
31	138	98	35	159	
32	142	99	36	163	
33	145		37	166	
34	148	99	38	169	
35	151				
36	155				
37	158				
38	161				
39	164				
40	167				
41	171				
42	174				
43	177				
44	180				
45	184				
46	187				
47	190				
48	193				
49	196				

TABLE 5.18

Weingarten Interest - Verbal

Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	59		4	48	1
1	63	1	5	53	2
2	67	4	6	58	3
3	72	8	7	64	5
4	76	16	8	69	7
5	81	21	9	74	12
6	85	28	10	79	20
7	89	37	11	84	26
8	94	44	12	90	32
9	98	54	13	95	46
10	102	62	14	100	54
11	107	71	15	105	65
12	111	77	16	110	74
13	115	83	17	115	81
14	120	86	18	121	88
15	124	88	19	126	93
16	128	92	20	131	94
17	133	93	21	136	98
18	137	95	22	141	99
19	142	97	23	146	
20	146				
21	150				
22	155				
23	159				
24	163				

TABLE 5.19
Weingarten Interest - Computational
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	53		0	43	1
1	57	1	1	47	
2	60	3	2	51	
3	64	4	3	55	
4	68	7	4	58	2
5	72	9	5	62	3
6	75	15	6	66	6
7	79	18	7	70	7
8	83	23	8	74	13
9	86	29	9	78	19
10	90	36	10	82	24
11	94	42	11	86	29
12	97	48	12	90	36
13	101	56	13	94	40
14	105	61	14	97	47
15	109	66	15	101	53
16	112	76	16	105	61
17	116	80	17	109	67
18	120	85	18	113	75
19	123	89	19	117	80
20	127	91	20	121	88
21	131	95	21	125	90
22	134	96	22	129	96
23	138	99	23	133	97
24	142		24	137	99
25	146		25	140	
26	149				

TABLE 5.20
Weingarten Interest - Time Perspective
Norms For Deaf Employable Adults

Male			Female		
Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	53		4	53	1
1	59		5	60	3
2	65	4	6	67	7
3	71	10	7	75	15
4	77	15	8	82	26
5	83	26	9	89	38
6	89	37	10	97	50
7	95	50	11	104	66
8	100	62	12	112	76
9	106	68	13	119	87
10	112	76	14	126	94
11	118	83	15	134	96
12	124	89	16	141	99
13	130	94	17	148	
14	136	96			
15	142	99			
16	148				
17	154				

TABLE 5.21
Norms For Deaf Employable Adults
Gottschaldt

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	0	1	38	82	
1	1		39	85	23
2	3		40	87	30
3	5		41	89	
4	7		42	91	38
5	10		43	93	
6	12		44	96	45
7	14		45	98	51
8	16		46	100	
9	18		47	102	57
10	21		48	104	62
11	23		49	107	
12	25		50	109	71
13	27		51	111	
14	29		52	113	78
15	32		53	115	83
16	34		54	118	
17	36		55	120	87
18	38		56	122	
19	40		57	124	91
20	43		58	126	94
21	45		59	129	
22	47		60	131	96
23	49		61	133	96
24	51	1	62	135	
25	54		63	137	97
26	56		64	140	
27	58	1	65	142	98
28	60		66	144	99
29	62	2	67	146	
30	65		68	148	99
31	67	3	69	151	
32	69	5	70	153	
33	71		71	155	99
34	73	8	72	157	
35	76		73	159	
36	78	13	74	162	
37	80	17			

TABLE 5.22

Norms For Deaf Employable Adults

Gates Reading

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
-5	52		20	95	44
-4	54		21	96	47
-3	56		22	98	49
-2	57		23	100	53
-1	59		24	101	56
0	61	2	25	103	58
1	62	3	26	105	60
2	64	4	27	106	63
3	66	5	28	108	64
4	67	7	29	110	66
5	69	7	30	112	68
6	71	8	31	113	69
7	72	10	32	115	73
8	74	12	33	117	75
9	76	14	34	118	77
10	78	16	35	120	79
11	79	18	36	122	80
12	81	20	37	123	84
13	83	23	38	125	87
14	84	25	39	127	90
15	86	29	40	128	95
16	88	31	41	130	95
17	89	33	42	132	98
18	91	37	43	134	
19	93	41			

TABLE 5.23

Norms For Deaf Employable Adults
Craig Lipreading - Word

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	21	1	51	77	14
1	22		52	78	
2	23		53	79	
3	24		54	80	16
4	25		55	81	
5	26		56	82	
6	28		57	83	18
7	29		58	85	
8	30		59	86	
9	31		60	87	
10	32		61	88	21
11	33		62	89	21
12	34	1	63	90	
13	35		64	91	26
14	36		65	92	
15	37	1	66	93	
16	39		67	94	31
17	40		68	95	
18	41	2	69	97	
19	42		70	98	36
20	43		71	99	
21	44	3	72	100	
22	45		73	101	44
23	46		74	102	
24	47	3	75	103	
25	48		76	104	53
26	49		77	105	
27	51	4	78	106	
28	52		79	108	63
29	53		80	109	
30	54	5	81	110	
31	55		82	111	72
32	56		83	112	
33	57	6	84	113	
34	58		85	114	80
35	59		86	115	
36	60	7	87	116	
37	62	7	88	117	87
38	63		89	119	
39	64	8	90	120	
40	65		91	121	94
41	66		92	122	
42	67	9	93	123	
43	68		94	124	98
44	69		95	125	
45	70	9	96	126	
46	71		97	127	
47	72		98	128	
48	74	11	99	129	
49	75		100	131	
50	76	11			

TABLE 5.24

Norms For Deaf Employable Adults

Craig Lipreading - Sentence

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	36	1	51	81	18
1	37		52	82	
2	38		53	83	
3	39		54	83	22
4	40	1	55	84	
5	41		56	85	
6	41		57	86	
7	42		58	87	25
8	43	2	59	88	
9	44		60	89	
10	45		61	90	
11	46		62	90	30
12	47	2	63	91	
13	48		64	92	
14	48		65	93	
15	49		66	94	
16	50		67	95	35
17	51	2	68	96	
18	52		69	97	
19	53		70	97	36
20	54		71	98	40
21	55	4	72	99	
22	55		73	100	40
23	56		74	101	
24	57		75	102	45
25	58	5	76	103	45
26	59		77	104	
27	60	5	78	104	
28	61		79	105	54
29	62	6	80	106	
30	62		81	107	
31	63		82	108	
32	64		83	109	62
33	65	10	84	110	
34	66		85	111	
35	67		86	111	
36	68		87	112	72
37	69	11	88	113	
38	69		89	114	
39	70		90	115	
40	71		91	116	72
41	72		92	117	81
42	73	12	93	117	
43	74		94	118	
44	75		95	119	
45	76		96	120	92
46	76	15	97	121	
47	77		98	122	
48	78		99	123	
49	79		100	124	
50	80	18			

TABLE 5.25
Norms For Deaf Employable Adults
Manual Communication - Signing

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	60	13	45	86	
1	60		46	87	21
2	61		47	88	
3	61		48	88	23
4	62	14	49	89	
5	62		50	89	
6	63		51	90	
7	64		52	90	25
8	64	14	53	91	
9	65		54	92	
10	65		55	92	
11	66		56	93	29
12	67	14	57	93	
13	67		58	94	
14	68		59	95	
15	68		60	95	32
16	69	15	61	96	
17	70		62	96	
18	70		63	97	
19	71		64	98	36
20	71	16	65	98	
21	72		66	99	
22	73		67	99	
23	73		68	100	39
24	74	17	69	101	
25	74		70	101	
26	75		71	102	
27	76		72	102	43
28	76	18	73	103	43
29	77		74	104	
30	77		75	104	
31	78		76	105	46
32	79	18	77	105	
33	79		78	106	
34	80		79	107	
35	80		80	107	50
36	81	19	81	108	
37	82		82	108	
38	82		83	109	
39	83		84	110	56
40	83	19	85	110	
41	84		86	111	
42	85		87	111	
43	85		88	112	65
44	86	20	89	113	

TABLE 5.25
(Continued)
Norms For Deaf Employable Adults
Manual Communication - Signing

Raw Score	Standard Score	Percentile
90	113	66
91	114	
92	114	74
93	115	
94	116	74
95	116	
96	117	84
97	117	
98	118	
99	118	
100	119	

TABLE 5.26
Norms For Deaf Employable Adults
Manual Communication - Reading

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
0	50	13	45	78	
1	51		46	79	
2	51		47	80	
3	52		48	80	
4	53		49	81	
5	53		50	81	14
6	54		51	82	
7	54		52	83	
8	55		53	83	
9	56		54	84	
10	56		55	85	
11	57		56	85	
12	58		57	86	
13	58		58	86	14
14	59		59	87	
15	60		60	88	15
16	60		61	88	
17	61		62	89	15
18	61		63	90	
19	62		64	90	
20	63		65	91	
21	63		66	92	16
22	64		67	92	
23	65		68	93	16
24	65		69	93	
25	66		70	94	17
26	66	13	71	95	
27	67		72	95	17
28	68	13	73	96	
29	68		74	97	18
30	69		75	97	
31	70		76	98	19
32	70		77	98	
33	71		78	99	20
34	71		79	100	
35	72		80	100	21
36	73	14	81	101	
37	73		82	102	23
38	74	14	83	102	
39	75		84	103	25
40	75		85	103	
41	76		86	104	28
42	76		87	105	
43	77		88	105	34
44	78		89	106	

TABLE 5 ?6
(Continued)

Norms For Deaf Employable Adults
Manual Communication - Reading

Raw Score	Standard Score	Percentile
90	107	40
91	107	
92	108	49
93	108	
94	109	63
95	110	
96	110	80
97	111	
98	112	94
99	112	
100	113	

TABLE 5.27

Norms For Deaf Employable Adults

Berger Block Test 1 - Identification

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
-27	33		20	85	26
-26	34		21	86	28
-25	35		22	87	30
-24	36		23	88	33
-23	37		24	90	35
-22	38		25	91	37
-21	39		26	92	39
-20	40		27	93	42
-19	42		28	94	44
-18	43		29	95	44
-17	44		30	96	46
-16	45		31	97	47
-15	46		32	98	49
-14	47		33	100	51
-13	48		34	101	52
-12	49		35	102	55
-11	51		36	103	56
-10	52		37	104	57
-9	53		38	105	59
-8	54		39	106	60
-7	55		40	107	62
-6	56		41	108	63
-5	57		42	110	65
-4	58		43	111	67
-3	59		44	112	69
-2	61	1	45	113	71
-1	62	1	46	114	74
0	63	3	47	115	75
1	64	3	48	116	77
2	65	4	49	117	78
3	66	5	50	119	80
4	67	5	51	120	81
5	68	6	52	121	83
6	69	6	53	122	84
7	71	7	54	123	85
8	72	8	55	124	
9	73	9	56	125	89
10	74	11	57	126	90
11	75	12	58	127	91
12	76	13	59	129	92
13	77	15	60	130	93
14	78	16	61	131	93
15	79	18	62	132	94
16	81	20	63	133	95
17	82	21	64	134	96
18	83	23	65	135	97
19	84	24	66	136	

TABLE 5.28

Norms For Deaf Employable Adults

Berger Block Test 2 - Identification

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
-30	6		11	67	7
-29	8		12	68	8
-28	9		13	70	
-27	11		14	71	10
-26	12		15	73	11
-25	14		16	74	13
-24	15		17	76	13
-23	17		18	77	14
-22	18		19	79	15
-21	20		20	80	16
-20	21		21	82	18
-19	23		22	83	21
-18	24		23	85	22
-17	26		24	86	24
-16	27		25	88	27
-15	28		26	89	29
-14	30		27	91	31
-13	31		28	92	34
-12	33		29	94	35
-11	34	1	30	95	37
-10	36	1	31	97	39
-9	37		32	98	41
-8	39		33	99	42
-7	40		34	101	47
-6	42		35	102	50
-5	43		36	104	53
-4	45		37	105	56
-3	46		38	107	60
-2	48	1	39	108	61
-1	49		40	110	64
0	51	3	41	111	66
1	52	3	42	113	69
2	54	3	43	114	72
3	55		44	116	74
4	57		45	117	77
5	58	4	46	119	81
6	60	5	47	120	83
7	61		48	122	89
8	63	5	49	123	91
9	64	6	50	125	
10	65	6			

TABLE 5.29

Norms For Deaf Employable Adults

Berger Block Test 3 - Identification

Raw Score	Standard Score	Percentile	Raw Score	Standard Score	Percentile
-31	28		11	79	20
-30	29		12	80	20
-29	31		13	81	21
-28	32		14	83	22
-27	33		15	84	22
-26	34		16	85	23
-25	35		17	86	24
-24	37		18	87	25
-23	38		19	89	26
-22	39		20	90	27
-21	40		21	91	27
-20	41		22	92	29
-19	43		23	94	32
-18	44		24	95	35
-17	45		25	96	36
-16	46		26	97	38
-15	48		27	98	41
-14	49		28	100	44
-13	50		29	101	48
-12	51		30	102	52
-11	52		31	103	53
-10	54		32	104	55
-9	55		33	106	57
-8	56		34	107	59
-7	57		35	108	62
-6	58		36	109	65
-5	60		37	110	68
-4	61	1	38	112	69
-3	62		39	113	72
-2	63	1	40	114	74
-1	64	1	41	115	76
0	66	14	42	117	77
1	67	15	43	118	79
2	68		44	119	80
3	69		45	120	82
4	71	16	46	121	84
5	72	16	47	123	86
6	73	17	48	124	88
7	74	17	49	125	90
8	75	18	50	126	92
9	77	18	51	127	
10	78				

TABLE 5.30

Speech Characteristics - Expert
Norms For Deaf Employable Adults

Raw Score	Standard Score	Percentile
0	31	
1	40	1
2	49	3
3	58	6
4	67	10
5	76	16
6	85	26
7	94	40
8	103	54
9	111	72
10	120	

TABLE 5.31

Speech Characteristics - Novice
Norms For Deaf Employable Adults

Raw Score	Standard Score	Percentile
0	58	1
1	65	6
2	72	15
3	79	23
4	86	34
5	92	43
6	99	53
7	106	61
8	113	71
9	120	84
10	127	

CHAPTER 5

INITIAL VALIDITY MEASURES

A. A Set of Graphic Norms

We have now displayed and summarized the test performance of deaf adults on a wide range of measures which were considered to be occupationally-oriented. In this present Chapter we begin the assay of those measures to determine whether they, indeed, have relevance as occupational adjustment indicators. We will be looking upon the test performance data in much closer detail then to investigate a variety of relationships--relationships with personal attributes and relationships with work adjustment indices--in the deaf adult sample.

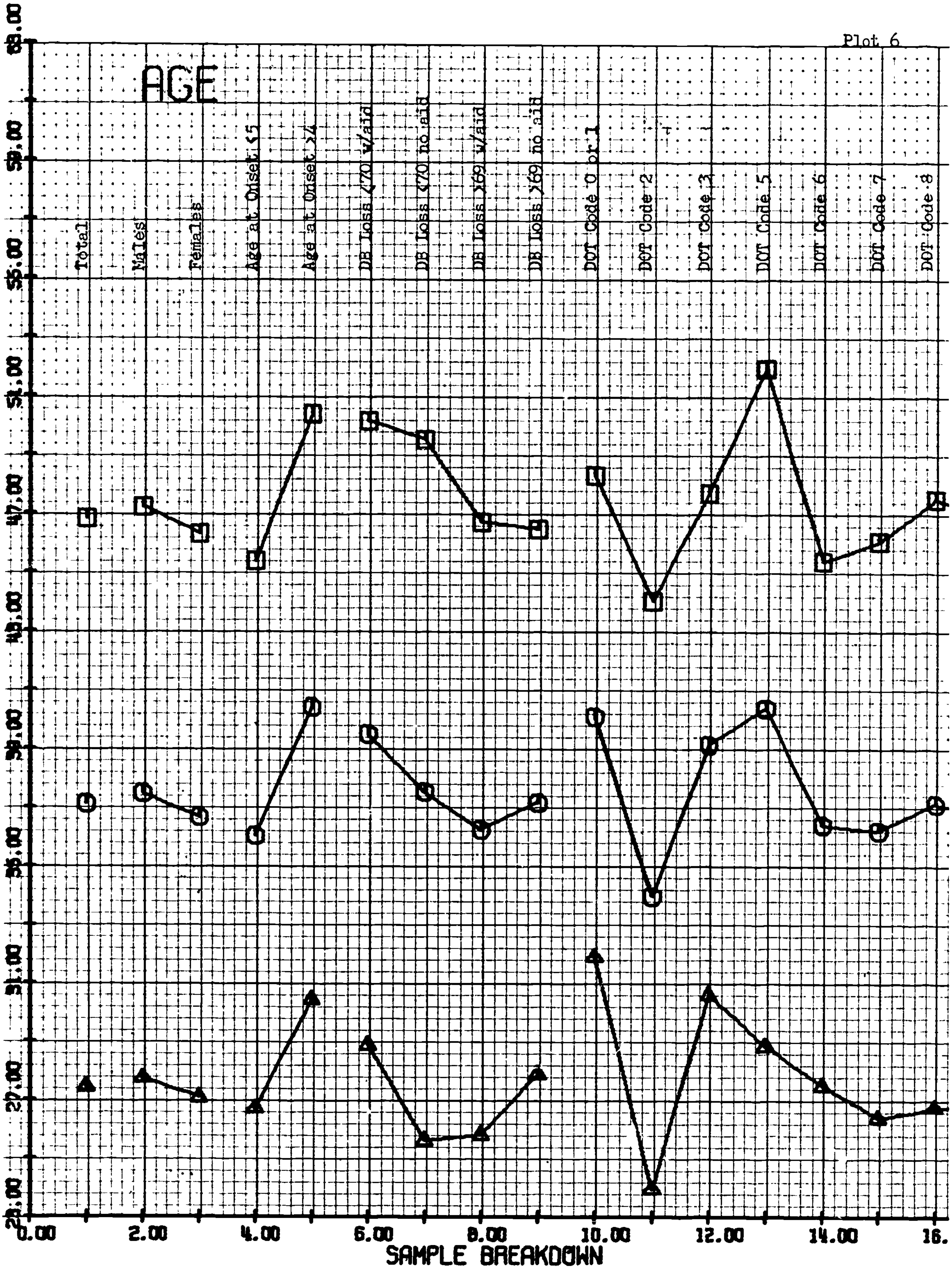
In approaching this issue the counselor will want to consider his daily practice, and recall how often he has found himself working with a deaf client and his vocational problem trying to use a test whose existing norms seem to be somewhat inappropriate, if not utterly unsuitable to the particular situation. For example, in Chapter IV test norms were established for the adult deaf, a broad and heterogeneous reference group. Most counselors would doubtless want more specific standards, i.e. norms with resolving power to focus on a more distinctive or selected group of deaf from which to make purposeful judgments about a given client's vocational potential. This Chapter is designed to move in that direction so that this report should contribute notably to contemporary counseling practice by providing test performance information on various stratifications of the adult deaf, and by permitting ever finer discriminations in estimating the individual client's capacity for vocational adjustment. Thus, while the initial set of norms presented in the previous chapter is applicable to all adult deaf, the norms we are about to present are focused more coherently on any of a number of subgroups of employable adult deaf. To accomplish this 39 normative profiles are drawn. Each profile relates information on a single variable such as age (subject variable), or GATB-G (test score variable). The information portrayed in each profile is plotted for sixteen different strata or sub-samples drawn from Sample I (N=375) in Oregon. We list forthwith the 38 profiles and subtend that list with a brief discussion of the baseline profile and some examples of profile interpretation.

The reader should understand that each profile is keyed by both its variable title and plot number. Thus the subject variable "age" is depicted in profile form in plot #6, while the Weingarten Interpersonal score is presented in profile on plot #35.

This brings us to clarify the information contained in each profile. To read a profile we need to comprehend its two axes: the baseline or abscissa, and the vertical or ordinate dimensions. The variable described in each profile is identified at the top, and is itself also calibrated on the ordinate. Thus, in plot 6 the ordinate serves as a measuring rod or yardstick for describing age which is also the theme or plot title. Similarly, on plot 29 the ordinate measures score values of "g" which is the variable being plotted, while on plot 69 the ordinate provides calibration for the pitch reading taken from expert judges on the Holdt Speech Characteristics Test.

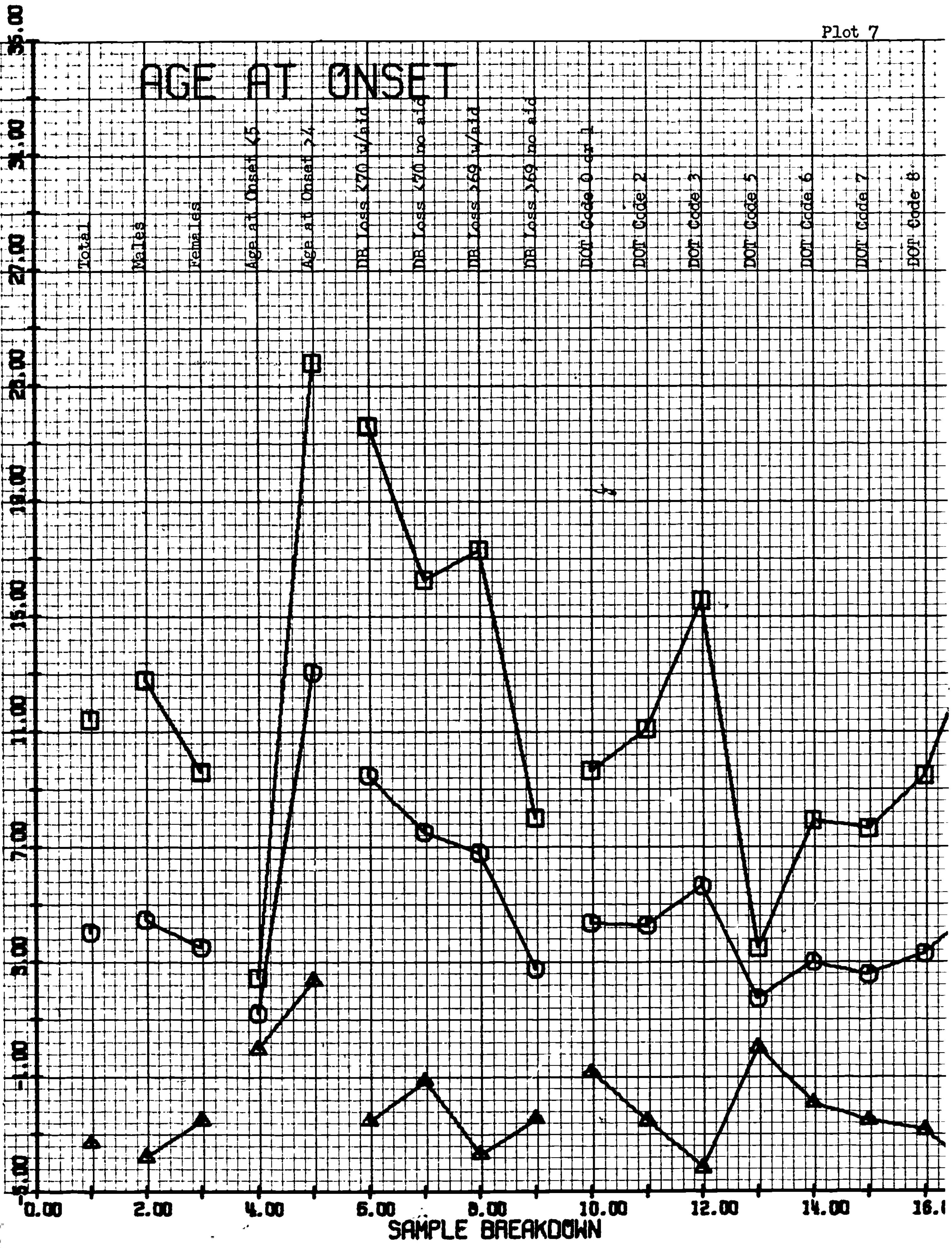
Profiles of Subject and Test Score Variables

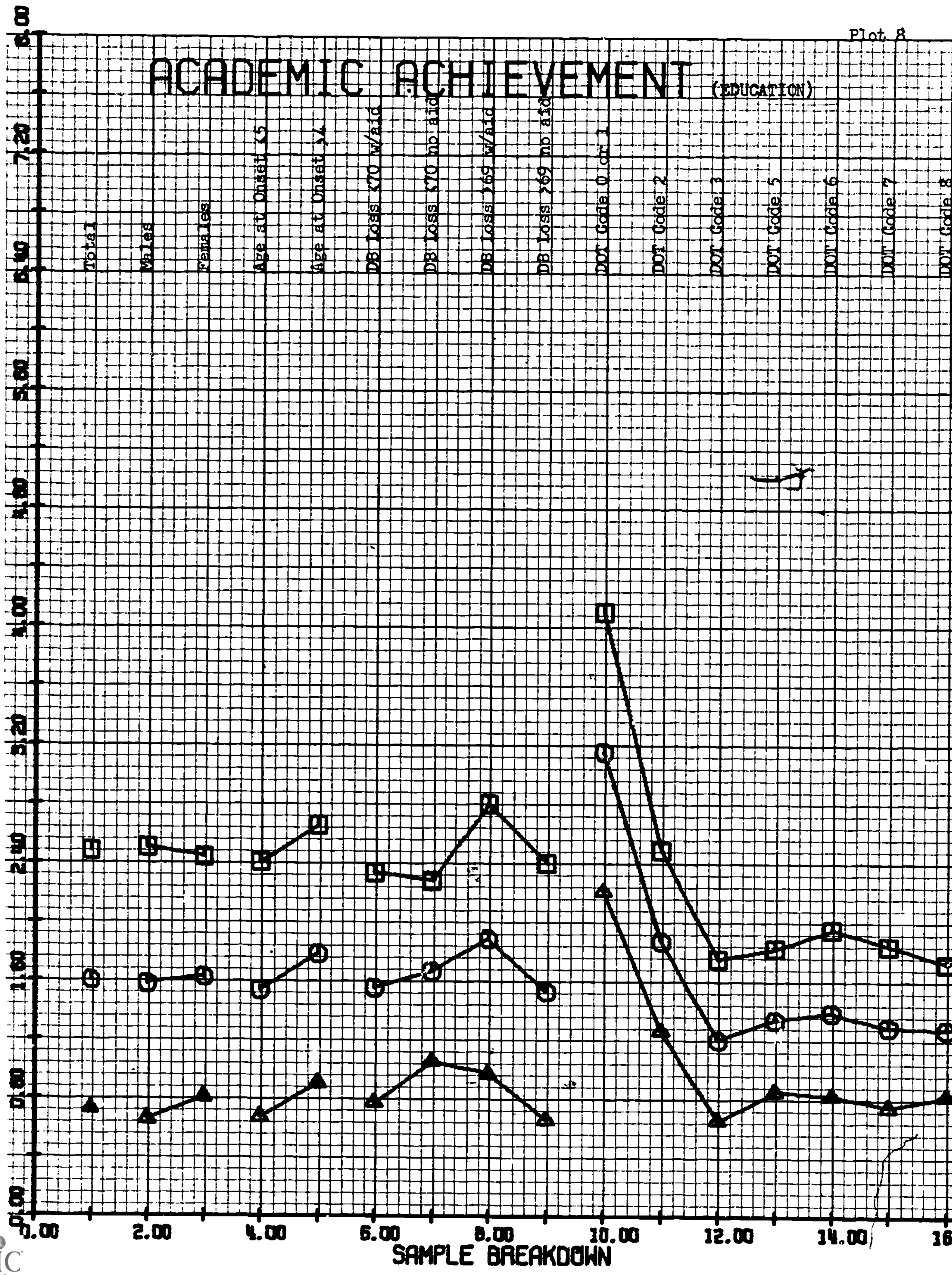
Variable	Plot #	Variable	Plot #
Age	6	Weingarten	
Age at Onset	7	- Esthetic	39
Academic Achievement	8	- Scientific	40
Monthly Pay Rate	12	- Verbal	41
No.Months Worked	19	- Computational	42
GATB - G	20	- Time Perspective	43
- V	21	Gottschaldt (standard)	53
- N	22	Gates Comprehension (raw)	54
- S	23	Craig Words	58
- P	24	Craig Sentences	59
- Q	25	Manual Communication (R)	60
- K	26	Manual Communication (S)	61
- F	27	Berger Ident. I	62
- M	28	Berger Ident. II	64
Culture Fair g	29	Berger Ident. III	66
Bender Gestalt (raw)	30	Holdt Speech Characteristics Test	
Weingarten		Expert Intelligibility	68
- Interpersonal	35	Pitch	69
- Natural	36	Volume	70
- Mechanical	37	Duration	71
- Business	38	DB Loss Better Ear	33



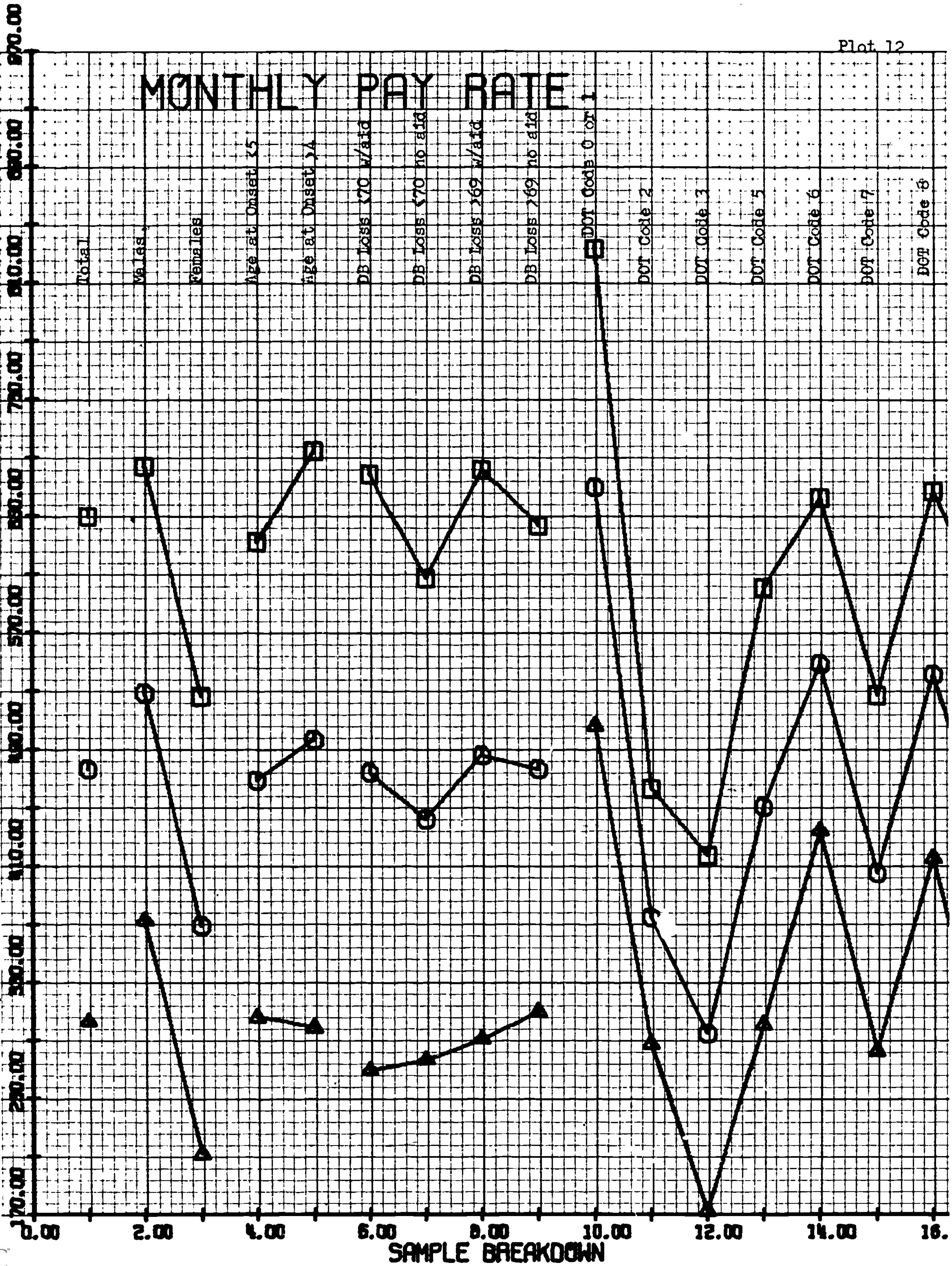
Plot 6
AGE
Total
Males
Females
Age at Onset ≤5
Age at Onset >4
DB Loss ≤70 w/aid
DB Loss ≤70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN
23.00
27.00
31.00
35.00
39.00
43.00
47.00
51.00
55.00
59.00
63.00

Plot 7

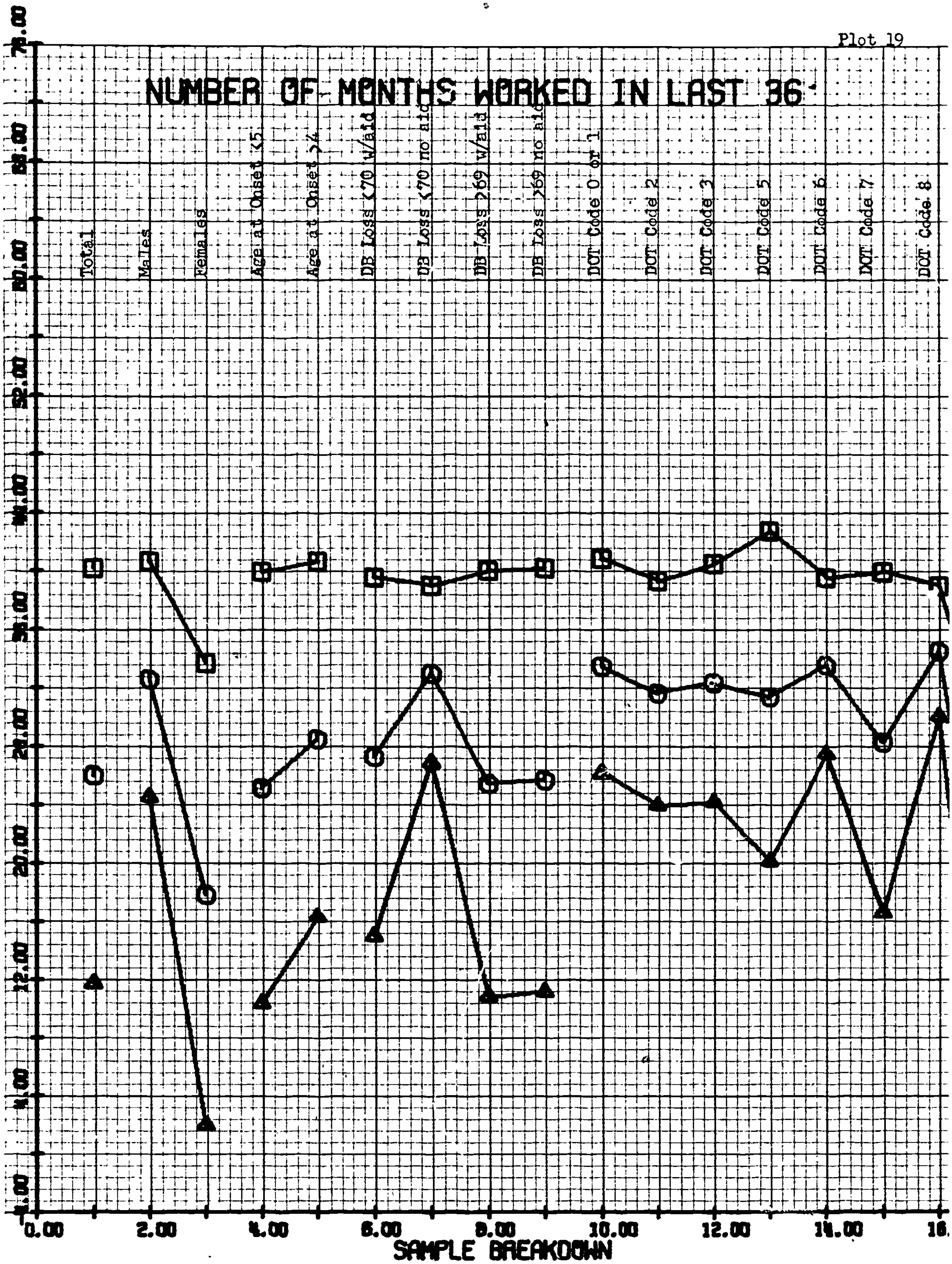

AGE AT ØNSET
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
35.00
31.00
27.00
23.00
19.00
15.00
11.00
7.00
3.00
-1.00
-5.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.0
SAMPLE BREAKDOWN



Plot 8
ACADEMIC ACHIEVEMENT (EDUCATION)
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
0.80
1.60
2.40
3.20
4.00
4.80
5.60
6.40
7.20
8.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

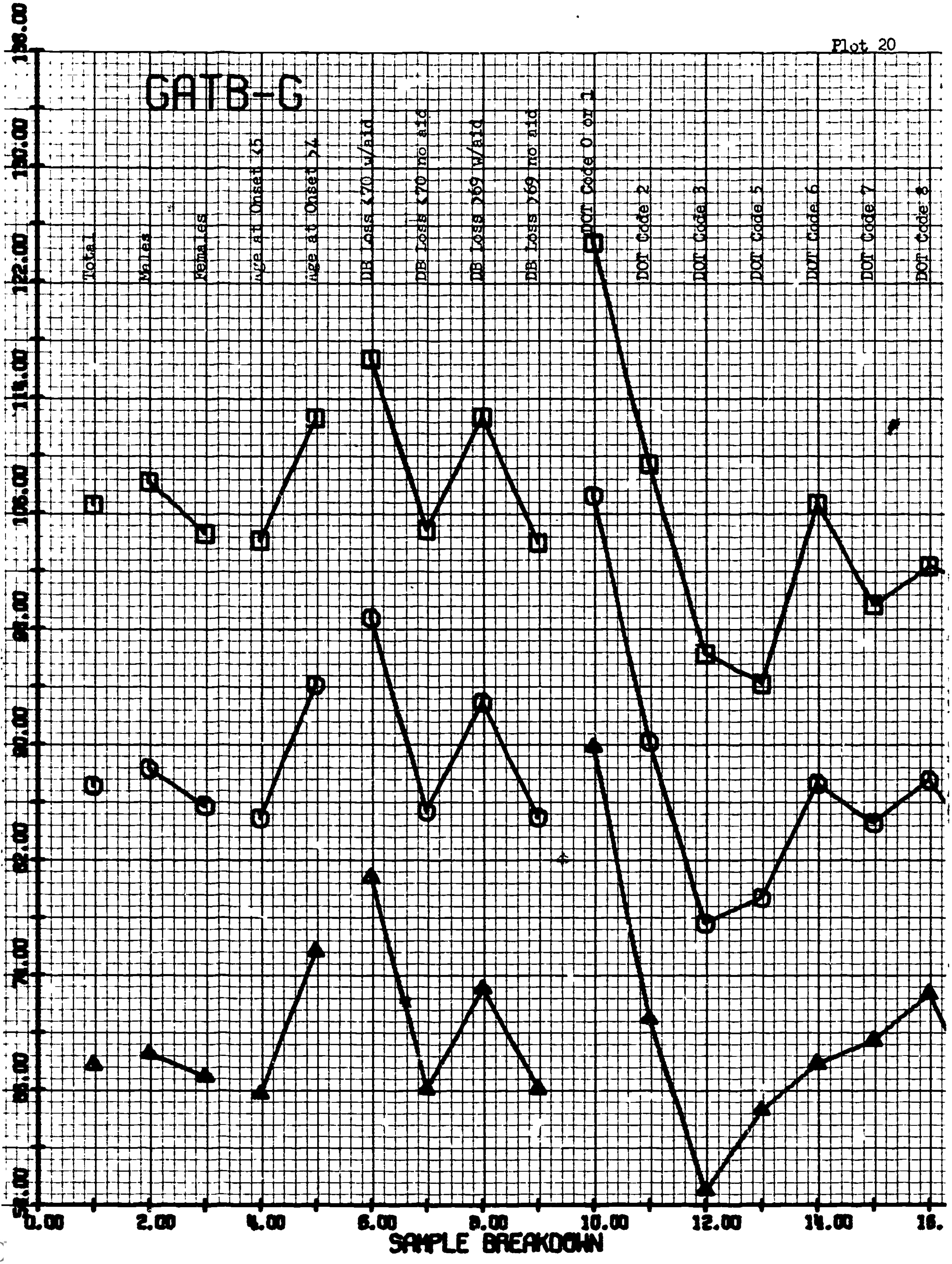

MONTHLY PAY RATE
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
970.00
570.00
410.00
330.00
250.00
170.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

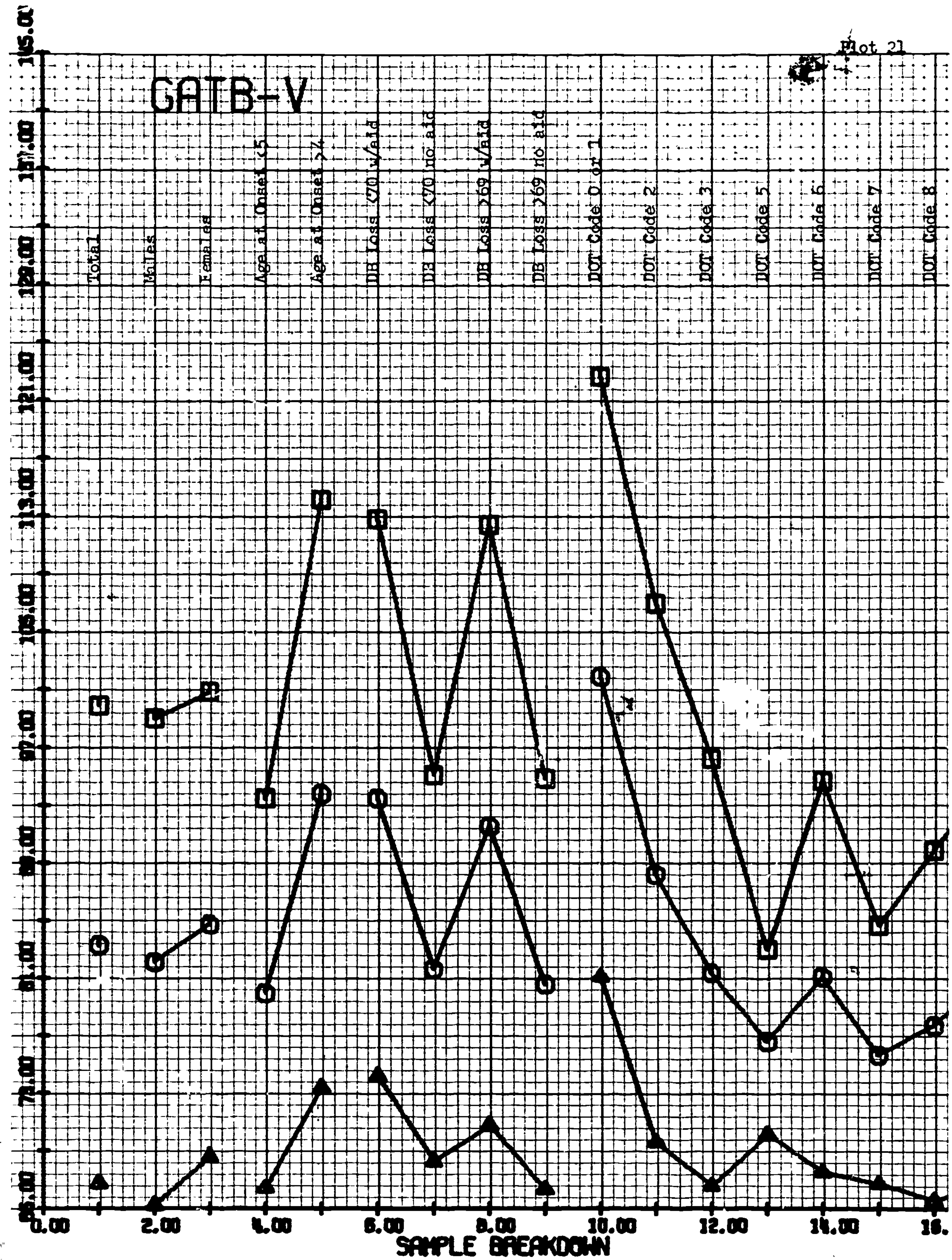
Plot 19



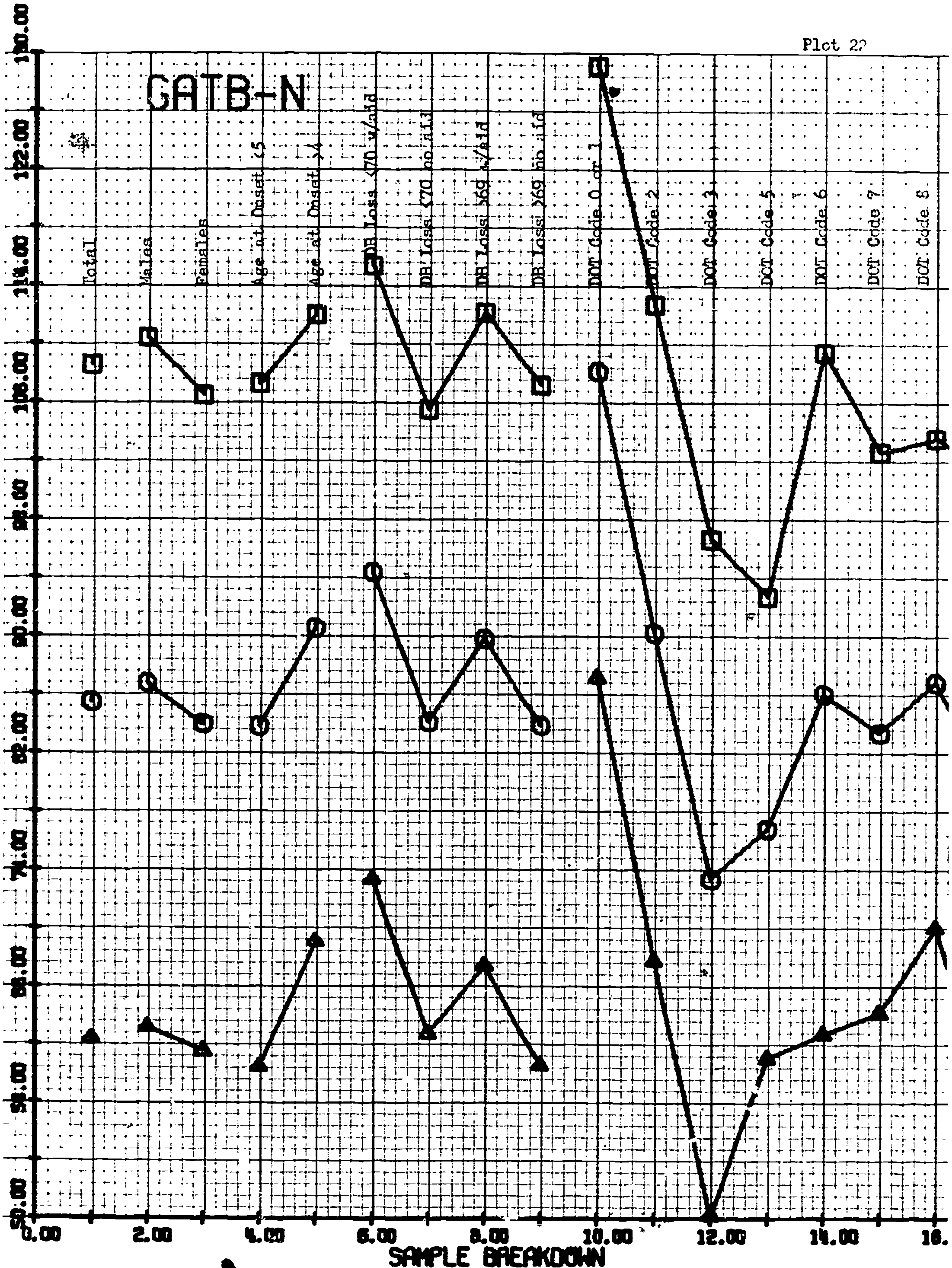
NUMBER OF MONTHS WORKED IN LAST 36
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN
4.00
12.00
20.00
28.00
36.00
44.00
52.00
60.00
68.00
76.00

Plot 20

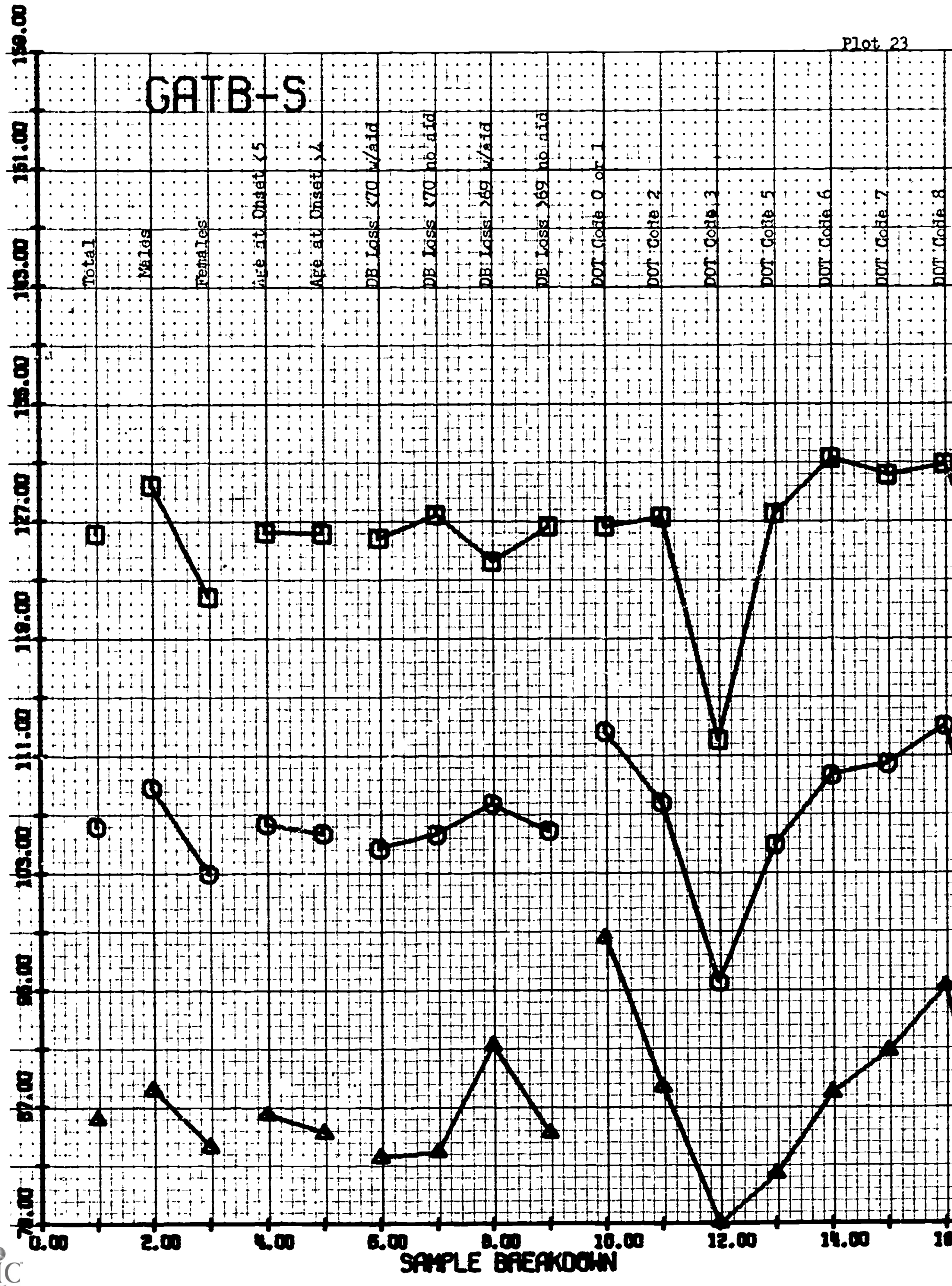

GATB-G
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN



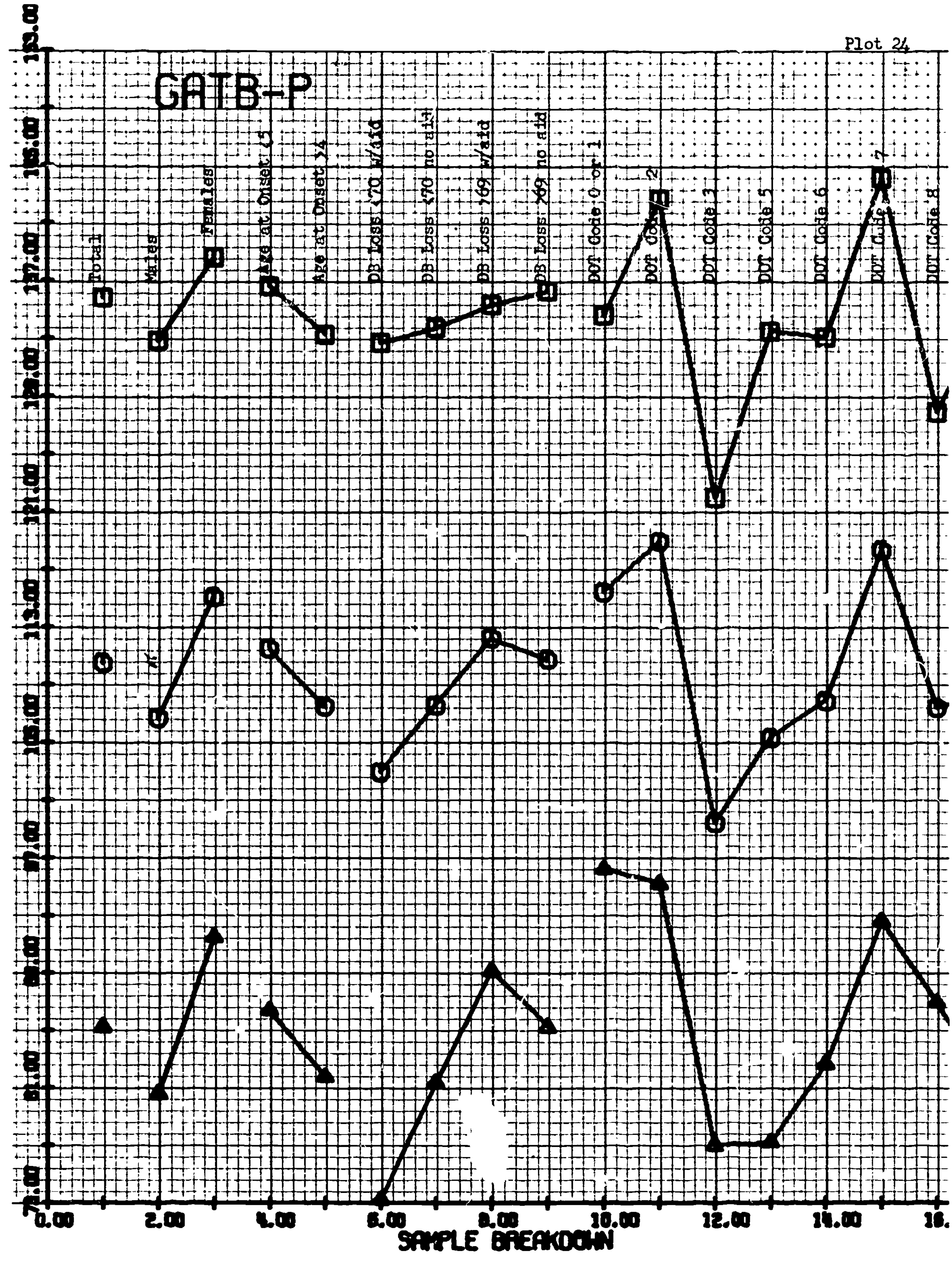
GATB-V
Plot 21
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
65.00
73.00
81.00
89.00
97.00
105.00
113.00
121.00
129.00
137.00
145.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN



GATB-N
Total
Males
Females
Age at Onset <5
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
50.00
58.00
66.00
74.00
82.00
90.00
98.00
106.00
114.00
122.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
SAMPLE BREAKDOWN

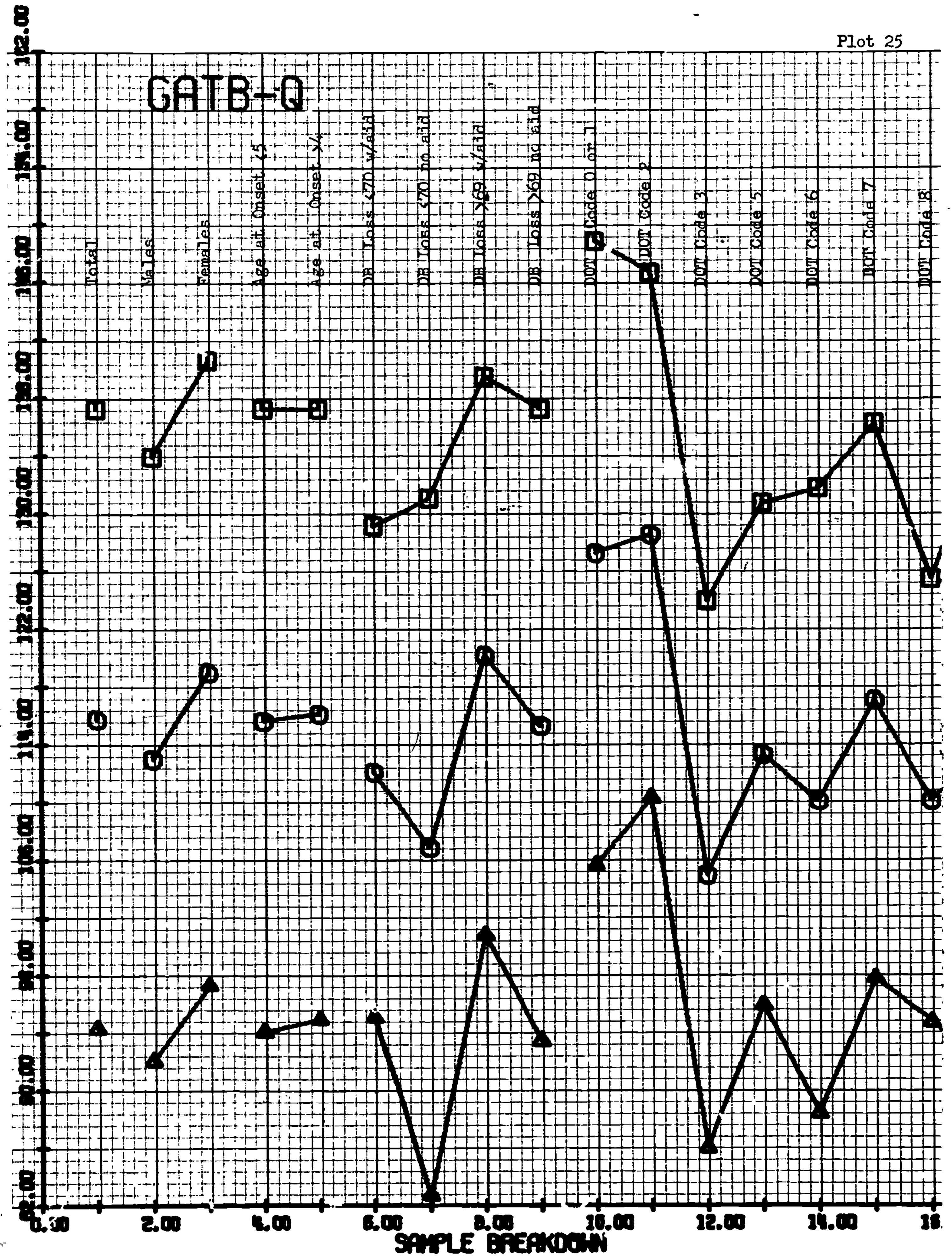


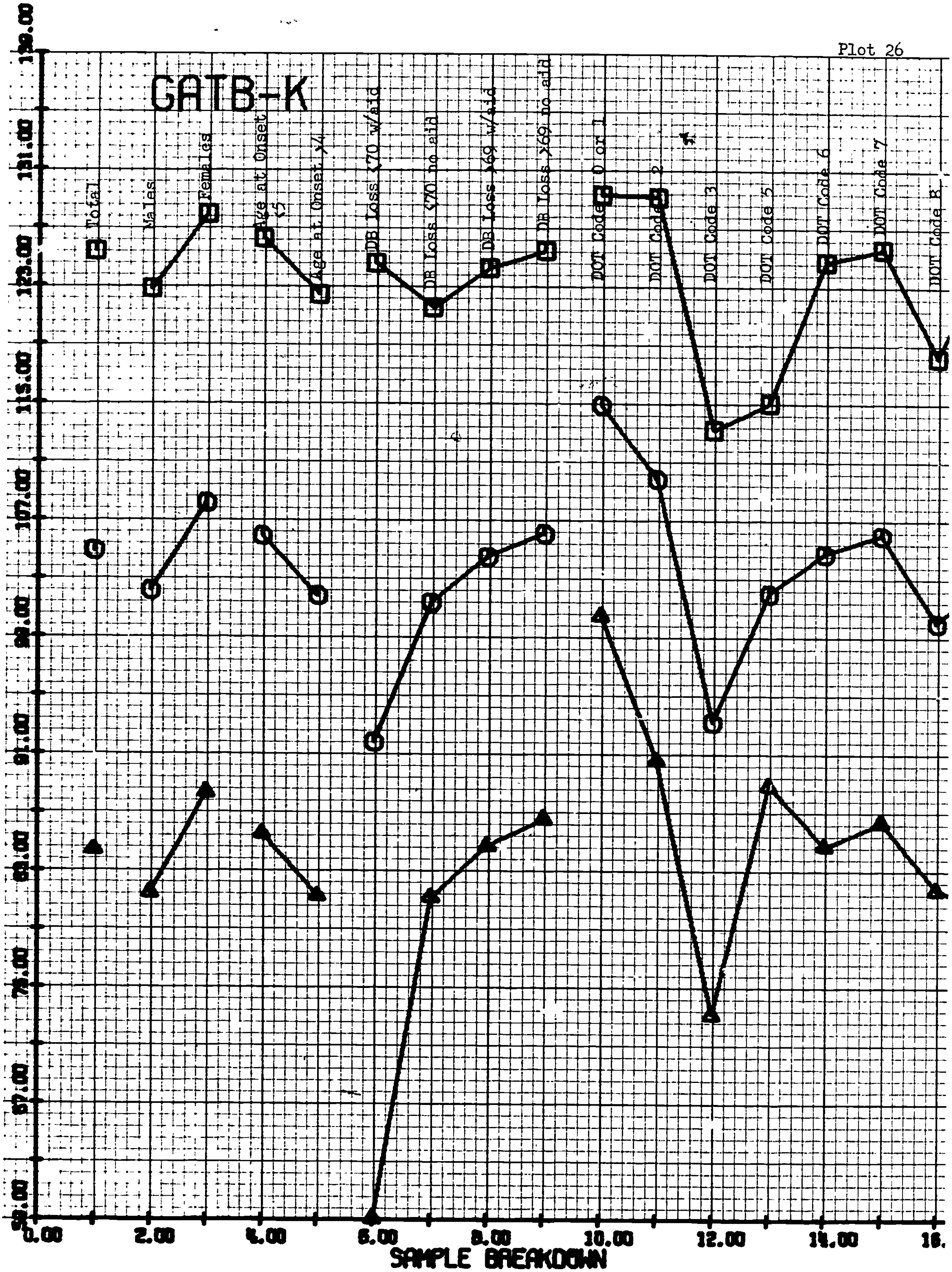
Plot 23
GATB-S
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

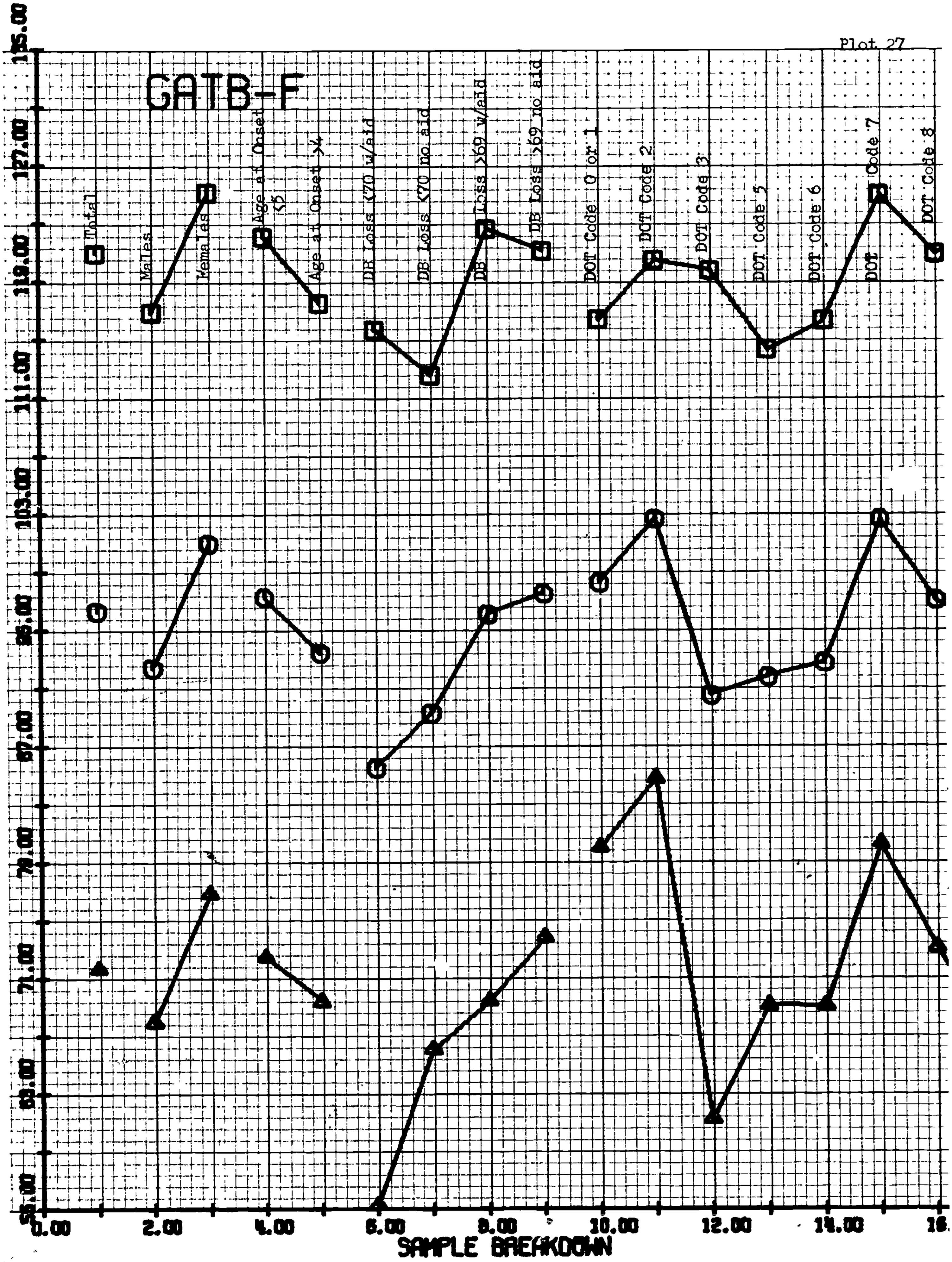


Plot 24
GATB-P
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
SAMPLE BREAKDOWN

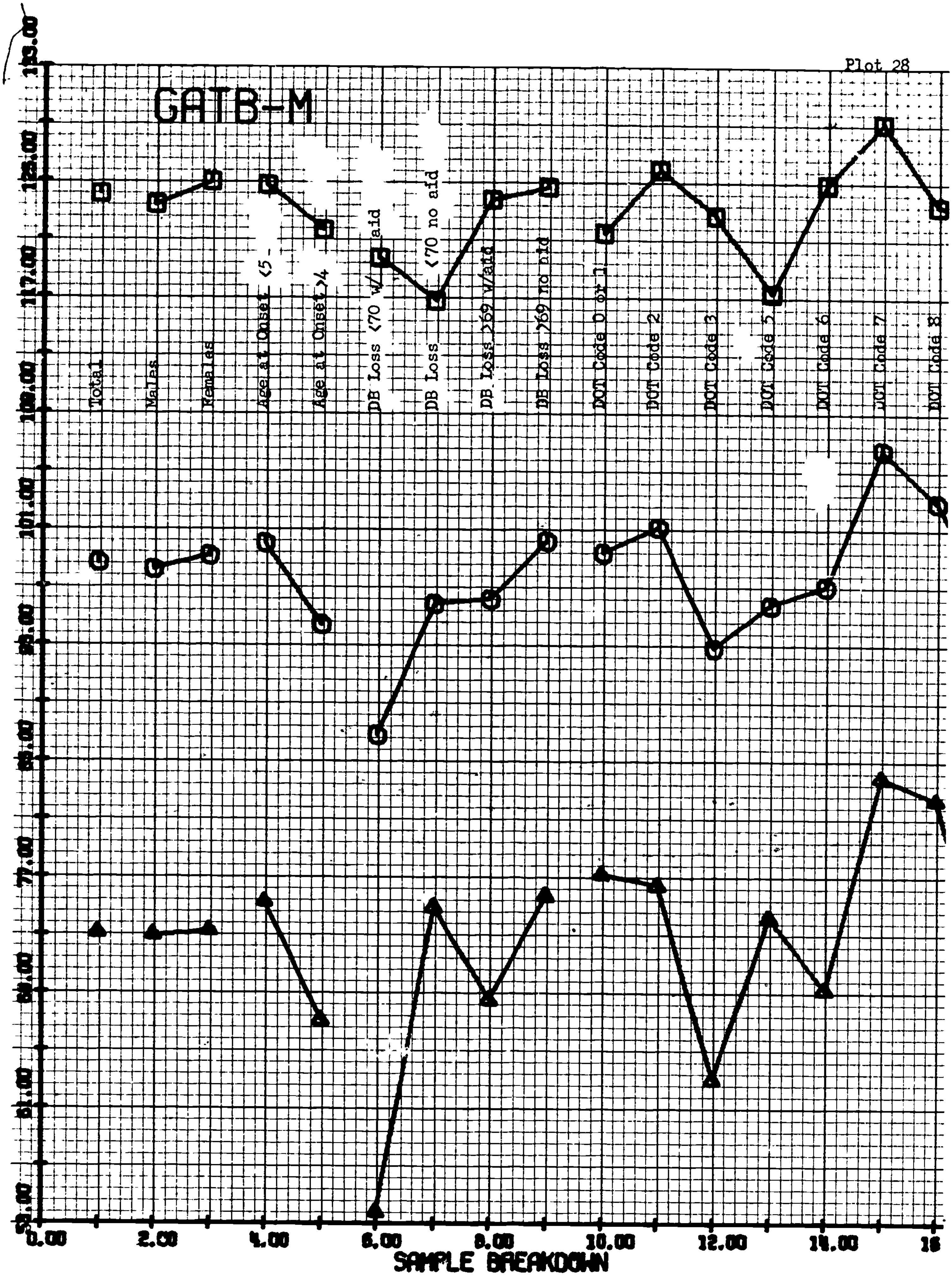
Plot 25


GATB-Q
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN


Plot 26
GATB-K
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
139.00
131.00
123.00
115.00
107.00
99.00
91.00
83.00
75.00
67.00
59.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

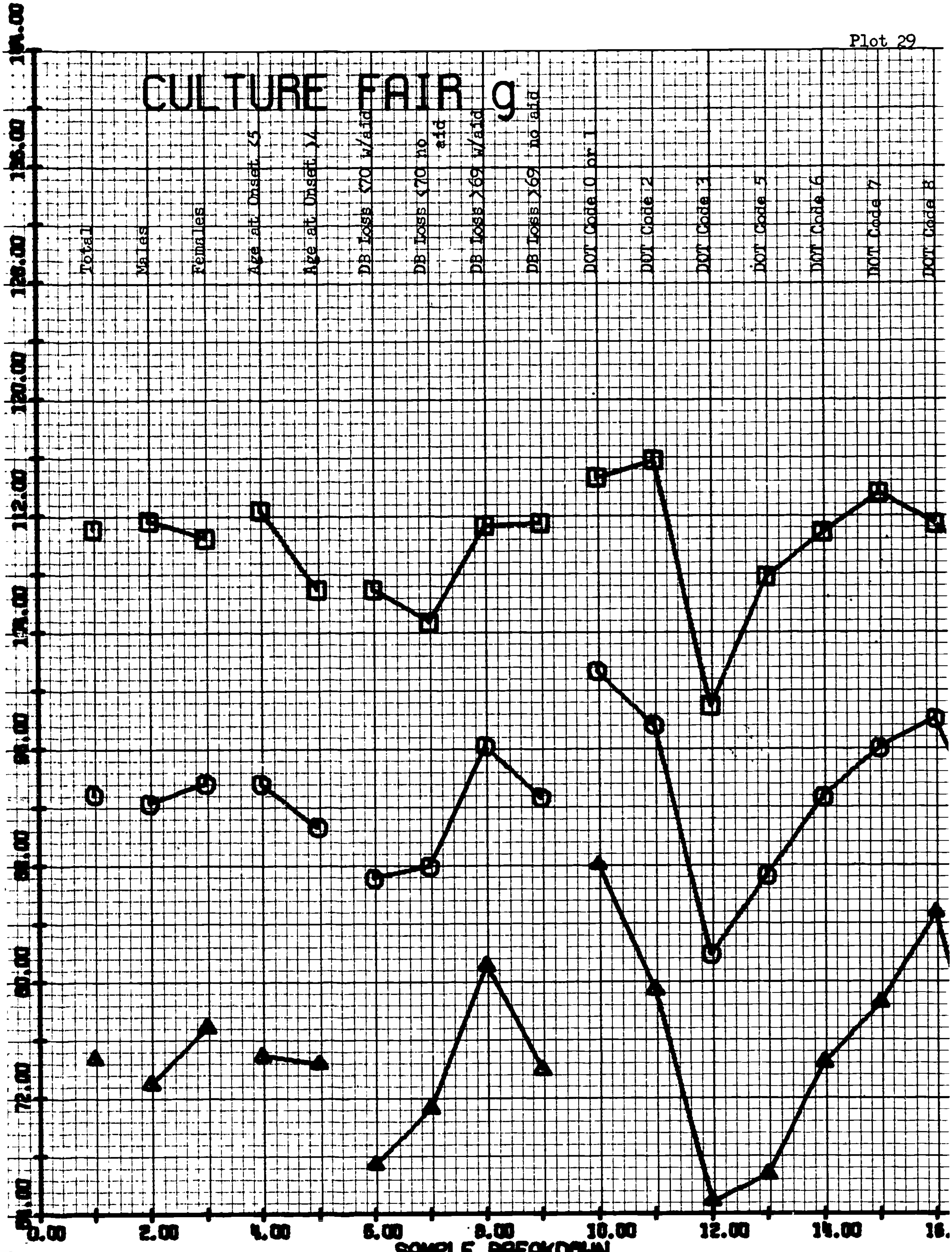


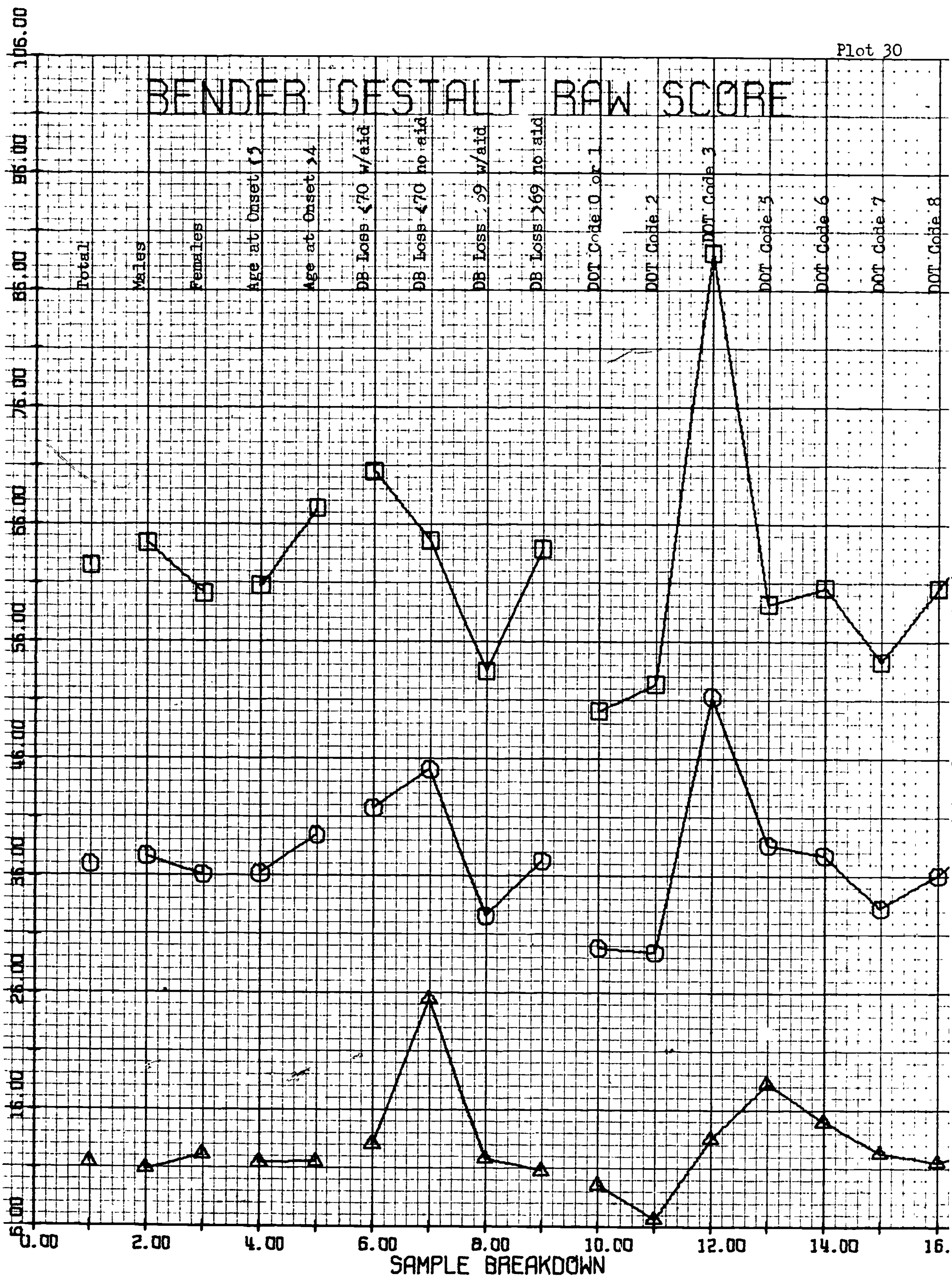
Plot 27
GATB-F
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
135.00
127.00
119.00
111.00
103.00
95.00
87.00
79.00
71.00
63.00
55.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

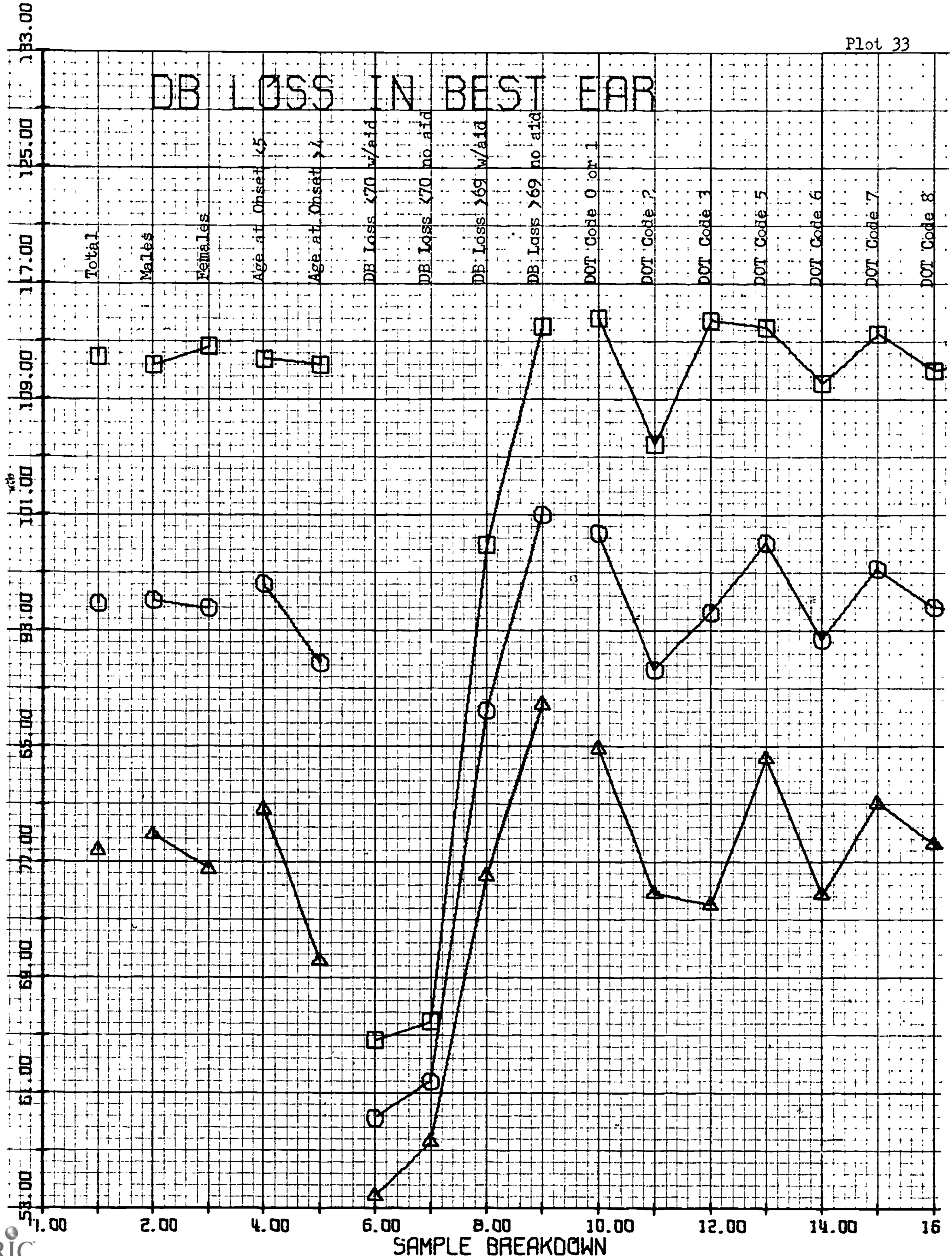


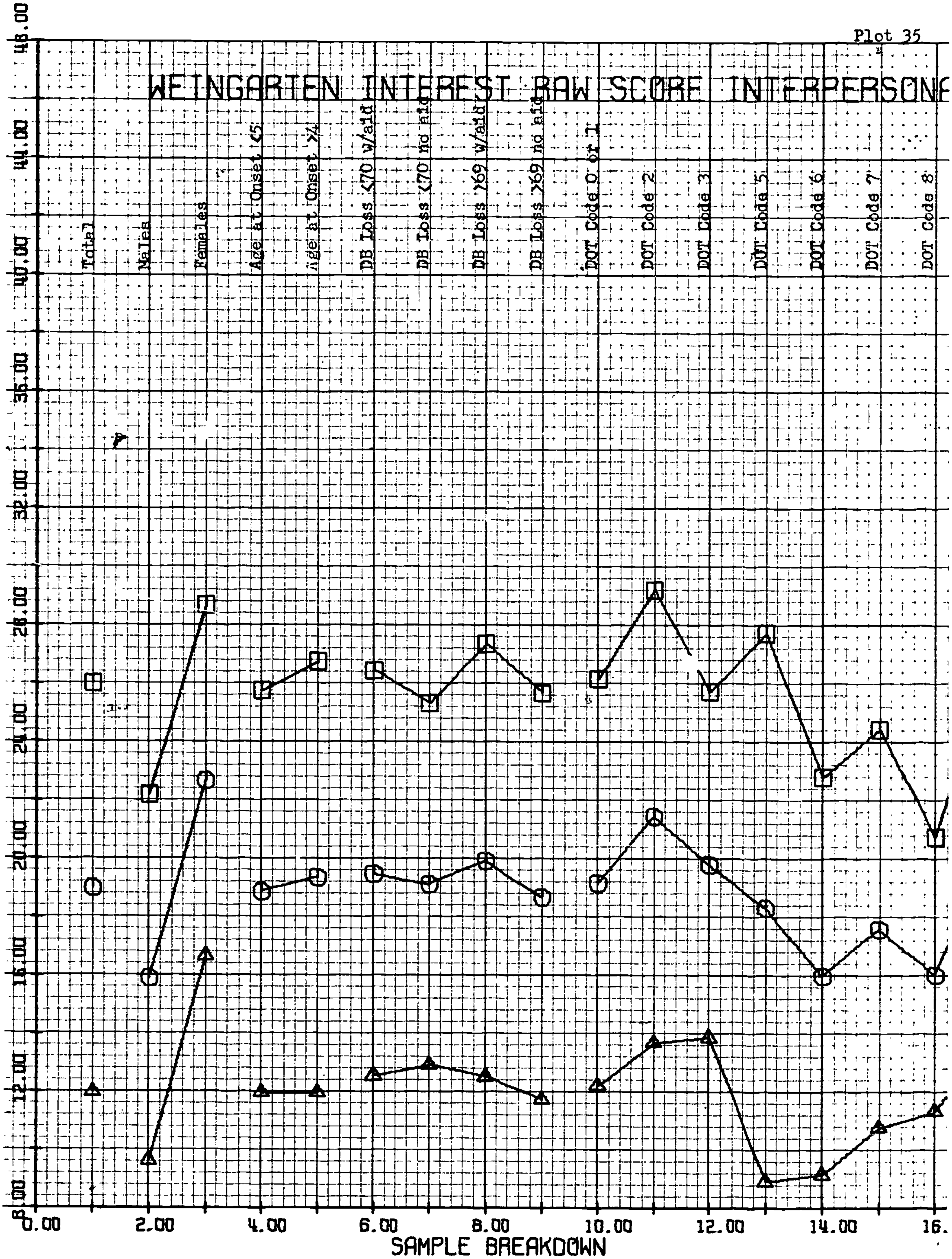
Plot 28
GATB-M
125.00
117.00
109.00
101.00
77.00
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/ aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

Plot 29

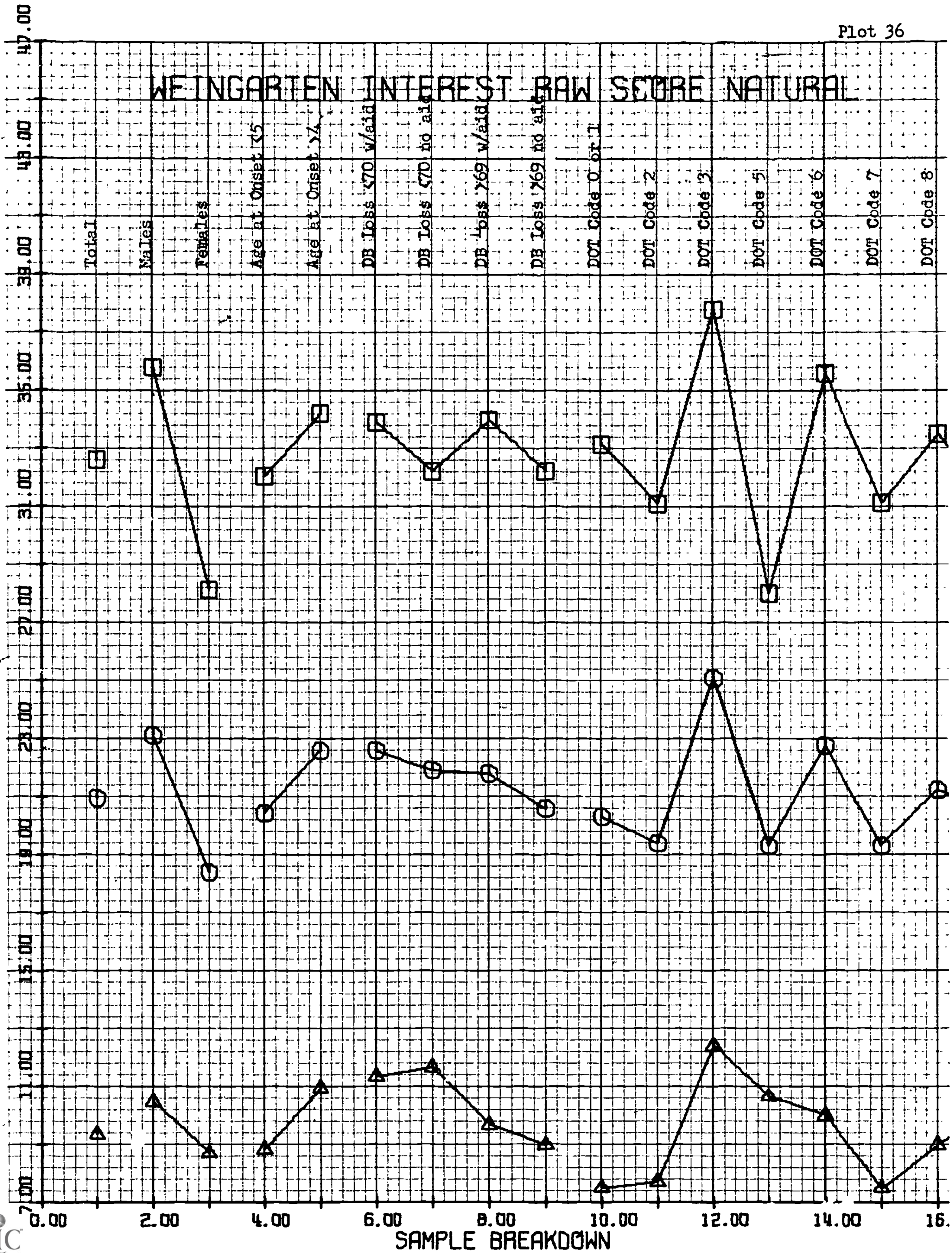

CULTURE FAIR g
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN
72.00
80.00
88.00
96.00
104.00
112.00
120.00
128.00
136.00


Plot 30
BENDER GESTALT RAW SCORE
Total
Males
Females
Age at Onset <3
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
106.00
96.00
86.00
76.00
66.00
56.00
46.00
36.00
26.00
16.00
6.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

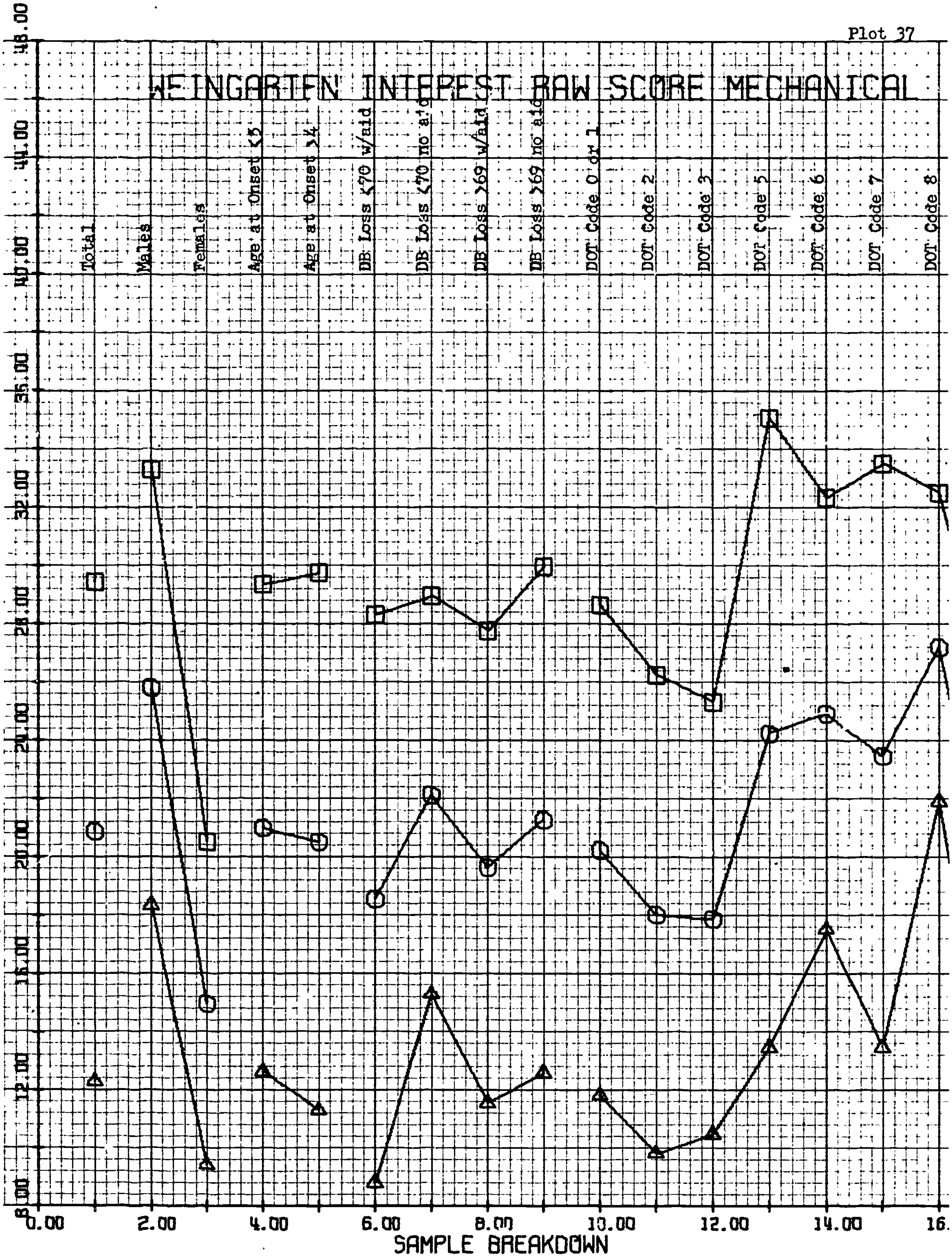

Plot 33
DB LOSS IN BEST EAR
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
133.00
125.00
117.00
109.00
101.00
93.00
85.00
77.00
69.00
61.00
53.00
1.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN


Plot 35
WEINGARTEN INTEREST RAW SCORE INTERPERSONA
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

Plot 36

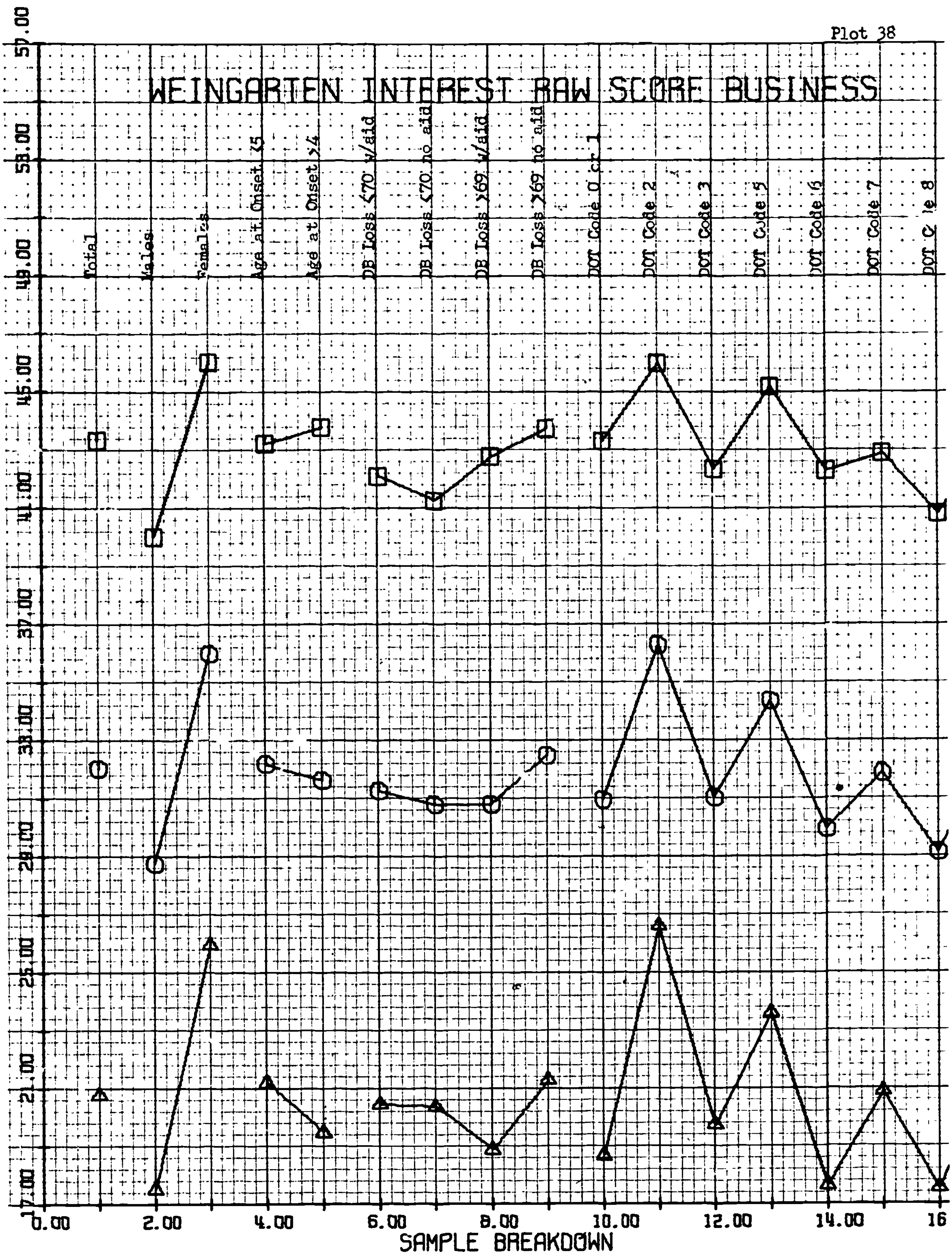

WEINGARTEN INTEREST RAW SCORE NATURAL
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
47.00
43.00
39.00
35.00
31.00
27.00
23.00
19.00
15.00
11.00
7.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

Plot 37

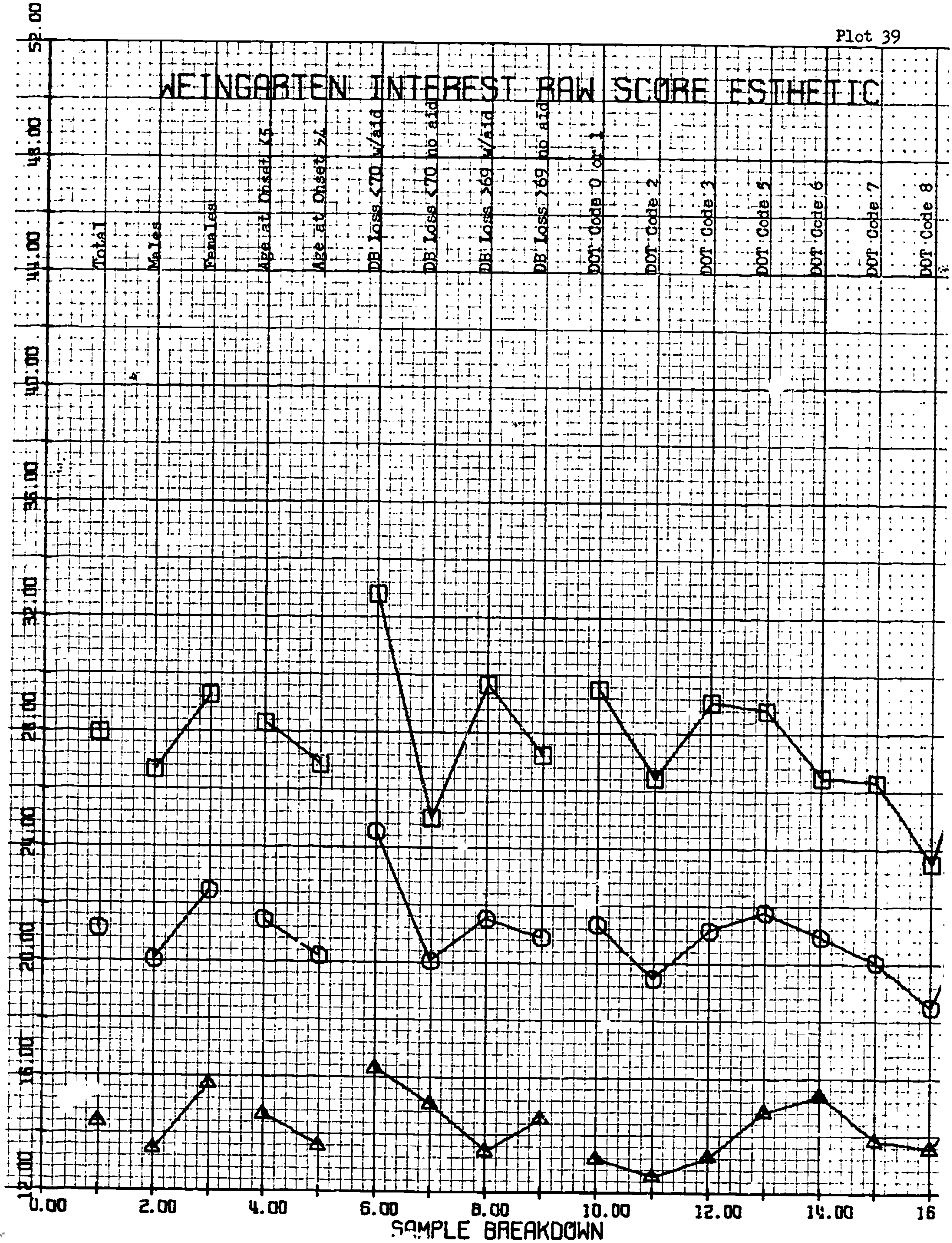


WEINGARTEN INTEREST RAW SCORE MECHANICAL
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

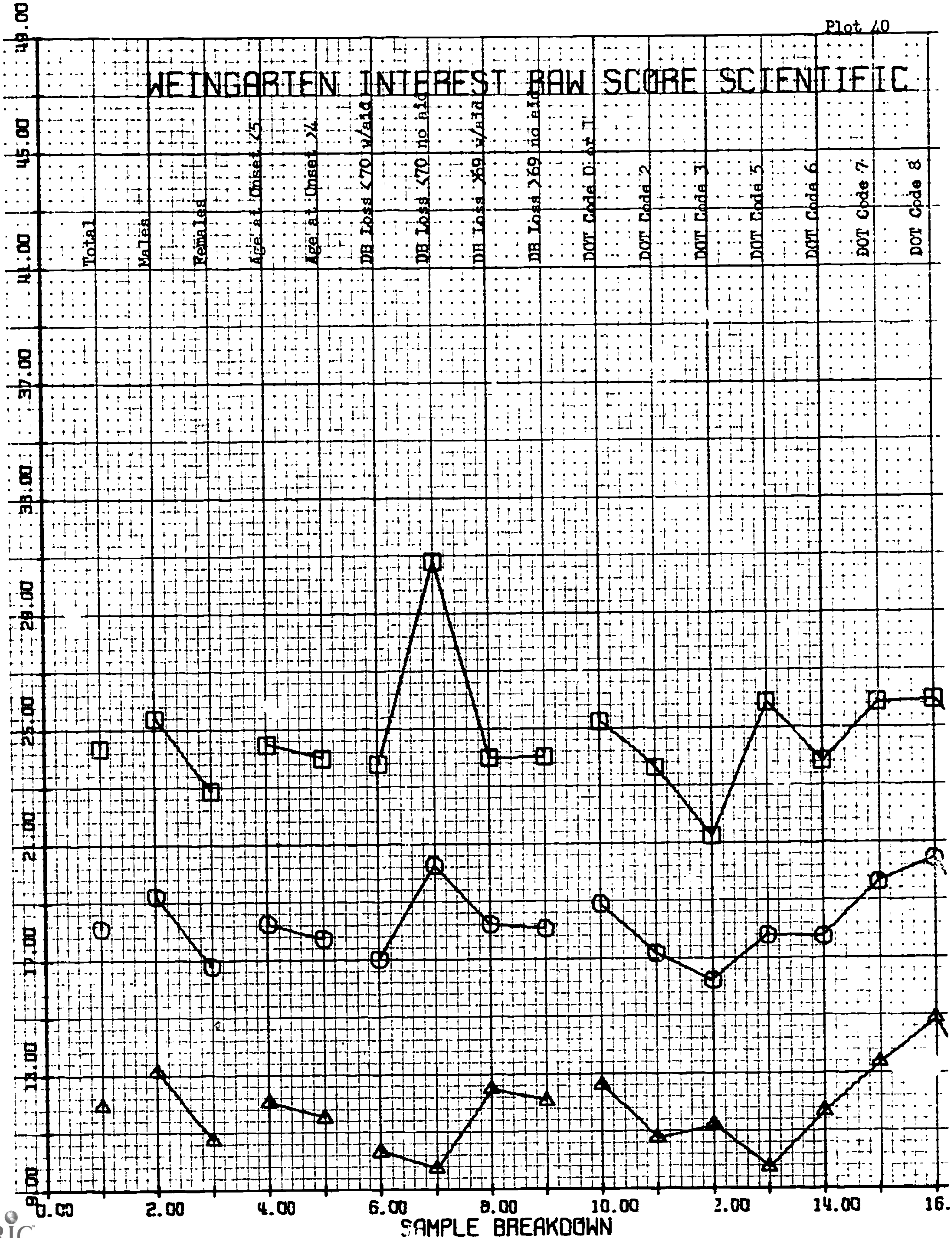
Plot 38


WEINGARTEN INTEREST RAW SCORE BUSINESS
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
57.00
53.00
49.00
45.00
41.00
37.00
33.00
29.00
25.00
21.00
17.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

Plot 39

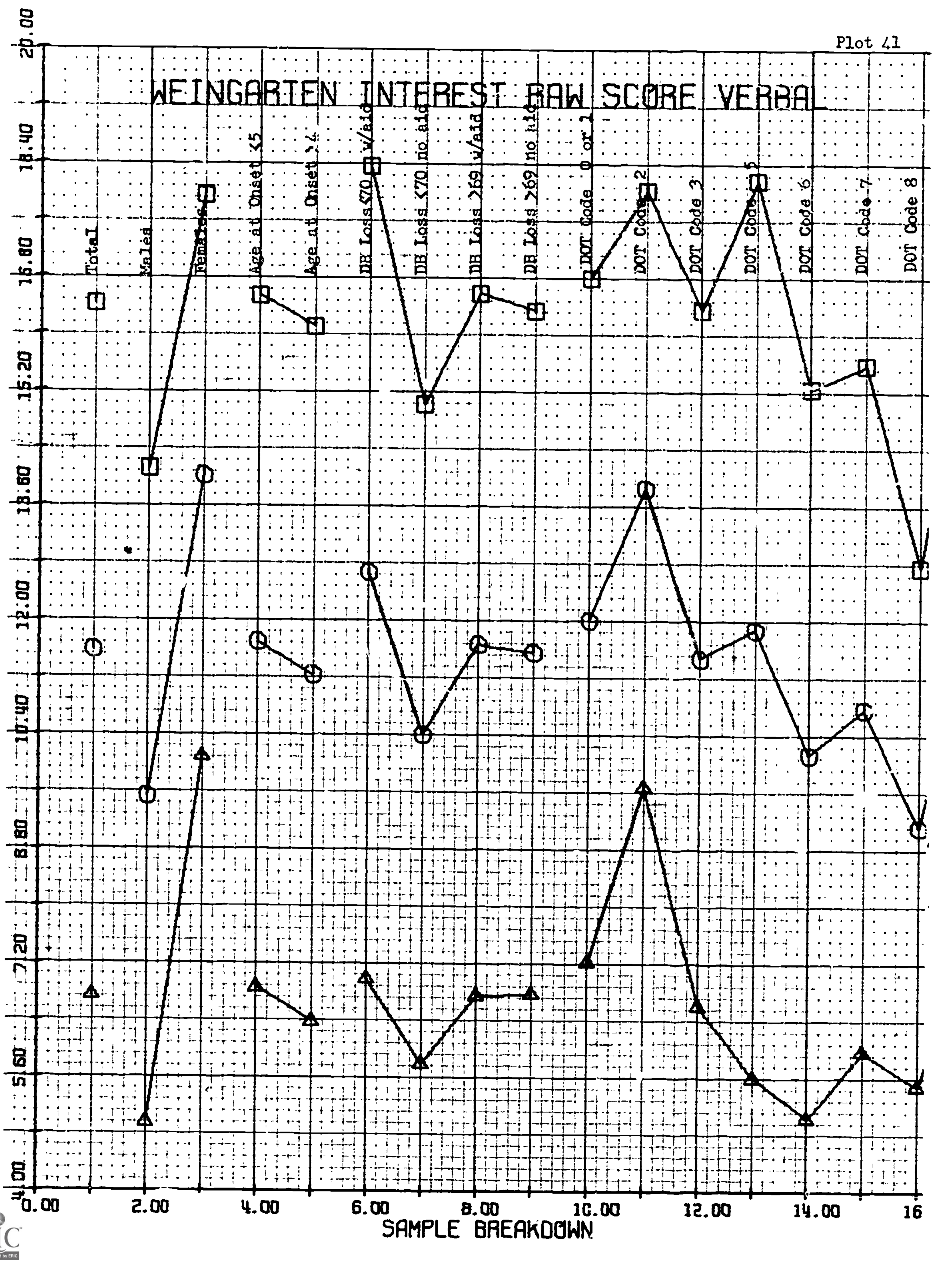


WEINGARTEN INTEREST RAW SCORE ESTHETIC
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
52.00
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN



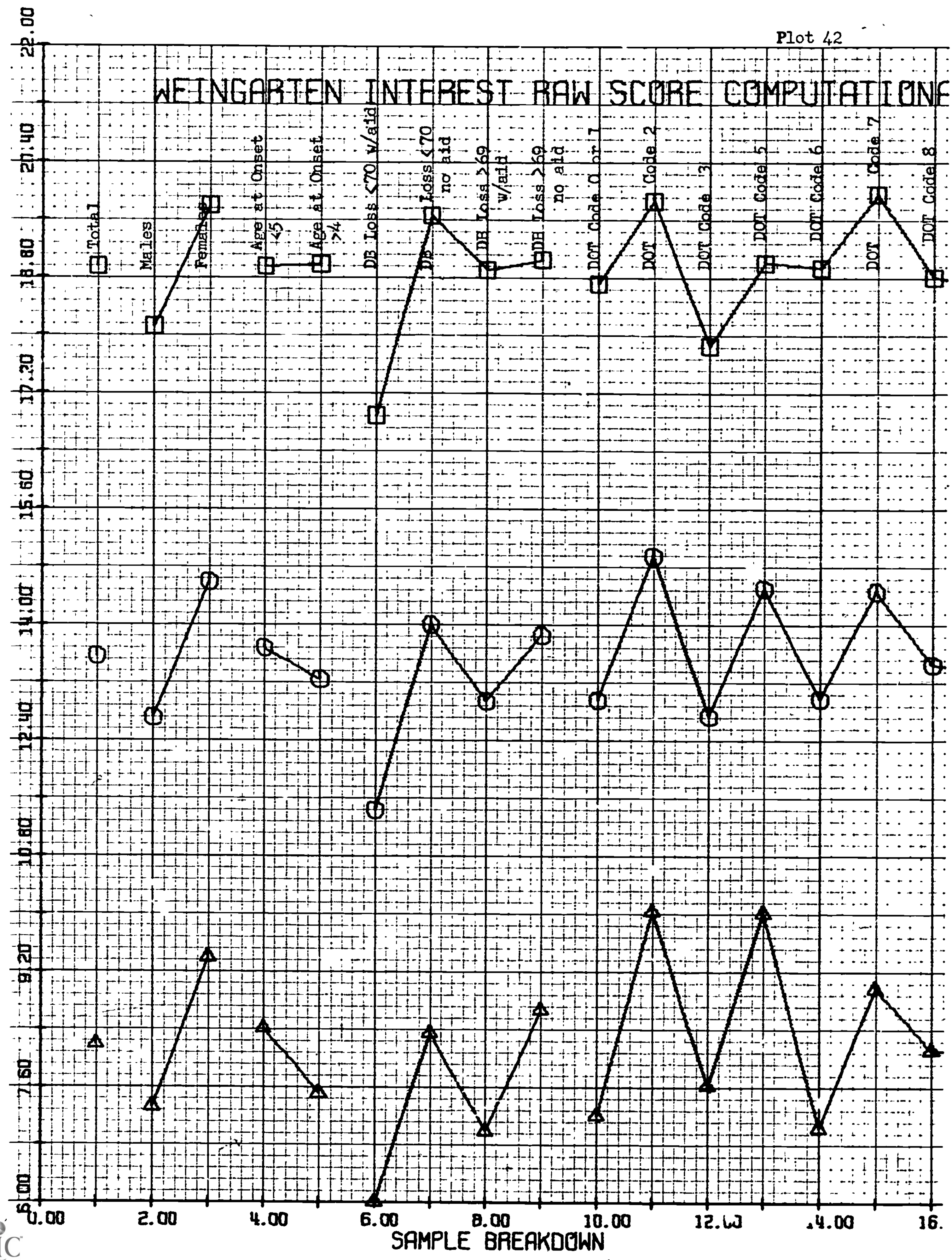
Plot 40
WEINGARTEN INTEREST RAW SCORE SCIENTIFIC
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
SAMPLE BREAKDOWN

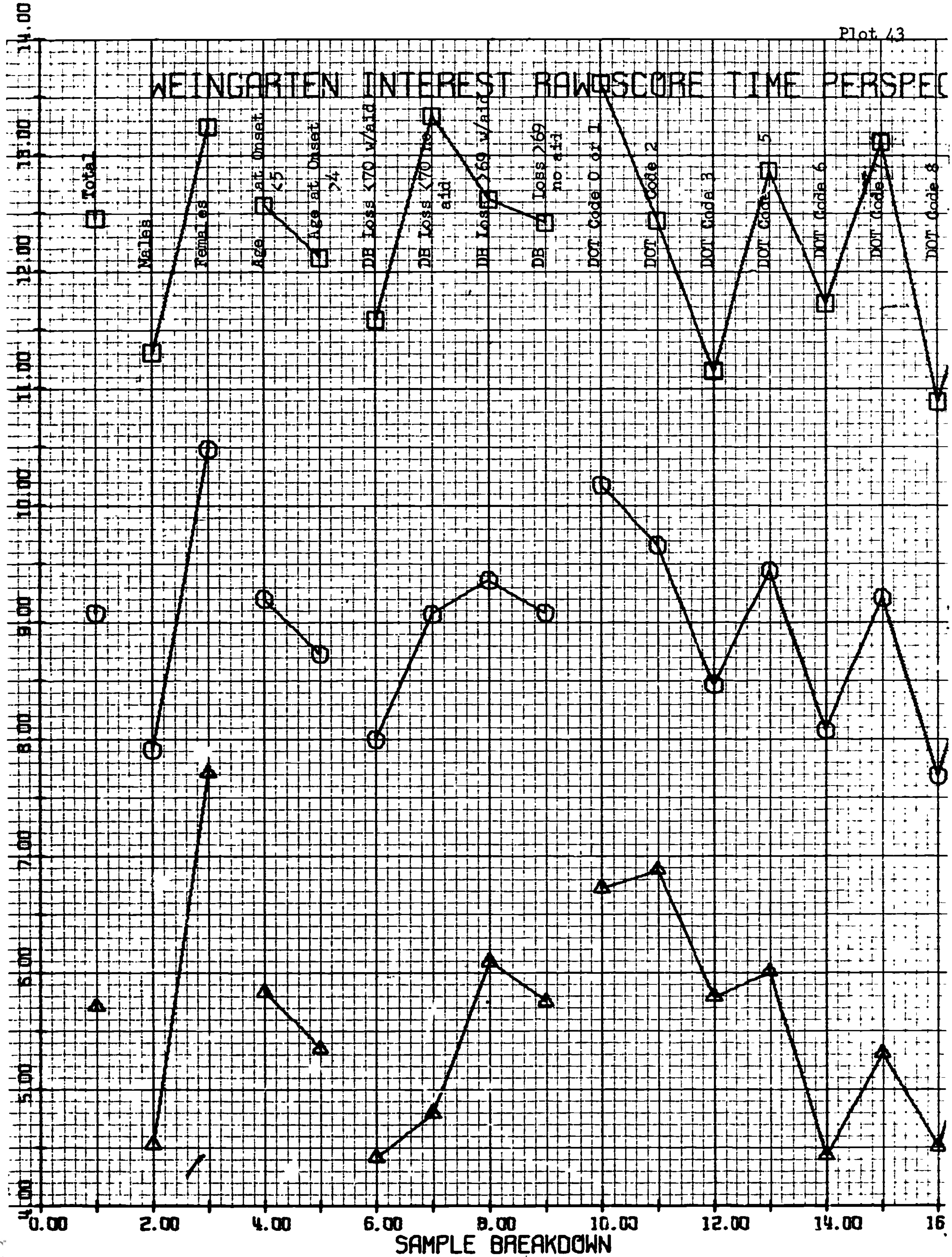
Plot 41



WEINGARTEN INTEREST RAW SCORE VERBAL
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
4.00
5.60
7.20
8.80
10.40
12.00
13.60
15.20
16.80
18.40
20.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

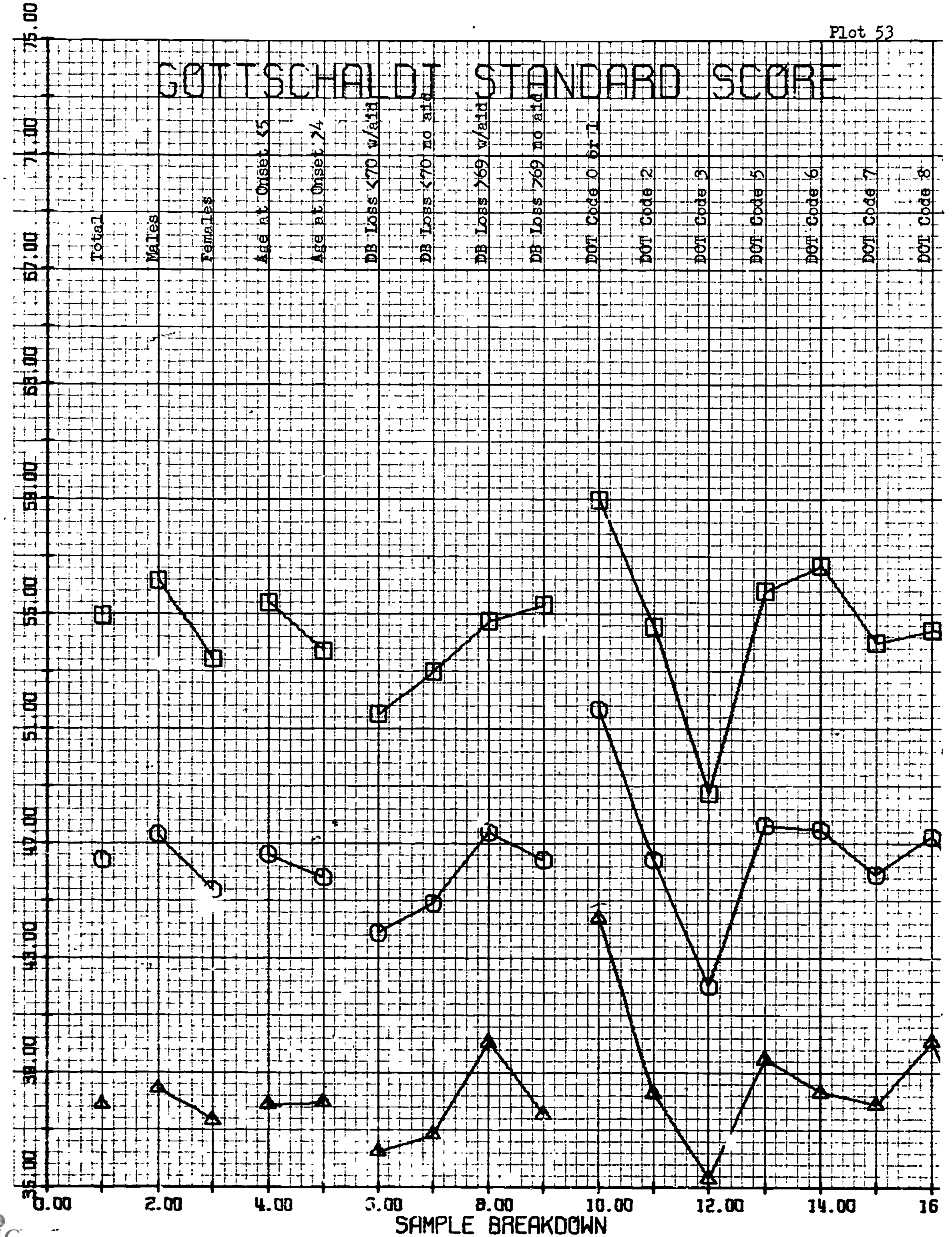
Plot 42

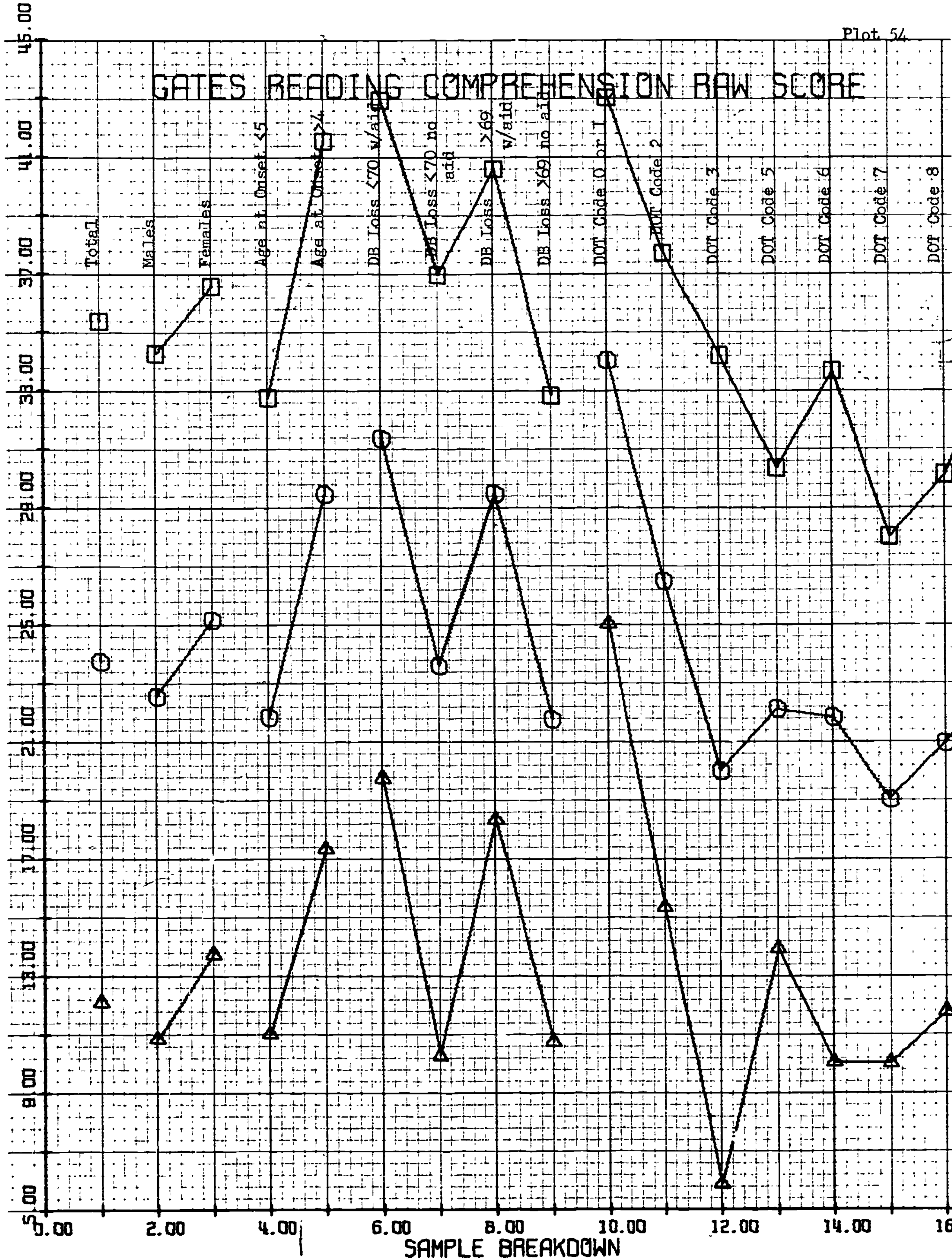

WEINGARTEN INTEREST RAW SCORE COMPUTATIONAL
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
6.00
7.60
9.20
10.80
12.40
14.00
15.60
17.20
18.80
20.40
22.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN



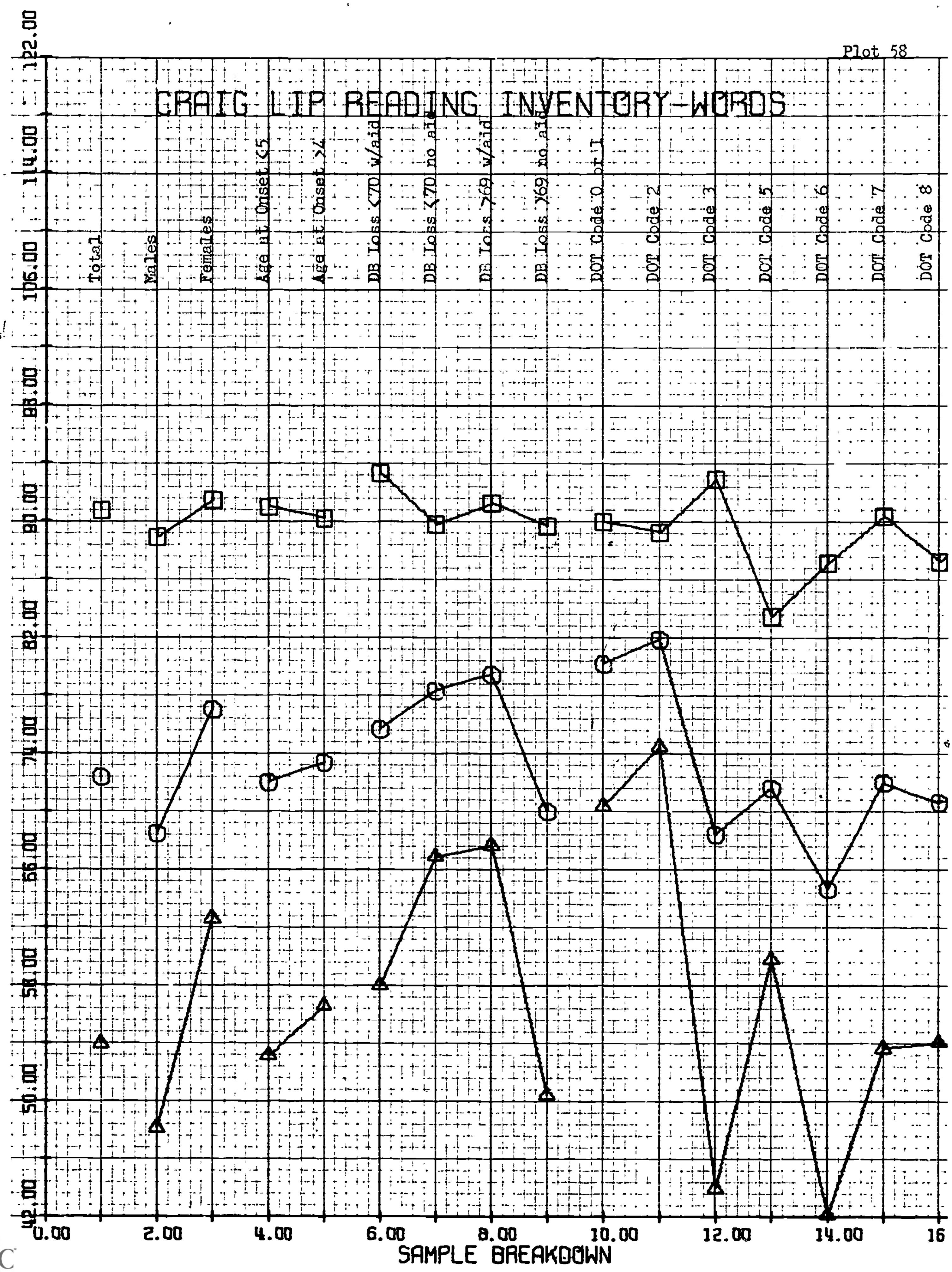
Plot 43
WEINGARTEN INTEREST RAWSCORE TIME PERSPEC
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
14.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

Plot 53

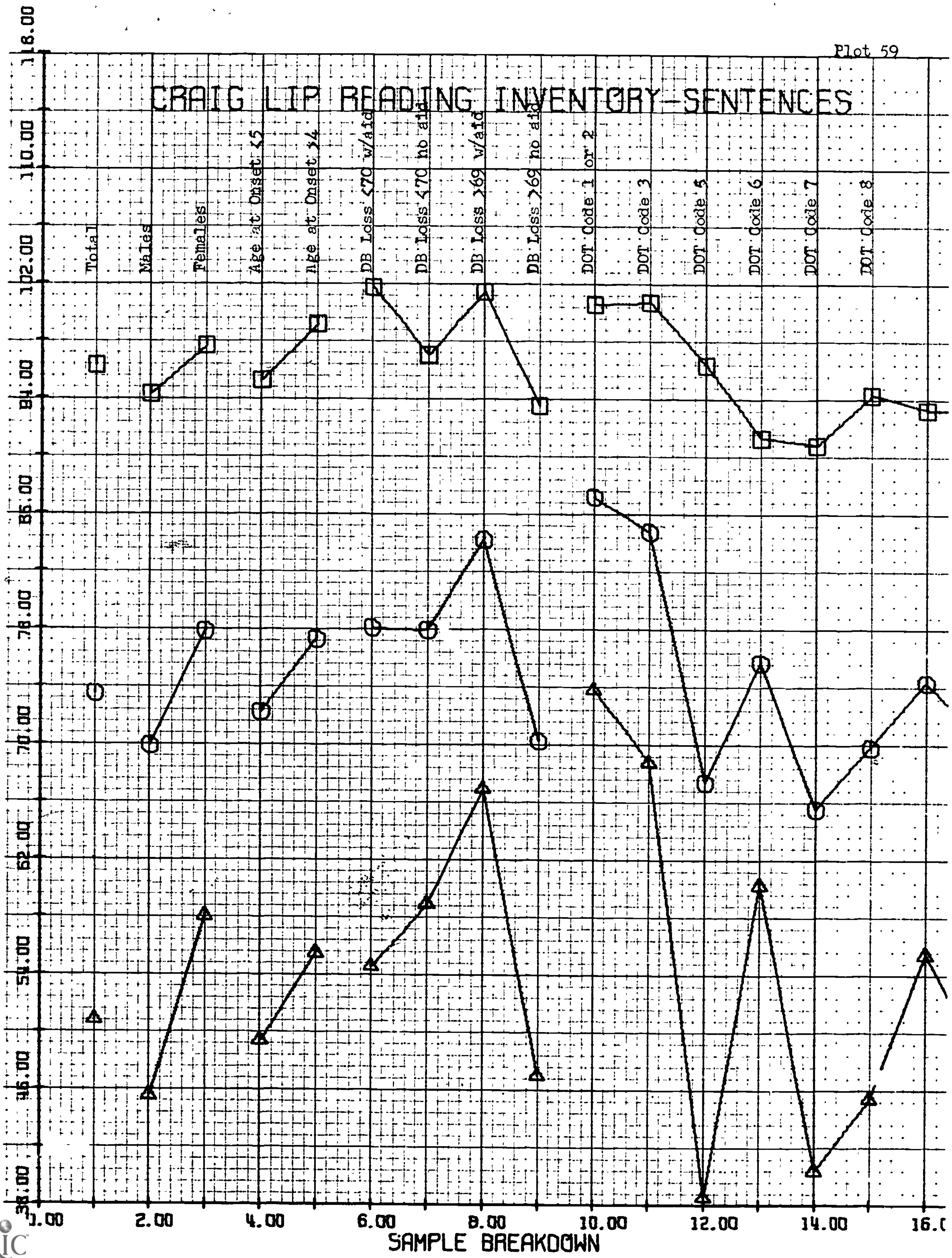

GØTTSCHALDT STANDARD SCØRE
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
75.00
71.00
67.00
63.00
59.00
55.00
51.00
47.00
43.00
39.00
35.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

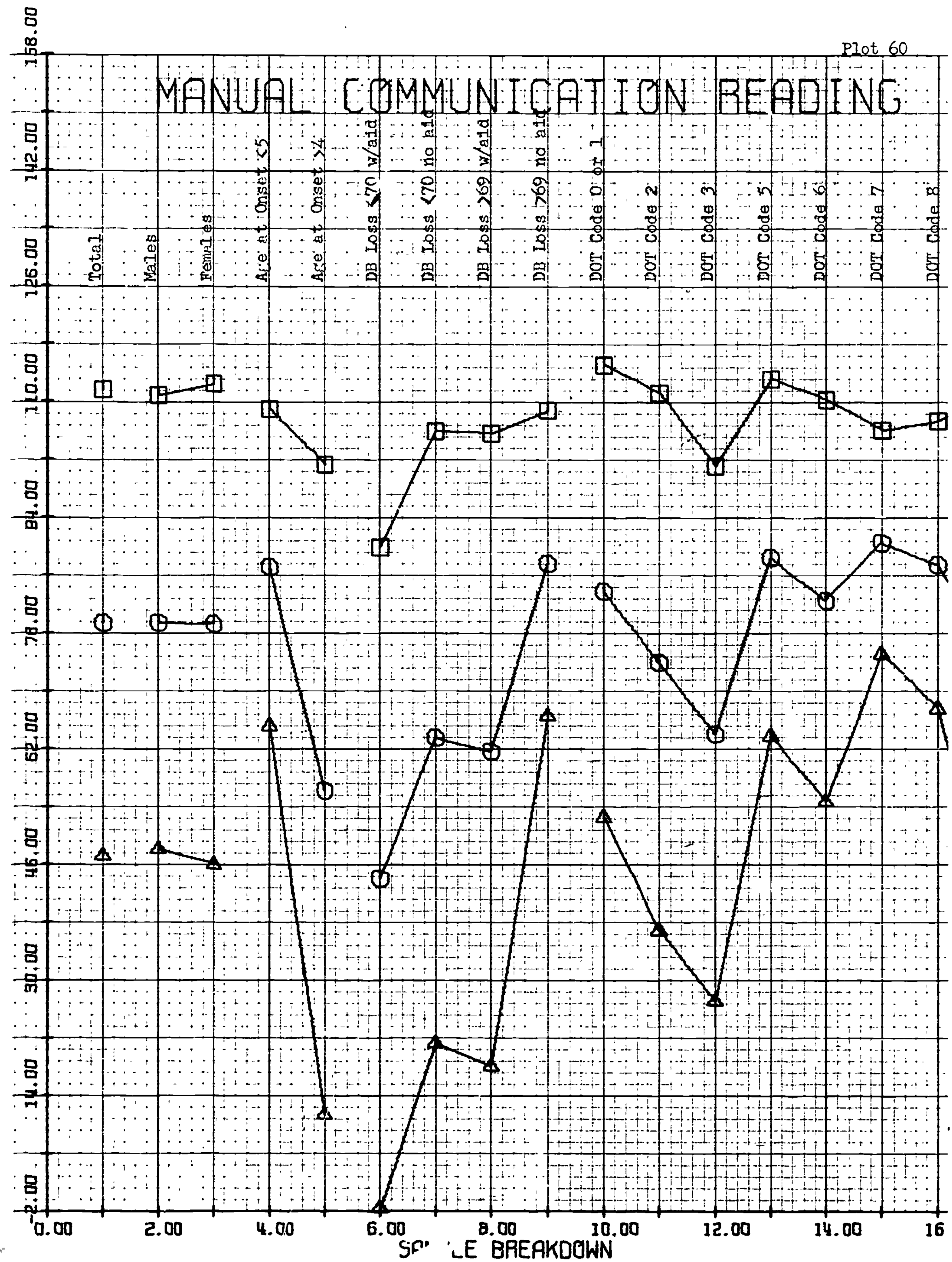


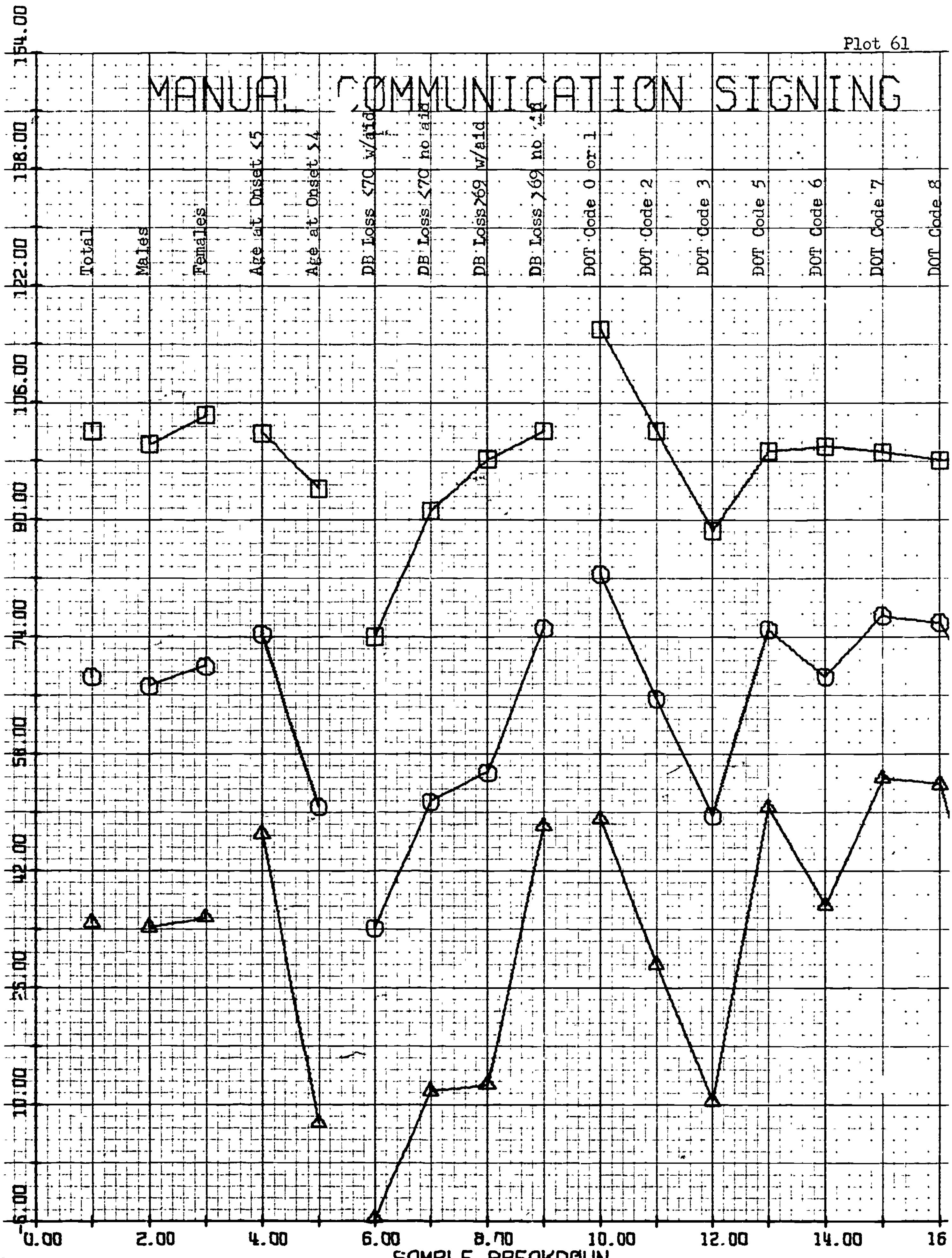
Plot 54
GATES READING COMPREHENSION RAW SCORE
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
45.00
41.00
37.00
33.00
29.00
25.00
21.00
17.00
13.00
9.00
5.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN


Plot 58
CRAIG LIP READING INVENTORY-WORDS
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
122.00
114.00
106.00
98.00
90.00
82.00
74.00
66.00
58.00
50.00
42.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

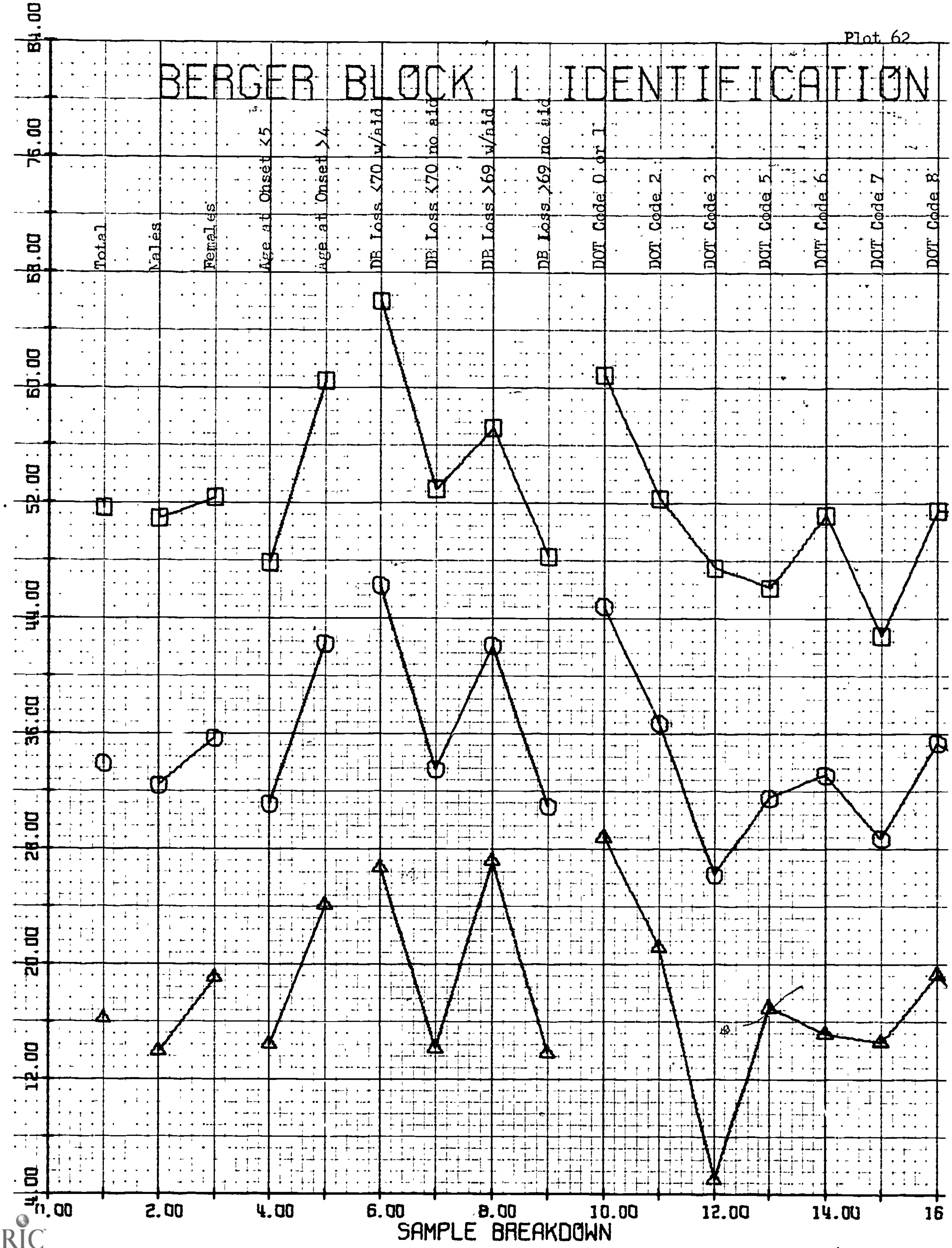
Plot 59


CRAIG LIP READING INVENTORY-SENTENCES
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 1 or 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
118.00
110.00
102.00
94.00
86.00
78.00
70.00
62.00
54.00
46.00
38.00
1.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.0
SAMPLE BREAKDOWN

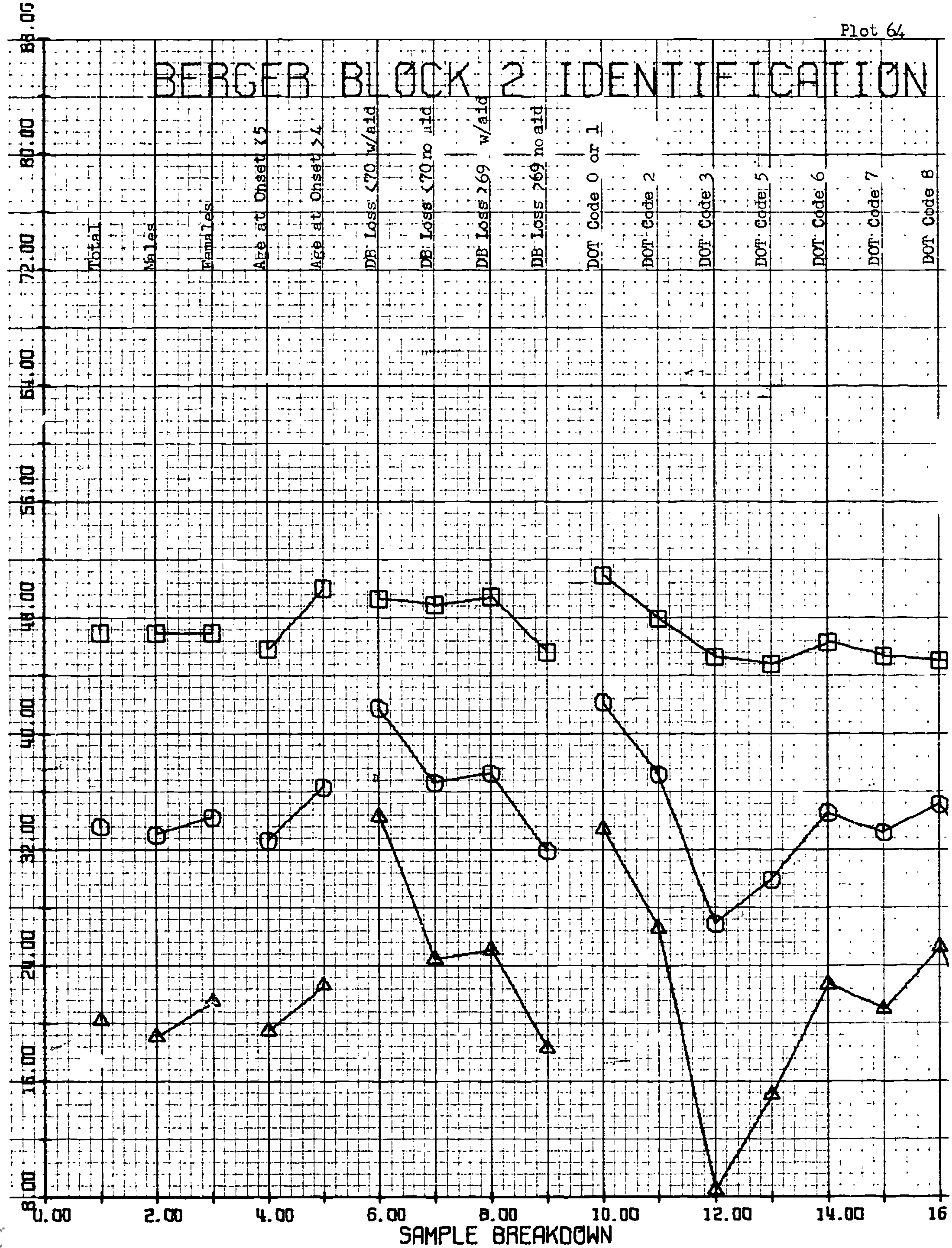

Plot 60
MANUAL COMMUNICATION READING
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
158.00
142.00
126.00
110.00
94.00
78.00
62.00
46.00
30.00
14.00
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SA' 'LE BREAKDOWN

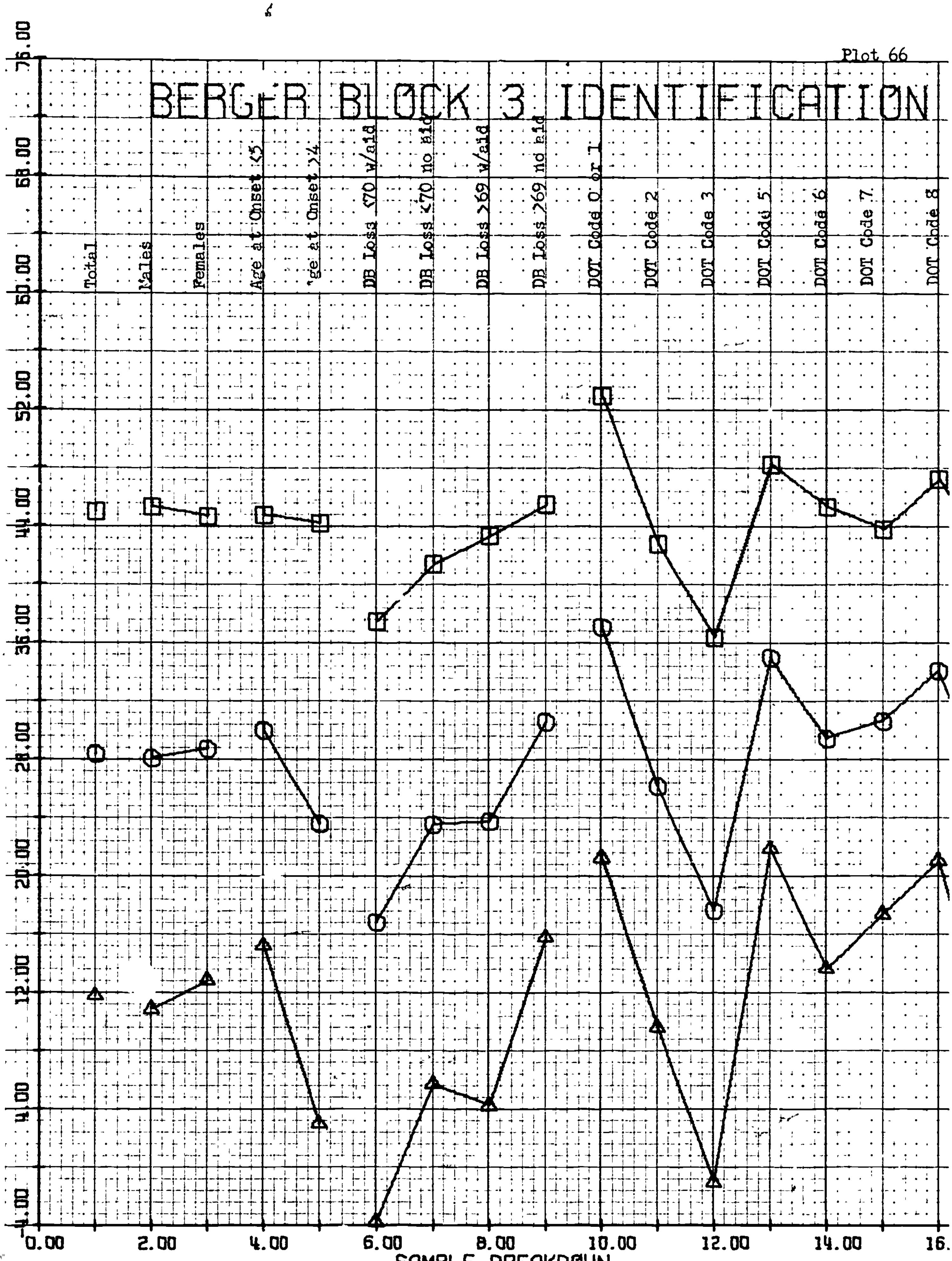


Plot 61
MANUAL COMMUNICATION SIGNING
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
154.00
138.00
122.00
106.00
90.00
74.00
58.00
42.00
26.00
10.00
-6.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

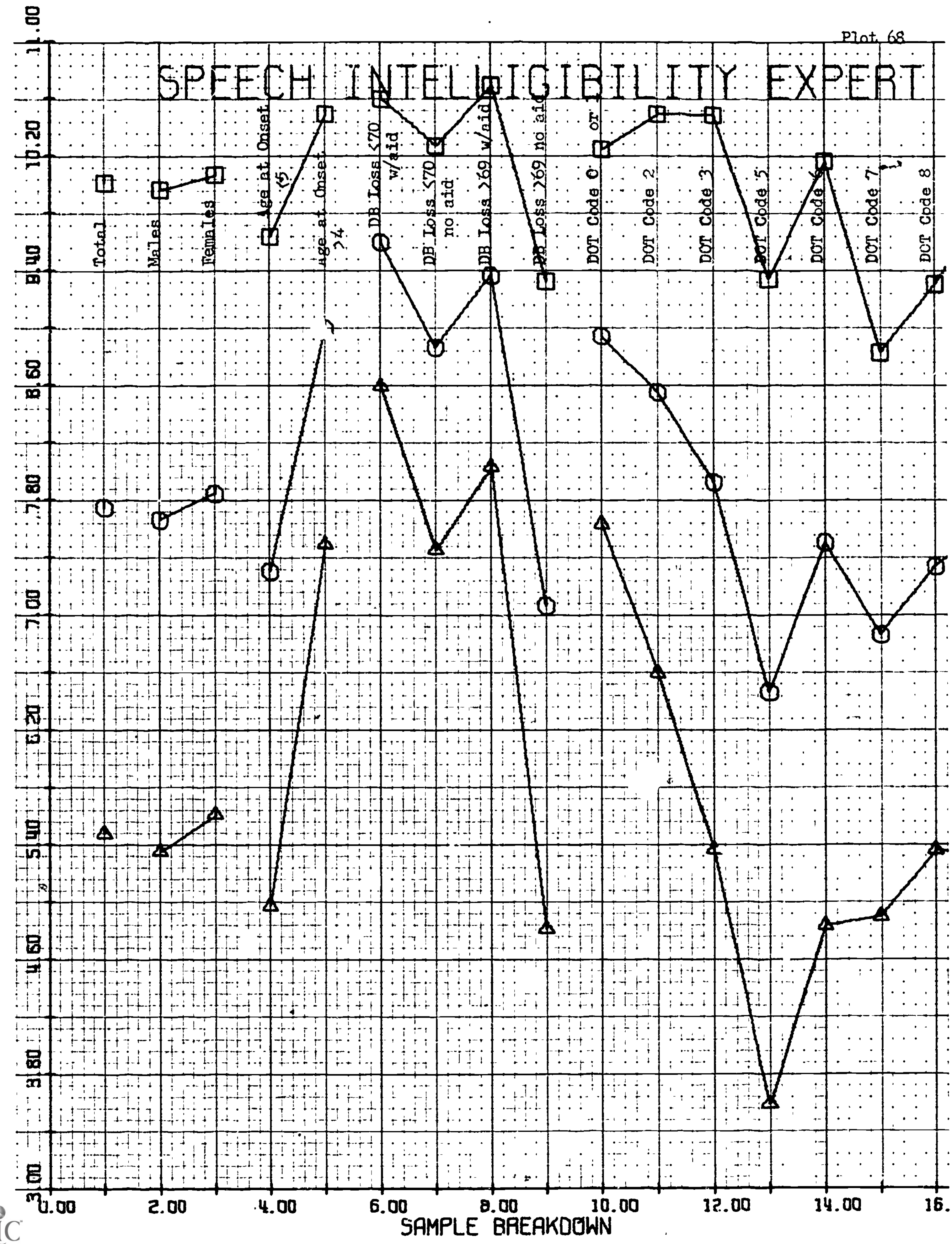

Plot 62
BERGER BLOCK 1 IDENTIFICATION
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
84.00
76.00
68.00
60.00
52.00
44.00
36.00
28.00
20.00
12.00
4.00
1.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

Plot 64

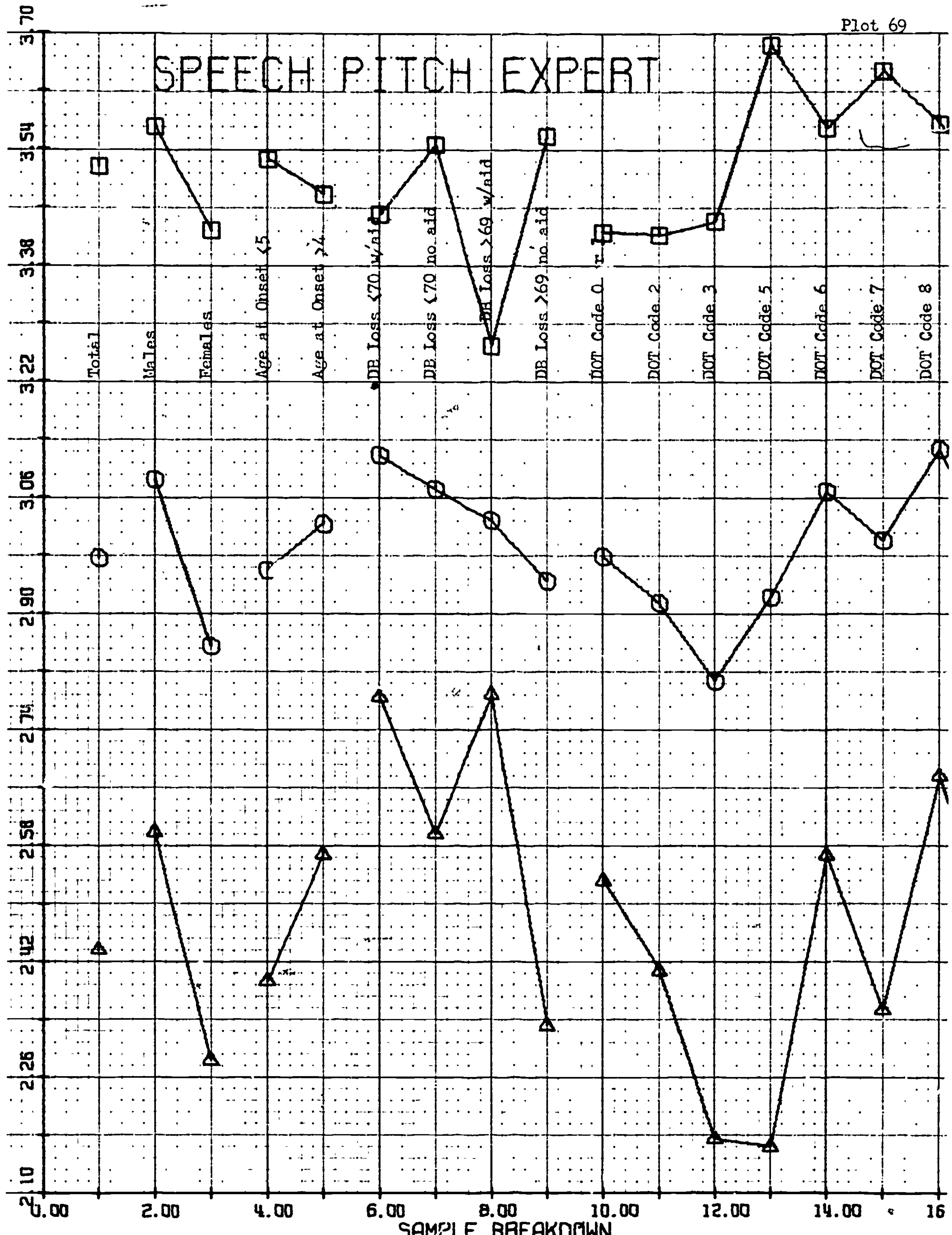

BERGER BLØCK 2 IDENTIFICATIØN
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
72.00
80.00
88.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN



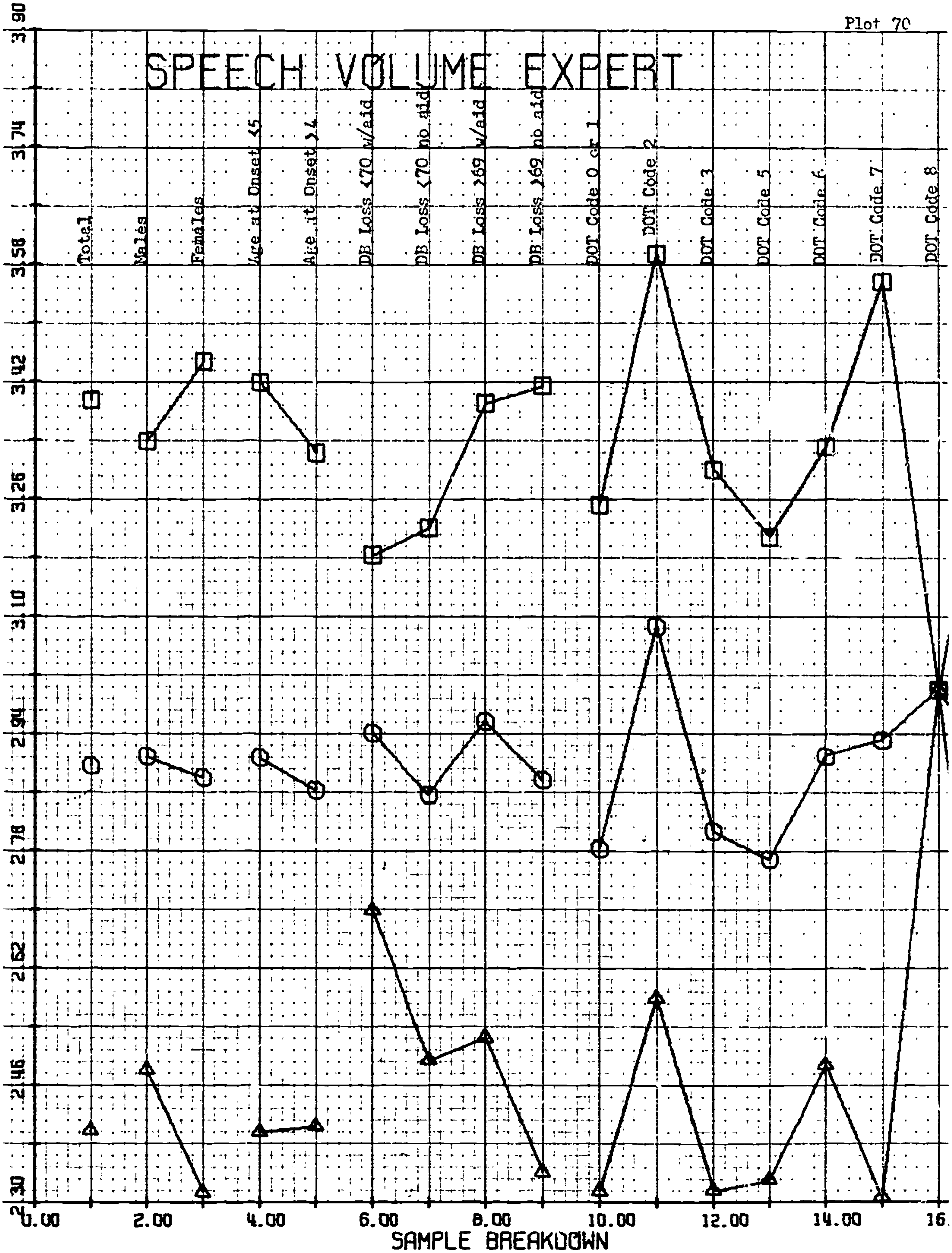
Plot 66
BERGER BLOCK 3 IDENTIFICATION
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
76.00
68.00
60.00
52.00
44.00
36.00
28.00
20.00
12.00
4.00
-4.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN

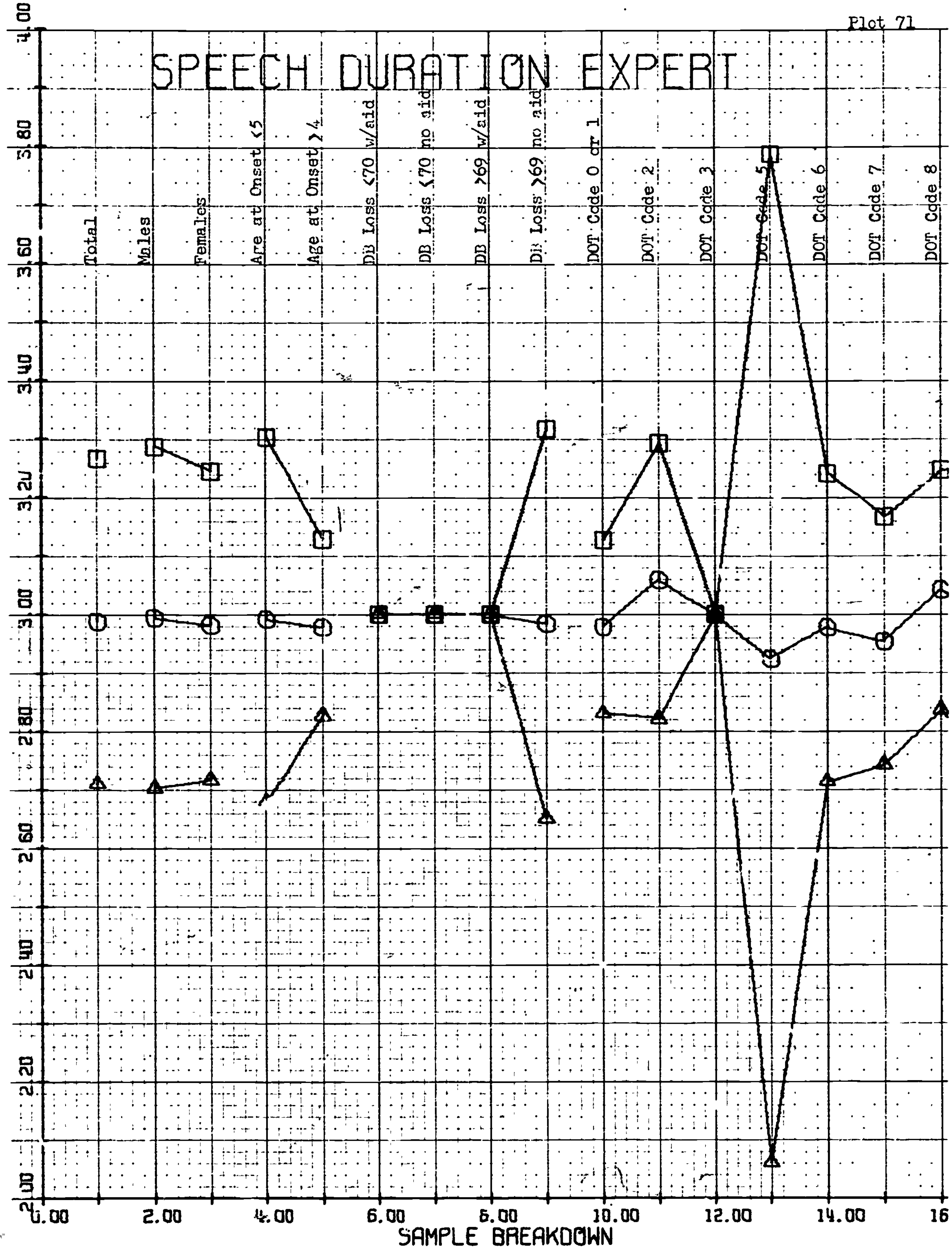


Plot 68
SPEECH INTELLIGIBILITY EXPERT
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
11.00
10.20
9.40
8.60
7.80
7.00
6.20
5.40
4.60
3.80
3.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN



Plot 69
SPEECH PITCH EXPERT
3.70
3.54
3.38
3.22
3.06
2.90
2.74
2.58
2.42
2.26
2.10
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN


Plot 70
SPEECH VØLUME EXPERT
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
3.90
3.74
3.58
3.42
3.26
3.10
2.94
2.78
2.62
2.46
2.30
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.
SAMPLE BREAKDOWN



Plot 71
SPEECH DURATION EXPERT
Total
Males
Females
Age at Onset <5
Age at Onset >4
DB Loss <70 w/aid
DB Loss <70 no aid
DB Loss >69 w/aid
DB Loss >69 no aid
DOT Code 0 or 1
DOT Code 2
DOT Code 3
DOT Code 5
DOT Code 6
DOT Code 7
DOT Code 8
4.00
3.80
3.60
3.40
3.20
3.00
2.80
2.60
2.40
2.20
2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16
SAMPLE BREAKDOWN

The baseline, or abscissa, in each plot is defined by a constant array of labeling or identifying numbers arranged from zero at the left to 16.00. The numbers simply have indicative value, with the denotations clearly recorded on each plot, so that 1=total sample; 2=males . . etc. It should be noted that DOT codes four and nine are omitted from the plots. Code four is not reported because only one study case in Sample I was employed in fishing and related occupations. Code nine is not listed--miscellaneous occupations--because it was treated inaccurately in the original computer programming. Regrettably, the error could not be rectified within the budgetary limitations of the closing months of the project. Each plot shows three profiles. The center profile connects the means or averages of each group or subsample on the subject variable. The mean is represented by a circular figure. The distances of one standard deviation above each mean (square figure), and one standard deviation below each mean (triangular figure) for each group or subsample are also inscribed and connected.

Turning again to the plot for profile six (the plot on age) the mean of the entire Sample I is circled at about 37; the age which is one standard deviation above the mean age is squared in at 47, and the age one standard deviation below the mean is triangulated at about 27.4. Thus, between ages 27-47 one might expect to find about two-thirds of the sample. This information was, it will be remembered, already reported in other form in Table 2. Moving to point two (2.00) on the baseline, we follow that upward to find the average age for males (about 37.6 years) and the "plus" (47.3 years) and the "minus" (27.8 years) one standard deviation range. In the case of point three the average age for females is somewhat younger (36.8) with deviations extending to somewhat lower age points. The early onset group has a lower average age as a study group than the late onset group (36.1 years to 40.5 years). If we follow the average profile curve across the plot, we note that the two subsamples of lower hearing loss, points six and seven, seem to be somewhat older as a group than persons in subsamples eight and nine, i.e., those who have more profound hearing loss. This brings us to the seven baseline points numbered ten to sixteen which represent the seven occupational classes included on the profiles. The oldest subsamples are those deaf working in professional, technical and managerial positions, as well as those employed in processing positions. The latter positions are occupied by deaf adults with the widest age range. The youngest adult deaf appear to be working in clerical and sales occupations. The value of Plot 6 should now be clear. The plot carries a message in its graphic representation of one demographic variable "age" as it is played against a series of sixteen dimensions employed in characterizing the deaf sample. In this sense it takes a variable for which we had some information on the total sample and traces that variable through a series of interesting interactions with the deaf sample. What has the counselor of the deaf learned from this plot? Hopefully he should have a better understanding of Sample I with regard to age than he had heretofore. Further, to the extent that inferences from Sample I can be generalized beyond Oregon, the counselor should now be better informed about variations in age of the deaf employed in the seven DOT job classifications.

It may be productive now to review a plot of a test score. Plot Number 55, the profile for the Gates Reading Comprehension Raw Score, is selected. The average score on this test for the total Sample I is circled on the plot at 23.7, with the upper square, or a standard deviation above the average, located at a score of 35.3, and the lower triangle located one standard deviation below at the score, 12.1. Such data were available in Table 4 on the total sample. Concentrating on the average scores circled for the fifteen breakdowns, we find males (2) at 22.6 doing less well than females (3) at 25.2; late onset (5) at 29.4 doing much better than early onset (4) at 21.8; the deaf who used a hearing aid (6,8) during the test doing better than those who failed to use an aid (7,9); and potent differences in averages on the job classes of the first digit of the DOT with Professional and Managerial (10) well above the other DOT groups. One may also infer that those employed in Service occupations are most variable in reading ability. This conclusion emerges, of course, from the greater range between the square and the triangle above point 12. The counselor can then also grasp very easily an impression of the variance of any of the sixteen different strata depicted on the baseline with respect to the Gates Reading Comprehension Test.

It should be profitable for the counselor to study these profiles. They obviously relate a great deal of information about test behavior of the adult deaf, organized as they are by various subsamples of interest to the counselor. They also provide, for the first time in this report, essential vocational validity information. For example, it should be patently evident that the deaf working in different types of employment perform differently on the Gates. Other interesting validity information is readily available for the price of careful study of these profiles. Falberg (34) has suggested that as a counselor of deaf persons he has had for too long been forced to "fly by the seat of his pants" and importunes for objective measurement in estimating the potential of the deaf. It is our urgent plea that counselors not only interview and test the deaf to derive objective measures of the deaf person's performance capacities and potential, but that counselors select their measures with deference to measures which possess the utmost demonstrated validity for a given task.

A counselor familiar with these Tables now has a norm based on adult deaf subjects for all study tests for any one of the 16 subsamples. In this way a counselor who might be using one or another cluster of tests employed in this study to counsel an individual client can compare that individual's test scores either with hearing norms, norms for the adult deaf, or with the corresponding mean and standard deviation portrayed in the plot for the particular sample breakdown most appropriate for the individual being counseled.

For the present report, a number of plots developed for interpreting test findings will be examined and compared to provide the counselor with experience in handling the data. The first test selected is the Berger Block Subtest I (the Identification Score). It will be recalled the Subtest I employs printed instructions for each task and hence depends on the subject's ability to read. The Identification Score requires that the blocks referred to in the instructions be correctly identified by the subject. Berger Block Identification I means and standard deviations are reported graphically in Plot 62. From this graph it is seen that, on the average, females do slightly better than males on this test. It is also clear that the Early Onset group does less well than the Late Onset group, and that those using a hearing aid do better than those who fail to use an aid. It seems clear, in any case, that those with a large hearing loss, who also do not use an aid, do somewhat less well than the other subsamples 6, 7, and 8. The breakdown according to occupational group shows the highest mean performance for those in the Professional and Managerial occupations. Clerical and Sales and Structural workers also do somewhat better than average. Bench workers do a little worse than average, although not as badly as service workers who do the least well on Berger Block I.

Consider now the plot for GATB G, number 20, where the corresponding means and standard deviations are similarly presented. The superiority of individuals in Professional and Managerial positions is even more marked on the GATB G than it was on the Berger Block.* In general, however, the profiles on the GATB are strikingly similar to those reviewed for the Berger Block I and the Gates Reading Comprehension Raw Scores. Plot 8, Academic Achievement (Education), also shows a similar profile. These data are consistent with the notion that performance on Berger Block I subtest may be highly dependent upon general ability (or at least Reading G) and Education. The markedly less adequate performance of the "Early Onset of Deafness" group on both measures suggests the disabling consequences of earlier blocking of the important auditory learning or educational channel.

In contrast now the slightly different results for the Culture Fair "g" are of interest. The two smaller groups with a hearing loss below 70 db did not do as well on the Culture Fair "g" as the two groups with more profound auditory defect. Furthermore, we encounter for the first time evidence that those who became deaf at an earlier point in their lives do better than those whose deafness apparently developed at a latter point in their personal histories. It is also noted that the Professional and Managerial group was only slightly superior to the Clerical and Sales group, while the Bench Workers and Structural Workers both performed rather well (above the sample average) on the Culture Fair "g".

Turning from test tasks dependent on reading skills we now consider test tasks which appear to measure communication skills. The first to be studied are the ratings of Speech Intelligibility by the Expert presented graphically in plot 68. It should be mentioned first that the distribution of Speech Intelligibility is markedly skewed negatively towards the lower end. That is, scores range from zero to ten with a mean between eight and nine so that scores very much above, or superior to, the mean are impossible. Thus, when one standard deviation is measured off above the mean on the graph, the score attained may be impossibly high score (greater than ten). Also, a point one standard deviation below the mean does not include the fraction of cases that would be included in a symmetrical, i.e., normal distribution.

* Note that the average score on "G" for the Professional and Managerial group is higher than one standard deviation above the total sample.

What are the main features of the profile of the means of the sixteen different groups in the sample breakdowns for the Speech Intelligibility ratings? First, there is again, as with The Gates, the Berger I, and GATB G (and as might be expected) a markedly lower mean for the Early Onset group in comparison to the Late Onset group. There is again comparatively inadequate, if not strikingly poor, performance by those whose hearing loss is over 69 db and who did not use an aid.

The occupational profile of Speech Intelligibility manifests highest scores in Professional-Managerial, and Clerical-Sales. The next highest are found on Service and Machine Trades occupations. It will be remembered that in The Gates, the Berger Block I, and the GATB G Service occupations had the lowest mean. This marked shift in the position of the Service occupations presumably reflects the importance of the ability to articulate intelligible speech for Service occupations--a finding which counselors should clearly bear in mind in dealing with the training and vocational placement needs of the deaf.

Turning to the Craig Lipreading Test one notices differences from, as well as similarities with the preceding test performances described. Females are significantly higher than males in both skills--lipreading sentences and lipreading words. The superiority of the Later Onset Group is less marked than previously noted. As with other tests reviewed, the large hearing loss group which failed to use an aid during testing showed to poor advantage on both segments of the Craig. The profiles for the occupational groups reveal great similarity between the performance of the deaf in Professional-Managerial and the Clerical-Sales positions, both having means above the other occupational groups. The Machine Trades and the Service groups apparently possess the least skill in lipreading. The fact that the Service groups and Machine Trades perform relatively well on Speech Intellibibility and poorly on Lipreading is somewhat surprising and encourages further research. Perhaps the Lipreading task is more saturated with the general ability factor than is the Speech Intelligibility test. Or, it may be that the particular positions which the deaf tend to occupy in the Service and Machine occupational classes place demands on the incumbent for reporting or communicating performance verbally, while instructions may either be received in written form, or where the work is highly routine, and instructions are kept to a minimum.

Moving now to the Manual Communication, Reading (plot 60) and Manual Communication, Signing (plot 61) graphs, which have very similar profiles, one notices impressive incongruities with the result of the communication and the ability measures already inspected. The means of men and women in Manual Communication in Signing and Reading are virtually identical. The relative superiority of the Early Onset group in Manual Communication is marked and reverses the result for the previously discussed measures other than for the Culture Fair "g". Skill in manual communication, as might be expected, is much more likely to be acquired by the Early Onset group. The profile for the four-fold breakdown related to Degree of Hearing Loss and Use of a Hearing Aid is almost exactly reversed for these two Manual Communication measures. The best performance in communicating through signing was given by those with greater hearing loss who didn't use a hearing aid (the fourth group). This group gener lly performed most poorly on the other tests: Lipreading, Speech Intelligibility, the Berger Block Test, and GATB G. The poorest performance in reading and signing is given by the first group which used a hearing aid and had less than 70 db loss--the group which, in fact might be expected to have least inv stment in manual communication.

These group differen could be summarized in terms of the channel of communi on used. The greater the hearing loss, and the earlier th onset of hearing loss, the more likely is the signing or manual communication channel to be used. Contrariwise, the lesser the hearing loss or the later the onset of loss, the more dubious is the skill in signing or manual communication, and the more completely elaborated are lipreading skills, the production of intelligent speech and reading abilities as multiple channels of communication.

The profile of the various occupational groups on Manual Communication is also markedly different. One sees the best scores made by Bench Workers, Processing Workers and Structural Workers, along with Professional and Managerial groups. The latter do a stellar job in the manual signing test, but evince no better than average ability in reading manually transmitted information.* However, the worst scores are consistently produced on both reading and signing manua ly by those in the Service occupations. Manual communication skills would, it must be concluded, rarely be of much use in Service occupations.

*This finding is similar to the one for Service occupations where dispatching information (Speech Intelligibility) was found to be above average in quality, but where receiving information (Speechreading) was found to be quite mediocre.

Space limitations preclude further elaboration of the profile information. It should be obvious that a great reservoir of information applicable to everyday counseling with adult deaf clients resides in these graphs. Counselors will hopefully be persuaded to inspect and assimilate the data into their practices. Perhaps the reader will, at this point, also be motivated to independently examine the findings on the Weingarten Picture Interest Inventory. While we have given little space, as yet, to the domain of interest test performance, we will expect to be giving close attention to it as we proceed with the data analysis. It would also be worthwhile to scan the profiles on the plotted indices of job complexity, which are rather instructive.

B. <u>Validity and CM II</u>

A second type of validity measure specific to CM II is listed for counselors of the deaf in Table 6. In this table are summarized the number, average, and standard deviations on forty variables for seven DOT First Digit Occupations. This data is based on Sample IV--the largest deaf sample combined from Oregon and Washington. It will be noted that the Miscellaneous Occupations (class 9) in the DOT first digit series are included in Table 6 despite the fact that class 9 data were not incorporated in the validity plots described previously in this chapter. These dat were fortunately available for this CM II analysis since the related computer programming was accomplished before project resources were exhausted. The careful reader will also note an apparent disparity in the sample sizes, averages, and standard deviations for Sample IV in Table 2 and for parallel data reported under "total" in Table 6. These discrepancies will be readily understood as a consequence of the fact that Table 6 is limited to those study cases which could be classified on the DOT first digit code structure.

To repeat then, this second set of validity references is designed to yield information about the vocational adjustment of the adult deaf with respect to CM II, Type of Employment. It is also designed to provide, for the first time in this study, validity information which can be appraised by means of statistical tests. This is reported in the last columns in Table 6 where F Values are listed. These values summarize the discrepancies among the means in a given row in t Table. Each F value is, in turn, then tested against conventional standards to determine whether the discrepancies in the mean values are statistically significant, or whether they may be attributable to chance. For example, the variable "age" in Table 6 is seen to be significant at the one percent level, which suggests that the differences in the average age of the deaf employed in the cited occupational categories is of a magnitude which could be explained by chance less than one time in one hundred similar tests. Hence, the F value allows us to conclude that there is a very reliable difference in the age of persons employed in different types of work. Similarly, Table 6 leads us to conclude that age at onset of deafness, and years in school, are significantly different (at the five-percent level of confidence) for the deaf adults working in the different occupational classes. If we move down the Table to the number of deaf members in the employees' family of origin we find no evidence that persons working in various vocational categories can be distinguished on this variable. In this sense, wherever the reader finds a single asterisk in the F column, he can feel confident about a significant statistical difference in the variable (such as age) with respect to the way the deaf are distributed over the DOT occupations. In cases where the F value is defined by a double asterisk the reader can have even greater confidence about a conclusion in support of a significant difference on the variable for persons working in the different occupations. And finally, in those cases where no asterisk appears in the F column, there is no evidence for a difference among the deaf working in the seven occupational classes on the relevant variable.

How can the data in Table 6 be used? For one thing, the data enables the counselor to take inferences from the sample studied to the general adult deaf population. This is in contrast to the data in Table 5, and the 38 profiles presented some pages ago which were primarily descriptive of the study sample, and where no formal attempt was made to determine the extent to which the data available in these sources could be generalized to comparable groups of adult deaf. In Table 6, however, we are in a position to draw probability inferences from the study sample about the general population of adult deaf. Mindful of the limitations in our study sampling process, we can now draw conclusions from Table 6 as to the probability that deaf adults (as a population) who work in different types of employment also possess distinctive personal attributes and different vocational test performance behaviors. In a word, we have generated here our first set of norms for the deaf, which are supported directly through statistical statements of confidence. Such statements define the discriminative capacity of the test score or personal characteristic to distinguish among different patterns (CM II) of vocational adjustment in the adult deaf.

TABLE 6

FORTY STUDY VARIABLES AND FIRST DIGIT OCCUPATIONAL CATEGORIES AND F - VALUES

Variable		DOT First Digit Occupational Categories							Total	F
		0 & 1	2	3	6	7	8	9		
Age	N	54	64	37	67	53	35	47	357	
	X	40.04	32.91	39.43	36.48	36.87	37.71	36.40	36.85	3.70**
	SD	8.35	8.57	9.07	8.78	9.93	9.99	9.43	9.30	
Age at Onset	N	53	63	36	65	53	35	47	352	
	X	4.94	3.03	4.94	2.94	2.45	2.66	7.21	3.93	2.99*
	SD	6.30	4.96	8.98	4.75	4.90	5.55	12.24	7.15	
Years in School	N	52	62	35	67	53	33	47	349	
	X	12.35	13.27	12.00	12.37	13.15	12.85	12.21	12.63	2.21*
	SD	1.86	1.93	2.14	2.86	2.15	2.05	2.93	2.36	
Education	N	54	64	37	66	50	34	47	352	
	X	3.04	1.77	1.19	1.33	1.28	1.35	1.38	1.66	51.89**
	SD	.99	.66	.52	.54	.54	.49	.61	.89	
Number Deaf in Family of Origin	N	54	64	37	65	53	34	47	354	
	X	.74	.58	.84	.63	.57	.53	.45	.62	.55
	SD	1.33	1.08	1.32	1.19	1.08	1.08	1.08	1.17	
Number Deaf in Conjugal Family	N	54	63	37	66	53	34	47	354	
	X	.89	.68	.43	.86	.91	.68	.51	.73	3.04**
	SD	.82	.82	.56	.78	.77	.68	.59	.7[illegible]	
GATB G	N	54	64	36	66	51	35	45	351	
	X	108.33	[illegible]9.17	76.03	86.41	83.67	86.14	87.53	88.94	16.06**
	SD	16.59	18.82	17.79	18.17	15.46	14.93	17.09	19.30	
GATB V	N	54	64	36	66	51	35	45	351	
	X	102.72	85.27	79.17	79.53	75.29	77.03	83.36	83.73	20.19**
	SD	20.78	17.19	14.38	12.92	9.00	11.40	14.30	17.13	
GATB N	N	54	64	36	66	51	35	45	351	
	X	108.43	90.39	72.06	85.68	82.37	84.66	85.84	88.08	13.84**
	SD	20.04	21.25	21.44	22.23	19.21	17.01	19.76	22.55	

* Significance Level = .05
** Significance Level = .01

TABLE 6
(Continued)

FORTY STUDY VARIABLES AND FIRST DIGIT OCCUPATIONAL CATEGORIES AND F - VALUES

Variable		DOT First Digit Occupational Categories							Total	F
		0 & 1	2	3	6	7	8	9		
GATB S	N	54	64	37	67	53	35	47	357	
	X	114.17	108.55	95.62	109.88	109.76	111.77	105.11	108.35	4.20**
	SD	13.94	18.64	16.53	21.59	20.05	17.65	21.08	19.38	
GATB P	N	54	64	37	67	53	35	47	357	
	X	117.41	121.13	94.8[illegible]	107.99	116.62	105.29	107.13	111.31	6.94**
	SD	19.19	23.21	23.30	23.49	25.50	21.24	25.91	24.40	
GATB Q	N	54	64	35	66	51	35	45	351	
	X	127.69	128.09	103.94	111.86	115.86	109.03	114.04	117.02	10.66**
	SD	20.35	18.23	18.64	21.76	18.85	15.82	19.82	21.17	
GATB K	N	54	64	37	67	53	35	47	357	
	X	115.26	111.73	94.05	102.81	104.60	98.86	100.98	105.02	7.40**
	SD	14.11	18.37	18.29	19.22	19.91	17.27	22.20	19.62	
GATB F	N	54	64	37	67	53	35	47	357	
	X	99.41	102.67	90.89	92.72	100.94	94.06	91.94	96.57	2.35*
	SD	18.22	22.03	26.76	22.32	23.31	24.99	22.73	22.94	
GATB M	N	54	63	37	67	53	35	47	356	
	X	101.56	106.70	92.38	99.30	103.93	101.23	98.13	100.96	1.48
	SD	23.74	27.35	27.48	26.43	24.66	23.66	25.72	25.79	
Culture Fair "g"	N	54	64	37	67	53	35	47	357	
	X	102.59	100.23	81.03	92.64	94.70	96.00	91.[illegible]	94.82	7.82**
	SD	13.45	16.51	15.72	18.29	17.47	13.73	19.[illegible]	17.58	
Bender Raw	N	54	64	37	67	53	35	47	357	
	X	27.93	25.63	47.95	34.28	34.32	33.80	34.49	33.17	4.14**
	SD	19.91	20.07	36.07	22.20	20.76	23.64	22.11	23.89	
Weingarten Raw Interpersonal	N	54	64	37	67	53	34	47	356	
	X	19.33	21.17	19.35	16.12	17.28	15.97	17.53	18.20	4.48**
	SD	6.80	7.36	6.17	6.96	6.61	5.08	6.80	6.90	

TABLE 6
(Continued)

FORTY STUDY VARIABLES AND FIRST DIGIT OCCUPATIONAL
CATEGORIES AND F - VALUES

Variable		DOT First Digit Occupational Categories							Total	F
		0 & 1	2	3	6	7	8	9		
Weingarten Raw Natural	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	20.11	18.75	25.03	21.66	19.34	22.09	25.51	21.46	2.47**
	SD	12.37	10.86	12.13	12.43	11.41	11.69	11.70	11.95	
Weingarten Raw Mechanical	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	20.67	17.39	18.89	25.30	23.28	27.44	21.85	21.96	9.47**
	SD	8.26	7.52	8.17	7.47	9.73	6.18	7.93	8.55	
Weingarten Raw Business	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	31.11	35.94	30.32	30.69	31.93	28.12	26.85	31.09	3.75**
	SD	11.88	9.79	11.08	12.27	10.59	11.17	9.72	11.24	
Weingarten Raw Esthetic	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	20.82	20.66	20.54	20.72	20.49	18.79	21.62	20.60	.61
	SD	7.85	7.13	7.58	5.39	6.20	4.98	7.26	6.68	
Weingarten Raw Scientific	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	18.87	17.88	16.81	18.31	19.57	21.09	19.68	18.80	2.02
	SD	6.08	6.50	5.09	6.29	6.44	6.54	5.95	6.24	
Weingarten Raw Verbal	N	54	64	37	67	53	34	45	356	
	$\bar{X}$	11.89	13.80	10.97	10.34	10.77	8.79	10.02	11.14	6.41**
	SD	4.54	3.79	4.80	5.26	4.67	3.82	4.17	4.70	
Weingarten Raw Computational	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	13.41	14.80	12.92	13.58	14.32	13.38	11.57	13.53	1.90
	SD	5.69	4.84	5.01	5.82	5.27	5.23	5.63	5.43	
Weingarten Raw Time Perspective	N	54	64	37	67	53	34	47	356	
	$\bar{X}$	10.30	10.06	8.16	8.08	9.26	7.56	8.11	8.91	5.75**
	SD	3.27	2.71	2.62	3.54	3.73	3.05	3.16	3.34	
Gottschaldt Standard	N	54	64	37	67	53	35	47	357	
	$\bar{X}$	52.17	47.56	41.30	47.25	45.40	45.83	46.75	46.95	6.87**
	SD	7.39	7.92	6.56	8.83	8.26	10.90	8.25	8.73	

TABLE 6
(Continued)

FORTY STUDY VARIABLES AND FIRST DIGIT OCCUPATIONAL CATEGORIES AND F - VALUES

Variable		DOT First Digit Occupational Categories							Total	F
		0 & 1	2	3	6	7	8	9		
Gates Raw	N	54	64	37	67	53	35	47	357	
	X	34.32	25.08	18.46	20.37	18.60	20.29	23.70	23.29	13.47**
	SD	8.74	110.85	13.55	11.97	8.96	10.08	12.17	12.05	
Craig Word	N	54	64	37	67	53	35	47	357	
	X	80.04	78.50	67.24	65.69	71.04	70.37	69.23	72.04	5.34**
	SD	9.73	11.56	22.88	20.74	18.50	17.58	22.11	16.49	
Craig Sentence	N	54	64	37	67	53	34	47	356	
	X	86.80	82.80	64.70	65.64	67.79	71.03	69.00	73.12	8.53**
	SD	13.50	17.71	27.97	24.38	24.87	19.42	24.92	23.43	
Manual Communication Reading	N	50	64	35	67	50	31	46	343	
	X	81.68	81.91	68.86	83.55	90.52	88.39	76.83	82.02	2.48*
	SD	33.69	30.22	35.14	27.23	14.76	17.52	34.89	29.17	
Manual Communication Signing	N	54	64	37	67	53	35	47	357	
	X	80.59	74.38	52.97	68.69	76.11	73.63	65.06	70.99	3.61**
	SD	35.19	31.71	37.53	30.97	21.64	24.76	35.24	32.10	
Berger Block I Identification	N	54	64	37	67	53	35	47	357	
	X	46.35	35.95	24.38	31.85	27.93	33.37	35.87	34.10	8.26**
	SD	15.83	15.43	19.83	17.98	14.14	17.12	19.34	18.03	
Berger Block II Identification	N	54	64	37	67	53	35	47	357	
	X	41.89	37.47	27.19	33.87	32.72	33.83	32.92	34.73	6.47**
	SD	10.21	9.96	17.00	12.34	11.84	11.24	13.59	12.78	
Berger Block III Identification	N	54	64	37	67	53	35	47	357	
	X	36.80	29.50	19.54	28.10	30.60	32.74	25.40	29.25	5.36**
	SD	16.81	15.15	17.73	15.40	13.03	14.49	17.01	16.21	
Speech Characteristics Intelligibility Expert	N	53	59	32	55	46	30	42	317	
	X	8.93	8.00	7.56	7.46	6.89	7.67	8.14	7.84	4.57**
	SD	1.30	2.08	2.51	2.46	1.95	1.95	2.32	2.17	

TABLE 6
(Continued)

FORTY STUDY VARIABLES AND FIRST DIGIT OCCUPATIONAL CATEGORIES AND F - VALUES

Variable		DOT First Digit Occupational Categories							Total	F
		0 & 1	2	3	6	7	8	9		
Speech Characteristics	N	53	59	32	55	46	30	42	317	
Pitch	$\bar{X}$	2.98	2.92	2.97	3.06	2.98	3.10	3.12	3.01	.97
Expert	SD	.42	.50	.70	.45	.65	.40	.45	.51	
Speech Characteristics	N	53	59	32	55	46	30	42	317	
Volume	$\bar{X}$	2.79	3.02	2.91	2.91	2.94	3.00	2.86	2.92	1.30
Expert	SD	.53	.47	.5[illegible]	.40	.61	.00	.42	.48	
Speech Characteristics	N	53	59	32	55	46	30	42	317	
Duration	$\bar{X}$	2.98	3.03	3.00	2.98	2.96	3.03	3.00	3.00	1.30
Expert	SD	.14	.18	.00	.24	.21	.18	.00	.17	
DB Loss - Better Ear	N	54	64	37	67	53	35	47	357	
	$\bar{X}$	99.35	92.06	96.03	92.15	97.09	94.11	89.51	94.20	2.10
	SD	15.06	15.13	19.31	17.47	16.50	16.12	19.31	17.07	

In a very real sense then, these statistical statements of confidence provide the credibility base for working with the general deaf adult population in the vocational guidance relationship, and for helping counselors make plausible judgments about their clients credentials for occupational achievement.

In summary of the forty analysis of variance tests performed in connection with CM II, twenty-seven were significant beyond the one-percent level of confidence; four were found significant beyond the five-percent level of confidence; and nine were statistically insignificant. Obviously, we have uncovered a set of predictors with exciting possibilitities for counseling the adult deaf. Among the most discriminating variables were educational level, four subtests of the GATB (G, V, N, and Q) and the Gates Reading Raw Score. Those variables which appeared to be unrelated to Type of Current Employment were number of deaf in family of origin, three scores on the Weingarten Inventory (Esthetic, Scientific, and Computational) and three subtests of the Holdt Speech Characteristics Test as assessed through expert judgment (pitch, volume, and duration).

Its at this very point, then, that the counselor will want to learn to use the data in Table 6 in conjunction with the data in the 39 profiles. Suppose that we consider for the moment one of the more discriminating test score dimensions, such as the GATB G. The data in Table 6 for this score are summarized by an F value of 16.06, which suggests that the counselor can employ the G score effectively in helping an adult deaf client prepare himself for productive vocational placement. Clearly then, the average score and standard deviation for the G score in Table 6 would, in themselves, provide useful leads to one or more categories of work or training for work which might be relevant for an individual client. Nonetheless, the counselor, who will also take the trouble to refer to the profiles (in this case, plot 20), will inevitably get a much more vivid and palpable impression of the informational yield from this study. The profiles should in this sense add a kind of pictorial dimension to the counselor's image or understanding of the validity of a test score or personal attribute for a given type of work adjustment. The counselor will, therefore, find the plots useful collateral information in helping him understand the relevance of personal variables and test scores for a given class of work.

C. Validity and CM VI

Table 2 in Chapter III made previous reference to variable 18. The same variable had been characterized precursively in Chapter II as CM VI, or by the title Complexity Demands of Current Position. We are now ready to examine the process by which this criterion measure was elaborated. The last three digits (4-5-6) of the DOT code reflect the complexity of work in any of more than twenty-one thousand jobs. Complexity of performance is detailed by rating on an eight point scale the requirements placed on a worker in terms of his prevailing pattern of interaction with data (4th digit), people (5th digit) and things (6th digit). The eight levels of complexity for each of the four dimensions of performance are:

Data

0	=	Synthesizing	(Most Complex)
1	=	Coordinating	
2	=	Analyzing	
3	=	Compiling	
4	=	Computing	
5	=	Copying	
6	=	Comparing	(Least Complex)
(7	=	No Significant	
(8	=	Relationship	

People

0	=	Mentoring	(Most Complex)
1	=	Negotiating	
2	=	Instructing	
3	=	Supervisory	
4	=	Diverting	
5	=	Persuading	
6	=	Speaking-Signaling	
7	=	Serving	(Least Complex)
8	=	No Significant Relationship	

Things

0	=	Setting Up	(Most Complex)
1	=	Precision Working	
2	=	Operating-Controlling	
3	=	Driving-Operating	
4	=	Manipulating	
5	=	Tending	

Things
(Continued)

6	=	Feeding-Offbearing	
7	=	Handling	(Least Complex)
8	=	No Significant Relationship	

Thus, to cite an example, a given position with a DOT code of .111 (in the fourth through sixth digits) would connote a position with consistently complex functions, including coordination of data, negotiating with people, and precision in the use of equipment and tools. Based on these three dimensions, occupations have been classified in practice into 114 Worker Trait Groups, each of which is identified by a particular combination of the 24 levels of complexity across the three functional dimensions of data, people, and things. These 114 Worker Trait Groups were further reduced to a lesser, and more manageable number for our purposes. Mr. Paul Kerr accomplished this using data developed in this study of Oregon and Washington adult deaf (Sample IV). He has evolved and discussed the use of six position clusters in a paper entitled "A Study of Aptitude Differences Between Deaf and Non-Deaf Employed Workers Using Occupational Clusters."(70) These clusters are:

Cluster Number	Cluster Title	Cluster Code	Occupational Clusters By Complexity Found in Oregon and Washington Adult Deaf
1.	Manual and Manipulating	001	.884; .885; .886; .887
2.	Machine Operating and Handtool Work	002	.781; .782; .883
3.	Crafts, Precision Machine Operating and Related	102	.280; .281; .380; .381; .382; .582
4.	Routine Clerical (Classifying Computing)	100	.388; .488; .588
5.	Inspecting, Checking, Testing	101	.387; .585; .587; .684; .687
6.	Education and Guidance	220	.108; .228

If we return to Table 2 momentarily to consider variable 18 (DOT Digits 4-6) in perspective now, we note that 375 deaf adults in Sample IV were described occupationally on each of the dimensions--data, persons, and things. Thus, unlike variable 17 in Table 2 (DOT, First Digit) in which the same 375 study subjects were categorized into one or another of the nine types of occupations, variable 18 provides three descriptive indices applied uniformly to each deaf adult's working situation. While no claim is made for statistical equivalence among the levels or rating steps of the three complexity dimensions, it is worth observing from Table 2 that the deaf in Sample IV were working in positions which exhibited a general complexity portrait on the "low" side of average. Also, of interest is the evidence that the deaf in this study are employed in positions which seem to place least demand on interpersonal skill; intermediate demand for data-handling skills; and most notable demand on "things" skills.

With this informational background to occupational classification for CM VI we are now forearmed to study Table 7 more efficiently. Much as with Table 6 there are forty variables displayed in relation to six occupational classes--in this case, the Kerr Occupational Clusters. These clusters are, therefore, empirically derived combinations which represent another means for conceptualizing the occupational adjustment of the deaf adult using a summary measure of the complexity of his work situation. And, in turn, then, the clusters provide another system apart from Digit 1 of the DOT for the ready categorization of jobs, and the individuals who work in them.

Employing the six Kerr Clusters with the forty variables, we find that the deaf working in the various Kerr Clusters were distinguishable on 23 variables on the one percent level of statistical confidence; six variables at the five percent level; while eleven were statistically insignificant, using the familiar F test.

These findings call attention to the global symmetry between the analyses validity for CM II--The Type of Employment, and for CM VI--The Complexity Demands of Employment. The adult deaf working in different types of work (CM II) were found to be statistically discriminable (at the five percent level or better) on thirty-one of forty study variables. The adult deaf classified by differences in the levels of complexity associated with their regular work (CM VI), were found to be statistically discrepant on 29 study variables. Thus, with respect to two independently defined indices of vocational adjustment, there is evidence that deaf individuals with different backgrounds of personal experience and different patterns of vocationally-oriented test performance vary in their occupational performance. For our purposes we may conclude then, that the battery of tests administered as it was in this study has demonstrated promise for predicting the work adjustment of the adult deaf.

Before moving to our other criterion measures, and the examination of their initial validity findings, it may be helpful to illustrate the use which could be made of the data already available to the counselor. Suppose a seventeen-year-old female student in a residential school on visiting a counselor's office expressed convincing verbal interest in sales and accounting work. Suppose also, that the counselor administered the Weingarten Picture Interest Inventory to this student and that it yielded a score of 31 on the Business field. Using the norms available for hearing adult females for the Business subtest, our seventeen-year-old is found to be an average examinee. That is to say, fifty percent of the standardization group for the hearing norms earned scores on the Business scale below hers. If we now relate this test findings to the validity data defined to this point in our presentation, we can begin to appreciate the virtues in the data developed in this study.

To begin, a score of 31 on the Business scale of the Weingarten places the client at the thirty-second percentile for deaf females (see Table 5.15). This is clearly a less encouraging piece of information than suggested by the norms for hearing subjects. If we turn to the profile for the Business scale--plot 38--we note, first, from the sample breakdown that women (with an average score of about 36) score considerably higher on this scale than do men. We also note that this scale reflects higher interests among the deaf working in Clerical and Sales positions, that is, persons classified in DOT code 2. The important question which emerges here then is, whether these data from Table 5.15 and plot 38 should be taken seriously in terms of our seventeen-year-old student's potential for a career in the Business world. To answer this we want to refer to Tables 6 and 7 to learn whether the clues we already have from the Weingarten test performance should be taken as valid indicators of work adjustment. For the type of work, DOT Digit 1 (CM II), the Business scale is clearly statistically relevant to work adjustment. For the Kerr formulation (CM VI) there is no reason to assume that the Business scale of the Weingarten is predictive of work adjustment.

Reviewing the situation, the counselor would probably behave cautiously then about encouraging his seventeen-year-old client to invest in her expressed area of vocational interest. Recognizing that he would doubtless want much more information before he could establish his counseling role in this relationship, and that the single interest score is but one lead to an ultimate judgment, and recognizing that in working with

TABLE 7

FORTY STUDY VARIABLES AND THE KERR OCCUPATIONAL CLUSTERS
AND F - VALUES

Variable		Kerr Occupational Clusters						Total	F
		001	002	100	101	102	220		
Age	N	119	51	22	19	85	33	329	
	X	37.56	38.53	32.09	35.58	35.84	39.97	37.03	2.65*
	SD	9.12	10.29	5.91	10.51	9.68	7.60	9.35	
Age at Onset	N	118	49	21	19	84	32	323	
	X	3.85	3.57	3.67	3.90	2.69	3.28	3.44	.33
	SD	8.13	6.73	5.26	6.59	5.44	3.65	6.64	
Years in School	N	117	49	21	19	84	31	321	
	X	12.62	12.53	13.19	12.16	13.08	12.10	12.69	1.28
	SD	2.61	3.02	2.06	1.74	2.00	1.78	2.39	
Education	N	116	50	22	18	84	33	323	
	X	1.19	1.36	1.82	1.22	1.60	3.39	1.59	74.94**
	SD	.49	.49	.66	.55	.64	.86	.87	
Number Deaf in Family of Origin	N	118	49	22	19	85	33	326	
	X	.64	.25	.50	.87	.91	.85	.64	2.56*
	SD	1.10	.69	.91	.68	1.45	1.33	1.17	
Number Deaf in Conjugal Family	N	118	50	21	19	85	33	326	
	X	.72	.64	.62	1.00	.75	.97	.75	1.44
	SD	.78	.60	.59	.88	.72	.73	.73	
GATB G	N	113	51	22	19	85	33	324	
	X	79.35	83.45	93.23	80.74	90.14	111.27	87.12	21.33**
	SD	16.69	15.40	18.29	20.15	16.28	1[illegible].75	18.96	
GATB V	N	113	51	22	19	85	33	323	
	X	76.75	77.78	88.77	77.32	81.37	102.58	81.62	21.61**
	SD	10.86	11.83	19.12	11.05	13.96	18.09	15.40	
GATB N	N	113	51	22	19	85	33	323	
	X	77.12	81.67	98.68	80.16	89.64	112.79	86.42	19.73**
	SD	20.60	18.16	19.38	25.27	18.85	18.99	22.54	

* Significance Level = .05
** Significance Level = .01

TABLE 7
(Continued)

FORTY STUDY VARIABLES AND THE KERR OCCUPATIONAL CLUSTERS
AND F - VALUES

Variable		Kerr Occupational Clusters						Total	F
		001	002	100	101	102	220		
GATB S	N	119	51	22	19	85	33	329	
	X	101.29	106.63	108.64	105.47	115.20	115.85	107.90	6.63**
	SD	21.13	16.68	14.80	24.86	18.49	13.78	19.84	
GATB P	N	119	51	22	9	85	33	329	
	X	102.45	104.33	121.96	109.84	119.34	117.67	110.37	7.18**
	SD	27.43	24.65	24.63	30.50	17.81	19.84	25.23	
GATB Q	N	113	51	22	19	85	33	323	
	X	110.24	105.98	131.55	113.90	121.78	129.58	116.24	11.87**
	SD	20.55	18.89	21.26	18.63	18.49	21.05	21.36	
GATB K	N	119	51	22	19	85	33	329	
	X	98.64	98.41	114.05	98.58	109.84	116.49	104.31	9.30**
	SD	20.91	17.90	17.45	17.25	17.23	13.01	19.56	
GATB F	N	119	51	22	19	85	33	329	
	X	90.36	90.98	99.82	101.05	102.37	98.67	95.64	3.59**
	SD	24.98	25.58	26.67	23.11	19.35	16.45	23.46	
GATB M	N	119	51	22	18	85	33	328	
	X	95.19	93.08	101.05	101.44	111.88	102.85	100.69	5.55**
	SD	25.62	24.85	26.86	29.36	25.03	18.55	25.89	
Culture Fair "g"	N	119	51	22	19	85	33	329	
	X	86.89	90.84	102.64	88.21	100.92	103.09	93.88	10.94**
	SD	19.26	17.44	16.72	20.01	12.82	13.92	18.12	
Bender Raw	N	119	51	22	19	85	33	329	
	X	40.50	33.47	19.82	28.26	31.64	29.42	33.92	4.17**
	SD	25.28	20.74	14.32	20.94	25.24	19.26	23.80	
Weingarten Raw Interpersonal	N	119	51	22	19	84	33	328	
	X	17.76	16.37	22.41	16.74	17.18	19.58	17.83	3.13**
	SD	6.80	6.46	7.18	6.30	7.27	6.37	6.94	

TABLE 7
(Continued)

FORTY STUDY VARIABLES AND THE KERR OCCUPATIONAL CLUSTERS
AND F - VALUES

Variable		Kerr Occupational Clusters						Total	F
		001	002	100	101	102	220		
Weingarten Raw Natural	N	119	51	22	19	84	33	328	
	X	22.59	22.71	19.32	21.58	21.51	29.33	21.83	.47
	SD	11.86	11.99	7.77	13.00	12.34	12.05	11.82	
Weingarten Raw Mechanical	N	119	51	22	19	84	33	328	
	X	22.89	25.51	15.18	24.74	22.61	29.61	22.59	5.30**
	SD	8.27	8.58	7.08	8.39	8.85	8.19	8.67	
Weingarten Raw Business	N	119	51	22	19	84	33	328	
	X	30.71	29.57	36.27	33.21	30.44	30.00	30.91	1.41
	SD	10.31	11.88	10.18	10.66	11.63	12.38	11.17	
Weingarten Raw Esthetic	N	119	51	22	19	84	33	328	
	X	19.77	21.35	20.23	17.74	21.46	21.30	20.52	1.62
	SD	6.43	5.97	6.16	3.93	6.58	8.81	6.58	
Weingarten Raw Scientific	N	119	51	22	19	84	33	328	
	X	18.61	19.08	18.23	19.53	18.68	19.06	18.77	.14
	SD	6.28	6.04	7.72	5.99	6.32	6.93	6.37	
Weingarten Raw Verbal	N	119	51	22	19	84	33	328	
	X	10.55	9.80	13.77	11.37	10.89	12.21	10.95	2.84*
	SD	4.35	5.19	3.56	4.83	5.13	4.90	4.80	
Weingarten Raw Computational	N	119	51	22	19	84	33	328	
	X	13.34	13.31	14.41	14.84	13.31	12.85	13.44	.52
	SD	5.20	5.68	4.08	6.36	5.15	5.65	4.30	
Weingarten Raw Time Perspective	N	119	51	22	19	84	33	328	
	X	8.40	7.80	10.36	8.37	8.85	10.67	8.78	4.50**
	SD	3.24	3.93	2.99	2.73	3.03	3.38	3.37	
Gottschaldt Standard	N	119	41	22	19	85	33	329	
	X	43.50	45.67	49.00	46.16	48.62	52.88	46.02	8.55**
	SD	7.66	9.72	9.63	9.31	8.13	7.34	8.80	

TABLE 7
(Continued)

FORTY STUDY VARIABLES AND THE KERR OCCUPATIONAL CLUSTERS
AND F - VALUES

Variable		Kerr Occupational Clusters						Total	F
		001	002	100	101	102	220		
Gates Raw	N	119	51	22	19	85	33	329	
	X	18.33	19.78	27.68	21.16	23.17	34.94	22.26	14.50**
	SD	11.05	11.68	11.11	11.63	10.06	7.41	11.68	
Craig Word	N	119	51	22	19	85	33	329	
	X	70.33	69.02	76.96	72.11	69.77	80.15	71.51	2.50*
	SD	19.47	18.75	7.71	15.51	21.66	10.70	18.71	
Craig Sentence	N	118	51	22	19	85	33	328	
	X	66.98	66.92	83.05	71.63	74.53	89.76	72.56	7.12**
	SD	24.54	23.01	13.59	27.46	22.86	9.66	23.40	
Manual Communication	N	116	48	22	19	80	29	314	
Reading	X	79.95	83.42	78.36	77.58	89.70	93.03	83.77	2.33*
	SD	29.38	29.13	34.41	35.01	18.96	18.07	27.23	
Manual Communication	N	119	51	22	19	85	33	329	
Signing	X	63.51	67.33	76.18	62.95	79.66	94.91	72.24	8.10**
	SD	31.90	31.95	34.40	32.87	23.20	17.44	30.46	
Berger Block I	N	119	51	22	19	85	33	329	
Identification	X	27.30	30.82	40.05	31.00	34.72	46.39	32.75	8.25**
	SD	16.98	17.91	14.41	18.61	16.04	15.02	17.54	
Berger Block II	N	119	51	22	19	85	33	329	
Identification	X	29.45	33.18	39.59	32.26	35.53	43.42	33.84	8.47**
	SD	13.51	11.93	8.06	11.28	13.06	7.64	12.93	
Berger Block III	N	119	51	22	19	85	33	329	
Identification	X	26.33	26.28	31.32	27.42	32.08	41.73	29.75	6.39**
	SD	16.01	14.9[illegible]	15.71	17.92	14.85	10.59	15.79	
Speech Characteristics	N	101	44	20	18	72	33	288	
Intelligibility	X	7.47	7.21	8.65	7.06	7.72	8.88	7.71	3.84**
Expert	SD	2.32	2.50	1.39	2.51	2.00	1.32	2.19	

TABLE 7
(Continued)

FORTY STUDY VARIABLES AND THE KERR OCCUPATIONAL CLUSTERS
AND F - VALUES

Variable		Kerr Occupational Clusters						Total	F
		001	002	100	101	102	220		
Speech Characteristics	N	101	44	20	18	72	33	288	
Pitch	X	2.97	3.09	2.90	3.06	3.01	3.00	3.00	.52
Expert	SD	.59	.52	.45	.42	.52	.43	.53	
Speech Characteristics	N	101	44	20	18	72	33	288	
Volume	X	2.86	2.91	3.10	3.11	2.94	2.73	2.91	2.55*
Expert	SD	.53	.47	.64	.32	.37	.45	.48	
Speech Characteristics	N	101	44	20	18	72	33	288	
Duration	X	2.98	2.93	3.05	3.00	3.04	2.97	2.99	1.40
Expert	SD	.32	.26	.22	.00	.20	.17	.25	
DB Loss - Better Ear	N	119	51	22	19	85	33	329	
	X	94.80	92.63	93.41	93.84	93.08	97.73	94.16	.49
	SD	17.12	18.49	16.35	14.73	16.59	16.39	16.89	

disabled individuals there may be reason to give greater weight to verbally expressed interests, the counselor, nevertheless, has multiple evidence to argue for a cautious approach. First, his client's interests as expressed in the Business scale are less than average when compared with other adult deaf, and especially with adult deaf females. Second, there is evidence that the adult deaf employed in clerical and sales work are rather high on this scale. And finally, there is statistical evidence for the interpretation of the Business scale as a predictor of vocational success in terms of different types of work. Hopefully, this illustration provides some indication of how the different forms of information can be interlaced in application with deaf clients.

D. Validity and CM I

CM I is a measure of the number of months each study subject worked during the thirty-six month period before he was interviewed and examined. Of the 483 subjects in Sample IV, 376 provided information both for the number of months worked and on each of the forty related background and test variables.

How predictive are the 35 variables of the vocational criterion measure Months Worked: This question was answered by a different method from that followed in the previous sections with CM II and CM VI. Months Worked is readily definable along a dimension, quantitatively calibrated by equal intervals of time. This dimension extends continuously from zero to thirty-six months. The classification systems for CM II--Types of Work, and for CM VI--Complexity Demands of Work are not easily distributed from low to high on a continuous array along a baseline calibrated into equal intervals. Since Months Worked is easily handled as a continuous measure, the opportunity presents itself to relate the predictor variables to it by way of the more traditional validity coefficients--the Pearson Product Moment correlation.

To do this the predictor variables were related to the number of months worked for the 376 deaf individuals for whom we had all the desired information. To make the interpretation of this data more perceptive the body of predictors was catalogued into four classes:

1. Background predictors,
2. Ability predictors,
3. Interest predictors, and
4. Communication predictors.

In addition, the investigators employed their growing experience with predictors, and decided to construct fourteen subsamples (stratifications) of deaf subjects from the total of 376 deaf available for this analysis. In effect the plan was to use a number of stratifying variables in heuristic combinations, which our previous work commended as reasonable. By reasonable we have reference to the dual expectation that each subsample should be of meaningful size, and also that each subsample be organized around a partition of the total sample, which might be propagative of information useful in the counseling relationship. In Table 8 all correlations are presented which are statistically significant at the five percent level or less. Where the number of cases in a strata equals one-hundred or more, correlation of .20 or greater are uniformly reported. In those cases where the number of cases analyzed was less than one hundred, the lowest significant correlation is specified in Table 8. We have also organized the data in Table 8 by the four predictor classes; background, ability, interest and communication.

1. Total Sample

For the total sample of 376 individuals studied from Sample IV we note that the average number of months worked is about 26 and one-half. We also learn that one background variable (sex), one-ability variable (GATB-G) and four interest scores (mechanical, verbal, interpersonal, and business) were related with vocational adjustment, as measured by months worked. Of special interest here is that three of the interest scales are related negatively to months worked. Thus, the deaf with low scores on these three indices do better than deaf with higher scores insofar as proportion of time worked.

2. Three Simple Stratifications

The first two sample strata which follow the total sample are those subsamples of 209 males and 167 females. Clearly the distribution of months worked for the two sexes is strikingly dissimilar, with male deaf adults working about 68 percent more than female deaf. This difference in regularity of work over three years also appears to contribute to the fact that the four interest scales which appeared valid for the total group vanish so mysteriously in the course of the independent analyses conducted for males and females. Since males tend to occupy the upper end of the dimension of length of time worked and the female deaf the lower end, and since male and female deaf perform on the four interest subtests so differently, we would expect to find valid interest test scores in the total deaf sample. However, when we focus on but one sex, we need to remember that we are dealing with a truncated distribution on the months worked dimension. At the same time, the distribution of interest scores of one sex is also limited to extreme scores in one direction (see plots 35, 37, 38 and 41) so that both distributions tend to be truncated and the correlations dim and fade out. To summarize this point, it appears that interest in mechanical, verbal, interpersonal and business pursuits among deaf adults is largely determined or mediated by sex. Thus, within either sex, these interest scores do not predict the number of months worked.

Now, rather than valid interest test scores in the male and female samples, we note, as already indicated, the emergence of valid ability and communication measures. Furthermore, the valid predictors for the two sexes are essentially incongruous. The one common valid test score shared by the two sexes in predicting months worked is the Craig Word score.

Generally, it seems that the measures which are valid for predicting number of months worked in females are education-related variables such as numerical and verbal abilities coupled with intelligibility of speech and speech reading skills. The predictors for male deaf are, perhaps, less directly tied to the verbal expressive communication mode (intelligible speech) or to educational preparation.

The third simple stratification carried out spotlights the 86 individuals whose deafness occurred later in life, i.e., after four years of age. Note that this is the first stratification which contains less than one-hundred deaf adults. The Table, therefore, provides a special correlation value (.22) for significance. This group of late onset deaf individuals constituted of members of both sexes, reports an average of 28.4 months worked over the three year recording period. As

TABLE 8

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH MONTHS WORKED)

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	CLASS OF PREDICTOR VARIABLES			
	Background	Ability	Interest	Communication
TOTAL N = 376 $\overline{X}$ = 26.52 SD = 13.62	Sex -.48	GATB G .20	Weingarten Mechanical .36 Verbal -.29 Interpersonal -.27 Business -.22	
MALES N = 209 $\overline{X}$ = 32.33 SD = 8.27		BB II Id .24 Bender Raw -.20 BB I Id .20		Craig Word .20
FEMALES N = 167 $\overline{X}$ = 19.26 SD = 15.43	Education .32	GATB V .24 GATB N .23 GATB G .21		Craig Sentence .24 Sp. Int. Expert .24 Craig Word .20
AGE AT ONSET > 4 N = 86 $\overline{X}$ = 28.40 SD = 12.13 (r) $\geq$.22 sig. @ 5% level	Sex -.41 Age .28	GATB N .31 BB II Id .26 GATB G .25	Weingarten Mechanical .28 Interpersonal -.27 Esthetic -.23 Verbal -.23 Natural .22 Time Perspec -.22	Volume Expert .27
MALES - AGE AT ONSET < 5 N = 156 $\overline{X}$ = 32.33 SD = 8.13	No Day School .21			

TABLE 8
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH MONTHS WORKED)

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	CLASS OF PREDICTOR VARIABLES: Background		Ability		Interest	Communication	
FEMALES - AGE AT ONSET < 5 N = 134 X = 18.56 SD = 15.69	Education	.31	GATB V GATB G	.25 .20		Craig Word Craig Sentence Sp. Int. Expert Man Commun Sign	.24 .24 .24 .20
MALES DB LOSS > 69 And No Aid N = 146 X = 32.16 SD = 8.59			BB II Id Bender Raw GATB G GATB M GATB S BB I Id Gott Std	.29 -.28 .26 .25 .24 .23 .22		Craid Word BB III Id.	.24 .21
FEMALES DB LOSS > 69 And No Aid N = 112 X = 17.79 SD = 15.49	Education Age of Onset No Pub School	.27 .23 .21	GATB V BB II Id.	.21 .20		Craig Sentence Craig Word	.22 .20
1st DIGIT DOT = 0 & 1 N = 59 X = 32.80 SD = 8.28 (r) ≥ .26 sig. @ 5% level	Sex Age	-.28 .26				Craig Word	.30

TABLE 8
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH MONTHS WORKED)

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	CLASS OF PREDICTOR VARIABLES			
	Background	Ability	Interest	Communication
1st DIGIT DOT = 2 N = 56 $\bar{X}$ = 32.55 SD = 6.93 (r) ≥ .26 sig. @ 5% level	No Day School -.32			
1st DIGIT DOT = 6 N = 52 $\bar{X}$ = 33.33 SD = 6.08 (r) ≥ .27 sig. @ 5% level			Weingarten Verbal -.34	
1st DIGIT DOT = 7 N = 38 $\bar{X}$ = 29.00 SD = 11.29 (r) ≥ .32 sig. @ 5% level	Sex -.37	GATB K -.33	Weingarten Verbal -.44 Natural .40 Esthetic -.39 Computational -.33	Man Commun Sign -.33
KERR CLUSTER 001 N = 86 $\bar{X}$ = 30.48 SD = 10.09 (r) ≥ .21 sig. @ 5% level	Age .28 Sex -.27		Weingarten Business -.21 Verbal -.36 Interpersonal -.26 Mechanical .24 Esthetic -.24 Time Perspec -.22 Natural .21	

TABLE 8
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH MONTHS WORKED)

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	CLASS OF PREDICTOR VARIABLES			
	Background	Ability	Interest	Communication
KERR CLUSTER 002 N = 37 $\bar{X}$ = 33.27 SD = 7.07 (r) ≥ .33 sig. @ 5% level	Sex -.44 Education -.43 Age .38	GATB Q -.50 Gott Std -.36	Weingarten Verbal -.61 Interpersonal -.49 Business -.41 Mechanical .38 Time Perspec -.38 Natural .37 Scientific .33	Duration Expert .34 Man Commun Sign -.33
KERR CLUSTER 102 N = 67 $\bar{X}$ = 33.13 SD = 6.36 (r) ≥ .24 sig. @ 5% level			Weingarten Time Perspec -.27	

such, this group, while clearly handicapped, nevertheless, had hearing to the point where verbal language should have evolved at least in puerile form. We would guess then that among the deaf this group should be capable of performing most like hearing subjects. The fact is that this subsample of 86 deaf individuals has the richest constellation of useful predictors uncovered in the correlational analysis to this point. To begin, two background variables proved valid. Males were more likely to be more fully employed in this subgroup. For the first time we encounter age as a predictor and learn that as the members of this subgroup age they are also apt to be more fully employed. In the realm of ability we find part of what was found to be valid for each sex independently. This is followed by a pattern of valid interest tests which was already seen in connection with the total sample. There is, then, considerable emphasis again on negative correlations between length of work and four interest scales. Finally, we detect speech volume to be related to length of work a kind of lonesome communication index finding which, again, may be associated with the sex of the study subject.

3. Multiple Variable Stratifications

The next four strata in the Table are defined by variables associated with deafness and used in two or three variable combinations. In every case, sex is a constituent member of the variable combination. In two cases, the combining variable is early onset of the hearing handicap. In the two remaining cases, sex is combined with higher hearing loss and the failure to use a hearing aid--in a three-element combine. We will first investigate the strata incorporating sex and early onset.

The number of months worked for males whose hearing handicap developed early was identical with that reported for all males in the Table, so that age of onset for men appears to be unrelated with amount of work reported over the three-year inquiry period. The situation is different for women, where those with early loss are seen to have worked 18.56 months of the 36 month period. This is three and one-half months less work than enjoyed during the same observation interval by women whose hearing loss occured after four years of age. This latter group, not reported in Table 8, reported working an average of 22.10 months Thus, it appears that late onset of disability in deaf women, unlike the situation with deaf men, is associated with somewhat better longevity in working history.

It should be clear that these two subsamples of early onset of deafness make up the majority of the deaf in the initial "cuts" of the sample into male and female subsamples. Of the 209 males in this correlational study, 156 are in the male, early onset group. Similarly, of the 167 females in the study, 134 are in the early onset group. There would be then little reason to expect much deviation in the pattern of validity measurement in these two subgroups characterized by age of onset from the major sex subsamples. This expectation is fulfilled for the females. It is not for males. The breakdown for males is virtually barren of useful predictors. This is an extremely important finding since it pinpoints an area in which this study was essentially unproductive. Thus, for one sizeable subsample made up of 42 percent of the deaf adults studied, or 74 percent of the deaf males studied, this report yields very little information regarding useful prediction to CM I: The Number of Months Worked. The only useful lead turned up, is that failure to attend Day School--an educationally-related-background variable--is positively related to length of recent work history. Putting it more cogently, Day School experience is antagonistic to more regular work experience for males with early onset of hearing loss.

The portrait for females as mentioned is essentially that for the major female subsample and doesn't bear further elaboration.

Dropping down the Table to the male and female strata for those with greater hearing loss, which is limited to those who didn't use a hearing aid, we can see that the group of 146 males worked an average of 32 months over the three years, which is quite comparable to the major male group of study subjects.

As a matter of fact the pattern of valid predictors in this subgroup resembles the major male subsample with its emphasis on the Berger Block II Identification, and the Bender Gestalt scores in the ability domain, its dearth of significant validity indices among interest scores and a common communication test, the Craig Word, showing to advantage in both male groups. Of special interest in this analysis is the appearance of GATB scales in that this is the only analysis where the GATB demonstrates validity for males in predicting Number of Months Worked.

The female subsample with higher hearing deficit and no hearing aid was conspicuous for its very modest working time (number of months), and for its background characteristics. In this particular connection we learn that there is a negative association between attending <u>public</u> school (for women) and length of work experience. This is extremely interesting in connection with the finding in this same stratification that education is positively related to length of work experience! Therefore, while education in general is important for regularity of work in this subsample, public school education is associated with a reduction in employment time.

4. <u>Vocational Variable Stratification</u>

At this point in discussion we come to the level of stratification in our presentation where we apply one criterion measure as a moderator variable in predicting to another criterion measure. This means that we will examine the correlation between predictors and length of time worked by using, one at a time, one vocational class from the DOT Digit 1 code, or one Kerr cluster (as a predictor).

The small sample sizes within strata so identified restricted us to seven classifications of work adjustment from CM II and CM VI. They occupy the last section of Table 8. The first four strata are based on DOT Digit 1 classes: the remaining three are based on the Kerr treatment of occupational information.

With regard to the Digit 1 subsample we look first at the Professional-Managerial group. This group numbers 59 persons with a favorable work record of 32.8 months. Statistical significance is reached here with a correlation of .26 or greater. The pattern of valid predictors is limited to the background attributes of sex and age, as well as the capacity to read words. There are no ability or interest test scores which achieve meaningfully valid correlations with Months Worked.

Space limitations prohibit our detailing the additional six subsamples. They will be reviewed only in gross detail. For the Clerical and Sales subgroup we find a single valid background indicator: for Machine Trades, one interest predictor with a significant correlation: while for Bench Work seven valid predictors. The related findings with the Kerr Clusters are extremely productive. On cluster 001 we uncover nine significant predictors. On cluster 002 we have fourteen valid predictors. Included are three high validity coefficients--the GATB-Q, and the verbal and inter-personal interest test scores. The reader must remember that the number of cases (37) in this cluster is small so that the size of the correlations is apt to be somewhat exaggerated. The final Kerr cluster, 102, reveals only one valid predictor in Table 8--the time perspective interest test score. In studying the results with these six subsamples, we want to call attention to the negatively correlated ability scores with the Bench Work group (DOT-7) and for Kerr cluster 002. We shall be encountering more evidence of this when we relate the ability test scores of Bench Workers with Pay Rate. At that point, we shall also discuss a possible explanation for such negative ability findings.

E. Validity and CM III

CM III is the fourth occupational adjustment measure we will study in detail. This measure is based on the subject's report of his monthly pay rate at the time of the study interview. As with the previous validity measures, this analysis was conducted with Sample IV. However, since there were many deaf adults interviewed who were not working or who failed to provide information about their current pay, this aspect of the initial validity study was held to 285 deaf adults.

TABLE 9

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH PAY RATE)

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	CLASS OF PREDICTOR VARIABLES: Background		Ability		Interest		Communication	
TOTAL	Sex	-.45	GATB G	.37	Weingarten			
	Education	.34	Gott Std	.33	Mechanical	.21		
N = 285			GATB N	.32				
$\overline{X}$ = 506			GATB S	.27				
SD = 183			GATB V	.26				
			Gates Raw	.25				
			Cul Fair "g"	.24				
			BB I Id	.22				
			BB II Id	.22				
			Bender Raw	-.20				
MALES	Education	.35	GATB G	.41	Weingarten		Sp Int Expert	.21
	Age	.26	GATB V	.38	Verbal	.24		
N = 188			Gates Raw	.36				
$\overline{X}$ = 564			GATB N	.35				
SD = 163			BB II Id	.34				
			BB I Id	.30				
			GATB Q	.28				
			Gott Std	.28				
			Cul Fair "g"	.25				
			GATB P	.24				
			GATB S	.21				
FEMALES	Education	.59	Gott Std	.40	Weingarten		Man Commun Sign	.34
			GATB G	.39	Computational	-.30	BB III Id	.33
N = 97			GATB N	.38	Esthetic	.24	Man Commun Read	.28
$\overline{X}$ = 393			Cul Fair "g"	.38	Business	-.23	Craig Sentence	.27
SD = 165			GATB S	.33				
			Bender Raw	-.31				
(r) $\geq$ .20 sig. @ 5% level			GATB V	.29				
			Gates Raw	.29				
			GATB K	.28				
			BB I Id	.24				

TABLE 9
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH PAY RATE)

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	CLASS OF PREDICTOR VARIABLES: Background	Ability	Interest	Communication
AGE AT ONSET > 4 N = 72 X = 517 SD = 208 (r) ≥ .24 sig. @ 5% level	Sex -.52 Education .34	GATB G .37 Gott Std .30 GATB V .29 GATB N .29 Cul Fair "g" .26 BB II Id .26 Gates Raw .24 Bender Raw -.21	Weingarten Interpersonal -.28 Mechanical .27 Business -.27 Verbal -.25	
MALES - AGE AT ONSET < 5 N = 139 X = 555 SD = 154	Age .25 Age at Onset -.21	GATB G .34 Gates Raw .33 GATB V .30 GATB N .29 BB I Id .29 GATB P .27 Gott Std .27 BB II Id .27 GATB Q .25 Cul Fair "g" .23 GATB S .21	Weingarten Verbal .31 Time Perspec .21	Man Commun Sign .24 BB III Id .22
FEMALES - AGE AT ONSET < 5 N = 74 X = 403 SD = 166 (r) ≥ .24 sig. @ 5% level	Education .64	GATB G .52 GATB N .49 GATB S .48 Gott Std .47 GATB V .43 Cul Fair "g" .42 Gates Raw .39 BB I Id .33 Bender Raw -.31 GATB Q .26	Weingarten Computational -.34	Man Commun Sign .29 BB III Id .29 Sp. Int. Expert .29 Craig Sentence .26

TABLE 9
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH PAY RATE)

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	CLASS OF PREDICTOR VARIABLES							
	Background		Ability		Interest		Communication	
MALES DB LOSS > 69, And No Aid	Education	.39	Gates Raw	.39	Weingarten		Man Commun Sign	.32
	Age	.23	GATB G	.38	Verbal	.29	BB III Id	.24
N = 130			GATB V	.36	Time Perspec	.27	Sp. Int. Expert	.24
$\bar{X}$ = 561			BB I Id	.33				
SD = 167			BB II Id	.32				
			GATB N	.30				
			Gott Std	.30				
			GATB M	.25				
			GATB S	.24				
			Cul Fair "g"	.24				
			GATB P	.23				
			GATB Q	.23				
FEMALES DB LOSS > 69, And No Aid	Education	.50	GATB G	.45	Weingarten		Craig Sentence	.33
			GATB N	.42	Time Perspec	.26	Sp. Int. Expert	.29
N = 63			Gates Raw	.38			BB III Id	.27
$\bar{X}$ = 398			GATB S	.37				
SD = 154			Cul Fair "g"	.35				
(r) $\geq$ .25 sig. @ 5% level			Gott Std	.33				
			GATB V	.31				
			BB I Id	.31				
			GATB K	.28				
			Bender Raw	-.26				

TABLE 9
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH PAY RATE)

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	CLASS OF PREDICTOR VARIABLES			
	Background	Ability	Interest	Communication
1st DIGIT DOT = 0 & 1 $\underline{N}$ = 59 $\bar{X}$ = 633 SD = 181 (r) ≥ .26 sig. @ 5% level	Education .58 Sex -.26	GATB G .64 GATB V .54 Gates Raw .52 GATB N .51 BB II Id .34 BB I Id .33 GATB K .32 GATB Q .30		Craig Word .26 Sp. Int. Expert .26
1st DIGIT DOT = 2 $\underline{N}$ = 55 $\bar{X}$ = 464 SD = 162 (r) ≥ .27 sig. @ 5% level	Sex -.47	Bender Raw -.38	Weingarten Scientific .32	Craig Word -.35
1st DIGIT DOT = 6 $\underline{N}$ = 52 $\bar{X}$ = 563 SD = 125 (r) ≥ .27 sig. @ 5% level	No Day School -.37 Age .27	Gott Std .39 GATB N .35 Cul Fair "g" .29 Gates Raw .29 BB II Id .29 GATB G .27 GATB Q .27		Sp. Int. Expert .30

TABLE 9
(Continued)

VALIDITY COEFFICIENTS (PRODUCT MOMENT CORRELATIONS WITH PAY RATE)

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	CLASS OF PREDICTOR VARIABLES			
	Background	Ability	Interest	Communication
1st DIGIT DOT = 7 N = 38 $\bar{X}$ = 427 SD = 124 (r) ≥ .32 sig. @ 5% level	Sex -.73	GATB K -.53 GATB Q -.34	Weingarten Mechanical .53 Verbal -.51 Interpersonal -.45 Time Perspec -.42 Computational -.39 Business -.33	
KERR CLUSTER 001 N = 88 $\bar{X}$ = 437 SD = 127 (r) ≥ .21 sig. @ 5% level	Sex -.67 Education -.22	GATB V -.24	Weingarten Mechanical -.40 Interpersonal -.30 Time Perspec -.24 Verbal -.23	Pitch Expert .25
KERR CLUSTER 002 N = 37 $\bar{X}$ = 530 SD = 165 (r) ≥ .32 sig. @ 5% level	Sex -.44 Age .35	GATB G .40		
KERR CLUSTER 102 N = 67 $\bar{X}$ = 511 SD = 155 (r) ≥ .24 sig. @ 5% level	Sex -.64	Gott Std .31	Weingarten Mechanical .38 Verbal -.28 Time Perspec -.27 Interpersonal -.26	Craig Word -.27

It should be clear that the product moment correlation could be used with Pay Rate much as with the previous validity studies performed with Number of Months Worked. The model for carrying out these two analyses was, in fact, identical with the predictor variables organized into four classes and the stratification process managed in the very same fourteen subsamples. We will report, as in Table 8, correlations which are of a magnitude of .20 or better when the analysis involves one-hundred or more deaf adults. When fewer cases were included in any strata, Table 9 reports the smallest correlation coefficient which is considered to be significant.

Before we launch into our discussion of the simple validity measures for CM III a few general remarks may be in order regarding this analysis. A hurried glance at the data summary in Table 9 indicates that: (1) there are generally a greater number of statistically meaningful indicators, and (2) the magnitude of the coefficients tend to be stronger than was the case with the validity coefficients predicting Number of Months Worked.

The predictive validity from personal and test performance variables to Pay Rate would be, accordingly, more successful (accurate) than to Number of Months Worked.

1. Total Sample

   The 285 deaf individuals included in this group earned an average monthly salary of 506 dollars. From the background predictor column of Table 9 we are informed that males were better remunerated than females, and that education was positively related to Pay Rate. There were ten ability variables with validity coefficients exceeding .20. Four of the ability variables were components of the General Aptitude Test Battery. In addition, the Gottschaldt Closure Flexibility Test, the Gates Reading Survey, the Culture Fair "g", two subtests of the Berger Block test and the Bender Gestalt were all reported out as significant predictors. In the realm of interest the mechanical interest subtest also proved to be a valid predictor. There is then, much more predictive capacity with Criterion Measure III than with Criterion Measure I for the total sample. Also, it will be recalled that the distribution of valid predictors for the total sample on CM I was heavily concentrated in the interest domain as opposed to the ability domain. With Pay Rate the reverse is evident so that ability predictors carry the weight of the total sample findings in sharp advantage over the interest variables. There could be no more convincing testimony to the counselor's responsibility to develop explicitly in the course of his relationship with his client the objectives of any given vocational counseling relationship.

2. Three Simple Stratifications

We want to partition the total sample again into three simple stratifications predicting from each to Pay Rate as was done with the criterion Number of Months Worked. This produces a subsample of 188 males; a subsample of 97 females and a late onset group of 72 men and women. Pay Rate was most remunerative for males. They averaged 564 dollars per month. Pay Rate was least rewarding for the all-female group at 393 dollars per month. The late onset (of hearing loss) subsample earned an average monthly salary of 517 dollars.

The male subgroup of 188 deaf adults demonstrates a positive correlation for both age and education with Pay Rate. This is again, an interesting result in that age and education were consistently inert, or ineffective predictors of CM I in the three male subsamples studied with that criterion measure. The ability profile for males is largely an image of the valid ability measures for the total sample with the Bender Gestalt deleted and two GATB subtests appended. Verbal interests are correlated with Pay Rate for men, as is the level of speech intelligibility. Thus, Pay Rate for males has a heavy loading on education, reading, verbal and speech capabilities.

The female subgroup, made up of 97 deaf women, reveals a stronger relationship between education and Pay Rate than found with men. It is interesting that age is not related to Pay Rate for deaf women. The ability domain is fairly consonant in pattern with both the total group and the male subsample. There are, however, some impressive differences in the magnitude of a few coefficients which are noteworthy. The principal differences are the increased magnitude of the Gottschaldt, the Culture Fair "g", and the Bender Gestalt in the case of the subsample of female deaf adults. The most striking differences come from the interest and communication classes of variables which are apparently much more important for women than men in predicting Pay Rate. In the province of interests we note that computational interests, esthetic interest, and business interests are all valid predictors of Pay Rate, while signing and speech reading skills characterize the more adequately salaried female deaf workers.

These six-linked differences in patterns of interest and communication warrant further criticism. In deaf men the level of pay reward on the job is related to expanded verbal interests along with the capacity to express oneself intelligently in verbal communication. For women the validity clues are quite different. As their business and computational interests go down within the group and as their esthetic interests become more pronounced, their pay increases. Also, and extremely important, as their manual communication and speech-reading skills become more adept, their pay is ~~improved.~~ This is a socially exciting finding. Seemingly, deaf males can work toward better pay by expanding and perfecting their speech and verbal expressive capabilities, those characteristics more usually associated with the hearing population. Deaf women, on the other hand, can more realistically work toward better compensation by developing those communication mechanisms traditionally associated with the deaf. The road sign to financial enhancement may then point in opposite directions. For deaf males the greatest rewards are found down the pathway to integration with the hearing population: for deaf females financial success is along the highway to continued estrangement and segregation in the deaf community.

The third level of data organization among the simple strata has to do with the 72 individuals whose deafness reportedly occurred after four years of age, and for whom Pay Rate information was available. The data in Table 9 reveal two valid background predictors; sex and education. It should be noted that these are the same two predictors which showed to advantage in the total group of 285 adult deaf. Coupled with this are a generous admixture of statistically significant ability and interest coefficients, and an absence of useful predictors among the communication variables.

3. Multiple Variable Stratification

We are concerned now with the four levels of analysis in Table 9 which correspond in format with the multiple variable analysis conducted with the criterion measure Number of Months Worked as presented in Table 8. As with the previous procedure with Months Worked, the first two analyses here will involve the study group with early onset of deafness dichotomized by sex. In the remaining two multiple-element-variables we examine again those deaf whose hearing loss is most profound and who failed to use a hearing aid in the test situation dividing them into two subsamples by sex.

From Table 9 we learn that there are 139 men in the early onset group. Their average monthly wage was 555 dollars. This is nine dollars below the average monthly income for the total sample of deaf males. More to the point the early onset male group earned an average of 34 dollars less per month than the late onset male group (not shown in Table 9).

Regarding background variables and their relationship to Pay Rate in early onset males, we find age operating as a valid predictor much as in the case of the total subsample of 188 males. There is, however, an interesting difference in connection with the variable education. In the total subgroup of males, education predicted Pay Rate while in the early onset subgroup of males education demonstrated no predictive capacity. Thus, in terms of the amount of earning power in deaf males, we suggest that education may be selectively relevant for those deaf males whose hearing disability occurred after four years of life.

The second background variable which has predictive validity for early onset males is the age of onset of the hearing deficiency. While marginal in the magnitude of its correlation coefficient, we nevertheless have a provocative dynamic to conjecture about for this group of deaf males. That is, within the early onset group of deaf males, the earlier the onset of hearing loss, the more adequate is the Pay Rate likely to be. Put more concisely, within the restricted subsample of males who lost their hearing before the age of five, there is some evidence that "the earlier the hearing loss the better."

Continuing to focus on the males with early onset of deafness, we note from Table 9 that a total of eleven ability scales predict Pay Rate, in addition to two valid predictor variables in the interest scale domain, and two valid communication subtests.

We turn now to examine the related finding for women with early onset. Unexpectedly we found that adult female deaf with early onset (who numbered 74 women) had an average monthly Pay Rate of 403 dollars. This, surprisingly, is 10 dollars more per month than was reported to be earned by the total subsample of 97 women in this study. Even more impressive, and certainly unanticipated, is the comparison with the earned income in the subsample of late onset deaf women (not shown in Table 9). Here we determine that early onset females earned an average monthly income of 52 dollars more than deaf women whose deafness developed later, or after four years of age. This finding is not easily explained. One possibility is that the relatively large group of women on this study who were professionally trained as teachers of the deaf were, in the main, handicapped by early onset of deafness.

Regarding the predictive effectiveness of the variables with early onset females we learn from Table 9 that the validity coefficients are generally more productive than was the case with early onset males. For example, education proves to be a very convincing background predictor for all female deaf, but particularly for those whose hearing loss occurred earlier in life. The differential value of education for predicting Pay Rate in early onset males and females is unmistakable. Thus, while education can be disregarded in predicting Pay Rate in early onset males, it occupies a salient role as a predictor for early onset females. Regrettably, the data don't carry their own convenient explanation for this profound difference. The reader should, of course, be sensitive to the disparity in sample size on the two groups with early onset. This difference may contribute to differences in magnitude of correlation coefficients.

The remaining variables which proved valid for predicting Monthly Pay Rate among the female deaf with early onset include ten ability measures (headed by

GATB-G with a coefficient of .52); the computational interest scale which is negatively related with this subsample of female deaf; and an impressive array of four communication variables. For the early onset female both receptive and expressive communication skills in lipreading and signing seem important as well as some degree of intelligible speech in order to command a more adequate salary.

This brings us to the two strata in Table 9 which describe the most severely disabled employable deaf--those persons whose hearing loss was profound and who failed to use a hearing instrument during the interview and test experience with our examiner.

The subsample of 130 males which was included in this stratification earned an average monthly income of 561 dollars, which is essentially concordant with the income of the total male deaf group studied. The catalog of valid predictors for this group of 130 males is largely a combination of findings from the total male subsample (188) studied in connection with Pay Rate in Table 9, and the 139 males studied who had early onset of deafness. For example, education comes to light again as a relevant predictor to Pay Rate as it did in the total subsample of men: a host of ability variables appears with an emphasis on reading and general academic competence: time perspective appears again as it did in the early onset stratification of male deaf: while the province of significant communication variables is a literal fusion of the findings from the total male and early onset male groups. It is instructive to note that the background variable "education" emerges again as a valid predictor for the profoundly deaf male's capacity to earn income as it did for the total sample of deaf males. This suggests to us that the lack of predictive power for the education variable in the group of early onset males was not merely a function of the possibility that early onset was associated with more profound hearing loss. The evidence points more directly to the educational process as being lamentably less well suited to the needs of those deaf males whose hearing problem originated early in life.

The final multiple variable analysis performed upon Table 9 data was with the 63 members of the female subgroup which had the more profound hearing loss, and failed to use a hearing aid. The average monthly Pay Rate in this group was 398 dollars, which is five dollars <u>more</u> per month than the average income documented for all women in the study, or fourteen dollars <u>more</u> per month than for women whose hearing loss was less remarkable. The evidence that the group of women with more profound hearing loss tended to earn at least as attractive salaries as women with a less profound defect is again unforeseen. This may be interpreted as being a function of the significant overlap between the subsamples of early onset and profoundly deaf women and by the much higher income reported for the early onset deaf women over the late onset deaf women. This influence is given support by the general level of agreement in the patterns of significant predictors found relating to Pay Rate for early onset and profoundly deaf females.

4. Vocational Variable Stratification

From Table 9 we note that there were 59 deaf individuals studied who were employed in the Professional, Technical and Managerial category of the DOT occupational structure and for whom we had information on Pay Rate. The reported monthly income for these 59 individuals was 633 dollars. This was clearly the best paid group or stratification reported in Table 9. The Pay Rate criterion measure was also predicted reliably by two background variables, eight ability variables, no interest measures, and two communication variables. Education was especially productive as a predictor. As usual, men were paid more adequately than women. The range of ability measures was not only wide, but included a number (GATB G, V, N and the Gates) which have rather substantial coefficients with Pay Rate. While no interest tests demonstrated predictive validity for this class of Professional and most affluent deaf workers, we find that proficiency in speech-reading skills and intelligible speech are predictive of better income in this group.

The next stratification in the Table is the 55 deaf adults employed under DOT Digit 2, i.e., in Clerical and Sales occupations. The average monthly pay of

464 dollars was considerably less in this group than in the Professional category. Again, men are reimbursed better than women. We also observe that the Bender Gestalt Motor Test is the one test measure which has predictive validity in this occupational group. The scientific interest subscale and The Craig Word measure round out the significant validities for this group of clerical and sales workers.

For those 52 deaf classified by DOT Digit 6 in the Machine Trades, we learn from Table 9 that they earned an average monthly salary of 563 dollars. Day School experience is positively related to Pay Rate while age carries its characteristic predictive value for those deaf in the Machine Trades. Much like the Professional group the Machine Trades stratification reveals a bounty of ability variables with productive validity coefficients. On the other hand there is a dearth of significant interest variables, and only one significant communication variable--intelligent speech--available to predict Pay Rate in this stratification.

The final DOT classification with a marginally adequate-in-size subgroup of deaf was the Digit 7 category of 38 Bench Workers. The average monthly wage or income in this class was 427 dollars, which is the lowest Pay Rate reported for the DOT occupational groups in Table 9. At the same time, Bench Workers had the most restricted variability in Pay Rate of the many subgroups examined in the Table with a standard deviation of 124 dollars. This occupational class seems then to be atypical with respect to criterion measure III--Pay Rate. As we explore further, we will note that the prediction information associated with Pay Rate in this occupational group is also anomalous.

Examining the background characteristics first, we find a very high validity coefficient for sex reflecting the conventional finding which favors higher salaries for male as against female deaf workers. We now find some surprises . Both of the validity measures listed for the ability domain are part of the General Aptitude Test Battery, and are <u>negatively</u> correlated. The correlation for Motor Coordination (K) is -.53, and for Clerical Perception

(Q) is -.34. Thus, for individual deaf employed in Bench Work, we find that low scores on two ability measures predict more adequate monthly wages, while high scores on these tests predict lesser monthly wages. Then, among the six valid interest predictors defined for this occupational group, we find five negative relationships. No communication scores proved useful in predicting to Pay Rate with this type of deaf worker. Giving reasonable interpretation to these data for Bench Workers is again not easy. To begin, it needs to be recognized that this occupational class is, as a group, generally poorly paid, and has within its membership relatively few well paid workers. One must wonder whether promotion within this class of workers is largely a function of remaining in the class, and not moving into work where more attractive pay is possible. In this sense, the less able and less promising workers may remain in Bench Work and make whatever progress is possible over time in Pay Rate within the narrow limits of this occupational class. Conversely, the more able who come into Bench Work may find the limited opportunity for salary improvement disheartening, and may look for more adequate rewards in upward mobility into other occupational classes. Limitation in funds made it impossible to examine this hypothesis by investigating the longitudinal work history of the various occupational groups in the DOT structure.

Space limitations also preclude discussion of the Kerr Cluster data which constitute the final three stratifications in Table 9. The reader should be prepared at this time to view and fully understand these data. It may be interesting to return to Chapter II to recall the titles given to the Kerr Clusters, and to then try to match these clusters with the DOT Classes as described in Table 9 to determine whether any apparent relationships obtain. This problem will be studied more systematically in Chapter VI.

F. Validity and CM IV and V

Criterion Measure IV, having to do with the Employed-Unemployed dichotomy, proved to be beset by adversity. We have seen how important it is to take into account the sex of the subject in analyzing data for understanding the vocational adjustment of the deaf. In examining our data on the employment history of Sample IV, we found that only one and one-half percent of the employable deaf males interviewed were unemployed, i.e. had no definable job. In contrast, 25 percent of the employable deaf women studied were unemployed. The same problem came to the fore in dealing with CM V--the Number of Jobs Held. As indicated, very few men were unemployed. Furthermore, we found that 64 percent of the men held one or no jobs, while 87 percent held up to two jobs, and 95 percent held up to three jobs during the three year reporting period. Only five percent of the men occupied more than three jobs. Compared with these figures we have already commented that 25 percent of the employable deaf women were unemployed. In addition, only four percent of the deaf women held more than two jobs. Job mobility was, therefore, rather limited in the women studied.

We also found that the interpretation of number of jobs was conflicting. Originally, we had planned to tabulate the number of jobs held as an index of vocational stability. There were, clearly, disconcerting problems with this formulation. Stability could be inferred with reasonable justification except in making judgment about the relative stability of two individuals--the study subject who had held one job; the other who had been completely unemployed. It would have been possible, of course, to employ the Number of Jobs criterion by disregarding the "No-Job" condition. However, because there were so many "No-Job" women, and so few "No-Job" men, it would have been, at best, a dubious solution to the problem.

Accordingly, the prediction to these two criterion measures, IV and V, was dropped for this report. Additional time and resources could, to all appearances, have made it possible to find a meaningful methodology for accomplishing this work.

G. Summary

While the final Chapter pulls the report together as a kind of binding agent, there is need here for a brief review of Chapter V. This need is dictated not only by the length and the wealth of data in the chapter, but as well, by one other objective. The style of presentation in the Chapter to this juncture has been to examine data in molecular detail. It will be useful to re-examine the same data now from a more global impressionistic vantage point.

This chapter reports five full-scale studies of the relationship between the adult deafs' employment, and (1) a series of background or demographic characteristics, and (2) their test performance. The first study is reported in the form of 38 graphic profiles. Each profile presents information about deaf adults or their test scores. The data are organized along a dimension or array of sample strata, including types of vocational adjustment as measured in Criterion Measure II. The profiles provide a pictorial description of these relationships based on data from Sample I. The remaining four studies are based on data taken from Sample IV. Each of these four studies fixes on a different measure of vocational adjustment, CM II, VI, I, and III in that order, and attempts to uncover useful predictors to each measure. Furthermore, each of the four studies is designed to employ statistical tests to determine whether the predictors examined are valid indicators of the prediction process. Two of the CM (II and VI) are studied by using an analysis of variance model to derive one comprehensive index (the F test) of the validity of each of forty predictor variables, with the two criteria examined independently. For criterion measures I and III a correlation model was used to study validity. Pearson product moment coefficients were computed for the same forty variables, each against fifteen stratifications of the sample and in one case against nine stratifications to bring the number of correlations estimated to 609 for each of the criteria I and III. All correlations reported in Tables 8 and 9 have a magnitude greater than that which could be attributable to chance at the five percent level of probability.

This work is summarized now in Table 10. As in previous tables the predictor variables are organized in four classes. The data for each variable are described on a single page. Columns A through D relate information about the number of statistical tests performed and the proportion which has produced significant findings for each criterion measure. The Table also contains information aggregated by type of predictor, across criterion measures, and over types of predictors and criteria in the form of grand totals.

The data in Table 10 are impressive. Consider first the data reported under grand totals at the end of the Table. There was a total of 1298 statistical analyses performed and tested for significance to assess the validity of the predictor variables. In reviewing this work we find that 330 of the 1298 tests were statistically significant. In each of these

TABLE 10

SIGNIFICANCE TESTS FOR FOUR CRITERION MEASURES OF WORK

ADJUSTMENT IN ADULT DEAF

STRATIFIED BY FOUR TYPES OF PREDICTORS

PREDICTORS		CRITERION MEASURES									
		A CM II DOT 1ST DIGIT		B CM VI KERR CLUSTER		C CM I MONTHS WORKED		D CM III PAY RATE		E TOTAL	
TYPE	TITLE	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings
Background	Age	1	1	1	1	15	4	15	8	32	14
	Age At Onset	1	1	1	0	15	1	15	1	32	3
	Years In School	1	1	1	0	0	0	0	0	2	1
	Education	1	1	1	1	15	4	15	9	32	15
	# Deaf Family, Origin	1	0	1	1	0	0	0	0	2	1
	# Deaf Family Conjugal	1	1	1	0	0	0	0	0	2	1
	DB Loss	1	0	1	0	0	0	0	0	2	0
	Sex	0	0	0	0	9	6	9	8	18	14
	No Day School	1	0	0	0	15	2	15	1	30	3
	No Public School	1	0	0	0	15	1	15	0	30	1
	No Day Class	1	0	0	0	15	0	15	0	30	0
	No Resid. School	1	0	0	0	15	0	15	0	30	0
	Total	(7)	(5) (71%)	(7)	(3) (42%)	(114)	(18) (16%)	(114)	(27) (24%)	(242)	(53) (22%)

TABLE 10
(Continued)

SIGNIFICANCE TESTS FOR FOUR CRITERION MEASURES OF WORK

ADJUSTMENT IN ADULT DEAF

STRATIFIED BY FOUR TYPES OF PREDICTORS

PREDICTORS		CRITERION MEASURES									
		A CM II DOT 1ST DIGIT		B CM VI KERR CLUSTER		C CM I MONTHS WORKED		D CM III PAY RATE		E TOTAL	
TYPE	TITLE	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings
Ability	GATB G	1	1	1	1	15	5	15	11	32	18
	GATB V	1	1	1	1	15	3	15	10	32	15
	GATB N	1	1	1	1	15	2	15	10	32	14
	GATB S	1	1	1	1	15	1	15	7	32	10
	GATB P	1	1	1	1	15	0	15	3	32	5
	GATB Q	1	1	1	1	15	1	15	6	32	9
	GATB K	1	1	1	1	15	1	15	4	32	7
	GATB F	1	1	1	1	15	0	15	0	32	2
	GATB M	1	0	1	1	15	1	15	1	32	3
	Culture Fair "g"	1	1	1	1	15	0	15	9	32	11
	Bender Gestalt	1	1	1	1	15	2	15	5	32	9
	Gottschaldt	1	1	1	1	15	2	15	10	32	14
	Gates	1	1	1	1	15	0	15	10	32	12
	Berger Block I	1	1	1	1	15	2	15	8	32	12
	Berger Block II	1	1	1	1	15	4	15	7	32	13
			1								
	Total	(15)	(14) (93%)	(15)	(15) (100%)	(225)	(24) (11%)	(225)	(101) (45%)	(480)	(154) (32%)

TABLE 10
(Continued)

SIGNIFICANCE TESTS FOR FOUR CRITERION MEASURES OF WORK

ADJUSTMENT IN ADULT DEAF

STRATIFIED BY FOUR TYPES OF PREDICTORS

PREDICTORS		CRITERION MEASURES									
		A CM II DOT 1ST DIGIT		B CM VI KERR CLUSTER		C CM I MONTHS WORKED		D CM III PAY RATE		E TOTAL	
TYPE	TITLE	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings
Interest											
Weingarten											
	Interpersonal	1	1	1	1	15	4	15	4	32	10
	Natural	1	1	1	0	15	4	15	0	32	5
	Mechanical	1	1	1	1	15	4	15	5	32	11
	Business	1	1	1	0	15	3	15	3	32	7
	Esthetic	1	0	1	0	15	3	15	1	32	4
	Scientific	1	0	1	0	15	1	15	1	32	2
	Verbal	1	1	1	1	15	6	15	7	32	15
	Computational	1	0	1	0	15	1	15	3	32	4
	Time Perspective	1	1	1	1	15	4	15	6	32	12
	Total	(9)	(6) (67%)	(9)	(4) (44%)	(135)	(30) (22%)	(135)	(30) (22%)	(288)	(70) (24%)

TABLE 10
(Continued)
SIGNIFICANCE TESTS FOR FOUR CRITERION MEASURES OF WORK

ADJUSTMENT IN ADULT DEAF

STRATIFIED BY FOUR TYPES OF PREDICTORS

PREDICTORS		CRITERION MEASURES									
		A CM II DOT 1ST DIGIT		B CM VI KERR CLUSTER		C CM I MONTHS WORKED		D CM III PAY RATE		E TOTAL	
TYPE	TITLE	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings	N Tests	Positive Findings
Communication	Craig-Word	1	1	1	1	15	6	15	3	32	11
	Craig-Sentence	1	1	1	1	15	3	15	3	32	8
	Manual Communication										
	Reading	1	1	1	1	15	0	15	1	32	3
	Signing	1	1	1	1	15	3	15	4	32	9
	Berger Block III	1	1	1	1	15	1	15	5	32	8
	Speech Characteristices										
	Intelligibility	1	1	1	1	15	2	15	6	32	10
	Pitch	1	0	1	0	15	0	15	1	32	1
	Volume	1	0	1	1	15	1	15	0	32	2
	Duration	1	0	1	0	15	1	15	0	32	1
	Total	(9)	(6) (67%)	(9)	(7) (77%)	(135)	(17) (13%)	(135)	(23) (17%)	(288)	(53) (18%)
GRAND TOTAL											
N TESTS		40		40		609		609		1298	
POSITIVE FINDINGS		31		29		89		181		330	
%		78		72		15		30		25	

330 analyses there is then support for the capacity of a predictor for valid prediction. Thus, in one-fourth of our validity testing effort we found evidence to sustain the belief that the work of helping deaf adults find useful vocational opportunity can be performed with some semblance of objectivity and credibility. The monumental challenge which this conclusion offers is the task of determining the conditions where the counselor's work can proceed economically and meaningfully. A number of suggestions are here then proposed to assist the practicing counselor working with the adult deaf make better informed judgments. It should be acknowledged that many of these suggestions summarize comparisons which have not been tested for statistical reliability.

1. For the counselor trying to help a deaf adult contemplate one or another occupational grouping for his future vocational involvement, our data indicate that there is only a very slight advantage in the number of valid predictors to the DOT classification system (CM II) in contrast to the number of valid predictors to the Kerr Clusters (CM VI). The extent of the advantage is truly negligible so that either one of these criterion measures may be thought of as essentially similar to the other on this empirical dimension of being predictable. Thus, the counselor can select either of the two adjustment measures without hampering his usefulness to his deaf client.

2. If a counselor decides to predict to CM II, the occupational category structure made up of the first digit of the DOT, our data provide 31 valid predictors among the 40 examined; with the greatest number and highest proportion of valid predictors in the ability domain. The proportion of valid predictors in the other three domains--background, interest, and communication--is quite similar ranging from 67 to 71 percent.

3. If a counselor decides to employ the Kerr Clusters as a criterion of vocational adjustment with a given deaf client, he will find in our data 29 valid predictors with the largest number of valid predictors in the ability domain again and with the most

productive proportion of validation* on the ability and communication groupings.

4. If a counselor is weighing the four criterion measures II, VI, I, and III for the number of valid predictor opportunities as defined in this study, his choice should rest between the last two, CM I and III. If it is useful to focus down further, the choice between the latter two measures clearly resides with Pay Rate, which has almost twice as many valid predictors as Number of Months Worked.

5. If a counselor finds himself trying to assist a deaf adult client find work where he can optimize the stability of his working time (Months Worked) he will find 89 valid predictor opportunities. The widest array of valid prediction opportunities is in the interest grouping of predictor variables. However, it should be kept in mind that the predictive value of interest test scores in this study was limited to those analyses which contain both male and female deaf. Inasmuch as gender is available in working with the typical deaf client the counselor will surely want to be fully acquainted with all four classes of predictors.

6. In the case of a counselor working with an adult deaf client planning to enhance his Pay Rate as far as possible, our data indicate that there are 181 valid predictor conditions for this task. It is also clear that the class of ability predictors offers the widest range of validity coefficients and the best proportion of useful predictions.

7. Reviewing the four groupings of predictors it seems clear that the province of the ability variables is the most relevant to the task of predicting vocational adjustment in the adult deaf.

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* The reference to the proportion of validities which are the highest is made in part to give the counselor a rough impression of those background and test domain, which appears to be more effective in connection with a given prediction problem. Obviously, if our initial choice of variables does not represent the domains fairly, the proportion will also be unrepresentative. It is also presented as a kind of stimulant to additional research in the sense that it identifies promising leads for future work in test development.

8. With regard to the usefulness of ability predictors there is little to choose between their predictive capacities for the DOT and Kerr criteria.

9. With regard to the usefulness of ability predictions to CM I and CM III, there is far superior performance in the number of validities with Pay Rate, in contrast to Months Worked.

10. With regard to the usefulness of communication type predictors, the counselor should be sensitive to their slightly superior validity performance with Pay Rate as opposed to Months Worked.

11. There are a number of outstanding or blue ribbon variables in terms of their global capacity for valid prediction. Among these are age, sex, and education in the background class; the GATB-G, the Gottschaldt, the Berger Block II and I, and the Gates in the ability domain; the verbal and mechanical interest subtests; and the Craig Word (lipreading) and the Speech Intelligibility subtest in the communication realm.

12. If we compare the success of the prediction effectiveness of the 24 commercially available test scores against the nine test scores (the three Berger Block, the two Manual Communication, and the four speech characteristic scores) there is a modest advantage of 27 percent effectiveness for the commercial instrument scores over the latter, which were 21 percent effective.

13. There are some very striking individual predictor differences in the task of relating valid information to CM I--Months Worked and CM III--Pay Rate. Among those worth noting are GATB-N, and S, the Culture Fair "g" and the Gottschaldt, all of which are singularly impressive in their differential validities with these two adjustment measures.

14. There are a number of interesting negative correlations in predicting to Months Worked and Pay Rate. Many of these are found in the interest test domain and among background variables. A few, quite unexpected negative correlations are also reported in the ability domain and give rise to lively speculation about the vocational adjustment of the deaf in certain types of employment.

15. The counselor working with a deaf client will be able to make a number of choices from Tables 8 and 9 regarding the particular strata of data he decides to use in assisting his client. We have some general recommendations with respect to such choice. If the client is young and without significant occupational experience or aspiration, the first choice should be the breakdown by sex and advanced hearing loss (69 db). If the client fits this portrait but has a more modest hearing loss sustained before five years of life, use should be made of the strata "sex by age of onset less than five years". If, however, the young person under study has a hearing loss of less than 69 db and late onset of loss the counselor will probably want to use the pure sex-related breakdown. For those clients who have relevant work experience or work interest, the counselor may add to the above choice the consideration of one or more of the occupation-class strata reported in the Table.

Reaffirming the conclusion then that the counselor's task to assist in the vocational guidance of adult deaf is one which can be supported by the results of this study and by careful application of these results, we now want to examine that conclusion from a somewhat different point of view. That is, we have to this point focused our spotlight of inquiry on any variable which carried reasonable predictive credentials for the counseling task. In the next chapter we will be concerned with the strength of the valid predictor's credentials for the task and the uniqueness of the individual predictor's contribution to the prediction problem.

CHAPTER 6

OTHER VALIDITY MEASURES

A. Plan For The Chapter

In the last Chapter we studied the relationships between a variety of predictor and criterion measures, always posing them one at a time against each other to yield a fund of simple validity measures. The thoughtful reader will almost certainly have noticed recurring regularities in these validities, wherein certain elements of the test battery appeared together as significant predictors of a given form of vocational adjustment. For example, in Table 8 it may be seen that in all of the strata treating the Number of Months Worked by female deaf that the Craig Word and Craig Sentence predictors invariably appear in unison. There were also suggestions in the data reported, that in some way the prediction problem with a given criterion measure was very different from the problem with another criterion measure. Yet, at the same time, there also seemed to be very marked similarities in the pattern of prediction to different criterion measures. This is probably most clearly depicted in comparing the incongruity in the patterns of validity coefficients for fourteen of the fifteen strata studied in Tables 8 and 9. However, for bench workers there was rather close agreement in the patterns of valid predictors for Months Worked and Pay Rate. The astute reader might also wonder how to decide between two predictor measures when they both seem to relate purposefully and with apparent equivalent predictive capacity to a given criterion measure. For example, in Table 9 we note that in predicting Pay Rate for 97 deaf women there are four ability measures whose validity coefficients range from .38 to .40. One may reasonably ask if they are equally vital to the prediction process, or whether perhaps they are merely alternate (redundant) choices, where one predictor (i.e. the Gottschaldt) is as good as another. In the latter case, the counselor is ostensibly in the position to select the one predictor which is most readily available to him, or the one which involves the least cost in procurement, or, perhaps, the one he is most familiar with in application with deaf adults.

This Chapter will then be oriented around two essential questions: (1) How do the predictors relate to one another? and (2) What is the most economical set of predictors which may be employed in helping a counselor and a deaf client optimize their estimate of any one dimension of the client's future vocational adjustment. These questions will be investigated by introducing multivariate statistics into this study.

B. The Factor Analytic Study

There is a kind of common tactic found in the work of investigators who look into those complex human behaviors which have not been previously examined in any systematic way. The most widely employed approach is to collect as many kinds of relevant data as possible with the hope that despite the mass of information assembled it can somehow be shaped or tapered to the investigator's purposes. The thorny task is then to machine or hone the data down to a potentially more workable or manageable amount without violating its potential meaningfulness. Factor analysis is one technique for accomplishing this. Harmon (51) suggests that, "the principal concern of factor analysis is the resolution of a set of variables linearly in terms of (usually) a small number of categories or 'factors'. This resolution can be accomplished by the analysis of the correlations among the variables. A satisfactory solution will yield factors which convey all the essential information of the original set of variables. Thus, the chief aim is to attain scientific parsimony or economy of description". It will be remembered that we have in the previous Chapter indulged in a provisional process of classifying variables into groups or bundles. There we categorized variables under titles such as background, ability, interest, and communication variables. While these classes were composed in an a priori manner by the investigators, the factor analytic solutions we are about to present are, on the other hand, derived from more rigorous mathematical procedures. Furthermore, the a priori classes of variables employed in Chapter 5 were only editorial conveniences which made it possible to concentrate our discussion on one subset of variables as opposed to the task of considering the entire array of variables simultaneously. In this sense we were able to organize data in Table 9 to portray simple validity coefficients by what we called "classes" of predictors. In a parallel sense we designed Table 10 to report the comparative number and proportion of significant results obtained for the four types of predictors. It should be clear in retrospect that no effort was made in Chapter 5 to develop a factor (or class, or type) score to stand for, or to connote a set of subsumed variables. This can, however, be achieved through factor analysis. By means of this procedure, we can extract from a body of correlational information a set of mathematically derived factors. Among the properties which such factors possess is that they convey much, if not most of the information in global or integrated form, which was contained in their constituent variables.

Three factor analyses were conducted and a fourth was being planned for this report. The technique used was the BMD Factor Analysis

Program X72. Unities were inserted in the diagonals and varimax rotations were performed on all factors with latent roots greater than one. The first analysis, which is to be discussed momentarily, is for 179 deaf adults who were in Sample I*. This was a preliminary analysis conducted during the fourth year of the study, while data was being accumulated in the second data collection wave for study Samples II, III, and IV. Two other completed factor analyses were calculated for each sex independently on Sample IV. One was on 157 males; the other on 77 females. Summary data for the latter two analyses are presented in Appendix 11 (Tables 12A and 13A), but will not be discussed here. This first reason for bypassing this material in our discussion is because of space limitations. The more important reason is because we were thwarted in our expectations with regard to the factor analysis studies on Sample IV. Our original interest in employing the factors which emerged from Sample IV was to use them in addition to the full range of predictor variables in predicting to the vocational adjustment criteria, or in the stepwise regression work to be discussed in the last section of this chapter. This was stymied by the unexpected interruption of project support. The fourth factor analyses, which was being considered, was to be done on the total Sample IV. This would have provided three factor structures from the largest sample to be used, as needed, in the prediction task.

1. Organizing The Factor Analysis For Adult Deaf in Sample I

Seventy-three variables, selected on the basis of multiple criteria, were included in this analysis. For one thing a special effort was made to select neglected variables, which had been collected on study subjects, and which, to the point of the fourth year of the study, had been given little, if any, space in the preliminary results. Thus, it was decided to include information such as:

a. hearing aid owned (as opposed to hearing aid used)**

*While there were 375 deaf adults in this sample, only 179 were employed in this analysis to avoid methodological problems which would have been caused by missing data.

**Three summary Tables (18A, 19A and 20A) are available in Appendix 12 on the ownership of hearing aids, years in school and physical handicaps in Sample IV.

b. years in school before college**
c. telephone available
d. automobile available
e. number deaf in conjugal family
f. number deaf in family of origin
g. a whole series of psychophysical handicaps, e.g., allergic handicap, etc.**
h. handedness

It was also decided to include in the analysis three criterion measures (Number of Jobs, Pay Rate, and Number of Months Worked). The intent here was to include criterion measures which could be calibrated along a single dimension from zero to greater magnitudes by way of units of equal value, such as jobs, dollars, and months. This made it necessary to omit from this analysis CM II - The Type of Employment, CM IV - Employment Status at Time of Study Contact, and CM VI - Complexity Demands of Current Position***. The purpose of including criterion measures along with predictors was, of course, to determine something of the underlying structure of intercorrelations of the predictors and criteria taken together. More generally we were interested in detecting the relationships which exist in the domain of the vocational adjustment of the adult deaf, by learning which independent groupings of predictors and criterion measures existed. Factor analysis was clearly a systematic approach appropriate to this end.

One other comment needs to be made about this initial factor analysis. It should be re-emphasized that the planning for this analysis antedated any substantive experience with project results. Accordingly, certain variables which were to be subsequently revealed as apparently redundant were included in this analysis. Thus, along with Identification Scores for the Berger Block test, the analysis also incorporated the highly correlated Movement Scores for the same test. Similarly, in the case of the Speech Characteristics Test, data were incorporated from both expert and novice judges.

**Three summary Tables (18A, 19A and 20A) are available in Appendix 12 on the ownership of hearing aids, years in school and physical handicaps in Sample IV.

***It should be remembered that this choice was made before the investigators had had meaningful experience with the quality of the criterion data -experience which eventually led to the abandonment of CM IV and CM V in Chapter 5.

2. The Factor Structure For Adult Deaf in Sample I

We are now ready to examine Table 11. The left-hand column entitled "Variable" contains row headings which list the 73 variables contained in the analysis, reading from Sex of the subject down to the speech characteristic, Duration of Speech, as judged by the novice evaluators. The remaining twenty-one columns are taken up with one column which reports the frequency of significant loadings for each variable, and twenty columns -- one for each factor which evolved from the factor analyses. Insignificant loadings for each factor are not reported. For Factor 1 loadings of .30 and greater are reported. For Factors 2 through 20, loadings of .20 and greater are reported. If we concentrate on Factor 1 for the moment, we see that the column is split with the loadings occupying the left-hand segment (under SL), and a rank number appearing under R to the right of each reported loading. We will return to these rank numbers momentarily.

There are 23 significant variables loaded under Factor 1 ranging in size from the Gates Reading Survey Raw Score (-.936) to the identification score of the Berger Block subtest 4 (-.307). The 23 variables which load at .30 or better are listed at the bottom of the column for Factor 1 by variable number according to their size rank. Thus, of the twenty-three variables with significant loadings for Factor 1, numbers 51 (Gates, Raw), 52 (Gates, Grade), and 53 (Gates, Age) had the highest loadings and numbers 64 (BB-4, I), 10 (Public School), and 65 (BB-4-M) had the lowest loadings. Factor 2 is similarly reported with seventeen significant variables loaded on it ranging in magnitude from the Oregon Manual Communication Reading Score (.882) down to the Craig Lipreading Inventory, Sentence Score. Eight of these seventeen variables load significantly on both Factors 1 and 2, such as Age of Onset and Public School. On the third Factor the list of significant loadings drops off to eight variables with the Business score of the Weingarten Picture Interest Inventory heading the array. Only one of these, the Time Perspective score of the Weingarten, overlaps with the roster of variables loading on Factor 2. None overlaps with the roster of variables portrayed under Factor 1. The reader should now scrutinize the twenty factors and the variables which reach significant loadings under each.

We now move back to examine the column in Table 11 entitled, "Frequency of Significant Loadings". Here, the first entry is a "1". This indicates that the variable, "Sex", found in the first row, had only one significant loading; i.e., the factor weight of -.816 on Factor 9. It should be noted that a "1" is reported beside the loading and under "R" in the column for Factor 9, indicating that this is the highest (and, in fact, the only) significant loading for this variable. The second variable, "Age", had three significant loadings ranging in size from -.575 on Factor 4 to -.243 on Factor 2. The reader can now hopefully comprehend the entries in the second column of the Table, and the use of the rank numbers inscribed beside each factor loading and under "R".

3. Interpreting the Factor Analytic Results for Sample I

What does the factor analysis mean to the practicing counselor of the deaf? To begin, the factor structure for Sample I will be summarized in the following listing of factors by number and title.

TOTAL SAMPLE

Factor Number	Factor Title
1	Reading Ability
2	Manual Communication
3	Business Interest
4	Speed Test Performance
5	Marital-Familial Ties
6	Hearing Deficiency
7	Pitch Verbal Delivery
8	Volume Verbal Delivery
9	Sex-Linked Interest
10	Esthetic-Scholarly Interests
11	Speech Communication Facility
12	Diffuse Psychophysical Complaints
13	Duration Verbal Delivery
14	Respiratory Complaint
15	Cardiac Complaint
16	Other Complaints
17	Type School Experience
18	Gastric Complaint
19	Scientific Interest
20	Handedness

TABLE 11

FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

VARIABLE NO.	NAME	FREQUENCY OF LOADINGS > .20	FACTORS 1	2	3	4	5	6	7	8	9	10
			SL[a] R[b]	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R
1.	Sex	1									-.816 1	
2.	Age	3		-.243 3		-.575 1	.375 2					
3.	Age of Onset	2	-.337 2	-.707 1								
4.	Hearing Aid Owned	3		.268 3				.567 1				
5.	Pre-College Years	6		.273 3		.271 4	-.325 2					
6.	Academic Achievement	3	-.578 1									.204 3
7.	Residential School	2		-.765 1								
8.	Day School	1										
9.	Day Classes	5						.205 4				
10.	Public School	6	-.326 2	.441 1				-.272 4				.280 3
11.	Telephone Available	5						-.347 2	.300 4			
12.	Number Jobs	3									.287 2	
13.	Pay Rate	5	-.413 2								.474 1	.282 4
14.	Residence	2					-.667 1					
15.	Automobile Available	3					-.451 2				-.238 3	
16.	Number Marriages	1					.741 1					
17.	Deaf Family Origin	3					.212 3					
18.	Deaf Conjugal Family	3		.372 2			.653 1					
19.	Deaf Spouse	1					-.848 1					
20.	Sensory Handicap	5			.232 4							
21.	Motor Handicap	2				.259 2						
22.	Allergic Handicap	1										
23.	Cardiac Handicap	1										
24.	Respiratory Handicap	1										
25.	Gastric Handicap	1										

TABLE 11

FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

		FACTORS											
7	8	9	10	11	12	13	14	15	16	17	18	19	20
R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R
		-.816 1											
				.335 2									
						-.222 6				-.375 1		-.225 5	
			.204 3										-.401 2
										-.376 2			
										.751 1			
				.204 5	.390 2		.206 3			.554 1			
			.280 3	.249 5						-.230 6			
00 4									.239 5		-.327 3	.368 1	
		.287 2					.570 1						.232 3
		.474 1	.282 4								.232 5		-.304 3
							.313 2						
		-.238 3				.588 1							
										.224 2		-.564 1	
											-.236 3		
				-.217 5	.503 1		-.288 2						.233 3
					-.486 1								
					.721 1								
								-.856 1					
							-.750 1						
											.815 1		

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

VARIABLE		FREQUENCY OF LOADINGS >.20	FACTORS									
			1	2	3	4	5	6	7	8	9	
NO.	NAME		a b SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	S
26.	Other Handicap	1										
27.	Handedness	1										
28.	Number Months Worked	5									.355 1	
29.	GATB-G	2	-.834 1			.322 2						
30.	GATB-V	1	-.839 1									
31.	GATB-N	2	-.738 1			.336 2						
32.	GATB-S	3				.594 1						.2
33.	GATB-P	1				.744 1						
34.	GATB-Q	3	-.498 2			.511 1						
35.	GATB-K	2				.673 1						
36.	GATB-F	1				.806 1						
37.	GATB-M	1				.809 1						
38.	Culture Fair "g"	3	-.378 2			.712 1						
39.	Bender Gestalt	2				-.558 1						
40.	DB Loss Better Ear	2						-.781 1				
	Weingarten:											
41.	Interpersonal	4			.390 2					.208 3	-.660 1	
42.	Natural	3			-.865 1	-.230 2						-.2
43.	Mechanical	2			-.265 2						.802 1	
44.	Business	1			.901 1							
45.	Esthetic	1										.8
46.	Science	4				.211 3					.230 2	-.2
47.	Verbal	2			.756 1						-.490 2	
48.	Computational	2			.809 1							-.2
49.	Time Perspective	4		.236 4	.619 1						-.400 2	
50.	Gottschaldt Figures	4	-.466 2			.498 1					.270 3	.2

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

		FACTORS											
7	8	9	10	11	12	13	14	15	16	17	18	19	20
SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R
									.821 1				
													.717 1
		.355 1		-.322 2			-.219 4		.304 3		.210 5		
			.207 3				-.236 2						
				-.224 3									
										.231 2			
										-.211 3			
											.316 2		
				.216 2									
	.208 3	-.660 1										.207 4	
			-.202 3										
		.802 1											
			.872 1										
		.230 2	-.208 4									-.665 1	
		-.490 2											
			-.253 2										
		-.400 2										-.292 3	
		.270 3	.212 4										

8

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

VARIABLE NO.	VARIABLE NAME	FREQUENCY OF LOADINGS > .20	FACTORS 1 SL[a] R[b]	2 SL R	3 SL R	4 SL R	5 SL R	6 SL R	7 SL R	8 SL R	9	10
	Gates Reading Survey:											
51.	Raw	1	-.936 1									
52.	Grade	1	-.934 1									
53.	Age	1	-.932 1									
	Craig Lipreading:											
54.	Word	2				.231 2						
55.	Sentence	4	-.411 2	.218 4		.321 3						
	Holdt Man. Communic.:											
56.	Reading	1		.882 1								
57.	Signing	1		.841 1								
	Berger Block:											
58.	I Identification	1	-.838 1									
59.	I Movement	2	-.815 1					.206 2				
60.	II Identification	3	-.741 1	-.262 2								
61.	II Movement	2	-.793 1									
62.	III Identification	1		.848 1								
63.	III Movement	2	-.434 2	.756 1								
64.	IV Identification	3	-.307 2	-.295 3				.790 1				
65.	IV Movement	3	-.334 2	-.272 3				.778 1				
	Speech Characteristics:											
66.	Intelligibil. (Exp.)	3	-.527 1					.358 3				
67.	Pitch (Exp.)	1							-.870 1			
68.	Volume (Exp.)	1								-.879 1		
69.	Duration (Exp.)	5								-.327 3		
70.	Intelligibil. (Nov.)	4	-.500 1	-.242 4				.470 2				

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

		FACTORS											
7	8	9	10	11	12	13	14	15	16	17	18	19	20
R	SL R												
				-.717 1 -.602 1									
													.251 3
													.204 2
0 1	-.879 1 -.327 3			-.481 2 -.392 2 -.393 3		-.436 1			.298 4				.208 5

B

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

VARIABLE		FREQUENCY OF LOADINGS > .20	FACTORS																			
			1		2		3		4		5		6		7		8		9		10	
NO.	NAME		SL[a]	R[b]	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
	Speech Characteristics: (Continued)																					
71.	Pitch (Nov.)	1													-.860	1						
72.	Volume (Nov.)	1															-.870	1				
73.	Duration (Nov.)	1																				
	SUM	171		23		17		8		18		8		10		3		4		11		9
			51	3	56		44		37		19		64		67		68		1		45	
			52	65	62		48		36		16		40		71		72		43		13	
			53	10	57		42		33		14		65		11		69		41		10	
			30	64	7		47		38		18		4				41		47		48	
			58		63		49		35		15		70						13		50	
			29		3		41		32		2		66						49		46	
		RANKS	59		10		43		2		5		11						28		32	
		OF	61		18		20		39		17		10						12		6	
		VARIABLE	60		64				34				59						50		42	
		NUMBERS	31		5				50				9						15			
		ON	6		65				31										46			
		EACH	66		4				29													
		FACTOR	70		60				55													
			34		2				5													
a =	Significant loadings		50		70				21													
	by factor.		63		49				54													
			13		55				42													
b =	Ranking of loading for		55						46													
	variable across factors.		38																			

TABLE 11
(Continued)
FACTOR STRUCTURE FOR 179 ADULT

DEAF IN SAMPLE I FOR 73 VARIABLES

	FACTORS													
	7	8	9	10	11	12	13	14	15	16	17	18	19	20
R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R
	-.860 1	-.870 1					-.801 1							
10	3	4	11	9	12	4	4	7	1	4	8	6	6	8
4	67	68	1	45	54	22	73	24	23	26	8	25	46	27
0	71	72	43	13	55	20	15	12		28	9	11	17	6
5	11	69	-41	10	66	21	69	14		69	7	39	11	13
4		41	47	48	70	9	5	20		11	5	18	49	60
0			13	50	69			32			35	13	5	20
6			49	46	4			28			10	28	41	12
1			28	32	28			9			17			69
0			12	6	10						38			61
9			50	42	34									
9			15		20									
			46		40									
					9									

B

Each factor is given an appellative title based on the flavor of the variables which tend to load most emphatically on it. Accordingly, Factor 1 was termed "Reading Ability". This title was assigned because the highest loadings on this Factor were found on the three Gates Reading Tests, the Berger Block Test I, and the V and G dimensions of the GATB. Similarly, Factor 2 was labeled "Manual Communication", inasmuch as its most impressive loadings were on the two Oregon Manual Communication Scores and Berger Block Test III. As we move down the list of twenty factors, the titles assigned become less and less obvious and more putative. Thus, by the time we reach Factors 16-20, the Factors not only account for lesser amounts of variance, but probably contain substantially greater error variance, and become increasingly difficult to interpret. The reader should find it especially interesting to examine in detail the variables which cluster with the most significant loadings on the top four or five Factors. It appears that the variables which coalesce most strongly under these initial Factors exhibit rather convincing face validity, and appear genuinely to belong together. Interestingly enough, they also tend to give support to the provisional classification into background, ability, interest, and communicational sets which was made in Chapter 5.

We now want to note certain salient features of the factor structure. For example, under Factor 1 we find that the three Gates scores load only under this Factor and exhibit essentially comparable loading magnitudes. This suggests their underlying redundant character. The counselor can investigate this table for additional redundancies -- pieces of information about deaf adults and their test behavior, which largely periphrase one another, and which may then in practice be substituted for one another when convenient. For example, it will be instructive to examine the factor loadings of the GATB-G and N variables, the GATB-F and M variables, or the two Oregon Manual Communication scores.

It will also be informative to examine the pattern of loading of the three criterion measures in the factor structure. Interestingly, Pay Rate is the only criterion which demonstrates a significant loading on the first eight Factors (with a moderate loading on Factor 1). All three work adjustment variables involved in the analysis reveal significant loadings on Factor 9, which appears to be a sex-linked-interest dominated factor. Counselors are also encouraged to examine the companion variables in Factor 9 and Factor 14 which load impressively in combination with the criterion variables.

A number of findings with engaging psychosocial implications are also available for study. For example, Factor 7 seems to be an especially interesting one. This Factor indicates that pitch as a speech characterstic among deaf adults is related to the availability of a telephone. While our data don't suggest any necessary cause and effect relationship, they do indicate that as the individual's pattern of speech tends to be lower in frequency, the availability of telephone instrumentation increases, and as speech takes on the character of the higher frequencies the availability of a phone tends to decrease. This warrants further study. Of interest also is the solitary variable "Cardiac Handicap" which loads without accomplice on Factor 15, and the various types of schooling featured in Factor 17. We shall be making frequent reference to this factor structure in the succeeding pages under the stepwise regression studies.

C. Two Stepwise Regression Studies

Tables 8 and 9 in Chapter 5 supply the counselor of the deaf with a vital compilation of information about test scores and personal characteristics of adult deaf, supported by statistical credentials to certify their validity. It should be understood that these data are selected from a larger body of findings from which substantial amounts of statistically insignificant information have been discarded. Thus, for example, the correlation of Age, Age at Onset, Day School, etc. with Pay Rate (Table 9) for the total adult group of 285 studied for this analysis remains unreported. The well-trained counselor will doubtless have reservations about selecting a limited number of reliable correlations from a larger distribution of correlations and wonder how far he can accept into practice the entire array of findings in Tables 8 and 9. We want to call attention to another practical limitation in the data in Tables 8 and 9. Surely the counselor is interested in learning which individual test or background measure demonstrates the most promising individual validity coefficients for his immediate objective. But the typical testing situation more often than not finds the counselor attempting to organize a battery of test scores and personal information about his client. Suppose the counselor were working with an adult whose hearing impairment occurred after four years of age. Suppose, also that his major purpose in guiding this client was to assist him to move into a regular, uninterrupted type of gainful employment with secondary concern for income, type of employment, etc. Table 8 would reveal in the third stratification that such ability variables as GATB-N and G, and the Berger Block Tests I and II are important predictors of Months Worked for deaf adult with onset of hearing loss after four years of age. Would the counselor want to go to the trouble of collecting each of these four individually recommended predictors? Perhaps he could be expected under most conditions to obtain the two subtests of the GATB, or the two components of the Berger Block Test. The question which needs to be asked is, would the two tests be that much more useful than one in reaching a counseling target with the client? Or for that matter would the four tests be better than one? Table 11 provides evidence to suggest that each of these four test scores load heavily (better than .7) on Factor 1. This raises substantial doubt as to whether the counselor would want to use his counseling service time to invest in collecting all four scores. It is this issue, then, of how to select the best possible set or combination of predictors for a given task that this section of this chapter will probe.

The multiple regression equation is one model for estimating a linear solution to the problem of selecting from a large number of predictors those which most pointedly relate as a group to a criterion measure. Stepwise regression is, itself, a specialized form of multiple regression which has the additional virtue of selecting progressively the best predictor from a pool of predictors. Each step of the process is designed to develop an optimally economical (in the use of information) equation. The procedure is artfully defined in Cooley and Lohnes (23) and Efroymson (32), and begins by selecting the single predictor which exhibits the highest simple validity. Then a second predictor is identified and integrated in the second step which is the one predictor which at that point adds the most to the incomplete regression equation. This is followed by a third predictor at the third step, which at this point in the process, is the predictor which adds the most to the regression equation. The process is continued until no additional predictor can be found which adds a significant (statistical) contribution to the equation. Another feature of this technique is that at that step, as a new predictor is being integrated, the contribution of each previously incorporated predictor is reviewed to determine whether it retains its previous "influence" or weight. In this way a predictor which appears to be useful in a small early set of predictors may be discarded before the final set of predictors is fixed. The final set portrays those variables which in the prescribed sequence of importance (as defined in the regression equation) tend to be the very best combination of predictor variables for estimating outcome -- in our study one or another form of vocational adjustment. It would follow then that the procedure can be useful to the counselor if it demonstrates that a group of predictors in combination will, if accurately processed, exceed the predictive validity of the variable with the highest simple validity. The measure of how well the predictors work in combination is indicated by the coefficient of multiple correlation.

The stepwise regression program employed in the two studies to be reported here was BMDO2R from the Biomedical Computer Programs described by Dixon in the University of California Press, 1970. The F value for inclusion was 4.00. Tolerance was set at .25.

One warning! Stepwise regression procedures capitalize on accidental relationships in small samples. We have, nevertheless, processed all our data for completeness regardless of sample size. When the sample size drops below 75 study subjects, there is great uncertainty about the stability of the findings. The counselor is encouraged then to exercise diligent caution with such data.

1. The Stepwise Regression With Months Worked

This work was performed on Sample IV and is presented in Table 14 by a similar format to the one employed with the simple validities described in Tables 8 and 9. The discussion of the information is also arranged after the organization of the simple validity data in the previous chapter using the same four data class headings. As such the information is arranged for the total sample and then by succeeding rows in the Table by 14 strata. The four columns in the Table should present no particular problem to the reader. It should be evident that the predictors are listed within each sample stratification in the order of their contribution to the variance in the multiple regression equation. This contribution is reported under "r^2" in the right hand column.

TABLE 14

STEPWISE REGRESSION RESULTS WITH MONTHS WORKED

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS r	MULTIPLE CORRELATIONS r^2
TOTAL	Sex	-	.48	.23
	Berger Block II Identification	+	.51	.26
N = 376	Weingarten Verbal	-	.52	.27
$\bar{X}$ = 26.52	Education	+	.54	.28
SD = 13.62	Age	+	.55	.30
	Craig Word	+	.56	.31
	Gates Raw	-	.56	.32
	GATB V	+	.57	.32
MALES	Berger Block II Identification	+	.24	.06
	Weingarten Verbal	-	.30	.09
N = 209	Bender Raw	-	.35	.12
$\bar{X}$ = 32.33	Age	+	.40	.16
SD = 8.27	GATB M	+	.42	.17
FEMALES	Education	+	.32	.10
	Intelligibility Expert	+	.35	.12
N = 167				
$\bar{X}$ = 19.26				
SD = 15.43				
AGE AT ONSET > 4	Sex	-	.41	.17
	Berger Block II Identification	+	.53	.28
N = 86	Age	+	.58	.34
$\bar{X}$ = 28.40				
SD = 12.13				

TABLE 14
(Continued)
STEPWISE REGRESSION RESULTS WITH MONTHS WORKED

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS	
			r	r^2
MALES - AGE AT ONSET < 5	No Day School	+	.21	.04
	Craig Sentence	+	.30	.09
N = 156	Bender Raw	-	.35	.12
$\overline{X}$ = 32.33	Age	+	.40	.16
SD = 8.13	Age at Onset	-	.44	.19
FEMALES - AGE AT ONSET < 5	Education	+	.31	.10
N = 134				
$\overline{X}$ = 18.56				
SD = 15.69				
MALES DB LOSS > 69, And No Aid	Berger Block II Identification	+	.29	.09
	Bender Raw	-	.37	.14
	Age	+	.43	.18
N = 146	Weingarten Business	-	.47	.22
$\overline{X}$ = 32.16	GATB M	+	.50	.25
SD = 8.59				
FEMALES DB LOSS > 69, And No Aid	Education	+	.27	.08
	Age at Onset	+	.34	.11
N = 112				
$\overline{X}$ = 17.79				
SD = 15.49				
1st DIGIT DOT = 0 & 1	Craig Word	+	.30	.09
	Sex	-	.45	.20
N = 59	GATB Q	-	.51	.26
$\overline{X}$ = 32.8	GATB G	+	.59	.35
SD = 8.28				

TABLE 14
(Continued)
STEPWISE REGRESSION RESULTS WITH MONTHS WORKED

SUBSAMPLE AND SUMMARY DATA ON MONTHS WORKED	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS	
			r	r^2
1st DIGIT DOT = 6	Weingarten Verbal	-	.34	.12
N = 52				
$\bar{X}$ = 33.33				
SD = 6.08				
1st DIGIT DOT = 7	Weingarten Verbal	-	.44	.20
N = 38				
$\bar{X}$ = 29.00				
SD = 11.29				
KERR CLUSTER 001	Weingarten Verbal	-	.36	.13
	Craig Word	+	.45	.20
N = 86	Age	+	.53	.28
$\bar{X}$ = 30.48	Sex	-	.57	.32
SD = 10.09	GATB F	+	.60	.36
KERR CLUSTER 002	Weingarten Verbal	-	.61	.37
	Duration Expert	+	.70	.49
N = 37	GATB Q	-	.79	.62
$\bar{X}$ = 33.27				
SD = 7.07				
KERR CLUSTER 102	Weingarten Time Perspective	-	.27	.07
N = 67				
$\bar{X}$ = 33.13				
SD = 6.36				

Total Sample: For the analysis of the sample, 376 adult deaf were included who worked an average of 26.52 months of the three year observation period. The summary data in this Table is identical with the data in Table 8, inasmuch as the sample attrition was precisely the same for the two procedures. From Table 8 we can note the best predictor for the total sample was Sex of the subject (-.48), which accounted for 23 percent of the total variance. Sex of the subject is, therefore, the prepotent variable in the stepwise equation, followed by Berger Block II, which brings the multiple correlation up to .51. Six more predictors close out this analysis, each adding about .01 to the multiple correlation. The last predictor GATB-V brings the multiple correlation to .57 which accounts for 32 percent of the total variance in Months Worked or CM I.

In comparison with the simple validity coefficient for Sex of the subject the best combination of predictor variables improves the prediction process from .48 to .57. The counselor is now in a position to select the very best combination of predictors which our data provides for attempting to optimize his prediction of Months Worked in a non-select group of adult deaf. We now propose to examine these predictors in some detail. To begin, Months Worked is clearly greater for men than women (Sex -.48). The prediction based on Sex of the subject is then improved by adding information from the Berger Block II with a high score relating to more months of employment, coupled with a low Verbal score on the Weingarten, advanced Education and Age, a high score on the Craig Word, a low score on the Gates Reading Survey Raw Score, and a high GATB-V score -- all predictive of better work adjustment in terms of Number of Months Worked. Interestingly, only two of these predictors were listed as significant simple validities in Table 8, suggesting that the six predictors listed in that earlier Table either contained considerable overlap in what they were measuring, or that they were strongly related to one or more of the eight predictors listed for total Sample IV in Table 14, or both. For the reader with the curiosity to trace these possibilities the factor structures presented in Tables 11, 12A and 13A (see Appendix 11) offer pertinent reference information.

There is, however, another very practical purpose, which the factor analysis results can be put to in connection with the stepwise regression information. In making sense of data in Table 14 it is well to remember that only one of a set of highly correlated predictors generally appears in the final stepwise regression equation. That is to say, predictors, which are strongly related to another predictor, which, itself, appears in the final stepwise solution, don't as a rule, themselves appear. The reason, of course, is that they are already "represented" effectively. This fact provides the astute counselor with considerable license in everyday practice.

Let's suppose, for example we were interested in employing the regression equation information developed for the general population of deaf clients (row 1 of Table 14). In the event that we had information on seven of the eight predictors, but didn't have the equipment and testing time to elicit the client's response to the Berger Block Test, or perhaps the Craig Word Inventory, we could, with little loss in predictive capacity, substitute another highly correlated predictor. That is, if two predictors load highly and consistently on the same factor(s) in the factor analysis structures, it is likely that they are measuring essentially the same thing and may with care be substituted for each other in applications of the stepwise data.

Three Simple Stratifications: Moving on now with data in Table 14, we will focus first on the three simple stratifications. The initial sub-group is composed of 209 adult deaf males. With Sex of the subject deleted from the predictor pool by virtue of the concentration on male adults Berger Block II is reported as the most important predictor (.24): followed by the Weingarten Verbal scale (which is negatively correlated) bringing the multiple correlation to .30: the Bender Visual Motor Gestalt Test (again negatively correlated) pushing the multiple correlation to .35: Age which enhances the correlation to .40: and finally the GABT-M, or Manual Dexterity score, which brings the multiple correlation to its statistically significant ceiling of .42. These are the five predictors, which in linear combination, produce the most useful prediction of Months Worked for male adult deaf which may be organized from the test and background information collected in this study. The female sample of 167 adult deaf is characterized by only two significant predictors contributing in productive combination to the multiple correlation with Education and the expert's impression of Speech Intelligibility yielding a combined predictor validity of .35. Reflecting on these two analyses it is clear that the predictor Sex is a forceful predictor which, when discarded in structuring subsamples of male or female subjects, has the effect of notably reducing the relative effectiveness of the final regression equation. Further, in comparing the multiple correlations with the simple validity findings for corresponding strata in Table 8 we note that the multiple correlation seems to add much more predictive power with the male than with the female subsample. Of interest also is the fact that two of the five predictors in the regression equation for male deaf also appear on Table 8, while both of the predictors in the regression equation for female deaf appear in Table 8. Furthermore, it is, indeed, interesting that the predictors in the stepwise regression for the two sexes are completely independent -- that is, there is clearly no overlap between predictors for the two sexes.

Going to the third stratification for the 86 individuals whose onset of deafness occurred after four years of age, we learn that sex of the subject emerges again as the pertinent variable. Coupled with it are the Berger Block II and Age yielding the highest stepwise coefficient (.58) obtained to this point in Table 14. Each of these three predictors was found to have significant potential as a simple validity measure. However, the combined multiple correlation of .58 represents a .17 improvement over the best simple validity of .41.

Multiple Variable Stratifications: This brings us then to the two segments of the Table which report on the group with early onset of hearing loss, organized first by the stratification of deaf males and then by the stratification for deaf females. It will be remembered that the male strata for the analysis of the simple validities yielded results which were next to fruitless with No Day School as a weak, but only predictor of consequence. In the companion stepwise analysis for the males, whose onset of loss was early in life, five predictors are important. They range in impact in the regression equation from No Day School

(.21), through the Craig Inventory score for Sentences (.30), the Bender Gestalt with its negative error score weight (.35), Age (.40), and Age of Onset in negative alignment (.44). The stepwise analysis has a clear advantage here over the simple validity analysis in Chapter 5. Contrariwise, while the 134 females with early onset of deafness demonstrated seven significant predictors with meaningful simple validities for CM I, or Months Worked, the stepwise analysis provided but one significant variable, Education (.31). In this case no predictor was found, which in combination with Education, produced a multiple correlation coefficient beyond .31. We have, then, our first illustration of the situation where the stepwise regression method proves to be of little utility beyond the simple validity, other than, to suggest that there is no purpose in doing any additional data collection beyond educational level in this subgroup.

This analysis for the male early onset subgroup deserves further discussion. Its two pivotal predictors (No Day School and the Craig Sentence score) emerge for the first (and only) time in the stepwise regression equations for predicting Months Worked. Age at Onset also appears for the first time, but will make an additional appearance in connection with CM I. The combination of age factors in this strata also claims our attention. Seemingly, the older the individual male deaf worker with early onset is the more regular his work experience. Further, for those in this group whose onset of loss tends to be closer to birth than to four years of age there is increasing potential for more satisfactory adjustment with respect to CM I. The reader will recall a similar finding for males with early onset in Chapter 5. There we found that within the early onset male group Pay Rate was most adequate for the very early onset group as opposed to the group whose onset happened toward the fifth birthday.

For the next two strata involving those who failed to use a hearing aid during both the interview and test experience, and whose hearing was profoundly disordered ($>$69 db), we find that the picture for profoundly deaf males is quite similar to that found for the major subset of 209 deaf males. The only departure from the pattern of combined validity indicators found in the total male subgroup is the substitution of the Weingarten Business score in the profoundly deaf for the Weingarten Verbal score (both negatively related in the regression equation). The multiple correlation of .50 is a convincingly superior prediction statistic than the highest simple validity coefficient (.29) for the Berger Block Test. However, we should note again that in this third application of the stepwise regression analysis to a female deaf subgroup -- this time for the profoundly deaf adult female -- the improvement over the simple validity measure of Education is quite modest. What improvement is found here derives from the predictor Age of Onset. In this instance, unlike our previous experience with this predictor in Table 14 in the early onset male subgroup, Age of Onset is positively related to CM I. This indicates that in the profoundly deaf female adult, late onset of the sensory deficit is associated with more regular work activity, while early onset tends to be related to less regular patterns of work.

Vocational Variable Stratification: We now approach the final six strata for CM I. Three of these have to do with the occupational classes taken from the first three digits of the D.O.T., while the final three are the occupational groupings generated by Kerr.

Examining the stratification for the class of 59 Professional, Technical, and Managerial workers we note for the first time, that we have worked with both sexes in a single stratification, that a predictor other than Sex of the subject exhibits the highest simple validity correlation. The predictor which claims this position is the Craig Word score which yields a correlation of .30 with Months Worked. This is followed then by Sex of the subject (with men in this vocational group having more stable work records) bringing the multiple correlation to .45, where the GATB-Q or Clerical Perception score helps to elevate the correlation to .51 at which point the fourth and final predictor for this analysis, the GATB-G or General Intellectual Aptitude helps to edge the multiple correlation to .59. This constellation of predictors is indeed different. We have already referred to the primacy of the Craig Word score. It should also be noted that there is no reference to Age or Education in the analysis, despite the fact that the results portray a tangible supply of significant predictors. Furthermore, it includes two dimensions of the GATB, which has had only limited representation in the stepwise analysis of prediction to Months Worked. At any rate the ultimate improvement in predictive capacity in the combined (multiple) correlation over the most useful single predictor is evident. The reader will clearly want to note the sample size in this analysis and wonder how much shrinkage might occur in the multiple correlation on cross validation.

Moving to occupational category 6, or Machine Trades*, it can be seen that there is no purpose in trying to combine predictor data in this study to improve on the simple validity performance of the Verbal score (-.34) on the Weingarten Picture Interest Inventory. The same conclusion can be drawn for occupational category 7, Bench Work. Here the -.44 simple correlation could not be improved upon. Thus, in predicting to Months Worked in either job class, Machine Trades or Bench Work, the counselor working with adult deaf may conscientiously limit his data collection effort to the Verbal score of the Weingarten. To have guessed this from the data in Table 8 where a plentitude of simple validities were reported for Machine Trades, and where an exceedingly extravagant supply of validity figures for predictors were documented would have been sheer legerdemain. In any case it is clear that as the Verbal score on the Weingarten goes up among deaf adults the number of months gainfully employed tends to decrease and as the score on the Inventory drops off the number of Months Worked increases. It should be noted that part of this relationship is associated with the sex of the deaf person.

This brings us up to the Kerr clusters. Cluster 001 which includes manual and manipulation skills reveals for 86 deaf adults an array of five predictors in the combined correlation analysis. The dominant predictor is, once again, the Verbal subtest of the Weingarten, which had a simple validity coefficient of .36. The Craig Word score improves the coefficient to .45, Age

*Occupational category 2 - Clerical and Sales was inadvertently omitted from the computer run on this stepwise analysis and was not correctable within the project time period.

brings it up to .53, Sex of the subject pushes it to .57, and the GATB-F, or Finger Dexterity score, brings it to .60 the highest stepwise correlation examined. The next Kerr cluster 002 focuses on machine work and has 37 adult deaf included within its class in this study. The results of this analysis provided the highest multiple correlation in Table 14, .79, which accounts for 62 percent of the variance in the Months Worked experience of persons working in this cluster. The predictor components are led again by the Verbal subscore of the Weingarten, which sports a simple validity of .61 (negative correlation as with previous evidence with this scale's predictive capacity). This is then amplified by the Duration score on the Speech Characteristics Test bringing the multiple correlation to .70, where it is given its final increment to .79 by the influence of the GATB-Q or Clerical Perception score. However, we must caution again about the size of this sample, and suggest that the counselor invoke his best skeptical posture in dealing with this finding. The final Kerr Cluster 102 is made up of 67 deaf whose work featured craft and precision operations. The results here were limited to the simple validity measure (-.27) for Time Perspective as measured by the Weingarten.

Summation for Months Worked: In the first study of stepwise regression analysis with the criterion measure Months Worked, we have learned that in eleven of the fourteen analyses undertaken we have been able to improve on the best single measure we had of simple validity. The amount of improvement realized over simple validities varied, but seemed to be appreciably less in the analyses limited to female adult deaf, and more pronounced in analyses of the male adult deaf strata. The character of the predictors which proved useful in this stepwise study also seemed to change as we moved from the total sample and the deaf subject background -- related strata to the occupationally related strata. In the latter we observed that the sex of the subject became less important as a predictor to Months Worked. Replacing it as the most prominent predictor was the Weingarten Inventory and especially the Verbal score.

2. The Stepwise Regression With Pay Rate

The very same statistical conventions and discussion considerations which were employed in the previous stepwise analysis are to be pursued here. This analysis is summarized in Table 15.

Total Sample: A total of 285 deaf adults were involved in this study. As with Months Worked in the previous study, Sex of the subject was the most prominent simple validity measure correlating in this case -.45. Five more predictors were added in the following sequence: Education (.59), Age (.63), Culture Fair "g" (.65), Weingarten Esthetic (.66) and Age at Onset with a negative influence raising the final multiple correlation to .67. Four of the six significant predictors are background variables. The two test scores present, the Culture Fair "g" and the Esthetic score of the Weingarten, are putting in their initial appearances in the stepwise regression studies. Also, we find Age at Onset correlating negatively with Pay Rate. This is unexpected for the total deaf population suggesting "the earlier the better" maxim which was previously proposed specifically for the early onset group, applies to Pay Rate prediction for our total group of deaf.

Three Simple Stratifications: The first of these strata is concerned with 188 adult deaf men. Seven predictors emerge as useful clues to Pay Rate. Five of these are test scores; one of which GATB-G heads the list with a simple validity correlation of .41. Age brings the first increment to that correlation and raises it to .48. Then the first of three Weingarten interest scores, the Verbal scale, comes to the fore, followed by the GATB-M, the Natural interest score, Age at Onset, and finally the Esthetic interest score. The appearance of the Verbal score is not surprising, since we saw so much of it in connection with the criterion, Months Worked. It is, however, the first experience in the multiple correlation studies, where the Verbal Interest score is positively related to the predicted criterion. Without going into further detail at this time we may conclude that in combination these six predictors are organized to produce a multiple correlation of .61. This is clearly much more useful than the stepwise result for male deaf in predicting Months Worked. At the next stratification for female deaf the final multiple correlation is .70 which once again represents a very much more conclusive statistic than the multiple correlation for deaf women and Months Worked.

TABLE 15

STEPWISE REGRESSION RESULTS WITH PAY RATE

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS r	MULTIPLE CORRELATIONS r^2
TOTAL	Sex	-	.45	.20
	Education	+	.59	.35
N = 285	Age	+	.63	.40
$\overline{X}$ = 506.05	Culture Fair "g"	+	.65	.43
SD = 182.54	Weingarten Esthetic	+	.66	.44
	Age at Onset	-	.67	.45
MALES	GATB G	+	.41	.17
	Age	+	.48	.23
N = 188	Weingarten Verbal	+	.52	.27
$\overline{X}$ = 564.48	GATB M	+	.54	.30
SD = 162.99	Weingarten Natural	+	.57	.32
	Age at Onset	-	.59	.35
	Weingarten Esthetic	+	.61	.37
FEMALES	Education	+	.59	.35
	Manual Communication Reading	+	.65	.42
N = 97	Weingarten Esthetic	+	.68	.46
$\overline{X}$ = 392.78	Gottschaldt Standard	+	.70	.49
SD = 164.86				
AGE AT ONSET > 4	Sex	-	.52	.28
	GATB G	+	.64	.41
N = 72	Berger Block II Identification	+	.67	.45
$\overline{X}$ = 516.63				
SD = 208.07				

TABLE 15
(Continued)
STEPWISE REGRESSION RESULTS WITH PAY RATE

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS r	r^2
MALES - AGE AT ONSET < 5	GATB G	+	.34	.12
	Age	+	.44	.19
N = 139	Weingarten Verbal	+	.50	.25
$\bar{X}$ = 555.20	GATB M	+	.54	.29
SD = 153.58	Weingarten Natural	+	.58	.33
	Weingarten Interpersonal	-	.60	.36
	Age at Onset	-	.61	.38
FEMALES - AGE AT ONSET < 5	Education	+	.64	.41
	GATB S	+	.69	.47
N = 74	Weingarten Esthetic	+	.72	.52
$\bar{X}$ = 403.42	Manual Communication Reading	+	.74	.55
SD = 166.00				
MALES DB LOSS > 69, And No Aid	Gates Raw	+	.39	.15
	Age at Onset	-	.49	.24
	Age	+	.54	.29
N = 130	GATB M	+	.58	.34
$\bar{X}$ = 560.60	Weingarten Esthetic	+	.61	.37
SD = 166.53	Education	+	.62	.39
	GATB K	-	.64	.41
	Craig Sentence	-	.66	.44
FEMALES DB LOSS > 69, And No Aid	Education	+	.50	.25
	Weingarten Time Perspective	+	.57	.32
	Weingarten Esthetic	+	.64	.41
N = 63				
$\bar{X}$ = [illegible].89				
SD = 154.00				

TABLE 15
(Continued)
STEPWISE REGRESSION RESULTS WITH PAY RATE

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS	
			r	r^2
1st DIGIT DOT = 0 & 1	GATB G	+	.64	.40
	Age	+	.69	.48
N = 59	Education	+	.74	.54
X = 632.98	Weingarten Mechanical	+	.77	.59
SD = 180.60	Craig Sentence	-	.79	.62
1st DIGIT DOT = 2	Sex	-	.47	.22
	Bender Raw	-	.55	.30
N = 55	Craig Word	-	.63	.39
X = 463.73	Weingarten Esthetic	+	.70	.48
SD = 162.48	Weingarten Scientific	+	.74	.54
	Berger Block II Identification	+	.77	.60
	Duration Expert	-	.80	.63
1st DIGIT DOT = 6	Gottschaldt Standard	+	.39	.15
	Age	+	.53	.28
N = 52	No Day School	-	.59	.35
X = 561.85	Weingarten Scientific	-	.63	.40
SD = 124.59				
1st DIGIT DOT = 7	Sex	-	.73	.54
	GATB K	-	.83	.69
N = 38				
X = 426.68				
SD = 123.56				

TABLE 15
(Continued)
STEPWISE REGRESSION RESULTS WITH PAY RATE

SUBSAMPLE AND SUMMARY DATA ON PAY RATE	PREDICTOR VARIABLE	SIGN OF REGRESSION COEFFICIENT	MULTIPLE CORRELATIONS r	r^2
KERR CLUSTER 001	Sex	-	.66	.43
	Berger Block III Identification	+	.68	.47
N = 88				
$\bar{X}$ = 436.92				
SD = 127.30				
KERR CLUSTER 002	Sex	-	.44	.19
	GATB G	+	.58	.33
N = 37	Day Classes	-	.67	.44
$\bar{X}$ = 530.03	Age	+	.72	.51
SD = 164.75	Pitch Expert	-	.78	.61
	Residential School	-	.82	.67
KERR CLUSTER 102	Sex	-	.64	.41
	Weingarten Scientific	-	.70	.49
N = 67	Day School	-	.72	.52
$\bar{X}$ = 33.13				
SD = 6.36				

The pattern of the correlations for male and female study subjects helps to explain the roster of significant predictors uncovered for the Total sample. Education seems to be associated with the female deaf, while Age is important in the male deaf in predicting Pay Rate -- much as they are in predicting Months Worked. Age at onset, which we commented on as a negative index in the Total sample, appears to be, in the main, a masculine-linked predictor with the very provocative negative correlation with Pay Rate. It is also impressive to examine the confluence of ability test scores in the male and female sample and to note that they emerge finally in the total sample multiple correlation in the form of the Culture Fair "g". The reader with a penchant for such inquiry may find it illuminating to trace the Culture Fair "g" selection for the total sample through the GATB-G selection for male deaf and the Gottschaldt selection for female deaf, and then turn back to Table 9 to begin to appreciate the maze of competing ability score influences which the computer had to weigh in arriving at the final resolution for the Total population prediction in "g". It should also be pointed out that the Oregon Manual Communication Reading subscale score appears among the female deaf four predictors. This is its introductory appearance in the stepwise analysis results. The same may be said for the Gottschaldt Concealed Figures Test. One final word is made on the two stratifications based on Sex of the subject. That is, that the Weingarten Esthetic scale comes to notice as a common bond in both the Male and Female analysis. No such bond was discovered between predictors to Months Worked between the sexes.

The third stratification for those deaf whose hearing suffered insult after 4 years of age reveals three significant predictors: first, Sex of the subject, then, GATB-G and the Berger Block II to achieve a multiple correlation of .67.

<u>Multiple Variable Stratifications</u>: According to our customary format, we shall investigate the Early Onset male and female groups before we turn to the two groups distinguished by Sex of the subject, profound hearing loss, and no utilization of a hearing aid. Regarding the 139 male deaf individuals whose hearing impediment occured before the fifth year the configuration of seven significant predictors is parallel with the male sub-

sample except for the replacement of the Esthetic Interest score with the Interpersonal Interest score in the Early Onset group. There is, in addition, some minor variation in the sequence of the predictors for the two male strata but the overall impression of symmetry is supported by the identical multiple correlation value of .61. This multiple correlation is exceeded by the finding for the Early Onset group of female deaf (.74). Again, it is necessary to call attention to the size of the sample of female deaf with early onset of disability. Four predictors led by the ubiquitous benchmark for vocational adjustment in the female deaf, Education (.64), followed by the debut of the GATB-S (Spatial Perception) in the stepwise program (.69), the Weingarten Esthetic Interest (.72), and finally completed by the Manual Communication Reading score make up the complex of significant predictors in this group. This constellation resembles closely that reported for the total group of female deaf in the analysis of Pay Rate multiple correlations. The difference rests in the substitution of the GATB-S for the Gottschaldt. The multiple correlation is somewhat higher in the Early Onset female group, than in the larger group of female deaf.

This takes us to the remaining two strata in the multiple variable investigation of Pay Rate. For the male subgroup with advanced hearing loss we find in Table 15 eight significant predictors -- as many predictors as in any strata examined in the stepwise analyses. This is, in addition to being a heavily represented strata, a strikingly interesting one. The initial simple validity variable is the Gates Reading Survey Form, which yields a correlation of (.39). This is followed by the negatively related Age of Onset (.49) and Age (.54). From this point we find the GATB-M, the Esthetic Interest scale, and Education all contributing to bring the multiple correlation to (.62). The final 2 predictors are the first appearance of the GATB-K, or Motor Coordination score, and the Craig Sentence score resulting in a terminal correlation value of .66, which is slightly higher than the multiple correlations for the two previous male strata examined in connection with Pay Rate or CM III. As already suggested, this is an interesting pattern of predictors built on the primary predictor the Gates Reading score. The reader will notice that Age at Onset, with a high order negative contribution to the multiple correlation, occurs for the third time in three studies of strata limited to the Pay Rate of deaf adult males. It can also be seen that it does not appear in any stepwise study of Pay Rate in the female groups so that the evidence testifies to the use of this predictor as an important discriminating variable between the two sexes. In addition, this strata reveals Education as an important predictor in males. This is the only appearance of Education in connection with a male subgroup in the stepwise results in either Table 14 or Table 15. And finally, there are two negatively weighted test scores -- the GATB-K, and the Craig Sentence score.

In contrast, the small female subgroup (N=63) with profound hearing loss is characterized by three significant predictors resulting in a multiple correlation of .64. Education is the principal component (.50), supplemented by the Time Perspective Interest score (.57), and brought to its final value by the Esthetic Interest scale.

Vocational Variable Stratifications: Seven small strata are inspected here. The first four are the occupational categories based on the first digit of the DOT. It is necessary to admonish again about the size of the multiple correlations to be reported and the corresponding limitation in size of some of the occupational groups examined here.

Looking first at the adult deaf in the Professional Technical and Managerial category, there are five important predictors based on the simple validity of the GATB-G (.64) and including Age (.69), Education (.74), the Mechanical Interest score (.77), and the negatively correlated contribution of the Craig Sentence score (.79).

The second category of Clerical and Sales personnel has seven predictors for adult deaf to Pay Rate, culminating in a multiple correlation of (.80). Sex of the subject, which failed to appear as a significant predictor to Months Worked in the occupational strata for deaf in Table 14, occupies the principal position in this analysis for Pay Rate. Pay Rate is also related to the Bender error score (.55), and negatively related to the Craig Word score (.63). This combination is followed by the Weingarten subtests; the Esthetic (.70) and Scientific Interests (.74), the Berger Block II (.77) and the Holdt Speech Characteristics score for duration. The latter is negatively correlated indicating that the deaf adults with more rapid speech patterns in the Clerical and Sales group are likely to earn more adequate pay, while the deaf with more drawn-out speech habits who work in Sales and Clerical positions earn less adequate salaries.

Occupational category 6 has to do with Machine [illegible]s. Four predictors beginning with the simple valid[illegible] measure of the Gottschaldt Closure Flexibility score (.39) and including Age (.53), the negatively related Day School (.59) and the negatively related Scientific Interest score (.63) are significant predictive indices for the adult deaf.

The final occupational category 7 presented has to do with Bench Work. Sex of the subject appears again as the pivotal predictor (.73) with deaf males very clearly favored in Pay Rate in this type of work. Motor Coordination is negatively related to Pay Rate (.83) -- which is difficult to explain, unless the reader is willing to assume here that the deaf women who are less adequately rewarded in Pay Rate in Bench Work nevertheless generally perform more competently than their male colleagues on the GATB-K. The extremely limited number of cases (38) in this stratification suggests the need for extreme caution in the interpretation of this analysis.

The three remaining Kerr Clusters bring to a close the discussion of the stepwise regression findings. The 001 cluster, which focuses on work situations with high manual and manipulatory demands reveals Sex of the subject as the primary simple validity coefficient (.66), coupled with the Berger Block III (.68). This appearance of the Berger Block III is the only evidence of this test's usefulness in the entire stepwise program.

Cluster 002, which is composed of a very small group of deaf working in positions with demands for skill in machine operations reveals six productive predictors of Pay Rate. Sex of the subject is again the salient predictor (.44) followed by the GATB-G (.58), the negatively correlated predictor Day Classes (.67), Age (.72), the pitch of speech as a negative score on the Holdt Speech Characteristics Test (.78), and Residential School (.82). This multiple correlation vies with that produced for Pay Rate in the Bench Work category. However, both are likely to be disconcertingly undependable.

This last group, Cluster 102, is constituted of 67 deaf adults and revolves on Sex of the Subject (.64), the Scientific Interest scale (.70), and Day School (.72) all significantly related to Pay Rate as negatively correlated predictors.

D. Summary of Chapter 6

The basic issue to which this Chapter is dedicated is a normal extension of the theme of the previous Chapter. In the fore-running Chapter 5 we addressed ourselves to the question, which predictors can be used successfully in estimating one or another form of vocational adjustment in the adult deaf? In Chapter 6 we raise the question, which predictors should be used most economically in this task? The questions not only imply a distinction between what the counselor can and what he should do in the service of his client, but they also express an important change in emphasis from concern with each predictor as an independent object of study, to concern with each predictor operating in reciprocal interaction with all other predictors. In a word, Chapter 6 has been designed to illustrate the final impact of this study -- the definition of informational batteries which the counselor can use in predicting vocational adjustment for deaf adults.

Our initial effort in this Chapter was to learn whether the predictors involved in this study were bound together in any meaningful clusters or combinations. We found that it was possible to reduce 73 study predictors to 20 factors or predictor clusters. We also found that the more important and reliable factors (the first 4 or 5) exhibited considerable face validity, and, in fact, tended to confirm a preliminary set of predictor categories which had been defined in an a priori style earlier in the study. Further, we found in the factor structure both logical support for elements of the stepwise regression work reported later in the Chapter, as well as practical everyday utility for the counselor in substituting one form of client-related information for another in a given vocational prediction battery.

The interpretation of the stepwise regression findings, which occupy the second section of this Chapter is a complex task. To begin it should be made clear that they represent a step toward what the counselor in the view of this team of investigators, will ultimately require in promoting the vocational adjustment of clients. There has been a long tradition in guidance work and all schools of counseling for a well balanced accumulation of data about the client and his background conditions. While hope has not yet been abandoned for building the ultimate all-purpose, brief instrument for insight into the client's dynamics and potential, practice usually dictates a compromise between what the counselor might, under the best of conditions, hope to do, and what the pressures of his work situation permit. This study has striven from the initial data-collection effort to organize predictors in the most expedient format for the hurried and harried counselor struggling realistically to allocate his time and skills for the vast body of persons seeking help in ordering their vocational prospects. The stepwise regression approach has then been employed to specify for each of a variety or class of deaf adults who are employable a battery of background and test data, which is at the same time the very best and the very least (most economical) that is available from this study to estimate the client's potential for work adjustment, either in terms of duration of pattern of work, or in terms of pay for work. It is clear that this is not a definitive work. It needs many supplemental studies. While we shall have more to say about this in the final Chapter, it can be said that one area which very evidently needs inquiry is the employment world of the deaf.

For the moment we want to examine the stepwise data again to derive whatever summary impressions seem apparent. Table 16 provides the desired summary portrait of the 34 predictors each of which registered one or more significant appearances in Tables 14 and 15. Table 16 reveals the frequencies of these appearances first for the criterion Months Worked and then for the criterion Pay Rate. The reader will remember that the magnitude of the multiple correlations for Pay Rate was generally greater than for Months Worked. From Table 16 it is also evident that the number of significant predictive events for Pay Rate exceeded those for Months Worked by more than 50 percent. While the global tendency is for a greater number of predictors to "hit pay dirt" under Pay Rate, there are also individual predictors which defy the overall trend and lean heavily in the opposite direction. Among these are:

The Bender Gestalt
The Berger Block (2)
The Craig Word and
The Verbal Interest Scale

On the other hand, the Esthetic Interest Scale weighs exceptionally heavy on the Pay Rate side of the ledger.

While the reader should be prepared to accept each of the predictors on display in Table 16 as of intrinsic value to the guidance process with deaf adults, it may nonetheless be interesting to identify those variables which exhibit the greatest number of total significant "hits". If we list the upper twenty-five percent of the 34 predictors, the most productive in order of their validity credits are:

Age	13
Sex	11
Education	10
Verbal Interest	8
Esthetic Interest	7
Age at Onset	6
Berger Block (2)	6
GATB-G	6

Among these prime predictors are four background variables, two interest test variables, and two ability variables. If we turn back to Table 10 in Chapter 5 to contrast these results with the results for the simple validities, we note that Age, Sex, and Education were prime background predictors but that Age at Onset was an also-ran. Its true import as a predictor was obscure, then, until the multivariate analysis revealed it. Among the interest scales the Verbal score and the Mechanical score were the two most prominent predictors in the simple validity measures. The stepwise analysis lends support again both to the Verbal score and the Mechanical score as prime predictors, and uncovers virtues in the Esthetic score which had been largely neglected in the simple validities. And finally the two ability tests, the Berger Block (2), and the GATB-G hold the spotlight of versatility across both analyses -- the simple validity and the stepwise correlations.

We are now ready to turn to the concluding chapter in which we attempt to place the project in perspective and tease out some of the basic lessons of this experience as well as some suggestions for future directions for work.

TABLE 16

FREQUENCY OF SIGNIFICANT PREDICTIONS ON TWO CRITERIA

PREDICTOR	CRITERION		
	Months Worked	Pay Rate	Total
Age	6	7	13
Age At Onset	2	4	6
Bender Gestalt	3	1	4
Berger Block 2	4	2	6
Berger Block 3	0	1	1
Business Interest	1	0	1
Craig Sentence	1	2	3
Craig Word	3	1	4
Culture Fair "g"	0	1	1
Day Class	0	1	1
Duration, Speech	1	1	2
Education	4	6	10
Esthetic	0	7	7
Gates	1	1	2
GATB-F	1	0	1
GATB-G	1	5	6
GATB-K	0	2	2
GATB-M	2	3	5
GATB-Q	2	0	2
GATB-S	0	1	1
GATB-V	1	0	1
Gottschaldt	0	2	2
Intelligibility, Speech	1	0	1
Interpersonal Interest	0	1	1
Manual Communication Reading	0	2	2
Mechanical Interest	0	1	1
Natural Interest	0	2	2
No Day School	1	2	3
Pitch, Speech	0	1	1
Residential School	0	1	1
Scientific Interest	0	3	3
Sex	4	7	11
Time Perspective Interest	1	1	2
Verbal Interest	6	2	8
TOTAL	46	71	117

CHAPTER 7

SUMMARY

A. A Frame of Reference

Despite the concentrated outlook of this study with its singular accent on the work adjustment of the adult deaf, it should be made clear that the investigators have, from the beginning, considered this narrow problem to be part of a broader subject matter. This broader domain is taken up with the dual ethic that individual effort to develop one's abilities can lead to success, and that educational and occupational investments are the keys which convert such energy and raw ability into success. In this sense then this study is concerned not only with documenting the levels of vocational opportunity and success which deaf adults enjoy, but as well with identifying the kinds of information which may contribute to more equal opportunity and success wherever such equality is denied for less than legitimate reasons.

Unfortunately, experience teaches that the educational and occupational pathways are generally quite narrow and can, at times, become painfully crowded. Because of these conditions, many of those who aspire to occupational advancement, i.e. upward mobility, find their progress slowed or blocked, so that they come to lose faith in the popular gospe which ties effort to success. The important matters in this discussion for us are: 1) that the restrictions in opportunity are not imposed indiscriminately, but fall unevenly on rtain groups of individuals; and 2) the withholding of eq opportunity serves invidiously then to promote personal dependency in such groups, and stimulates a sense of social defeat in elements of a society which professes egalitarian principles. The practice of vocational guidance may then be thought of as one compensatory mechanism to intervene in a society which may give preferential opportunity to certain elements at the expense of others. In this connection Walton (147) has argued convincingly that the science of vocational guidance is consonant with the democratic philosophy of life. From this perspective the guidance movement is thought of as promoting the natural capacities and differences in individuals, so that the social order can be said to be strengthened by supporting diversity of interest and talent. Accordingly, as each individual finds the opportunity to develop his unique potential, both the individual and the community may be thought to be expanding their dignity and confidence and gaining more complete fulfillment.

Before we move then to summarize the information developed in this study, we want to establish some of the dimensions of this more comprehensive frame of reference. Thus, the final impact of the study may be enhanced if we provide a brief historical perspective to the world of work and to the special place the handicapped worker has come to occupy in it; if we explore the competitive operation of the industrial system which both sustains and is sustained by the nation's manpower; if we examine the implications of the working role for personal and social identities; and if we give some space to the major theoretical positions which are available for understanding how people come to move into one or another type of work.

1. <u>An Imperfect Economic System</u>

No social system operates perfectly. As a matter of record it is generally rather easy for a trained observer to spot significant disruptive events which occur in such systems because these influences inevitably produce explicit disabling consequences both for individuals participating in the system ar[illegible]r the performance pattern of the system. Thus, the Na[illegible]'s economic system with its employment subsystem has [illegible]s recurring disruptions and discontinuities, which are [illegible]lt to one degree or another by most of us. In the special case of the atypical worker, such as the adult deaf, his employment possibilities are particularly reduced during periods of general unemployment by arbitrary standards, bias and discrimination Caplow (17). Edna Adler (1) has estimated that as many as forty percent of the adult deaf are, at a given moment, vocationally disadvantaged--a term she fails to clarify. Whatever her particular referent may be, we are interested in those individuals who are chronically denied equal opportunity to compete vocationally, who are counted among the hard core underemployed or unemployed, who are commonly labeled as the disadvantaged, the disaffected, or the deprived, and who are then too often incorporated in one or another underprivileged minority group "for further study."

In some cases the displaced have individual handicaps in the form of physical stigmata or emotional problems, which are said to explain their relative segregation and rejection. In other instances, where no apparent blemish in appearance or deficit in behavior prevails, <u>institutional</u>

handicaps to employment are encountered, such as the cyclic nature of the economy or the increasing investment by the industrial community in job-eliminating technology. For example, in 1960, the Census Bureau was able to perform an assignment with fifty staff and some newly installed equipment; the same task which had required 4000 staff just ten years before. We may conclude then with Morgan (91) that there are at least two critical complementary influences which help to explain the distressing facts of underemployment and unemployment: 1) the attributes of the individual which, under a given social circumstance, mark them as deviant; and 2) the character of institutional barriers to employment. When the problem appears to be individual rather than institutional, remedial efforts generally assume the form of worker assessment techniques, or motivational instruction or perhaps, skill training. When the problem is principally institutional the remedial effort may be directed toward the restructuring of organization recruitment practices; or on installing a program for modifying or designing revisions in working conditions; or the recommending of major modifications in the economic system, such as Theobald's (136) argument for a guaranteed annual income.

Recognizing then that there are significant individual and social factors which influence the opportunity for a deaf adult to find work or to improve his work situation, and anticipating somewhat the discussion to follow regarding the multiplicity of life roles which serve the individual in his work performance, we want to point out that the vocational predictor and criterion data presented in this study could have counselor utility far beyond the concrete purposes they are put to directly in this study. Baggaley (5) defines three major tasks for vocational counselors: 1) selection as a type of counselor responsibility which involves many applicants competing for one position; 2) guidance as a responsibility which comes about when one individual is contemplating a number of possible positions; and 3) classification as a task having to do with many people relating to many jobs. Gellman (42) classifies the work of the vocational counselor who is serving the adult deaf rather more specifically as involving three principal duties: 1) helping to find compensating mechanisms for the inadequacies in the vocational personality of the deaf client; 2) uncovering work skills, potentials and duty competencies which will contribute to "placeability" and then to retention of the deaf adult on the job; and 3) increasing the capacity of the individual deaf applicant, who is seeking the help of the counselor, to use that help as it pertains to his vocational adjustment. Whichever frame of reference seems more meaningful for the counselor's obligation to his deaf client it should be plain that the data presented in this study needs to be employed thoughtfully and with discretion depending for their immediate pattern of application on the client's status with respect to the working world, his family and a whole series of interacting conditions--the least of which is surely not his relationship with the counselor.

Thus, it would be distinctly possible to use the study data not only in recruiting an unemployed deaf adult for a given position, but as well in upgrading an unskilled deaf worker into a more demanding and prestigeful position, keeping in mind that the type of decision made in employment is not necessarily the type which might be made in promotion. Further, it may be possible to use the predictor data to select established deaf workers for additional training or for advanced educational benefits apart from the issue of promotion. Obviously, the counselor would have to weigh carefully the problematic nature of the criterion measures developed in this study if he were bent on selecting deaf workers for educational opportunity. Or, the data may have relevance for an employer of a sizable number of handicapped workers who decided to organize the kind of Assessment Center, which Byham and Pentecost (16) have described. In such Centers, workers and positions are examined in conjoint observation with the hope of altering both elements in a process of mutual enrichment. Both predictor and criterion information, as gathered in this study, would be patently appropriate data for counselors operating within such a program. We would also guess that the predictor information, perhaps more so than the criterion data reported, could also be useful to the vocational counselor who may become involved with the deaf adult's investment in leisure time or with the older deaf client's plans for retirement. And finally, there is the provocative question for the practicing counselor, How best to communicate occupational information and individual assessment findings back to the deaf client? What is being suggested, of course, is that the predictor information collected herein may have value for determining the most useful feedback channel or media for guiding a given client into a rewarding vocational experience. Collateral evidence for such information sharing with hearing clients has been documented by Holmes (57), Lister and Ohlsen (83) and Tipton (138).

In this larger sense then, the predictor data and the criterion measure data collected in this study could well be considered for their relevance to a broad range of problems having to do with the vocational security and upward mobility of the employable deaf. It should follow that while there are, and will surely continue to be, disrupting influences in the economy, that more reliable vocational assessment instruments and more appropriate use of them in connection with defined work expectations could be important contributions to reducing the risk the deaf adult assumes in, "estrangement from the mainstream of society and the denial to him of access to the rewards of life by the dominant culture" (101). In a word, the work described in this volume could be employed in a variety of ways to increase the deaf adult's opportunity for maximum feasible participation in the working world.

2. The World of Work

Quey has defined work as "purposeful physical and mental activity oriented to the future and intended to produce economic goods and services to satisfy human needs" (110). Work has not always been considered as virtuous or even tasteful experience. To the ancient Hebrews and Greeks work was only painful drudgery to be avoided by all but slaves who were condemned to work in retribution for sinful behaviors. Work, other than intellectual investment, was considered to brutalize the mind and to deprive men of virtue. The early Christians also associated physical labor with punishment, but claimed on the other hand that work might be useful in warding off the evil thoughts of idleness. It was not until Luther, however, that a dramatic reversal in attitude took place, with work coming to be defined as the key to a fully useful life. John Locke, in turn, developed the notion that work was the underlying influence behind the concept of private ownership - a principal celebrated in the work of Adam Smith and the liberal economic writers of the late Eighteenth Century. Perhaps the final historical influence which bears heavily on modern attitudes toward work was the view, which emerged from the Renaissance, that conceived of work as a force, which when properly applied, had the potential for lifting man from destitution or disgrace to a position of creative accomplishment and positive self-regard.

This view is consistent with some of the more persuasive philosophical writers of this day. Savary (118), for example, contends that "human work lies at the intersection where man confronts creation. Here in that spending of human effort, which each man calls his work, is the locus of man's productive self-expression." Kierkegaard (71) goes further to suggest that the experience of work contributes significantly to the individual's "b ming a self." In this way work is thought of as a mo..ing experience by means of which man confronts himself straight on in a process of distinguishing his self-concept and his unique individuality. Thus, it is suggested that characteristics of the man can be inferred from the characteristics of his work. Other authors, who advocate a sociological approach to understanding work, such as Obermann (94) and Caplow (17), are more concerned with work as a sharpening influence for characterizing man's position in the community. At any rate these two components of our contemporary work ethic; 1) the self-defining aspect, and 2) the social status determining aspect are fundamental elements in appreciating the vocational guidance movement's potential for improving the adjustment prospects of the employable deaf.

3. <u>The Work World and the Disabled Worker</u>

According to Schein (120) the social experiences associated with deafness are not necessarily attributable to sensory deficit. In his view the social problems which the deaf encounter develop more from a "lack of favorable attitudes than of inadequate abilities and aptitudes." His work also suggests that handicapped persons, such as the deaf, should be thought of as fully competent workers in many settings, but that discrimination by employers and large segments of the public has the effect of reducing the availability of real opportunity to them. There is much indirect evidence to support this allegation. For example, Boatner et.al.(11) and Furfey and Harte (39) have assembled wide-ranging evidence of the competence of deaf workers. Boatner's work as well as Rainer's study (111) provide strong evidence for the deafs' ability to sustain themselves over time in a working role, and for the regularity of their work habits. Also the report of Fine and Heinz (36), based on a survey made by the U. S. Employment Services of 4000 jobs, concludes that only fourteen percent of the positions examined revealed critical hearing and verbal communication aspects. Discrimination against the deaf on the part of employers, if it can be presumed to exist, may therefore, be justified only in some small measure by the hearing deficit. We would suggest that this kind of discrimination has a long and vital history, and that the adult deaf, and their service agencies, all too often contribute unwittingly to it.

Historically, Toynbee (139) has traced both the influence of the Industrial Revolution--see also Kroll et. al. (75)--and the related gathering of people in urban clusters as two prevailing influences in evolving our contemporary work force with its array of specialized skills, and technique-oriented work force. He also points out, very interestingly, that the original motivation for the specialization of work skills evolved long before the Industrial Revolution with the desire to find productive work experience for handicapped individuals, who could not be expected characteristically to assume a broad or unrestricted set of working duties. In this regard then positive discrimination in selecting prescribed work experiences for the disabled was originally a concession to their needs. However, this original charitable attitude may have lost its merciful aim over the years so that it now may indeed have become a barricade against, rather than an invitation to opportunity.

Sussman has also raised the question about a social agency's part "in producing or heightening the stigmatized role" (133). He points out that service agencies have the responsibility of defining deviance, and finds that their operational support is oftentimes tied to the amount of deviance they expose in their case finding efforts. In the process of reaching out to define deviance, social agencies frequently bring into their net of disabled or needy those who would, at the moment, not consider themselves prospective clients. Naturally, once the individual is identified as a potential client, he is pressured to adapt to the help-seeking role. The major demand of this role is the internalization of a negative self-image. That is, the potential customer is supposed to face himself with the proposition that as a respectable client he is individually underpowered, and must therefore rely on others to learn to compete successfully in an industrial culture demanding competence in work and social behavior.

There are many studies in support of these contentions. Generally, they indicate that once negative or disparaging ability stereotypes are formulated about an individual or a group, that productive performance, which would normally be expected to alter such beliefs, tends to have little impact on those beliefs--Kepka and Brickman (68), Weiner and Kukla (148), Johnson, Fiegenbaum, and Weibley (64), and Grzelak (50). Thus, successful performance on a test which measures ability, when such success is found in individuals who are generally thought to be of low or marginal ability is often explained, not as correcting the impression of limited ability, but rather as due to "unusual motivation" or to chance, or to the particular influence of a high quality teacher or instructional model. Kepka (68) has observed how these findings support the enduring convictions we have about disabled persons, and how such convictions discourage further hard work and commitment by individuals defined as disabled. This evidence is all the more fascinating for our understanding of the plight of the deaf and other disabled persons as we review the work of Feather (35), Johnson et. al. (64), and Keniston and Keniston (66), who reveal how disadvantaged or disabled subjects discounted their own performance when it exceeded the "appropriate" levels (or stereotyped picture) of acceptable behavior for handicapped persons. In these studies handicapped persons are found then to rationalize their "superior" performance, as due to unusual external factors, or to explain it as a function of momentary and unpredictable motivational experience. Gellman (42), in this same sense, speaks of a kind of ghetto mentality in the deaf, which expresses itself in rigidity and self-segregation in the face of the ever-present fear of being rejected.

This body of evidence suggests then that the employment of adult deaf workers may be influenced adversely by a general system of social attitudes toward disabled persons. It is apparent that this system of attitudes is extremely complex in its origins, and, that in its present form, it likely inhibits the employment opportunity of deaf adults to an extent beyond that which their auditory handicap alone would warrant. We would suggest also that the inhibiting force of these attitudes tends to exercise untoward influence over the behavior of employers and their agents; has an unhappy influence on social agencies, which are chartered to serve groups like the deaf; fosters unnecessary dependency among the deaf; and, in some instances, influences the deaf to deny and obstruct their own opportunities for vocational achievement.

4. The Division of Labor and the Multiplication of Opportunity

Early distinctions in the work roles assumed by men were determined much as were individual surnames, i.e. by accident of birth and parentage. With the passage of time and the choreography of almost endless new forms of work and skill-demands the serviceability of a family-based occupational structure clearly had to come into question. Thus, by the first quarter of the 19th Century the familiar transfer of work role from father to son began to weaken and is gradually giving way to a competitive system in which personal qualifications and performance competence determined the process by which workers and work were joined. According to Holtzman (58) the process of "judging each person on the basis of his measured performance rather than on his family background, social status or political connections has been a powerful agent of social change." This model of competitive selection not only opened the system to greater specialization, but also defined the opportunity structure by which one might "move forward" occupationally. In addition, and perhaps most important for our discussion is the fact that the competitive model made it reasonable and purposeful to develop a science of vocational guidance. That is, if competitive processes are operating to encourage individual talent and unique capacities, then individual workers should be free to seek a place in the occupational ladder which best utilizes their unique blend of capacities, and which at the same time makes available optimal individual satisfactions and rewards. Individuals with differing patterns of ability and needs should also then be apportioned throughout the work world and in such a way as to optimize the match between positions and position occupants.* Clearly then, the competitive model for occupational structuring has not only made it more possible for individuals to

*Hull (59) advocated in the Mid-Twenties the hope for the eventual development of sufficiently precise indices of individual behavior and position requirements to match students in large school systems to jobs. Recognizing the scope and complexity of this hope he looked forward to the development of high speed computers to facilitate this proposal. A more modern sounding approach (Owens, 97) introduces the concept of subgroup membership and their behavioral correlates in predicting performance.

ignore their father's work in selecting an occupation,* but it has coined in a very real sense a nationwide ideology of success. Interestingly enough, this ideology makes it possible now for certain occupations to select workers. In this sense Samler (117) has called attention to the belief that "an occupation, like any other social institution has a life of its own, and can be particular in its culture, in the requirements laid upon its members, and in stipulating the life they are to lead outside the work setting as well as within it." Obermann (94) has, in this same vein, emphasized the forceful control which occupations exert on where men reside, on their intelligence, their social status, their technical abilities, recreational habits. etc.

We may see more clearly then the historical influence of the competitive occupational structure on the two dynamic components in today's world of work: 1) the search for status by individuals competing for a shifting number of positions, which have themselves shifting levels of prestige and attractiveness; and 2) the search for individuals by a wide system of work settings, each with its peculiar admixture of prestige and rewards. Kroll (75) has expressed this parallelism nicely, "through the career a person seeks progressively to accommodate the environment to suit himself, while simultaneously being progressively incorporated by the environment. Thus, we cannot say that the self determines the career, for the career also determines the self."

It follows then for us that a relatively free and competitive vocational marketplace inevitably imposes restrictions of a kind on occupational opportunity with people rejecting certain opportunities and with opportunities rejecting certain people. Under these conditions, vocational counseling should inevitably involve much more

*We are not suggesting, of course, that no relationship exists between the work of father and son. Strong (129) (130) has, as a matter of fact, published evidence of significant correlations between the vocational interests of fathers and sons. Interestingly enough, this association seems to have, in part, a genetic base as documented by Vandenberg and Kelly (145) and Vandenberg and Stafford (146).

than the matching of individual aptitudes and abilities with the demands of a job. Obviously, effective counseling requires more information than one gets from job titles, which, however detailed, rarely inform us about the critical behaviors which constitute acceptable job performance. Similarly, vocational counseling involves knowing how a worker feels about himself--the kind of person he is and would like to be or become in his working and social life. It is this distinction between a relatively straightforward matching of individuals with available positions, and the notion that occupational choice is itself a very complex, continually-in-flux condition, which marks major current approaches to vocational guidance. In this sense we subscribe to the proposition that effective vocational guidance for the deaf, as for the hearing, will only be perfected to the extent that we broaden our perspective and take seriously comments such as Alan Sussman's that "more emphasis should be placed on the conduct of the whole man, on the total personal adjustment of the deaf individual" (133). We also believe that the effective counselor, assuming a broad gauge attitude toward his deaf client, will doubtless bring with him into his counseling relationships a set of general principles, which will tend to color his approach to clients and the interpretations he gives to the interaction experience he has with clients. We now turn briefly to the major systems of general principles commonly held by counselors.

5. Four Approaches to the Study of Career Development

Freedman (38) has called attention to the observation that by the time a man reaches thirty years of age he falls into one of three classes: 1) the most advantaged, 2) the most disadvantaged, or 3) the mid-range, or class of the overwhelming majority. The most advantaged are those who find employment in the professions or in the upper stratum of managers. The most disadvantaged seldom work, or, if they do, their employment is highly transitory and extremely limited in benefits. Such pay as they earn is not typically sufficient to bring them above poverty levels. There is also the vast majority of middle Americans, who have settled for a living wage, abandoning the hope for rapid advancement for the security of relatively stable employment generally found in an industrial organization. The important point, however, in Freedman's work is that some individuals in the work force can be seen to live orderly lives with what might be termed progressive responsibility and little risk of unemployment, while the majority live orderly lives with essentially limited unvarying responsibility and somewhat greater risk of brief periods of unemployment, while the most disadvantaged live substantially disordered vocational lives having little, or no significant experience with responsibility, and a prevailing struggle contending with unemployment and high risk of layoff. Goldman, et. al. (46), for example, report on a group of young men in New York involved in a work training program, who illustrate the most disadvantaged group. While this particular study group ranged in age from eighteen to twenty years, each member had held at least six jobs with a median duration of less than six weeks per job. Whether it is meaningful then to speak of a vocational career or even vocational choice for <u>all</u> members of the work force is clearly a matter of personal choice (see Wilensky, 151, and Gross, 49). We have used the concept of occupational adjustment in this study as a kind of analogue for the more conventional concept of career development. The reader will remember that we have investigated in a systematic way a three-year period of vocational history in the lives of employable deaf adults. To the extent that we have found differences in the work adjustment of these deaf individuals--in the type of work, the level of remuneration, etc.--we feel the need to understand such differences. Explanation can, of course, take many forms. For example, a low level explanation would be of the form that occupational adjustment relates simply to level of intelligence, or, perhaps, to age. However useful such information about work adjustment and its relationship to individual determinants (such as age) may be, it is useful <u>primarily</u> in helping to point ultimately to more complex and hopefully more revealing questions. For example, if age is shown to relate to income earned, we need not conclude that young people are incapable of performing responsibly, or that aged individuals are inevitably more capable vocationally. Rather, we should want to examine a whole series of intervening variables which may have implications for helping us understand the assumed relation between age and occupational choice. Thus, we may choose to study the world of work closely and learn how some people (generally the younger set) see themselves involved in entry occupations with some hope of moving up the ladder to occupy, in time, more stable and more valued positions. Given these insights one could begin to perceive the developmental nature of individual progress through the working world, and doubtless begin to understand how the complex elements of social structure and economic organization contribute to the diverse division of labor, which simultaneously provides and withholds opportunity to individuals and groups. It follows then that the process of improving our understanding in this area is dependent upon organizing an orderly set of general explanations about occupational adjustment and the various connections it may have with variables, both within individuals, and in their conditions of life. Such general explanations are called theories. The counselor invariably operates under the influence of one or more theories which allows him to link his training and experience into a broad cluster of general regularities or primitive laws, and thereby enable him to help clients each with his own unique pattern of problems and aspirations. Theories constructed to serve the vocational counselor vary in complexity, dependent on the extent to which multiple levels and combinations of variables are examined and integrated in the explanatory process. The four theories of career development, which are to be depicted here, clearly vary in their complexity. Furthermore, they have been defined from observing and working with hearing clients. Nevertheless, we perceive them as being applicable to the disadvantaged as well as to the advantaged.

The Trait-Factor Theory: This is the most primitive theory of the four to be examined. It assumes only an empirical matching between individuals' abilities and interests against elements in the vocational opportunity structure. The question of vocational choice for the individual then becomes a matter of assessing his abilities, interests and aptitudes competently to determine with the counselor's help that particular occupational class which might be most congruent with his test profile. This least sophisticated position on career selection has its roots in the trait-factor approach, and is illustrated by the early work of Parsons (98), and the subsequent work of Hull (60) and Kitson (72).

The Socio-Cultural Theory: This point of view is also referred to as the reality theory or, by some, as the accident theory of vocational choice. According to the advocates of the position (Caplow, 17; Hollingshead, 56;

Miller and Form, 90) circumstances, generally considered beyond the effective reach of the worker, help to shape his placement in the world of work. Such factors as age, race, sex, socio-economic status and family-friendship networks are thought of as significant contributors to career development. Among these factors sex has probably been investigated as extensively as any. Cohen (21) reports that women commanded a median income in 1970 of about 55 percent of that of men (in 1955, it was 64 percent): that women are less geographically mobile in selecting work: and that women generally prefer fewer hours of work than do men. Lewis (82) suggests that interest is less crucial an element in vocational choice for women, while Empey (33) counters with the belief that women, in contrast to men, prefer jobs working with people rather than with things, espouse service over professional goals, and are less concerned with job advancement possibilities. Clearly then, American women relate to the occupational world and are responded to by that world differently than are men. At the same time women's interest in occupational work is becoming more and more distensive. Wolfbein predicts that the average high school girl can now expect to get married, have children and still spend 25 years of her remaining life in the work force (154).

This theoretical position focuses on a wide range of background and biological circumstances in an individual's life, and attempts to pinpoint the way such conditions may come to determine how an individual enters and moves through the world of work.

The Self-Concept Theory: This approach to understanding career development concentrates on the concept of the self. Meadow (88) sees the development of the self in the child as a process of learning to perceive oneself as others do. In this sense the self "becomes an object to itself by means of the manipulation of symbols....that is, through the use of language." Working from this premise Meadow then carefully develops the role of language, asserting that this process of self-appraisal "should not be seen as merely a mechanical mirroring of the opinions of others." Rather, she suggests that the normal development of the self image requires the resolution of conflicting perceptions between succeeding personal episodes, or between the interpretations which others give to a single event. Language is considered to be the core instrument for perfecting such resolutions. The importance of Meadow's view for our discussion is the reliance placed on language function for the development of the self; a concentration which would, indeed, suggest that, given the limited language competence of the deaf child (Wodin, 15) we might expect not only delay in development, but distortion as well in the contours of the self-concept. Gowan (47) goes so far as to identify a change in self-concept as the essential element in the effective counseling of the deaf. Further, evidence for faulty development of self-concept and self-appraisal behavior in deaf children has been reported by Craig (24) and Brunschwig (14). Self views, it would appear, must inevitably relate to the individual's personal view of the occupational world. Accordingly, it may be that one's eventual career choice - including the choice to remain unemployed - is keyed to the individual's self-concept, as well as to his beliefs about the world of work. It would follow then that the counselor working with the deaf client should explore not only the client's self-concept, but would also attempt to audit the client's occupational information, and, where indicated, work to improve it. Pimentel (105) has advised that inadequate occupational information among the employable deaf has implication for the vocational stereotyping he finds both in their vocational objectives and actual employment situations. Whatever the value of occupational information in the guidance process, it should be clear that the theoretical position of authors such as Super (131, 132), Samler (116) and Ginzberg (45) is a rich and imaginative one, articulated in a kind of theoretical depth which far exceeds the explanatory properties of the trait and socio-cultural theories. The central thesis is expressed in the fundamental hypothesis that the more obvious the congruence between the ratings and understanding of himself and the personally significant traits of an occupation, the greater the probability that one or another occupation would be selected by the individual for his life's work. In this sense the degree of similarity between self ratings and occupational ratings is referred to as the "incorporation" of an occupation. Super (131) sums this theoretical position's implication for the work of the counselor in the following definition: "Vocational guidance is the process of helping a person to develop and accept an integrated and adequate picture of himself and of his role in the world of work, to test this concept against reality and to convert it into reality with satisfaction to himself and benefit to society."

The Personality Theory: This is a relatively new approach to the problem of vocational choice, coming into prominence in the second half of the century. The basic theme projected by Beall and Bordin (6), Galinsky (40), Nachmann (93), and Segal (122) is that occupational choice is linked more to personality development than to aptitudes. By this approach occupational choice fits into the framework of psychoanalytic theory. Perhaps the central, if not fundamental assumption, which girds this approach, is the notion that all occupations can be thought of as offering different experiences and opportunities for growth, satisfaction and challenge. Because of these differences, then, occupations are said to provide the counselor and his client with a range of choices for the expression of impulses and for the employment of the client's individual personality defenses. The work of Holland (55), Roe (113), and Schaffer (119) gives testimony as to how it may be possible to classify work settings and individual positions according to their available modes of expressing and controlling impulses. For the reader who may be particularly interested in this position it would be well to read the early paper by Bordin, Nachmann and Segal (12) where attention is given to the expression of impulses, and where the authors classify the objects or things toward which impulses are directed, the masculine or feminine content of the impulse, and the nature of the emotional investment in the impulse and the final course of the emotion. As an illustration the practice of law might provide an individual with a ready and socially sanctioned opportunity for expressing verbal hostility in a direct and highly visible way.

Theoretical Integration: It should be cautioned that these four theoretical positions are far from independent points of view. To be sure, there is much work published in single projects which involves a combination of collateral theoretical elements from these four positions. Thus, Sewall, Haller, and Ohlendorf (124) have developed a model for understanding the mediating influences between social class and ability levels on the one hand and educational and occupational attainment on the other. Bellante (7) has studied the interaction among a series of demographic characteristics, the experience of vocational counseling and the productivity record in the work situation. Further, both the Self-Concept Theory and the Personality Theory of Vocational Choice share the conviction in their formulations that individuals move through various life stages or developmental phases in preparation for early employment and more ultimate employment. Nevertheless, in spite of the overlap in the applications of these conceptual approaches, there is good reason to believe that our understanding of how career-development evolves has been notably improved by investigators contributing to these four theoretical systems. For our purposes we need to specify in this summary chapter that the data developed in this study are employed essentially in the Trait-Factor, and to a lesser extent in the Socio-Cultural approaches. This should in no way be taken to imply a discounting of the Self-Concept or Personality orientations. Rather, the investigators respect these approaches, and would not only strongly encourage but openly endorse the counselor's use of data and belief systems pertinent to these approaches in conjunction with the information presented formally in this study. It would, indeed be comforting as previously suggested, to have available predictive data from these additional theoretical vantage points for regular use in working with deaf clients and their occupational problems.

B. The Data Collection Experience

During the early planning for this study a code of operation for working with the deaf community was defined. This bound the staff to: 1) give every potential study subject full opportunity to understand the objectives of the study and his role in working toward the objectives; 2) explain as clearly as possible the nature of the equipment used and how he, the subject, would be expected to interact with it if he decided to participate; and 3) structure the physical conditions to help subjects feel comfortable and fully secure. Despite these efforts many problems were encountered in reaching the deaf and in mobilizing their cooperation after they were located. These have been reported at length along with some of the coping mechanisms employed in working through such problems. The principal suggestions which emerge from this experience are that a research team should work from a base within the deaf community, while they use all possible authenticating devices, such as business cards and letterhead correspondence, in negotiating for the deaf's cooperation. At the same time they should prepare themselves for a flexible work schedule of appointment hours and a tolerance for broken appointments.

Thus, the enterprising investigator should give close attention to the quality of the transactions between the research team and the deaf public. Social Scientists have repeatedly warned against the danger of studying a minority or subgroup through the limited vision and conceptual framework of the prevailing or dominant culture. Tulkin (142) with interests in disadvantaged children, argues this issue convincingly. "The psychologist investigating developmental patterns among minority group children should attempt to understand the 'realities of life' in these populations, and how these realitities affect life styles. These insights could be developed in many ways: (a) living in the minority group community; (b) holding meetings with community people--not just professionals from the sameminority groups as the subject--to discuss any proposed research; and, most important, (c) including minority group (or community) members on the research team at every level of responsibility, from the initial planning of the project through the analysis and interpretation of data." Somewhat closer to home, Marvin Sussman (134) has suggested "that our knowledge about the deaf and their problems is deficient because we use a frame of reference fitted to the hearing world." McClure (87) in tracing the long and disconcerting history of the adoption of the Braille system for the blind documents the stubborn opposition of sighted "authorities" to the proposal despite the clear and dogged pressure of the blind for more than a century. It follows then that excellence of design and soundness of measurement cannot deliver a meaningful applied research program unless they are combined with an awareness that a community must ultimately decide whether to sanction the work and accept the informational product.

Data were collected for four years in Oregon. They were also collected in the Seattle-Tacoma area for one of those four years. During this time contact was made with 1690 persons for the purpose of screening deaf subjects. Difficulties in locating and getting cooperation from all those referred for participation, as well as the results of the screening of those who agreed to participate, narrowed the study down to 483 qualified candidates. Four study samples were constituted. Sample I was made up of the 375 fully examined employable deaf adults accepted into the study during the first three years' work in Oregon. During the fourth year of data collection, additional deaf adults were added from the Oregon population to bring the total of Oregon deaf in the study up to 399 persons--the group labeled Sample II. In the fourth year Sample III was organized from the 84 deaf enrolled and processed through the Tacoma-Seattle testing program. Sample IV is merely the composite of the 483 deaf persons which are present in the union of Samples II and III.

The reader will remember that we had originally hoped to identify between six and eight hundred qualified deaf in Oregon. Our best estimate of the number was, as a matter of fact, 578, or somewhat short of the hoped for number. Thus, we were able to fully enroll only 399 persons in Oregon, or 67 percent of our original best estimate of 578 persons. It is, of course, never possible to know with certitude how many persons who reside in a state possess a given set of personal credentials such as those we were employing in the screening activity. There is, then, no way to estimate what proportion of the true population of qualified deaf were located and enrolled in Oregon. By the same token there is no way to estimate how representative our Sample II is--that is how well it reflects the character of the target Oregon population of deaf adults wehad hoped to work with insofar as their attributes of education, geographical distribution, etc., are concerned. Furthermore, it is impossible to know how many of the 467 Oregon residents, who either failed to participate after being contacted, or failed to respond to letters of invitation, could have qualified for the study. Our intuitive guess is that we have enrolled and tested at least fifty percent of those deaf, who, under ideal circumstances, could have been processed. The proportion of eligibles enrolled may, all things considered, have been considerably higher--i.e., eighty percent or more. Accordingly, we contend that our study produced a sample of subjects which describes a significant segment of the "actual" numbers of the adult deaf within the defined age, hearing acuity, and employability selection criteria who were resident in Oregon during the study period. We cannot, however, on the face of it, know to what extent this sample typifies, or simulates a representative sample of the prescribed deaf population in Oregon. We shall return to this issue.

Our experience with the sampling effort also produced some insights which might be helpful to other investigators organizing sizeable surveys in the deaf community. We found that a majority of the persons referred as candidates, sixty percent to be exact, failed to qualify for enrollment by one or more of the screening criteria. Therefore among those who are generally perceived as deaf in the Oregon community, there was a very substantial group who proved to be inappropriate candidates for our purposes because of age, hearing level and/or employability. Screening of unfit individuals, therefore, took an important block of prime project time. The study log also reveals, that of the deaf referred for study who proved to be suitable candidates, and who participated in the program of interviewing and testing, that each such individual was recommended for study by an average of 2.64 sources. These deaf adults were therefore generally known to service agencies and were frequently referred to us as part of the family or friendship network of other deaf persons screened. To summarize the referral process, fraternal organizations, to which the deaf belonged, were the most fecund source of information about those who were not only to qualify, but to be included as acceptable subjects for study. Other significant sources of acceptable candidates who participated were word of mouth of other adult deaf, and informational leads from religious institutions.

In general, we also learned that the process of reaching and involving qualified deaf adults in the screening program proceeded much more economically when the contact for cooperation was handled by personal encounter rather than through mail contact.

Time estimates were also very difficult to forecast accurately in this study. We consistently underestimated time. One of the critical aspects of planning for this work was that each case to be screened had a "must" quality about it in terms of a sampling frame. In this sense when study candidates were located in remote, somewhat inaccessible locations, and where the mails failed to achieve preliminary contact, it proved to be a disruptive drain on resources to trace the candidate, to obtain cooperation, and to conduct the screening--all propaedeutic to the collection of the core program data. Further, there are various forms of individual or family resistance in seeking participation and cooperation, which need to be managed carefully. Travel time, as well as staff and study subjects' inconvenience are costly adjuncts to the process of data collection and should obviously not be overlooked in planning state-wide or regional study programs.

Once candidates passed the screening program they were asked to furnish considerable background information about themselves. As part of this information-collection package, data were gathered relevant to six criterion measures of work adjustment. Four of these work adjustment measures were actually used in the results. In addition, each study subject underwent a six to seven hour test experience along with an extended interview, which provided 38 different measures to be analyzed for their potential as predictors of work adjustment. We need to emphasize at this point the importance of controlled conditions for interviewing and testing the deaf client. While this problem clearly pervades the entire domain of counseling, it needs to be firmly accentuated in the case of the deaf client, whose victimized defensiveness about testing is so often pronounced and so often justified. Little evidence need be marshalled to support the contentions that personnel offices in industry all too regularly ignore defined standards in their applicant testing and interviewing practices (Rusmore, 115). We simply, but strenuously, admonish against the mindless and perfunctory testing and interviewing of deaf clients. Furthermore, we recommend against the use of our normative data and their associated body of inferences in settings which fail to observe responsible techniques in testing their deaf clients.

Moving on then with our review of the interview data, we are able to piece together a portrait of the adult deaf who were studied in Oregon. This portrait is summarized for two domains: 1) the non-occupational, and 2) the occupational. With respect to the non-occupational information we can draw a profile of what a fictive average adult deaf would look like as we examined him. He:

1. Has completed something more than a grade school, but something less than a high school education;

2. Has, during his school years, been enrolled for a greater absolute period of time in a residential school than in a public or a day school;

3. Had typically come to own a home rather than to rent a home or to live as a boarder in a group residence;

4. Owns an automobile, or is able to conveniently use one belonging to another;

5. Supports the use of a phone in his own residence or is able to conveniently use one in a neighbor's home;

6. Has been married and remains actively involved in his original marriage;

7. When married, lives in a conjugal family with one other deaf individual;

8. Is the only member in his family of origin who was deaf; and

9. Exhibits left-handed preference somewhat more frequently than might be expected.

With regard to the occupational information we derived a similar profile for the so-called average adult deaf studied in Oregon which suggested he:

1. Can be classified vocationally on the first digit of the D.O.T., in better than 75 percent of the cases;

2. Is found most probably in the machine trades, and then, in order of likelihood, in bench work, in professional and managerial work, and in some limited number in clerical and sales work;

3. Is most probably not found in farming and processing work;

4. Is more likely underemployed in comparison with hearing persons working in Oregon insofar as the proportion of deaf and hearing persons working in professional and managerial positions, and in clerical and sales work is concerned, and to some less discernible degree in service occupations;

5. Is more likely (proportionately) to be employed in Oregon in machine trades and bench work and to some minor degree in processing work than are members of the hearing population.

6. Has an unemployment rate of 21 percent against an estimated figure of 4.3 percent for the State at the time; and,*

7. Is receiving an average monthly wage or income from employment which appears to be 140 to 200 dollars below that reported for the State's general working population.

*Point 6 should be appraised with special caution because 1) this study did not enumerate unemployed housewives unless they were actively seeking work, and because 2) the unemployment rate reported in this study (21 percent) is, in the main, attributable to the adult deaf woman.

The reader is reminded that the portraits reported in the above description of the Oregon deaf adult are based on what may be a non-representative segment of the relevant deaf population in the State. Moreover, the relevant target population, about which we organized this study had restrictions on age, level of hearing and employability--restrictions which are surely not imposed in reporting state-wide information on employment for the general population. It should also be kept in mind that the data available on the deaf living in Oregon are based exclusively on a select sample of the base population, being limited to those who were found to qualify and who were willing to participate in the study. The careful reader will need to decide for himself how much weight to attach to the various possible sources of incompatibility which may exist between the study sample of adult deaf and the general population which serve as a base for Oregon's employment statistical reports. For our part we are inclined to believe that the dissimilarities in occupational adjustment between the study deaf sample and the general Oregon employment picture are not only striking, but real. We are therefore prepared to assert that the deaf employable adults, when employed, were involved in less prestigious and less well-paying employment than the Oregon general population. How much of this deficiency in working perspectives can be attributed to real unalterable deficits in vocational capacities or skills in deaf employable adults, how much to modifiable deficits in their capacities, and how much to lack of equivalence in working opportunity for the deaf remains unanswered from this data. What is clear is that while large numbers of deaf are employed in white collar, professional and clerical work, the proportion of deaf so employed, is disarmingly low.* This suggests that either those adult deaf of superior ability and most obvious talent are, for the most part, already employed in the more desirable working positions, and/or that training has been successful, in part, in projecting a fortunate number, but unfortunately small proportion of adult deaf into higher prized positions, and/or that pockets of acceptance in white collar and professional occupations have gradually opened to the deaf adult, pockets which need to be resolutely expanded. Much the same could clearly be said for the detailed deficiencies in the rate of employment and pay reported for the adult deaf.

*Crammatte (26) reports 17 percent of the deaf population employed in white collar jobs compared to 47 percent of the general U. S. population.

This representation of the deaf adult's position in the Oregon world of work brings to mind the connection we noted between vocational guidance and the democratic process. Deficiencies and inequities in vocational opportunity experienced by a single employee have implications for a great number of employees. Bjorkquist (10) admonishes that:

> "The full utilization of manpower implies the employment of all those in the labor force, as well as the optimum use of the talents of those who are employed. Individuals with aptitudes and ambitions exceeding those required by their jobs might well be considered underemployed and a deterrent to the full utilization of the labor force. Such underemployed persons not only hold positions requiring something less than their full abilities, but also block the employment of individuals who might be better suited for those jobs. In the period when the rapid expansion of technology in industry has placed a strain on the supply of competent technical workers, the identification of underemployed workers and their retraining for more technical employment have become important problems."

Given then such persuasive evidence of discrepancy in the work adjustment of deaf adults this program of research was undertaken to determine whether meaningful information could be produced in collaboration with members of the deaf community to improve their work adjustment opportunities. The approach taken was a conventional one in guidance studies emphasizing the trait-factor and the socio-cultural theoretical positions already described in this chapter.

C. Research Design

1. Validity Coefficients

The essential purpose of this study was stated early in the initial chapter to "enhance the level and quality of information about those behavioral strengths, deficiencies and peculiarities of the deaf which may have relevance for their work performance." This is a matter of establishing reliable connections between an individual's vocational performance and his vocational testing behaviors and his personal background. The process of searching for and establishing such connections between background information or test behaviors and work behavior is called validation. One approach to the estimating of validity is called concurrent validity. In the general case concurrent validity is expressed as a correlation coefficient, i.e. as a statistic summarizing the relation between a test score (or a piece of demographic information) earned by a group of people participating in a standardized study, and some measure of their work performance. It should be noted that both the test score, and the on-the-job performance measure are both available at the time that the test data are collected to compute a concurrent validity measure. The reason for assembling such test data is then to use them as a kind of yardstick against which to compare the test performance--and to estimate potential work performance--of future job applicants. In this way the concurrent validity approach involves using test information from one group of individuals in a defined setting, or assemblage of settings, and projecting it forward to other individuals interacting with the same tests in a broad range of settings.

Test construction specialists generally urge that concurrent validity information be repeated in facsimile settings, so that the predictive efficiency of the coefficients can be enhanced over time and work settings. This is merely another way of pointing out that the process of validation never ends, and that the validity indices which have been produced in this study are published with the invitation to be challenged and revised with additional experience.

What is to be expected when concurrent validity data are subjected to subsequent examination? Both Peterson (102) and the members of the Task Force on Employment Testing of Minority Groups of the American Psychological Association (3) agree that validity coefficients, which yield from simultaneous testing and derivation of job performance behavior, tend to understate the true or authentic degree of relationship. The principal reason given for this is that when a group of individuals is selected by previous longitudinal experience from a larger original group, so that the residual group represents a restricted range of talents and abilities, the correlation is most always attenuated. In the establishment of concurrent validity, we, as a rule, find ourselves examining a group of individuals on a job. This group is generally a leftover mix of a larger original group, some of whom have departed, because they failed and were terminated, or because they were successful and moved to more rewarding positions. On the other hand there is a compensating shortcoming with validity coefficients based on test scores collected from employees who have been employed long enough to be evaluated for their work performance which is not alluded to in the work of the American Psychological Association's Committee report. This difficulty is based on the fact that test information so collected may reflect a significant element of skill or functional behavior developed directly in the work situation. One should clearly not expect a novice applying for this type of work to reveal such skill or behavior in his test response. In this sense, then, one could argue that the predictive power of the test would be overstated using the concurrent validity method.

Another important question which needs to be clarified in interpreting validity coefficients is the matter of the magnitude of the correlation. Generally validity coefficients don't rise much above .60 in adequate samples. Cronbach (27) puts the case succinctly.

> "Although we would like higher coefficients, any positive correlation indicates that predictions from the test will be more accurate than guesses. Whether a validity coefficient is high enough to warrant use of the test as a predictor depends on such practical considerations as the urgency of improved predictions, the cost of testing and the cost and validity of the selection methods already in use. To the question 'What is a good validity coefficient?' the only sensible answer is 'The best you can get.'."

Why are validity coefficients likely to be of limited magnitude? There are two conventional answers to this question. One focuses on the fallibility of tests as predictors. The other deals with the criteria which have been employed typically in the classical validity model. To begin, it needs to be understood that tests are merely surrogate devices used to obtain information, which might better be obtained by placing an individual directly in the working situation on a trial basis. In this sense short term job performance would be used to predict longitudinal job performance--a less economical, but perhaps more powerful assessment approach than is the test route. The problem for validity studies inherent in conventional work with criterion measures, such as those used in this study (the extent of employment, the type of employment, and pay rate) is that the individual applicant or worker does not have clear and lasting influence over them. Another way to say this is that these criteria are too often, "several steps removed from job behavior" (Wernimont and Campbell, 149). Accordingly, Dunnette (31) and Smith and Kendall (126) have argued for the strict reliance on job behaviors as criteria in the vocational prediction equation, as against the more usual outcome variables, which are so bound up with community and organizational influences. These authors have, indeed, reported more convincing validity measures using behavior based predictors and criteria.

2. Test Norms

Test scores usually have no fundamental intrinsic meaning. They absorb meaning and become useful only when we fit them into a frame of reference. Test norms provide such referential information for the counselor. For example, they instruct him as to which groups or reference populations he may compare a given deaf subject's test score. The position that a given client occupies within the distribution of test scores for a given group is rather crucial information for the counselor and his client--assuming, of course, that the group is an appropriate reference group for his particular client. Magnusson (85) makes this point nicely. "If we wish to employ an individual as an office worker we should base the assessment of his capacities on a comparison with what good office workers achieve on the test battery, not on a comparison with what good factory workers achieve." Norms should then obviously be based on as large a sample of the reference group as may be economically assessed. They should also be based on a representative sample. Further, norms should invariably be supplemented with data about the size of the sample employed, the average test score and some measure of variation in response as is reported in Table 4 of this study. Our initial study norms (Table 5) are founded on a sizable sample of deaf adults. However, their representative quality is, as already testified to, not clear. Keeping this limitation in mind, we have provided norms in Chapter 4 for employable deaf adults on nine tests and 31 subtests. These norms are based on the performance of the deaf in Sample II, inasmuch as this is the largest group of deaf tested, for which we have reason to assume some degree of representativeness in subjects examined. Two sets of norms are provided: standard scores and percentiles. In addition separate norms are designated for deaf males and females for the nine Weingarten Interest scores. Of special interest to the counselor is the evidence that deaf adults can be tested quite successfully. We emphasize this point because of the persisting question in the minds of professional counselors with regard to the motivation of deaf persons and the assumed general refractoriness of the deaf for doing well on paper and pencil tests. It also seems to have become first nature to avoid language-loaded test material with the deaf because of their well-chronicled language or vocabulary deficiencies and poor performance on abstract reasoning. Yet, our evidence indicates that despite these assumed intellectual handicaps, our subjects were, indeed, quite able to respond to the test material not only actively, but incisively. There were few instances (apart from the Berger Block subtest--which was based exclusively on auditory reception) where tests proved to be beyond the grasp of the deaf, just so long as the deaf were given the benefit of considerate, well-structured instructions. Indeed, if we compare the norms for the GATB, which this study produced, with those reported from three other studies in Chapter 1, we find support for our attention to the special needs of the deaf individual in helping him deal with the demands of the testing condition, and particularly in reducing the possible unfair discrimination against him which most standardized test instructions impose.

FINDINGS	GATB AVERAGE RAW SCORES								
	G	V	N	S	P	Q	K	F	M
Composite Results	79	73	82	100	107	99	103	100	106
Results this Study	86	83	85	106	110	115	105	96	98

The current study results exceed the average score computed (by us) for seven of the nine tests for the 411 deaf individuals examined in the Boatner (11), Lavos (79), and Kronenberg and Blake (76) studies. For some reason the Finger Dexterity (F) and Motor Dexterity (M) scores for the Oregon study sample were lower than those in the work of the referred to investigators. This discrepancy does not appear to be a function, however, of the testing technique employed in this study. If the reader will examine the F and M scores obtained by the study examiners working in Washington (Table 4) it will be seen that the 84 deaf in Sample III did much better on manual dexterity and somewhat better on finger dexterity than the Oregon deaf samples. Despite the apparent benefits which our testing format may have afforded the deaf adult, we must conclude that a clear deficiency exists in handling test material with a heavy language loading (G.V.N. on the GATB) in contrast to hearing adults.

Space limitations preclude a more complete review of this initial set of normative data. We do want, however, to emphasize three additional elements in these norms: 1) the comparative normative findings for the GATB-G and the Culture Fair g tests with Sample II in Oregon, 2) the Bender Gestalt findings, and 3) the relation between the interest inventory norms for adult male and adult female deaf. The Cattell Culture Fair Intelligence examination, it should be remembered, is a non-verbal instrument made up of geometric figures employed in a paradigm which elicits information on reasoning ability. Its principal virtue is that it is supposed to be free of cultural influences. In reality, the term "culture fair" is a kind of fiction. For good or ill, any test which elicits information can hardly be free of cultural influences. Its selection as one of the tests administered in this study was guided, nevertheless by the expectation that it might prove to be a reasonably equitable general intelligence test for the deaf with its limited language involvement. Tables 5.01 and 5.10 lend support to this proposition. The average raw score of 100 earned on both tests by the hearing population was attained by 38 percent of the adult deaf responding to the Culture Fair and by only 25 percent responding to the GATB-G. We shall continue to compare these two tests as we move forward with this summary chapter since the paramount question about their comparative worthiness has to do with their validity coefficients. Turnball (143) has put this issue in perspective.

> "It is my contention that on a predictive test any score difference between groups whose backgrounds differ should be judged not good or bad, not right or wrong, but useful or not useful, valid or invalid for the prediction of future behavior. We must specify the criterion we wish to predict, and then justify intergroup equality or inequality of test scores on the basis of its effect on prediction."

The findings with the Bender Gestalt indicate a very obvious deficit in visual motor performance for adult deaf. Numerous studies--Bender (8), Koppitz (73,74), and Kerr (69) document a consistent relationship between academic performance in children and their visual motor competence. The only systematic study found in the literature specifically on the deaf is a study by Keogh, Vernon, and Smith (67) who examined deaf youngsters in a residential school with the Bender Gestalt. Their results reveal that deaf children were two or three years behind hearing children of comparable chronological age in visual motor performance. Also of interest in that study is the observation that, as improvement in test performance occurred with age in the deaf child, the configuration of improvement was very similar to that found with maturation in hearing children. If the maturational pattern of improvement in the deaf and hearing are the same or similar, one would wonder: 1) why the apparent deficit in the deaf child; and 2) whether the adult deaf would with additional experience eventually reach the performance level of the hearing adult. Melzach (89) suggests one possible explanation for the deficit in the proposition that the early restriction of sensory input often leads to deficit or disruption in perceptual processes. Whatever the basis may be for this reported visual-motor deficiency in the childhood performance of the deaf, our data indicate that the impairment is not overcome in the course of the maturational process.

As for the comparative data for the two sexes on the Weingarten Picture Interest Inventory, the norms indicate that the adult male deaf expressed lower interest in the domains of interpersonal and business activity than did the adult female deaf. Little difference in interest for vocational investment was expressed in esthetic or scientific pursuits by the two sexes. Male adults appeared to be more favorably disposed, however, toward natural and mechanical elements in vocational interests. These distinctions are substantive evidence for the value of analyzing normative test data taken from the deaf by a number of population subgroups. Thus, the use of "sex" here as a kind of classification variable for studying vocational interest patterns in the deaf illustrates the part that subgrouping of population may play in making more accurate (valid) predictions of vocational adjustment, Ghiselli (44). It should be clear that a test, or for that matter any predictor, may be more useful in relating to a criterion measure with men than with women, with the aged than with youth or with individuals characterized by early onset of deafness as opposed to individuals whose history reveals a later onset of deafness. It is in this direction of stratifying our population norms that our second set of study norms was organized.

The second set of test norms are presented in graphic form as thirty-nine plots. Tukey and Wilk (141) have suggested that graphic data can be much more provocative than tabled data. They believe such data tend to instigate insights which normally don't yield from mere numerical summary. The careful reader will not only pick up valuable information about the deaf in Oregon from these plots, but he should get a kind of "fingertip" impression of how different subgroups of deaf adult performed on a single test, or across tests. Our first introduction to validity information comes then in profile form which reveals rather marked discrepancies in test behaviors of deaf individuals with differing age, sex, hearing deficits, etc. In addition to learning how deaf adults behave on the many tests in the study battery, the thirty-nine profiles give us reason to wonder about the tests themselves--i.e. how they interact among themselves in providing information to the counselor and deaf client. It is possible then to not only gain impressions about the deaf's test behavior, but also about the "behavior" of tests from these plots. Tests, much like subjects, may show differential capacities to discriminate and to perform different kinds of work. For the counselor the task then is not simple: he must be able to estimate the functional potentialities both of his client, and of the formal assessment devices which he employs in his practice. We therefore commend the thirty-nine plots as one fertile source of knowledge which can lead to more confident coordination of tests and clients in the cause of better counseling results with the adult deaf.

3. Simple Validities

Four independent studies of concurrent validity are also discussed in this report. Two of them, based on two work classification schemes (CM II--The Type of Employment and CM VI--Complexity Demands of Current Position), were investigated by means of the analysis of variance model. The remaining two studies were performed on CM I--The Extent of Employment and CM III--Current Monthly Pay Rate. The analyses for the latter two studies employed the more traditional correlation coefficient as a validity index.

Given the validity data generated in these analyses and assuming that deaf clients and their counselors possess the capacity to effectively collaborate in gauging the job marketplace and the client's position in the deaf community, it should follow that vocational guidance can be a beneficial experience in promoting the deaf adult's sense of occupational and social fulfillment. A number of important inferences may be summarized from this data. To begin, it should be abundantly clear that the instructional-training requirements which these complex data place on the counselor, coupled, as they must be, with specialized communication training testify vehemently against the all too common, custom of referring the deaf client to the generally well-trained, well-intentioned counselor, who has not had specialized training for serving the deaf. It should also be clear that regular appraisal of regional, and in some cases, local employment trends as they influence hiring and working conditions for disadvantaged groups, such as the adult deaf, are indispensable elements in the counselor's informational reference system. Further, as the counselor comes to recognize the importance of distinguishing the requirements of his role with deaf clients from the time honored role with hearing clients, he must avoid the temptation to perceive the deaf as a simple undifferentiated group. In marked contrast to this habit of thought our study data reveal very broad differences in temperament, experience, and capacity to profit from experience among deaf adults. It is these differences among the deaf, and our beginning, if, as yet, humble appreciation of their character, that give this study its true perspective and purpose. It is also our contention that these demonstrated differences among the adult deaf are involved not only in the processes of job selection and work success, but as well in the impact a particular work experience may have on the deaf employee. We are suggesting then that it may be interesting in future work to go beyond this study, in which we have found very sharp differences in test behaviors of deaf adults in various strata of occupational adjustment, to try to uncover companion differences, for example, in social convictions and political beliefs in deaf adults who have achieved one or another level of vocational success. The work of Converse (22), Centers (19), Stouffer (128) and Hyman (62) attests to connections between the hearing populations occupational adjustment and attitudes toward government involvement in the lives of the governed, tolerance for non-conformity and conservative-radical movements, and willingness to consider high levels of risk as opposed to "playing it safe." Such information collected about the political and social convictions of the adult deaf should offer interesting opportunities for expanding the net of validity findings. In this sense the work of the present report might be enriched through a kind of construct validity study, in which the underemployed deaf (defined by test battery scores) and the appropriately employed deaf (similarly defined) would be compared in terms of their political and social convictions.

There is yet another vital suggestion for the counselor of deaf adults which should be gleaned from the validity studies reported in this investigation. This is the clear and compelling evidence that the counselor and his deaf client need to specify the objectives which are to be achieved through their working relationship. First, it is apparent from the validity information that the predictors relate differently to the four criteria of work adjustment employed in our effort. Second, and happily, while the predictors have diversified capacities, there is an ample supply of valid predictors which can be collected economically for any of the examined criteria. There should then be no reason for the counselor to be less than discriminating in selecting the best possible battery of tests and background data in assisting a deaf client move toward a specific vocational objective. This brings us to Table 17 which contains the relationships among work criteria for adult deaf, as taken from our study. It should be apparent that the criteria vary in their interrelatedness from a low association of .02 between the Number of Months Worked and the Occupational Classes as categorized by the first D.O.T. digit, to a high relation of .44 between Months Worked and the Kerr Occupational Classes. Within our pool of work adjustment measures it is clear that some are quite independent of others, while others show modest relationships.

In summary we may conclude that all predictor measures, other than for residual hearing in the better ear, day classes, and residential school revealed meaningful and useful validity as predictors of one or more measures of work adjustment in the deaf adult (Table 10). Further, the evidence is that the four criterion measures developed for appraising work adjustment appear to have sufficient independence to justify their use in this study and to have application in everyday counseling practice.

TABLE 17

RELATIONSHIP AMONG FOUR OCCUPATIONAL ADJUSTMENT CRITERIA*

	PAY RATE	MONTHS WORKED
PAY RATE		
MONTHS WORKED	+ .31	
KERR GROUPINGS	+ .21**	+ .44**
D.O.T.--1ST DIGIT	+ .07**	+ .02**

*No relationship was computed between the Kerr and the D.O.T.--1st Digit classes.

** The relationship was estimated in these instances using Hays' (52) measure of strength of association (w^2) as applied to one-way analysis of variance.

4. Multivariate Studies

Three principal issues have been reviewed in this chapter now with respect to the deaf samples studied. We have explored some of the information collected to provide a broad description of the deaf adult studied. We have then looked at some of the highlights of the response of the deaf to the test battery. And then we examined the relationship between the individual test behavior--test by test-- and the adjustment of the deaf to the world of work.

In preparation for the next section of this chapter, in which we will define a minimum test battery, we now want to briefly recount some data derived in the multivariate analysis programs we undertook. In the factor analysis performed, the empirical connections among tests were defined. They tended, in general, to support the intuitive classification of predictors composed earlier in the study as background, ability, interest and communication classes. While the stepwise regressions were informative, they were also disconcerting because of the limitation in numbers of subjects available for some of the analyses. Apart from this limitation, this data should be extremely useful to the counselor. That is to say, when used in combination with the factor analytic data, the regressions should be great time savers in selecting tests and test interpretation weights in working with deaf clients. The counselor will hopefully also be open to the powerful mandate which the multivariate study results give to demographic information. In many instances the relevance of such inexpensive-to-collect information far exceeds that of costly test-elicited-data.

D. A Minimum Test Battery For The Working Counselor

If we were asked to select an all-purpose population classification for predicting Months Worked or Pay Rate, we would select the breakdown by Sex of the Client. Any deaf client regardless of age of onset, level of hearing disability or work history can be examined conveniently against the stepwise regression information organized in this study by male or female subgroups. First, our analyses by Sex of the Client are based on a sizable number of deaf adults. Second, because the stepwise regression analysis is the most discriminating procedure employed for detecting valid predictors which are both powerful as well as efficient, we now list a basic battery of tests and background data derived from Tables 14 and 15. These variables may be thought of as providing the essential kinds of information for working with either sex in attempting to enhance adjustment with respect to Criterion Measures I and III.

<u>For Male Deaf</u>: <u>Test Data</u>

Berger Block II
Bender Visual Motor Gestalt Test
GATB--General Score (G)
GATB--Manual Dexterity (M)
Weingarten Verbal
Weingarten Natural
Weingarten Esthetic

<u>For Female Deaf</u>: <u>Test Data</u>

Gottschaldt Concealed Figures
Weingarten Esthetic
The Holdt Speech Characteristics Test:
Speech Intelligibility Score
The Oregon Manual Communication Test:
Reading Score

<u>Male and Female</u>: <u>Background Data</u>

Age
Age at Onset
Education

The reader will note that there is only one test which is generally advantageous with the two sexes--the Weingarten Esthetic score. It is also clear that the pattern of basic tests in the two batteries is rather different: the battery for males is largely focused on ability tests and interest tests: the battery for females is weighted more heavily on communication test information. Further, the skillful counselor using this battery will have to spend about 4--5 hours testing male deaf clients, and only 1-1/2 to 2 hours testing female clients. And finally the reader will recognize that, if the counselor working with the deaf is more concerned with Criterion Measure II (Type of Current Employment) or Criterion Measure VI (Complexity Demands of Current Position), that the eleven tests in the recommended basic battery along with the three recommended background variables offer a good selection of valid predictors for these criteria. For this study then we identify these tests as the most useful predictor elements worked with in this study which may be employed most prudently with deaf adults involved in the vocational guidance process. For the counselor of the deaf unfamiliar with any one of these instruments, and unable, for any reason, to become proficient in the application of a given instrument we urge a review of the factor analytic structure reported in Chapter 6 for reference to substitute tests which may be most profitably surrogated.

E. A Concluding Statement

Most comprehensive investigations of the vocational opportunity and adjustment of the adult deaf which go beyond an attempt to standardize a single test, or to assess a single intellectual or personality function tend to be heavily descriptive in character - Boatner, Stuckless and Moores (11), Crammatte (26), Gellman (42), Kronenberg and Blake (76), Lunde and Bigman (84), and Schowe (121). As such, the usual format followed in these studies is to relate experience in impressionistic or anecdotal sketches. Some of these studies also produce statistical data presented descriptively in summary form usually as averages or proportions. The work documented in this report has been carried out as a somewhat more rigorous and systematic study. That is to say, it was formulated with well-defined sampling criteria and clearly spelled-out data collection procedures. Furthermore, the data processing plan was facilitated by high speed computer to assure the full exploitation of available information. It is in this latter connection that this study represents a departure from the mainstream of work reported in this area. Accordingly, the data yield a great number of population parameters for the deaf, which are then defined and tested for inferences about the practical value they may be to the counselor helping deaf adults find an appropriate role in the working world.

Our attempt to summarize the significance of the data disclosed in the previous pages will be limited to some rather general remarks about what we have learned.

1. That adult deaf as a population will participate cooperatively in research programs.

   It should be clear that adult deaf, much like other "minority groups", harbor realistic reservations about their involvement in research enterprise. Given an opportunity to be represented in the organization and implementation of the program, and provided with understandable and self-serving objectives the deaf will respond in good numbers, providing their involvement is, in their experience, not personally discrediting. There will also be a significant number of adult deaf who will, much like hearing candidates for research study, be resistant to participation. Some of these who resist will likely not choose to participate, irrespective of how palatable the invitation may be made by the investigators. The planning of large scale studies should therefore include provision for treating sample or population attrition.

2. <u>That once adult deaf persons have agreed to participate in research activity the investigator can expect good cooperation, but must be prepared for certain idiosyncratic reactions.</u>

   Our experience teaches that once contact is established with members of the target deaf population, and once agreement to participate in the program is obtained, that participation can in general be anticipated. It was also learned that the deaf as a group don't always share the hearing population's standards about time and place. Our understanding of this problem is not to presume an underlying recalcitrance or irresponsibility among the deaf, but to believe with others Rileigh and Odom (112), Fraisse (37) and Hirsch (54) that individuals whose sense of hearing is impaired cannot accurately detect temporal changes. Consequently, they often fail to develop (or, in fact lose) an accurate sense of time and regard for time-dependent relations.

3. <u>That the deaf compete less than as equals with the hearing population in terms of psychological test performance and in practical life experiences in work achievement.</u>

   On the face of it, the education and socialization processes impinge on the deaf child in uncommonly complicated and deviant ways in contrast with the hearing child. Guidance workers need to keep these distressing dynamics in mind when working with the deaf adult. In this sense, the counselor should be trained to avoid the tendency to feel superior, or to be condescending in response to his client. Limitations and strengths in the deaf client need to be scrupulously assessed and defined both with respect to other deaf adults and the hearing adult: social bias among educators and employers needs to be uncovered and treated carefully: and realistic pathways and goals for occupational adjustment need to be carved out collaboratively by the counselor and his deaf client.

4. <u>That the deaf public much as the hearing population reveals wide individual differences.</u>

   Any impulse to treat the deaf as a homogeneous segment of the total population reflects a clear prejudice against available data. To maintain an image of the deaf adult as a member of an undiversified group is to treat the deaf summarily and without regard to the wide range of talents and skills they possess. It would be hoped that counselors working with the deaf have by this time renounced the shopworn stereotypes which so long characterized the deaf and which have now been discarded by knowledgeable workers. Our data point indisputably to profound differences in life experience, in cognitive abilities, in motor functioning, and in communication competencies among deaf adults. Individual differences among the deaf are as prevalent as among the hearing.

5. <u>That there is a series of prevailing myths about the inability of the deaf to respond adequately to certain types of test material.</u>

   The counselor intending to work successfully with deaf clients needs to be skeptical about the wealth of prohibitions scattered throughout the literature admonishing against interest tests, language-laden tests, tests of abstract reasoning, and the like. This report provides norms for deaf adults on a multitude of test instruments. In some instances it also gives information on the comparative performance of hearing subjects. And in all instances it provides the essential information--not heretofore available in any substantive sense--about the connection between the deaf individual's test performance and his potential for different forms of work adjustment.

6. <u>That the differences among employable deaf in personal history and test behaviors are related to differences in work adjustment.</u>

   It was determined that an informed counselor, employing systematic, and meaningful data-collection techniques with adult deaf clients would elicit not only more, but also more reliable information in working with deaf clients. Special cautions need to be observed in employing test materials with the deaf. Given such discreet care in relating to the deaf adult the evidence indicates that relationships obtain between demographic characteristics and test behaviors in the deaf and their work achievement as measured through a variety of approaches. The nature of these relationships is complex and not always readily apparent. For example, the relationship varies depending upon the criterion measure of occupational achievement employed. We also find negative relationships between certain measures of subject characteristic and test behavior.

7. <u>The use of historical information and test information provided by deaf adults is made more trustworthy in the process of validation by applying it with discrimination to various strata of the adult deaf population.</u>

   The evidence is that the utility of predictor information as developed in this study may be notably improved by applying it with subsets of the deaf population. Perhaps the most easily employed stratification is that organized by the Sex of the Client. Other somewhat more restrictive, but nevertheless promising, population breakdowns were found to be those based on the Age of Onset of the hearing deficit and Education of the Client.

8. <u>That the obligation assumed by the professional guidance counselor to assist the deaf client achieve the most proficient vocational adjustment possible is facilitated by identifying practical occupational objectives.</u>

   Since predictors relate selectively (both individually and in combination) to various adjustment criteria, it follows that one, if not the cardinal responsibility to be discharged in the counseling relationship, is the process of exploring adjustment objectives and distinguishing those which may have the most particular relevance for the individual deaf client.

9. <u>That the vocational counselor incorporates a broad-spectrum perspective undertaken with respect for community, family, and client.</u>

   It is clear that deaf adults behave in divergent ways in contrast to sensory intact adults in relating information about themselves both in interview experience and in psychological test performance. It is also clear that the tests reviewed in this study vary in their capacities to evoke responses in their interaction with the deaf. Counselors should therefore be well-trained in their understanding of the response potential of the deaf. They should also be familiar with the eliciting potential of tests designed for use with the deaf. This, however, is not enough. Coupled with such training must also be a positive disposition to appreciate the complex influences of family and community as they mediate access to and attitude toward risk and opportunity.

There are also a number of crucial recommendations which emerge from this work and which could profitably be the focus of supplemental studies.

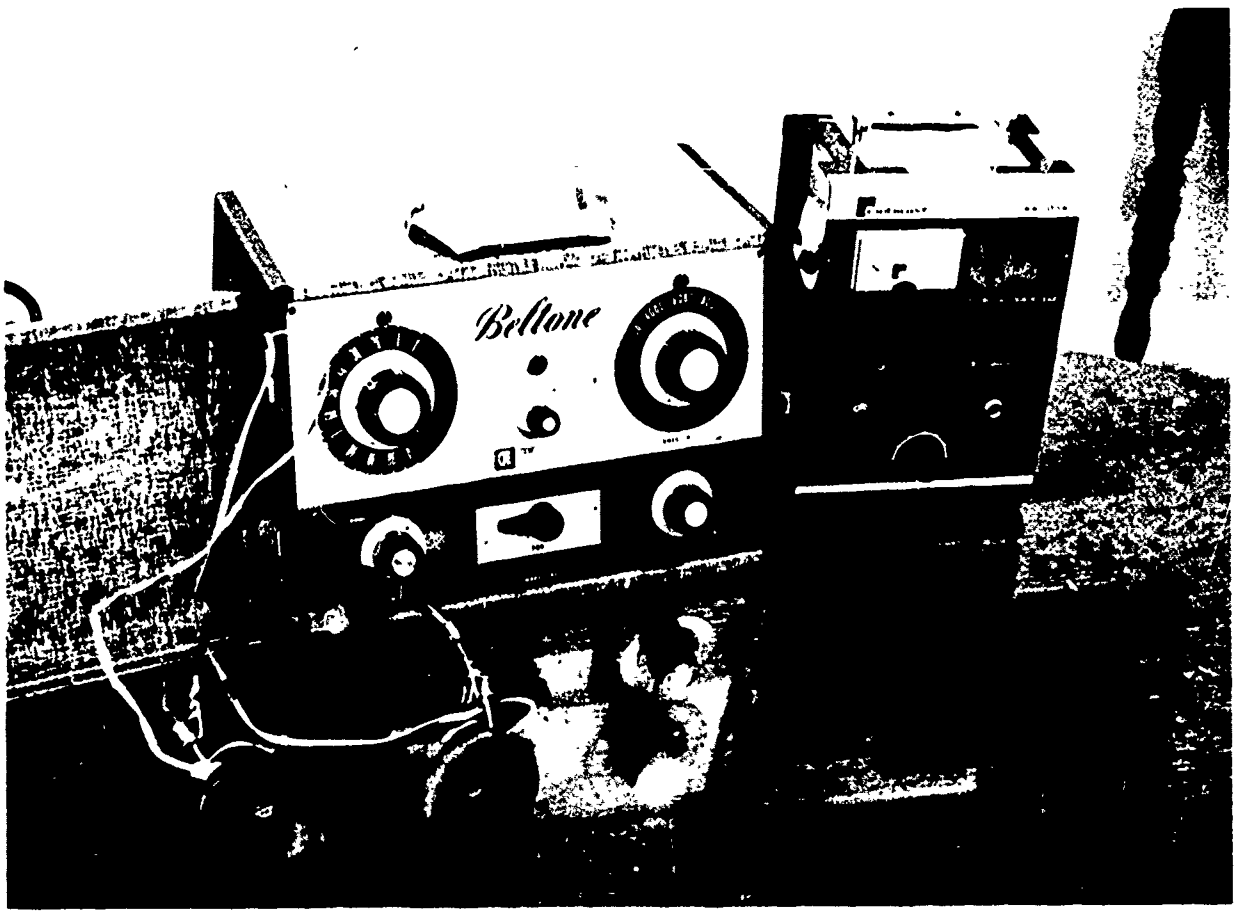
a. Studies need to be supported which would employ the findings developed here prospectively with high school seniors in an effort to estimate future adjustment potential (true predictive validity studies).

b. Studies replicating our methodology should be conducted in other areas of the nation than the Northwest.

c. Studies concentrating on circumscribed groups of deaf workers (professional, clerical, etc.) need to be developed, where the sample size is large and where subgroups or strata of our occupational classes can be examined.

In conclusion, it is hoped that this report has helped to sort out some of the bewildering tangle of belief and perception about the deaf and their vocational potential. If the counselor's effort can be even minimally improved by this report much has, in fact, been accomplished. Levine has suggested that "progress begins with effective research." She has also suggested (81) that researchers are today more actively, "rubbing shoulders with their professional associates--and not infrequently drawing sparks". It would be our hope that this research may produce the spark which illuminates for some deaf persons and their counselors the road to more adequate helping relationships and life adjustment.

APPENDIX 1



BELTONE PORTABLE AUDIOMETER, MODEL 110

APPENDIX 2

INSTRUMENTS AND EQUIPMENT USED IN TEST ADMINISTRATION

1. Beltone Portable Audiometer, Model 110

2. Bell & Howell Color Motion Picture Projector, 16mm

3. Peg Board (Manual Dexterity)

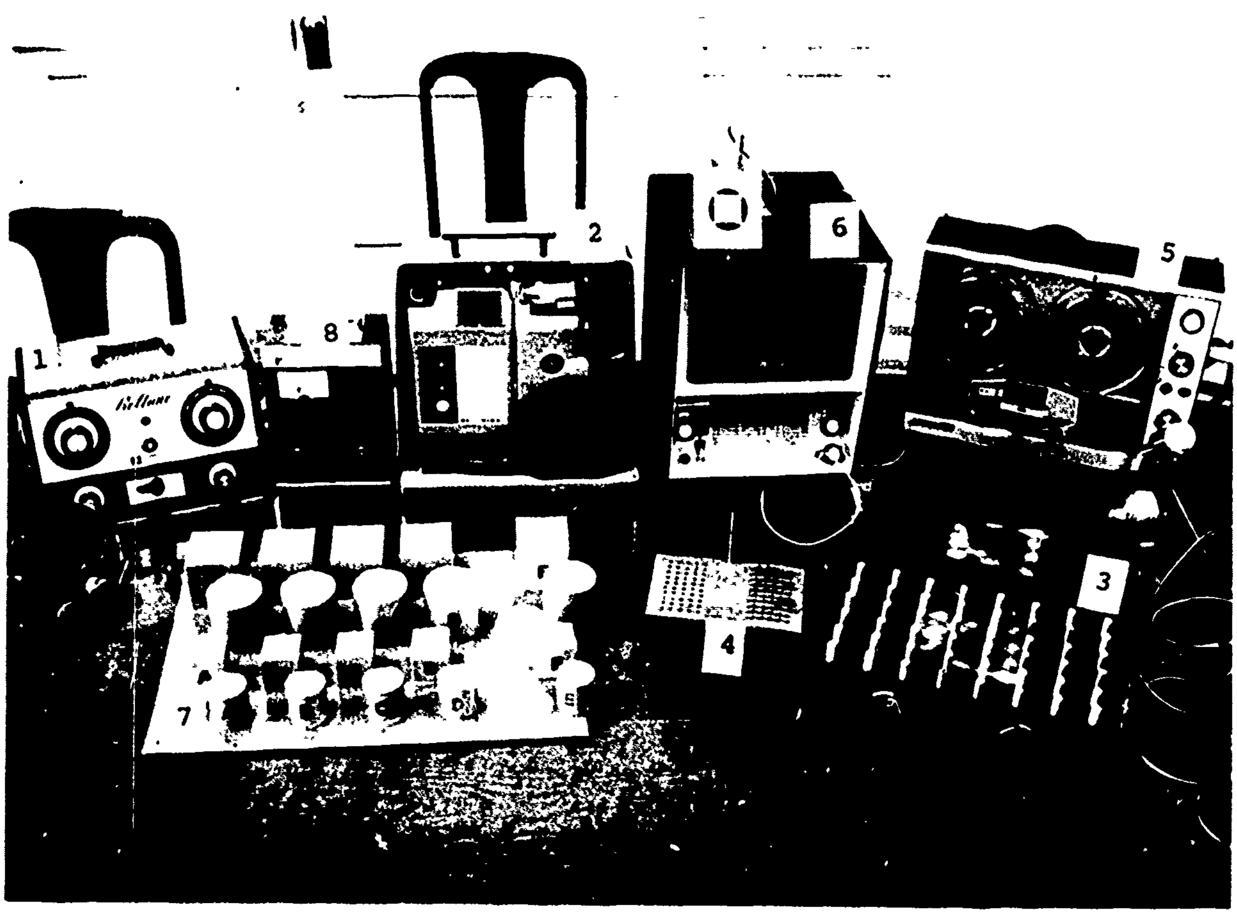
4. Finger Board (Finger Dexterity)

5. Ampex Tape Recorder and Unidirectional Microphone

6. Fairchild Mark IV Projector, with self-contained viewing screen, modified to permit remote control and volume unit control (V.U. Meter)

7. Berger Block Test Template and Manipulanda

8. Rudmose Electro-Acoustic Ear



APPENDIX 3

OFFICE OF SECRETARY

MEMBERS
MARK O. HATFIELD . . . . . . GOVERNOR
TOM MCCALL . . . . SECRETARY OF STATE
ROBERT W. STRAUB . . . STATE TREASURER

OREGON STATE BOARD OF CONTROL
OREGON VOCATIONAL RESEARCH PROJECT FOR THE DEAF
(CARE OF OREGON STATE SCHOOL FOR THE DEAF)
999 LOCUST ST. N.E.
SALEM 97310

Many deaf people cannot find jobs.

Some deaf people work in jobs that do not pay much money. Some of these people do not have training for work in better jobs.

Different tests are used by some companies before they hire people. They want to know if the person can do the work. Employment people use these tests to find out what kind of work people can do best before they send them out to apply for jobs. Schools use the tests to find out what kind of training is best for each student. The tests they use are all made for hearing people. They can't use the same tests for deaf people because the tests for hearing people have too many hard words in them. Some deaf people do not know all the words in the tests.

Nobody has ever made tests like this for deaf people. So now the government wants to make tests that do not have so many words in them so they can test deaf people the same as they test hearing people.

To make these tests right for deaf people we need help from many deaf people. We need many deaf people to take these tests. Then we will know how to make tests to use for all deaf people everywhere. Then we can help all deaf people when they want to know what kind of work they can do best.

These tests will help Schools for the Deaf to know what kind of pre-vocational training is best for each student.

You will help us make these tests right to use with deaf people if you will take the tests. They do not cost anything to you.

Please answer the questions on the paper we are sending you now. We will write a letter to you in a few weeks about taking the tests. The man giving the tests has been a teacher in the School for the Deaf for many years.

Sincerely, T. J. Holdt

T. J. Holdt, Administrator
Vocational Research Project

APPENDIX 3

STATE OF OREGON
OREGON STATE SCHOOL FOR THE DEAF
M. B. CLATTERBUCK, SUPERINTENDENT
999 LOCUST STREET
SALEM

TO: The Deaf People of Oregon

FROM: M. B. Clatterbuck, Superintendent
Oregon State School for the Deaf

SUBJECT: Oregon Vocational Research Project for the Deaf

The Oregon State Board of Control has a very fine research project to help the Deaf of Oregon and the rest of the United States. The people working on this project have their offices at the Oregon State School for the Deaf.

We here at the school are pleased to have this research done in Oregon. We think it is good and that it will help the deaf students in our school. I would like to ask you to cooperate with all of us to make the project successful. Please help when you can. Thank you.

M. B. Clatterbuck

TO MEMBERS OF THE OREGON ASSOCIATION OF THE DEAF, AND ALL DEAF PERSONS:

As President of the Oregon Association of the Deaf, I know about the Oregon Vocational Research Project for the Deaf. They are making tests to use with deaf persons, and with deaf students in the Schools for the Deaf, much like the tests used for hearing people, so that the teachers and employment people can help deaf people to choose the kind of training or work they can do best. To do this they must try out these tests on many deaf people.

I hope all the Deaf will take these tests, so deaf people can get better help in the future. So fill out the form in this letter, so they know who you are, and where you are.

John J. Kaufman
President,
Oregon Association for the Deaf

APPENDIX 3

NAME___________________________________ADDRESS________________________

DATE OF BIRTH____
(Month) (Day) (Year)

MARRIED (Yes)____________________(No)___________________

Are you employed?______________________________________

Where do you work?____

Do you have a telephone?__________________Telephone Number_____________

Do you like your work?____________________

What kind of work do you like best?_____________________________________

____

Where did you go to school?____

How many years in school?____________________________

What kind of job training have you had?________________________________

Do you have an automobile?____

Will you take these trial tests so we can help other deaf people?___

109-V-5

APPENDIX 3

TO: All Deaf People in the State of Washington

FROM: Luther Sandberg, President Luther Sandberg, Pres.

SUBJECT: Testing Program for all Deaf and Hard of Hearing People

The people from the Vocational Research Project are making some tests to use with deaf adults and with deaf students in schools for the deaf, so that counselors and teachers in schools for the deaf and people in DVR offices and Employment Service offices can help deaf people to choose the kind of training or work that they can do best, and the kind of work they like best. To do this, they must try out these tests on many deaf people.

I hope all the deaf people in the state will take these tests so that in the future deaf people can get better help in training for jobs, and in finding jobs. There is no charge for these tests. The government pays the costs. Will you please fill out the form in this letter so that the people working on the project will know who you are and where they can find you.

TJH:ng

APPENDIX 4

OFFICE OF SECRETARY

MEMBERS

MARK O HATFIELD . . . . . . GOVERNOR
TOM McCALL . . . . SECRETARY OF STATE
ROBERT W STRAUB . . STATE TREASURER

OREGON STATE BOARD OF CONTROL

OREGON VOCATIONAL RESEARCH PROJECT FOR THE DEAF
(CARE OF OREGON STATE SCHOOL FOR THE DEAF)
999 LOCUST ST. N.E.
SALEM 97310

A few weeks ago we wrote to you about some research that the Oregon State Board of Control is doing and we sent to you a form to be filled out, so that we would know whether we can count on you to be one of the persons that will help in our research project. One of the questions we asked on the form was, "Will you take these trial tests so we can help other deaf people?" By this, we mean that by giving these tests to many deaf people, we will know how to find out what kind of work each person can do best. The tests the counselors use are for hearing people and have many words in them that are hard to explain. So now we are making up tests especially for the Deaf and we must try these tests with many deaf people so that we will know how to change them to make them work for other deaf people in the future. When we are finished working on these tests, they will be used everywhere in the United States by people who plan vocational training programs and by people who help the deaf to find jobs.

We are sending you another form to fill out and an addressed envelope which does not need a stamp. We pay the postage here. Please fill out the form and send it to us in the envelope we are sending you so we can plan a time and place for you to take the tests.

These tests can be given whenever you can take them. They are given in the morning, afternoon, evening or on Saturday. Please write on the form when would be the best time of day for you to take the test. In Salem we give the tests at the Oregon State School for the Deaf. In Portland the tests are given at the Tucker Maxon School for the Deaf or at the Hosford School. We will also be giving tests at the Washington High School.

These tests do not cost you anything and you will be helping us in our research project.

Yours truly,

T. J. Holdt

T. J. Holdt
Administrator

Don Sheridan

Don Sheridan
Research Project Representative

TJH/jk

APPENDIX 5

FILE # ____________________

DATE ____________________

HISTORY FORM

(Please Print)

1. Name ____
   (last) (first) (initial)

2. Address ____
   (Street #) (Street Name) (City) (State)

3. Home Telephone Number ____________________

4. Date of Birth ________________________________
   (Month) (Day) (Year)

5. Place of Birth ____________________________ ____________
   (City or County) (State)

Spouse (current)

6. Name ____
   (last) (first) (initial)

7. Date of Birth ________________________________
   (Month) (Day) (Year)

Character of Deafness

8. Age at onset: ____________
   (Years)

Education

9. Schools:

	Name	Location	Res.	Day Sch.	Day Cl.		From Mo.	From Yr.		To Mo.	To Yr.
First											
Next											
Next											
Next											
Next											
Next											

10. Have you attended college? Yes ______ No ______ If yes:

School Location From To Credit Hrs. Degree

Employment Status

11. List Employment over last three years:

	Company	Kind of Work	Hrs. Per Week	From Mo.	From Yr.	To Mo.	To Yr.	Salary in Dollars
Present job:								
Previous job:								
Previous job:								
Previous job:								
Previous job:								

12. List those relatives who are alive and tell how often you see them:

Relative	Approximately How Often
Father	______________
Mother	______________
Sisters	______________
Brothers	______________

13. How many friends visited your home during the last two weeks?

Number of Deaf ________ _____ Number of Hearing ______________ Total ________

How many friends' homes did you visit during the last two weeks?

Number of Deaf ______________ Number of Hearing ______________ Total ________

14. Do you own your home, or do you rent? Own _______ Rent _______

Do you have an automobile? Yes _______ No _______

APPENDIX 6

AUTHORIZATION TO CONFER WITH EMPLOYER

This is to certify that I do hereby voluntarily authorize representatives of the Vocational Research Project for the Deaf to confer with my employer,

(Name of Employer____)
for the purpose of obtaining an accurate and detailed description of all aspects of the work performed by me in the course of my employment, such information to be used for purposes of the Vocational Research Project.

I fully understand this document and give this authorization in consideration of the assurance that all information obtained will be held in strict confidence.

Signed_______________________________

Address______________________________

____

Witnessed by_________________________

Title________________________________

109-V-1

APPENDIX 7

FILE # ____________

DATE ____________

INFORMATION SHEET

1. Name ____
(last) (first) (initial)

2. Address ____
(Street #) (Street Name) (City) (State)

3. Marital Status:
   Never Married ____________
   Married at Time ____________
   Divorced ____________
   Separated ____________
   Widowed ____________

4. Number of Marriages:
   One ____________
   Two ____________
   Three ____________
   Four or more ____________

Spouse's Occupation
5. Current Job:

____

6. List jobs held during last three years:

Job	Full-Time	Part-Time	Length of Job

7. Cause of Deafness:

   Injury ____________
   Illness ____________
   Congenital ____________

   Hereditary ____________
   Don't Know ____________

   Explain:

8. Type of Hearing Loss: Bone _____ Air _____ Nerve _____ Unknown _____

Hearing Conditions in Family

9. Family of Origin (check if Deaf)

   Father _____ Mother _____ Sister _____ Brother _____

   Number of Sisters ____________ Number of Brothers ____________

10. Conjugal Family (check if Deaf)

   Spouse ________ Son ________ Daughter ________

   Number of Sons ________ Number of Daughters ________

16. Active member of clubs (meet at least once every two months)

Number ________________

17. Attendance at church services or functions during past month.

Number ________________

	Yes Very Much	Yes Slightly	No Not Generally	No Definitely Not
Did you find these tests interesting?				
If you had it to do over again, would you think you should take these tests?				
If you had the chance would you encourage your deaf friends to take these tests?				

What deaf friends do you have that you would like to have take these tests?

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________

Attitude of Subject	Extremely Uncooperative	Average	Extremely Cooperative
Interview			
Tests			

Are there any other health problems which would make it difficult to take any kind of job?

11. Other handicaps (obvious)

Sensory _______ Description: ______________________

Motor _______ Description: ______________________

Allergy _______ Description: ______________________

Convulsion ____ Description: ______________________

Organ-Systemic Defects:

Cardiac _______ Description: ______________________

Respiratory ___ Description: ______________________

Gastric _______ Description: ______________________

Other _______ Description: ______________________

12. Any change in hearing during the last two or three years? Yes _____ No _____

If yes, document:

Vocational Training

13. Character of training course:

Where Received	Length of Training From	Length of Training To	Hours Per Day	Certificate of Completion Yes	Certificate of Completion No	Training used Vocationally Yes	Training used Vocationally No

Used Where	Degree of Satisfaction with Training: Dissatis.	Indiff.	Satisfied

Was it useful to you in helping you find and keep work? Yes _______ No _______

14. If you had the chance what additional training would you feel could be helpful?

____

15. If you were given a chance could you take on a more difficult job? Yes _____ No ___

If "yes," define job: ______________________________

VOCATIONAL RESEARCH PROJECT FOR THE DEAF

APPENDIX 8

DATA SHEET I

FILE NUMBER 1	NAME 2 LAST FIRST MI	SEX 3 1 MALE 2 FEMALE	AGE: LAST B.D. 4	AGE AT ONSET 5
CAUSE OF DEAFNESS 6	HEARING AID OWNED 7 1 YES 2 NO X UNK.	HEARING AID USED IN TEST SESSION 8 1 FIRST SESSION 2 SECOND SESSION 3 BOTH 4 NEITHER	YEARS IN SCHOOL BEFORE COLLEGE 9	ACADEMIC ACHIEVEMENT 10 0 NONE 1 GRADE 2 HIGH 3 BACH. 4 MAST. 5 DR. X UNK.
TYPE OF ACADEMIC SCHOOL 11 RESIDENTIAL: 1 YES 2 NO DAY: 1 YES 2 NO DAY CLASSES: 1 YES 2 NO PUBLIC: 1 YES 2 NO		TELEPHONE 12 1 YES 2 NO X UNK.	NATIVE OREGONIAN 13 1 NATIVE OF ORE., TESTED ORE. 2 NATIVE OF WASH., TESTED WASH. 3 TESTED ORE., NOT NATIVE ORE. 4 TESTED WASH., NOT NATIVE WASH.	
NO. OF JOBS IN PAST THREE YEARS 14	PRESENTLY EMPLOYED 15 1 YES 2 NO X UNK.	PRESENT OCCUPATION D.O.T. 16	MONTHLY PAY RATE 17	RESIDENCE 18 1 OWN 2 RENT 3 BOARD 4 OTHER X UNK.
ACCESS TO AUTO 19 1 YES 2 NO X UNK.	MARITAL STATUS 20 1 SINGLE 2 MARRIED 3 DIVORCED 4 SEPARATED 5 WIDOW X UNK.	NO. OF MARRIAGES 21	NO. OF DEAF IN FAMILY OF ORIGIN 22	PARENTAL DEAFNESS 23 1 FATHER 2 MOTHER 3 BOTH 4 NEITHER 5 BOTH UNK. 6 FATHER UNK. MOTHER DEAF 7 FATHER UNK. MOTHER NOT DF. 8 FATHER DEAF MOTHER UNK. 9 MOTHER UNK. FATHER NOT DEAF
NO. OF DEAF IN CONJUGAL FAMILY 24	CURRENT SPOUSE DEAF 25 1 YES 2 NO 3 NOT LIVING W/ SPOUSE 4 NOT MARRIED X UNK.	ATTITUDE TOWARD INTERVIEW-TEST 26	FORMAL OCCUPATIONAL TRAINING 27	ADDITIONAL TRAINING 28
SECONDARY TRAINING 29	MULTIPLE HANDICAP: 30 SENSORY: 1 YES 2 NO X UNK. MOTOR: 1 YES 2 NO X UNK. ALLERGY: 1 YES 2 NO X UNK. CONVULSIONS: 1 YES 2 NO X UNK. CARDIAC: 1 YES 2 NO X UNK. RESPIRATORY: 1 YES 2 NO X UNK. GASTRIC: 1 YES 2 NO X UNK. OTHER: 1 YES 2 NO X UNK.			
HANDEDNESS 31 1 RIGHT 2 LEFT X UNK.	ETHNIC GROUP 32 1 WHITE 2 NEGRO 3 ORIENTAL 4 AM. INDIAN 9 OTHER X UNK.	COMMENTS:		

GATB SCORES

G	V	N	S	P	Q	K	F	M	CULTURE FAIR G

GATB PATTERNS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

GATB (CONT.)

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

GATB (CONT.) 33 34 35 36	BENDER SCORES RAW	STANDARD	COMPLETED BY:	DATE:

TABLE 12A

FACTOR STRUCTURE FOR 157 MEN

IN SAMPLE IV FOR SIXTY VARIABLES

VARIABLE NO.	VARIABLE NAME	FREQUENCY OF SIGNIFICANT LOADINGS	FACTORS 1 SL[a]	R[b]	2 SL	R	3 SL	R	4 SL	R	5 SL	R	6 SL	R	7 SL	R	8 SL
1.	Age	3							-.476	1							
2.	Age at Onset	1			.723	1											
3.	Hearing Aid Owned	2			-.291	2					-.615	1					
4.	Pre-College Years	2			-.241	2											
5.	Education	2	.519	2									-.583	1			
6.	Residential School	1			.786	1											
7.	Day School	1															
8.	Day Classes	5													-.335	2	.409
9.	Public School	2			-.541	1					-.330	2					
10.	Number of Jobs	1															
11.	Pay Rate	6	.462	1											.265	5	
12.	Number of Marriages	2											.213	2			
13.	No. Deaf Family Origin	7	.312	3	-.227	5	.226	6							.334	1	
14.	No. Deaf Family Conjugal	3			-.513	1											
15.	Sensory Handicap	4													-.469	1	-.391
16.	Motor Handicap	3					-.260	3			.298	2					
17.	Allergic Handicap	2													-.218	2	
18.	Cardiac Handicap	2															
19.	Respiratory Handicap	1													-.718	1	
20.	Gastric Handicap	1															
21.	Other Handicap	7													-.281	3	
22.	Handedness	5											.248	5			-.336
23.	Number Months Worked	3											.256	2			
24.	GATB-G	2	.826	1					.394	2							
25.	GATB-V	2	.791	1									-.250	2			

TABLE 12A

FACTOR STRUCTURE FOR 157 MEN

APPENDIX 9

IN SAMPLE IV FOR SIXTY VARIABLES

	FACTORS																							
	6		7		8		9		10		11		12		13		14		15		16		17	
R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
							-.341	3			.447	2												
1																								
							.614	1																
	-.583	1																						
													-.676	1										
			-.335	2	.409	1					-.219	5	-.232	4	.255	3								
2																								
											-.747	1												
			.265	5					.314	2	.273	4					.284	3			-.203	6		
	.213	2					-.779	1																
			.334	1			-.330	2					-.212	7			-.281	4						
							-.342	2									-.208	3						
			-.469	1	-.391	2			.260	3			-.246	4										
2																			.383	1				
			-.218	2											.575	1								
							.260	2							.731	1								
			-.718	1																				
																	.825	1						
			-.281	3			.212	7			.259	4					-.223	6	.458	1	-.227	5	.341	2
	.248	5			-.336	3	.291	4			-.341	2	.394	1										
	.256	2									.618	1	-.202	3										
	-.250	2																						

B

TABLE 12A
(Continued)
FACTOR STRUCTURE FOR 157 MEN

IN SAMPLE IV FOR SIXTY VARIABLES

VARIABLE NO.	NAME	FREQUENCY OF SIGNIFICANT LOADINGS	FACTORS 1 SL[a]	1 R[b]	2 SL	2 R	3 SL	3 R	4 SL	4 R	5 SL	5 R	6 SL	6 R	7 SL	7 R	8 SL
26.	GATB-N	2	.724	1					.412	2							
27.	GATB-S	3	.328	2					.593	1							
28.	GATB-P	1							.789	1							
29.	GATB-Q	3	.413	2					.587	1							
30.	GATB-K	2							.714	1			-.289	2			
31.	GATB-F	1							.813	1							
32.	GATB-M	1							.829	1							
33.	Culture Fair "g"	2	.376	2					.731	1							
34.	Bender Gestalt	2							-.542	1							
35.	DB Loss Better Ear	1									-.736	1					
	Weingarten:																
36.	Interpersonal	2					-.389	2									
37.	Natural	2					.860	1									
38.	Mechanical	2					.292	2									
39.	Business	1					-.909	1									
40.	Esthetic	1															
41.	Scientific	1															
42.	Verbal	2					-.762	1									
43.	Computational	2					-.881	1									
44.	Time Perspective	3	.328	2	-.247	3	-.668	1									
45.	Gottschaldt Figures	2	.488	2					.580	1							
46.	Gates Reading Survey	1	.876	1													
	Craig Lipreading:																
47.	Word	3									.514	1					-.397
48.	Sentence	4	.412	2							.472	1	-.227	4			-.365
	Holdt Manual Communic.:																
49.	Reading	1			-.905	1											
50.	Signing	1			-.832	1											

APPENDIX 9

TABLE 12A
(Continued)
FACTOR STRUCTURE FOR 157 MEN

IN SAMPLE IV FOR SIXTY VARIABLES

FACTORS																									
5		6		7		8		9		10		11		12		13		14		15		16		17	
	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
										.283	3														
														-.220	3										
		-.289	2																						
																		.222	2						
6	1																								
																						-.714	1		
										-.210	2														
																						.730	1		
										.854	1														
																						.642	1		
																						-.485	2		
										-.219	2														
4	1					-.397	2																	-.237	3
2	1	-.227	4			-.365	3																		

TABLE 12A
(Continued)
FACTOR STRUCTURE FOR 157 MEN

IN SAMPLE IV FOR SIXTY VARIABLES

VARIABLE NO.	VARIABLE NAME	FREQUENCY OF SIGNIFICANT LOADINGS	FACTOR 1 SL[a]	1 R[b]	FACTOR 2 SL	2 R	FACTOR 3 SL	3 R	FACTOR 4 SL	4 R	FACTOR 5 SL	5 R	FACTOR 6 SL	6 R	FACTOR 7 SL	7 R	FACTOR 8 SL
51.	Berger Block I	1	.826	1													
52.	Berger Block II	4	.721	1	-.232	2					.203	4					
53.	Berger Block III	2	.347	2	-.778	1											
	Speech Characteristics (Expert):																
54.	Intelligibility	4	.514	1	.215	4					.506	2					-.280
55.	Pitch	1															
56.	Volume	1															
57.	Duration	1															-.757
	D.O.T. Digits 4 - 5 - 6																
58.	Data	5	-.514	1									-.225	3			
59.	People	3	-.341	2							.204	3	.746	1			
60.	Things	1											-.707	1			
	SUM	139		19		13		9		12		9		10		7	
			46	48	49	54	39		32		35		59		19		57
			51	33	50		43		31		3		60		15		8
		RANKS	24	53	6		37		28		47		5		8		47
		OF	25	59	53		42		33		54		30		13		15
		VARIABLE	26	44	2		44		30		48		23		21		48
		NUMBERS	52	27	9		36		27		9		25		11		22
		ON	5	13	14		38		29		16		22		17		54
		EACH	54		3		16		45		59		48				
		FACTOR	58		44		13		34		52		58				
			45		13				1				12				
			11		4				26								
			29		52				24								

a = Significant loadings by factor.

b = Ranking of loading for variable across factors.

APPENDIX 9

TABLE 12A
(Continued)
FACTOR STRUCTURE FOR 157 MEN

IN SAMPLE IV FOR SIXTY VARIABLES

	FACTORS																							
	6		7		8		9		10		11		12		13		14		15		16		17	
R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
4																			.215	3				
2					-.280	3																		
																			-.769	1				
																							.835	1
					-.757	1																		
	-.225	3					.222	5			-.247	2	-.224	4										
3	.746	1																						
	-.707	1																						
9		10		7		7		9		6		8		8		3		6		4		6		3
	59		19		57		12		40		10		7		18		20		55		38		56	
	60		15		8		4		11		23		22		17		11		21		36		21	
	5		8		47		14		27		1		15		8		13		16		41		47	
	30		13		13		1		15		22		8				21		52		42			
	23		21		48		13		43		11		58				34				21			
	25		11		22		22		37		21		29				14				11			
	22		17		54		18				58		13											
	48						58				8		23											
	58						21																	
	12																							

6

TABLE 13A

FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

VARIABLE		FREQUENCY OF SIGNIFICANT LOADINGS	FACTORS															
			1		2		3		4		5		6		7		8	
NO.	NAME		SL[a]	R[b]	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
1.	Age	3					-.265	2									.232	3
2.	Age At Onset	3					-.733	1										
3.	Hearing Aid Owned	2					.255	2										
4.	Pre-College Years	4																
5.	Education	7	-.524	1	.220	5			.203	7								
6.	Residential School	4					-.[illegible]6	1										
7.	Day School	1																
8.	Day Classes	1																
9.	Public School	6					.378	1	-.234	6			-.237	5	-.255	4		
10.	Number of Jobs	1																
11.	Pay Rate	7	-.369	2			.296	3	.259	4					-.241	5		
12.	Number of Marriages	2																
13.	Number Deaf Family Origin	1																
14.	Number Deaf Conjugal Family	3					.274	3					-.614	1				
15.	Sensory Handicap	1																
16.	Motor Handicap	5											.251	5				
17.	Cardiac Handicap	1																
18.	Respiratory Handicap	3											.223	2				
19.	Gastric Handicap	1											.815	1				
20.	Other Handicap	7			.319	3					-.333	1			-.229	7	-.291	6
21.	Handedness	2											-.278	2				
22.	Months Worked	2									-.223	2						
23.	GATB-G	1	-.925	1														
24.	GATB-V	3	-.801	1	.222	3												
25.	GATB-N	1	-.864	1														

APPENDIX 9

TABLE 13A

FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

	FACTORS																											
	6		7		8		9		10		11		12		13		14		15		16		17		18		19	
R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
					.232	3																					-.723	1
													-.207	3									.257	2				
											-.810	1																
									-.239	4	-.316	2			-.280	3											.575	1
													-.253	4							.369	2	-.257	3			.219	6
											.258	4			-.403	3							-.411	2				
															.846	1												
																							.798	1				
	-.237	5	-.255	4							-.376	2											-.278	3				
									.780	1																		
			-.241	5									-.494	1							.240	6	-.235	7				
									.241	1																	-.750	2
																	-.764	1										
	-.614	1																									-.304	2
																									.793	1		
	.251	5							-.538	1	-.412	2									.321	3					.258	4
																			.929	1								
	.223	2							-.784	1															.219	3		
	.815	1																										
1			-.229	7	-.291	6									-.303	5			.306	4							-.330	2
	-.278	2																			-.797	1						
2													-.714	1														
																											-.238	2

TABLE 13A
(Continued)
FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

VARIABLE		FREQUENCY OF SIGNIFICANT LOADINGS	FACTORS															
			1		2		3		4		5		6		7		8	
NO.	NAME		SL[a]	R[b]	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
26.	GATB-S	4	-.535	1														
27.	GATB-P	5	-.471	1					-.207	5							-.324	3
28.	GATB-Q	5	-.593	1							-.211	5					-.236	4
29.	GATB-K	3	-.348	2									.254	3			-.613	1
30.	GATB-F	2					.237	2									-.698	1
31.	GATB-M	3			-.216	2							.212	3			-.806	1
32.	Culture Fair "g"	4	-.689	1													-.298	3
33.	Bender Gestalt	6	.402	2					.223	4							.329	3
34.	DB Loss Better Ear	3					.223	3										
	Weingarten:																	
35.	Interpersonal	2			-.207	2												
36.	Natural	1			.879	1												
37.	Mechanical	1																
38.	Business	1			-.923	1												
39.	Esthetic	1													-.914	1		
40.	Scientific	5											.284	3	.567	1		
41.	Verbal	3			-.726	1									-.240	3		
42.	Computational	2			-.830	1									.333	2		
43.	Time Perspective	4			-.535	1												
44.	Gottschaldt Figures	4	-.620	1													-.212	4
45.	Gates Reading Survey	1	-.910	1														
	Craig Lipreading:																	
46.	Word	5	-.387	2									.215	5				
47.	Sentence	4	-.670	1														
	Holdt Manual Communication:																	
48.	Reading	2					.899	1										
49.	Signing	3	.303	2			.830	1										
50.	Berger Block I	2	-.812	1														

APPENDIX 9

TABLE 13A
(Continued)
FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

FACTORS																											
6		7		8		9		10		11		12		13		14		15		16		17		18		19	
SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R	SL	R
						-.226	4															-.333	2	.292	3		
				-.324	3							.279	4													.432	2
				-.236	4									-.281	3											.362	2
.254	3			-.613	1																						
				-.698	1																						
.212	3			-.806	1																						
				-.298	3																			.233	4	.432	2
				.329	3							.223	6											-.486	1	-.318	4
										-.782	1					.224	2										
						.777	1																				
						-.866	1																				
		-.914	1																								
.284	3	.567	1					.230	4	-.211	5					-.373	2										
		-.240	3			.504	2																				
		.333	2																								
						.262	4			-.266	3					-.490	2										
				-.212	4	-.354	2																			.235	3
.215	5									.414	1					-.349	3							.229	4		
												-.249	3							-.270	2			.204	4		
										-.220	2																
										-.239	3																
						.237	2																				

B

TABLE 13A
(Continued)
FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

VARIABLE NO.	VARIABLE NAME	FREQUENCY OF SIGNIFICANT LOADINGS	FACTORS 1 SL[a]	1 R[b]	2 SL	2 R	3 SL	3 R	4 SL	4 R	5 SL	5 R	6 SL	6 R	7 SL	7 R	8 SL	8 R
51.	Berger Block II	1	-.810	1														
52.	Berger Block III	2	-.471	2			.719	1										
	Speech Characteristics (Expert):																	
53.	Intelligibility	5	-.435	2					.209	5	.222	3						
54.	Pitch	7							.254	4	.233	5					-.296	3
55.	Volume	6									-.507	1						
56.	Duration	1									-.895	1						
	D.O.T. Digits 4 - 5 - 6																	
57.	Data	4	.493	2	-.227	4												
58.	People	6	.412	2					-.534	1								
59.	Things	1							.866	1								
	SUM	181		22		11		12		9		7		10		7		11
			23	52	38		48		59		56		19		39		31	
			45	53	36		49		58		55		14		40		30	
			25	58	42		2		11		20		40		42		29	
		RANKS	50	33	41		52		54		54		21		9		33	
		OF	51	46	43		6		9		22		29		11		27	
		VARIABLE	24	11	20		9		33		53		16		41		32	
		NUMBERS	32	29	57		11		53		28		9		20		54	
		ON	47	49	24		14		27				18				20	
		EACH	44		5		1		5				46				28	
a	= Significant loadings	FACTOR	28		31		3						31				1	
	by factor.		26		35		30										44	
			5				34											
b	= Ranking of loading for		57															
	variable across factors.		27															

TABLE 13A
(Continued)
FACTOR STRUCTURE FOR 77 WOMEN

IN SAMPLE IV FOR FIFTY-NINE VARIABLES

APPENDIX 9

	FACTORS													
	6	7	8	9	10	11	12	13	14	15	16	17	18	19
R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R	SL R
3						.526 1		-.212 4						
5			-.296 3				-.384 1	-.222 6		-.200 7				-.301 2
1								.201 6	.284 3	.245 5			.473 2	.267 4
1							.539 1				-.301 3			
					.201 6		.344 3				-.265 4	.213 5		
7	10	7	11	7	7	12	10	8	6	4	7	8	8	15
	19	39	31	37	18	3	22	7	13	17	21	8	15	12 5
	14	40	30	35	10	34	57	6	43	20	5	6	33	1
	40	42	29	41	16	53	11	20	40	55	16	26	55	4
	21	9	33	44	12	46	54	28	46	54	57	9	26	27
	29	11	27	43	4	16	58	4	55		58	5	32	32
	16	41	32	50	40	9	27	54	34		11	2	46	28
	9	20	54	26	58	4	5	53			47	11	18	20
	18		20			6	47	55				58	47	33
	46		28			43	33							14
	31		1			49	2							54
			44			48								55
						40								16
														24
														44

APPENDIX 10

WORD LIST FOR

OREGON MANUAL COMMUNICATION PROFICIENCY TEST

Signing or Performance Subtest*

1. BETWEEN
2. BITTER
3. BORROW
4. BUT
5. COMPARE
6. CONTEST
7. CONTINUE
8. DAILY
9. DIFFICULT
10. DUTY
11. ENEMY
12. FOLLOW
13. IMPORTANT
14. MACHINE
15. MISUNDERSTAND
16. OFTEN
17. PROUD
18. PERMIT
19. REQUIRE
20. SATISFY
21. SHARE
22. STAR
23. TAX
24. WISE
25. WHEN

* Examinee responds by performing the sign that he believes correct for the word appearing on each flashcard as it is presented.

APPENDIX 10

WORK LIST FOR
OREGON MANUAL COMMUNICATION PROFICIENCY TEST
Sign Reading Subtest*

	WORD				
1.	FOR	think	for	agree	dream
2.	HOUR	week	time	minute	hour
3.	SOMETIMES	once	again	sometimes	often
4.	WHEN	when	always	where	
5.	PREACH	lecture	preach	speak	announce
6.	COUNT	pay	honest	add	count
7.	BEHIND	follow	after	behind	with
8.	LIGHT	heavy	soft	light	lift
9.	NEAR	before	after	near	shut
10.	RIGHT	right	plow	wrong	pay
11.	COMPARE	appear	lift	light	compare
12.	MAKE	work	make	do	wash
13.	HERE	here	now	what	heavy
14.	BUT	different	add	half	but
15.	SAME	as	same	even	during
16.	BETWEEN	between	bother	share	stop
17.	ARRIVE	pay	buy	arrive	prove
18.	BORROW	keep	lend	borrow	careful
19.	CALL	call	warn	advise	on
20.	INVITE	my	our	invite	accept
21.	CONTINUE	stay	continue	letter	stamp
22.	DECIDE	agree	think	disagree	decide
23.	FIND	learn	find	out	choose
24.	TOAST	toast	intend	fork	against
25.	MISUNDERSTAND	understand	think	brilliant	misunderstand

* Examinee responds by underlining word he thinks is the correct choice.

APPENDIX 11

BERGER BLOCK TEST TEMPLATE AND MANIPULANDA

APPENDIX 12

Table 18A

Ownership Of Hearing Aid In Deaf Adult Sample IV

Aid Owned	Frequency	Percent
Yes	157	32.5
No	278	57.6
Unknown	48	9.9

Table 19A

Years In School Before College In Deaf Adult Sample IV

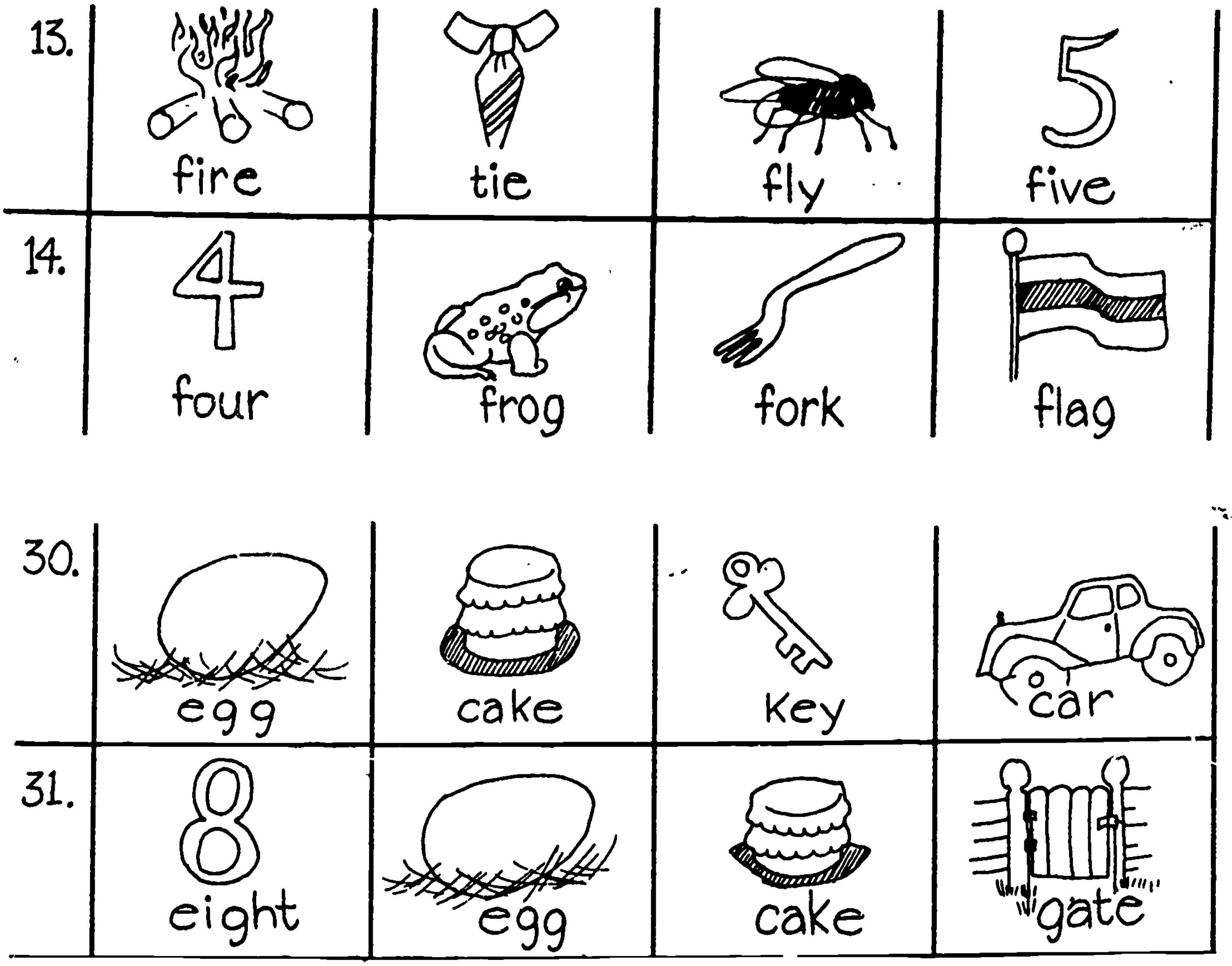
Years	Frequency	Percent	Years	Frequency	Percent
4	1	0.2	13	80	16.6
5	2	0.4	14	81	16.8
6	3	0.6	15	45	9.3
7	4	0.8	16	25	5.2
8	13	2.7	17	11	2.3
9	22	4.6	18	5	1.0
10	27	5.6	19	2	0.4
11	52	10.8	20	1	0.2
12	47	20.1	Unknown	12	2.5

Table 20A

Additional Handicaps Reported In Deaf Adult Sample IV

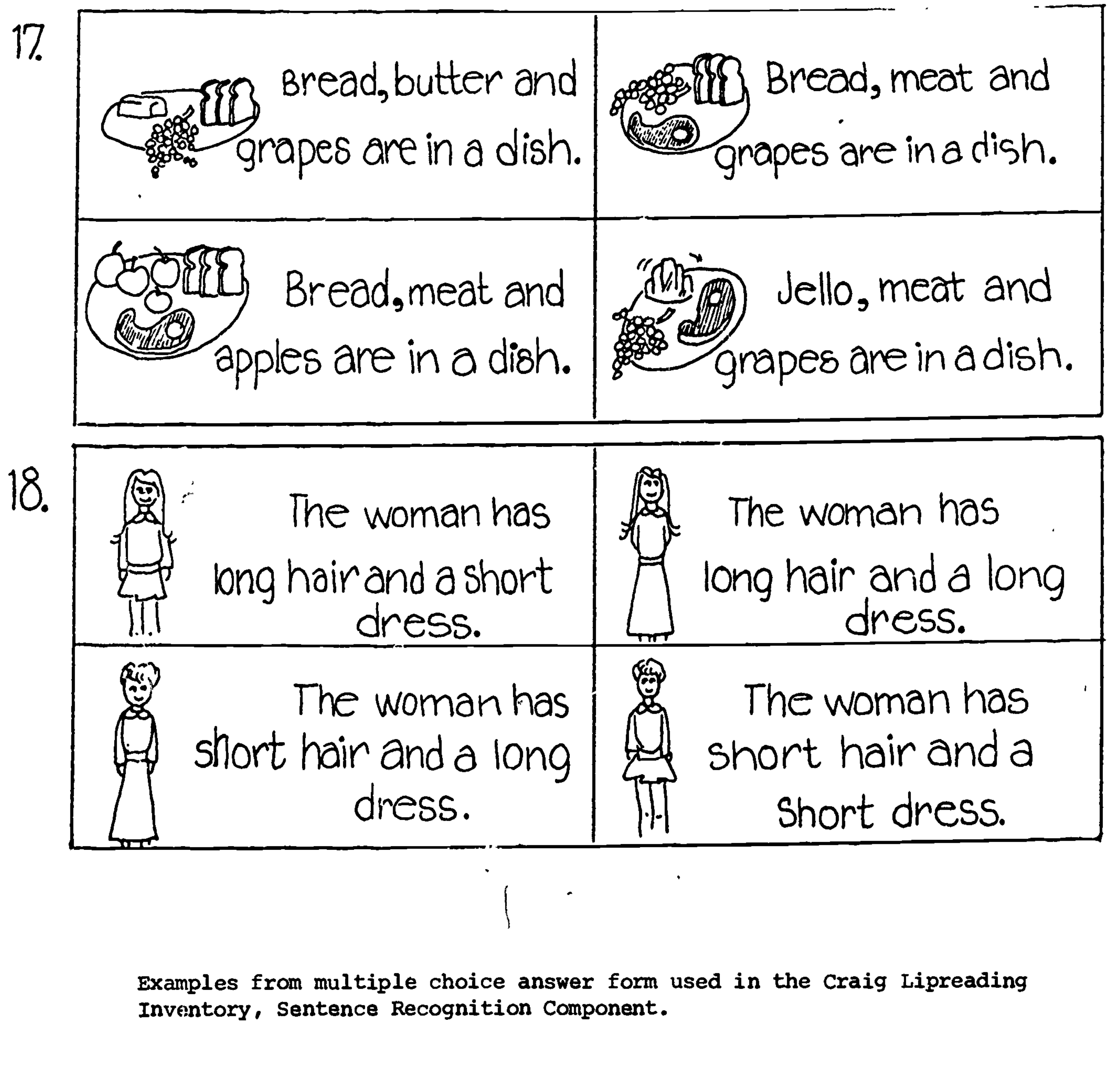
Handicap	Frequency	Percent	Handicap	Frequency	Percent
Other Sensory	29	6.0	Cardiac	7	1.4
Motor	33	6.8	Respiratory	15	3.1
Allergic	66	13.7	Gastric	15	3.1
Convulsive	2	0.4	Other	62	12.8

CRAIG LIPREADING INVENTORY



Examples from multiple choice answer form used in the Craig Lipreading Inventory, Word Recognition Component.

CRAIG LIPREADING INVENTORY



Examples from multiple choice answer form used in the Craig Lipreading Inventory, Sentence Recognition Component.

WORD LIST USED IN HOLDT SPEECH

CHARACTERISTICS TEST*

1. ACE	14. EAST	27. MEW	39. THERE (THEIR)
2. ACHE	15. FELT	28. NONE (NUN)	40. THING
3. AN	16. GIVE	29. NOT (KNOT)	41. TOE
4. AS	17. HIGH	30. OR (OAR)	42. TRUE
5. BATHE	18. HIM	31. OWL	43. TWINS
6. BELLS	19. HUNT	32. POOR	44. YARD
7. CARVE	20. ISLE (AISLE)	33. RAN	45. UP
8. CHEW	21. IT	34. SEE (SEA)	46. US
9. COULD	22. JAM	35. SHE	47. WET
10. DAD	23. KNEES	36. SKIN	48. WHAT
11. DAY	24. LAW	37. STOVE	49. WIRE
12. DEAF	25. LOW	38. THEM	50 YOU (EWE)
13. EARN (URN)	26. ME		

* W-22 Word Lists. PB-50, List 1, Davis and Silverman, Hearing and Deafness 536 (1962), by authorization of Dr. Ira J. Hirsh.

REFERENCES

1. Adler, E. P. The severely disadvantaged deaf. In G. Lloyd (Ed.), Vocational rehabilitation of the deaf. Department of H.E.W., Social & Rehabilitation Service. Washington, D.C.: 1968, 224-226.

2. Altable, J. P. The Rorschach psychodiagnostic as applied to deaf mutes. Rorschach Research Exchange and Journal of Projective Techniques, 1947, 11, 74-79.

3. American Psychological Association, Task Force on Employment Testing of Minority Groups. American Psychologist, 1969, 24, 637-650.

4. Babbidge, H. Education of the deaf. Department of H.E.W., Social & Rehabilitation Service. Washington, D.C.: 1965.

5. Baggaley, A. R. Intermediate correlational methods. New York: John Wiley, 1964.

6. Beall, L., & Bordin, E. S. The development and personality of engineers. Personnel and Guidance Journal, 1964, 43, 23-32.

7. Bellante, D. M. A multivariate analysis of a vocational rehabilitation program. The Journal of Human Resources, 1972, 7, 226-241.

8. Bender, L. A visual-motor gestalt test and its clinical use. New York: American Orthopsychiatric Association, 1938.

9. Birch, J. R., & Birch, J. W. The Leiter-International Performance Scale as an aid in the psychological study of deaf children. American Annals of the Deaf, 1951, 96, 502-511.

10. Bjorkquist, D. C. Technical education for the underemployed and unemployed. Vocational Guidance Quarterly, 1970, 18, 264-272.

11. Boatner, E. B., Stuckless, E. R., & Moores, D. F. Ocupational status of the young deaf of New England. Hartford: American School for the Deaf, 1964.

12. Bordin, E. S., Nachman, B., & Segal, S. J. An articulated framework for vocational development. Journal of Counselling Psychology, 1963, 10, 107-116.

13. Bradway, K. P. The social competence of deaf children. American Annals of the Deaf, 1937, 82, 122-140.

14. Brunschwig, L. A study of some personality aspects of some deaf children. Contributions To Education, No. 687. New York: Columbia University, Teachers College, 1936.

15. Burchard, E., & Myklebust, H. R. A comparison of congenital and adventitious deafness with respect to its effect on intelligence, personality and social maturity. American Annals of the Deaf, 1942, 87, 140-155.

16. Byham, W. C., & Pentecost, M. Assessment center for spotting future managers. Harvard Business Review, 1970, 48, 150-160.

17. Caplow, T. The sociology of work. Minneapolis: University of Minnesota Press, 1954.

18. Cattell, R. B., & Cattell, A. K. S. The Culture-Fair Intelligence Test. Champaign: Institute for Personal and Ability Testing, 1949.

19. Centers, R. The psychology of social class: A study of class consciousness. Princeton: Princeton University Press, 1949.

20. Closure Flexibility Test (Concealed Figures), Manual, Chicago: Industrial Relations Center, The University of Chicago, 1965.

21. Cohen, M. S. Sex differences in compensation. Human Resources, 1971, 6, 434-447.

22. Converse, P. E. The shifting role of class in political attitudes and behavior. In E. Maccoby, T. Newcomb, & E. Hartley (Eds.), Readings in social psychology, New York: Henry Holt, 1958, 388-399.

23. Cooley, W. M., & Lohnes, P. R. Multivariate procedures for the behavioral sciences. New York: John Wiley, 1962.

24. Craig, H. B. A sociometric investigation of the self-concept of the deaf child. American Annals of the Deaf, 1965, 110, 456-478.

25. Craig, W. N. Effects of preschool training on the development of reading and lipreading skills of deaf children. American Annals of the Deaf, 1964, 109, 280-296.

26. Crammatte, A. B. The formidable peak: A study of deaf people in professional employment. Washington, D.C.: Gallaudet College, 1965.

27. Cronbach, L. S. Essentials of psychological testing. (2nd ed.) New York: Harper & Row, 1960.

28. Davis, H. & Silverman, S. R. (Eds.) Hearing and Deafness. New York: Holt, Rinehart and Winston, 1970.

29. Dictionary of Occupational Titles. I and II. (3rd ed.) Washington, D.C.: United States Government Printing Office, 1965.

30. Drever, J. & Collins, M. Performance tests of intelligence. Edinburgh: Oliver and Boyd, 1936.

31. Dunnette, M. D. A modified model for test validation and research. Journal of Applied Psychology, 1963, 47, 317-323.

32. Efroymson, M. A. Multiple regression analysis. In A. Ralston & H. S. Wief (Eds.), Mathematical methods for digital computers. New York: John Wiley, 1960, 191-203.

33. Empey, L. T. Role expectations of young women regarding marriage and a career. Marriage and Family Living, 1958, 20, 152-155.

34. Falberg, Roger M. Sifting the sands. The Silent Worker, 1957, 11.

35. Feather, N. T. Attribution of responsibility and valence of success and failure in relation to initial confidence and task performance. Journal of Personality and Social Psychology, 1969, 13, 129-144.

36. Fine, S. A., & Heinz, C. A. The estimates of worker-trait requirements for 4000 jobs. Personnel Guidance Journal, 1957, 36, 168-174.

37. Fraisse, P. The psychology of time. New York: Harper & Row, 1963.

38. Freedman, M. The process of work establishment. New York: Columbia University Press, 1969.

39. Furfey, R. H., & Harte, T. S. Interaction of deaf and hearing in Frederick County, Maryland. Washington, D.C.: Catholic University Press, 1964.

40. Galinsky, M. D. Personality development and vocational choice of clinical psychologists and physicists. Journal of Counseling Psychology, 1962, 9, 299-305.

41. Gates Reading Survey, Manual, (Form I, Grades 3-10), New York: Columbia University, Teachers College, 1960.

42. Gellman, W. Vocational Adjustment and guidance of deaf people. In United States Department of H.E.W., Proceedings of a national research conference on behavioral aspects of deafness. (New Orleans). Washington, D.C.: 1965, 62-73.

43. General ptitude Test Batter, Manual, United States Department of Labor, Washington, D.C.: Government Printing Office, 1967.

44. Ghiselli, E. E. Moderating effects and differential reliability and validity. Journal of Applied Psychology, 1963, 47, 81-86.

45. Ginzberg, E., Ginzberg, S. W., Axelrod, S., & Herma, J. L. Occupational choice: an approach to a general theory. New York: Columbia University Press, 1951.

46. Goldman, I., McDonald, R. G. & Epstein, J. Characterists of jobs held by economically disadvantaged youth. American Journal of Orthopsychiatry, 1970, 40, 97-105.

47. Gowan, J. C. Guidance of the deaf. In J. Griffith (Ed.), Persons with hearing loss. Springfield, Illinois: Charles C. Thomas, 1969.

48. Gregory, I. A comparison of certain personality traits and interests in deaf and hearing children. Child Development, 1938, 9, 277-280.

49. Gross, E. The occupational variable as a research category. American Sociological Review, 1959, 24, 640-649.

50. Grzelak, J. Reduction of cognitive dissonance and self-esteem. Polish Sociological Bulletin, 1965, 1, 87-97.

51. Harman, Harry H. Modern Factor Analysis. University of Chicago Press, 1960.

52. Hays, W. L. Statistics. New York: Holt, Rinehart and Winston, 1963.

53. Heider, F., & Heider, G. M. Studies in the psychology of the deaf. Psychological Monograph, 1941, No. 242.

54. Hirsh, I. J. Information processing in input channels for speech and language: the significance of serial order of stimuli. In C. H. Millikin, & F. L. Darley (Eds.), Brain mechanisms underlying speech and language. New York: Grune and Stratton, 1967.

55. Holland, J. L. A theory of vocational choice. Journal of Counseling Psychology, 1959, 6, 35-45.

56. Hollingshead, A. B. Elmstown Youth. New York: John Wiley, 1949.

57. Holmes, J. E. The presentation of test information to college freshmen. Journal of Counseling Psychology, 1964, 11, 54-58.

58. Holtzman, W. The changing world of mental measurement and its social significance. The American Psychologist, 1971, 26, 546-553.

59. Hull, C. L. An automatic machine for making multiple-aptitude forecasts. Journal of Educational Psychology, 1925, 16, 593-598.

60. Hull, C. L. Aptitude Testing. New York: World Publishing, 1928.

61. Hunt, J. McV. The challenge of incompetence and poverty. Urbana: The University of Illinois Press, 1969.

62. Hyman. H. H. The value system in different classes. In R. Bendix, & S. M. Lipset (Eds.), A reader in social stratification. Glencoe, Illinois: Free Press, 1953.

63. Jacobs, P. Keeping the poor poor. In J. H. Sholnick, & E. Currie (Eds.), Crisis in American institutions. Boston: Little Brown, 1970, 42-52.

64. Johnson, T. J., Fiegenbaum, R., & Weibly, M. Some determinants and consequences of the teacher's perception of causation. Journal of Educational Psychology, 1964, 55, 237-246.

65. Kates, S. L., Kates, W. W., & Michael, J. Cognitive processes in deaf and hearing adolescents and adults. Psychological Monographs, 1962, No. 551.

66. Keniston, K. & Keniston, E. The American anachronism: the image of women and work. The American Scholar, 1965, 33, 355-375.

67. Keogh, B., Vernon, McK., & Smith, C. Deafness and visual-motor functions. The Journal of Special Education, 1970, 4, 41-47.

68. Kepka, J., & Brickman, P. Consistency versus discrepancy as clues in the attribution of intelligence and motivation. Journal of Personality and Social Psychology, 1971, 20, 223-229.

69. Kerr, A. Determinants of performance of the Bender Gestalt and Raven's Progressive Matrices Test. Journal of Learning Disabilities, 1972, 5, 219-221.

70. Kerr, P. A study of aptitude differences between deaf and non-deaf employed workers using occupational clusters. Salem: Oregon Employment Service, 1969. (mimeographed)

71. Kierkegaard, S. Stages of life's way. Princeton, New Jersey: Princeton University Press, 1940.

72. Kitson, H. D. The psychology of vocational adjustment. Philadelphia: Lippincott, 1925.

73. Koppitz, E. M. The Bender Gestalt for young children. New York: Grune and Stratton, 1964.

74. Koppitz, E. M. Brain damage, reading disability, and the Bender Gestalt Test. Journal of Learning Disabilities, 1970, 3, 429-433.

75. Kroll, A. M., Dinklage, L. B., Lee, J., Morley, E., & Wilson, E. H. Career development, growth, and crisis. New York: John Wiley, 1970.

76. Kronenberg, H. H., & Blake, G. D. A study of the occupational status of the young adult deaf of the Southwest and their need for specialized vocational rehabilitation facilities. Report to Vocational Rehabilitation Administration, (RD-1652) March, 1966.

77. Lavos, G. The reliability of the educational achievement test administered to the deaf. American Annals of the Deaf, 1944, 89, 226-233.

78. Lavos, G. Interrelationships among three tests of non-language intelligence administered to the deaf. American Annals of the Deaf, 1954, 99, 303-314.

79. Lavos, G. Personal correspondence, August 14, 1970.

80. Levine, E. S. Youth in a soundless world. New York: New York University Press, 1956.

81. Levine, E. S. The psychology of deafness. New York: Columbia University Press, 1960.

82. Lewis, E. C. Counselors and girls. Journal of Counseling Psychology, 1965, 12, 159-166.

83. Lister, J. L., & Ohlsen, M. M. The improvement of self understanding through test interpretation. Personnel and Guidance Journal, 1965, 43, 804-810.

84. Lunde, A. S., & Bigman, S. G. Occupational conditions among the deaf. Washington, D. C.: Gallaudet College Press, 1959.

85. Magnusson, D. Test theory. Reading, Massachusetts: Addison-Wesley, 1967.

86. McAndrew, H. Rigidity and isolation: a study of the deaf and the blind. Journal of Abnormal and Social Psychology, 1948, 43, 476-494.

87. McClure, W. Mental health for the deaf in the school setting. In Altshuler, K., & Rainer, S. (Eds.), Mental Health and the deaf. Washington, D. C.: United States Department of H.E.W., 1969.

88. Meadow, K. P. Self image, family climate, and deafness. Social Forces, 1968, 47, 428-458.

89. Melzach, R. Effects of early experience of behavior: experimental and conceptual considerations. In P. Hoch, & J. Zubin (Eds.), Psychopathology of perception. New York: Grune and Stratton, 1965.

90. Miller, D. C., & Form, W. H. Industrial sociology. New York: Harper & Row, 1951.

91. Morgan, S. Chronic unemployment--psychological vs. institutional approaches. Urban and Social Change Review, 1970, 4, 12-14.

92. Myklebust, H. R. The psychology of deafness. New York: Grune and Stratton, 1969.

93. Nachmann, B. Childhood experience and vocational choice in Law, Dentistry, and Social Work. Journal of Counseling Psychology, 1960, 7, 243-250.

94. Obermann, C. E. A history of vocational rehabilitation in America. Minneapolis: T. S. Denison, 1965.

95. Oleron, P. A study of the intelligence of the deaf. American Annals of the Deaf, 1940, 95, 179-195.

96. Oleron, P. Conceptual thinking of the deaf. American Annals of the Deaf, 1953, 98, 304-312.

97. Owens, W. A quasi-actuarial basis for individual assessment. The American Psychologist, 1971, 26, 992-999.

98. Parsons, F. Choosing a vocation. Boston: Houghton Mifflin, 1909.

99. Pascal, G. R., & Suttell, B. J. The Bender Gestalt Test: its quantification and validity for adults; with scoring manual. New York: Grune and Stratton, 1950.

100. Pemberton, C. L. A study of the speed and flexibility of closure factors. Unpublished dissertation, Chicago: University of Chicago, 1957.

101. Peters, H. J., & Hansen, J. D. Vocational guidance and career development. New York: MacMillan, 1971.

102. Peterson, D. A., & Wallace, S. R. Validation and revision of a test in use. Journal of Applied Psychology, 1966, 50, 13-18.

103. Peterson, E. G., & Williams, J. M. Intelligence of deaf children as measured by drawings. American Annals of the Deaf, 1930, 75, 273-290.

104. Picture Interest Inventory, Manual, Monterey, California: California Test Bureau, DelMonte Research Park, 1958.

105. Pimentel, A. T. Vocational counseling. In J. Griffith (Ed.), Persons with hearing loss. Springfield, Illinois: Charles C. Thomas, 1969.

106. Pintner, R., & Patterson, D. G. A su vey of a day school for the deaf. American Annals of the Deaf, 1916, 51, 417-433.

107. Pintner, R., & Patterson, D. G. Psychological tests of deaf children. Volta Review, 1917, 19, 661-667.

108. Pintner, R. The measurement of language ability and language progress of deaf children. Volta Review, 1918, 20, 755-764.

109. Pintner, R., Day, H. E., & Fusfelt, I. S. A survey of American schools for the deaf. National Research Council, Washington, D. C.: 1928.

110. Quey, R. L. Functions and dynamics of work groups. The American Psychologist, 1971, 26, 1077-1082.

111. Rainer, J. D., Altshuler, K. Z., Kallman, F. J., & Deming, W. E. Family and mental health problems in a deaf population. New York: Columbia University, 1963.

112. Rileigh, K., & Odom, P. Perception of rhythm by subjects with normal and deficient hearing. Developmental Psychology, 1972, 7, 54-61.

113. Roe, A. The psychology of occupations. New York: John Wiley, 1956.

114 Rosenstein, J. Perception and cognition in deaf children. Unpublished dissertation, St. Louis, Washington University, 1959.

115. Rusmore, J. T. Psychological tests and fair employment: a study of employment in the San Francisco Bay Area. State of California, Fair Employment Practice Commission, 1967.

116. Samler, J. Psychosocial aspects of work: a critique of occupational information. Journal of Personnel Guidance, 1961, 39, 458-465.

117. Samler, J. Occupational exploration in counseling: a proposed orientation. In Henry Borow (Ed.), Man in a world of work, Boston: Houghton Mifflin, 1964.

118. Savary, L. M. Man: his world and his work. New York: Paulist Press, Exploration Books, 1967.

119. Schaffer, R. H. Job satisfaction as related to need satisfaction in work. Psychological Monographs, 1953, No. 14.

120. Schein, J. D. Deaf persons in the United States: a demographic sketch. In Social and Rehabilitation Services, International Research Seminar on the Vocational Rehabilitation of Deaf Persons. Washington, D. C.: United States Department of H.E.W., 1968.

121. Schowe, B. M. The deaf at work. American Annals of the Deaf, 1958, 103, 283-292.

122. Segal, S. J. A psychoanalytic analyses of personality factors in vocational choice. Journal of Counseling Psychology, 1961, 8, 202-210.

123. Sessions, J. A. Automation and the deaf. Paper presented at The Leadership Training Program in Deafness, San Fernando Valley State College, San Fernando, California, 1966.

124. Sewall, W. H., Haller, A. O., & Ohlendorf, G. W. The educational and occupational status attainment process: replication and revision. American Sociological Review, 1970, 35, 1014-1027.

125. Shirley, M., & Goodenough, F. L. A survey of deaf children in Minnesota Schools. American Annals of the Deaf, 1932, 77, 238-247.

126. Smith, P. C., & Kendall, L. M. Retranslation of expectations: an approach to the construction of unambiguous anchors for rating scales. Journal of Applied Psychology, 1963, 47, 149-155.

127. Stanton, M. B. Mechanical ability of deaf children. Teachers College Contribution to Education Series, No. 751, New York: Teachers College, Columbia University, 1938.

128. Stouffer, S. A. Communism, conformity and civil liberties: a cross-section of the nation speaks its mind. New York: Doubleday, 1955.

129. Strong, E. K. Jr. Vocational interests of men and women. Stanford: Stanford University Press, 1943.

130. Strong, E. K. Jr. Interest of fathers and sons. Journal of Applied Psychology, 1957, 41, 284-292.

131. Super, D. E. A theory of vocational development. The American Psychologist, 1953, 8, 185-190.

132. Super, D. E. The psychology of careers. New York: Harper, 1957.

133. Sussman, A. Adjustment problems of the deaf: panel of deaf adults. In J. Rainer, and K. Altshuler (Eds.), Psychiatry and the deaf. Department of H.E.W., Washington, D. C.: 1968, 25-36.

134. Sussman, M. B. Sociological theory and deafness: problems and prospects. Washington, D. C.: United States Vocational Rehabilitation Administration, 1965, 38-53.

135. Templin, M. C. The development of reasoning in children with normal and defective hearing. Minneapolis: University of Minnesota Press, 1950.

136. Theobald, R. Free men and free markets. New York: Clarkson N. Potter, 1963.

137. Thurstone,L. L. Primary mental abilities. Psychometric Monographs, Chicago: University of Chicago Press, 1944.

138. Tipton, R. M. Relative effectiveness of two methods of interpreting ability test scores. Journal of Counseling Psychology, 1969, 16, 75-80.

139. Toynbee, A. S. A study of history. (II), London: Oxford University Press, 1956.

140. Treacy, L. A study of social maturity in relation to factors of intelligence in acoustically handicapped children. Unpublished dissertation, Evanston: Northwestern University, 1952.

141. Tukey, J. W., & Wilk, M. B. Data analysis and statistics: techniques and approaches. In Proceedings of the symposium on information processing in sight-sensory systems, California Institute of Technology, 1965.

142. Tulkin, S. R. An analysis of the concept of cultural deprivation. Developmental Psychology, 1970, 6, 326-339.

143. Turnbull, W. W. Influence of cultural background on predictive test scores. In A. Anastasi (Ed.), Testing problems in perspective. Washington, D.C.: American Council on Education, 1966.

144. Tyler, L. E. The work of the counselor. New York: Appleton Century Crofts, 1961.

145. Vandenberg, S. G. & Kelly, L. Hereditary components in vocational preferences. Acta Geneticae Medicae et Gemellologiae, 1964, 13, 266-271.

146. Vandenberg, S. G., & Stafford, R. E. Hereditary influence on vocational preferences as shown by scores of twins on the Minnesota Vocational Interest Inventory. Journal of Applied Psychology, 1967, 51, 17-19.

147. Walton, L. E. The scope and function of vocational guidance. Educational Outlook, 1957, 31, 119-128.

148. Weiner, B., & Kukla, A. An attributional analysis of achievement motivation. Journal of Personality and Social Psychology, 1970, 15, 1-20.

149. Wernimont, P. F., & Campbell, J. P. Signs, samples and criteria. Journal of Applied Psychology, 1968, 52, 372-376.

150. Wile, I. S. Handedness, right and left. Boston: Lothrop Lee and Shepard, 1934.

151. Wilensky, H. L. Orderly careers and social participation: the impact of work history on social integration in the middle mass. American Sociological Review, 1961, 26, 521-539.

152. Williams, B. R., & Vernon, M. Vocational guidance for the deaf. In H. Davis, & S. R. Silverman (Eds.), Hearing and deafness. New York: Holt, Rinehart and Winston, 1970.

153. Wodin, M. The psychological evaluation of the deaf adult. In R. Allen and T. W. Jefferson (Eds.), Proceedings of the third annual professional development seminar for psychologists and rehabilitation personnel: on the psychological assessment of the disabled. Coral Gables: United States Department of H.E.W. and the University of Miami, 1963, 31-41.

154. Wolbein, S. The impact of social and economic changes. Counselor Education and Supervision, (Special Issue), 1967, 6, 230-236.