

SOME PSYCHOLOGICAL AND PHYSIOLOGICAL FACTORS
AFFECTING EXCELLENCE IN ACTING

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ABSTRACT

SOME PSYCHOLOGICAL AND PHYSIOLOGICAL FACTORS AFFECTING EXCELLENCE IN ACTING

by William H. Stock

This study was predicated on the assumption that there do exist certain measurable differences between actors and non-actors, and also between persons with high and low potential in acting. The purpose of this study was to examine a group of psychological and physiological factors within a controlled observational situation in order to determine the extent to which these factors constitute measurable differences.

Thirty-five factors ranging from ability to accurately differentiate differences in pitch to psychological flexibility were examined. Data were gathered with six separate testing instruments; The Seashore Measures of Musical Talents, The Otis Quick-Scoring Mental Ability Tests, Gamma Fm, The MacQuarrie Test for Mechanical Ability, The Remote Associates Test, The California Psychological Inventory, and The Stock Index of Solipsism. Each separate sub-division or scale of each test was regarded as a separate factor.

Data were gathered from a sample of 100 persons. The sample was divided into four observational groups of twenty-five persons each. The observational groups were categorized as actors of proven worth and ability, beginning actors with high potential, beginning actors with low potential, and non-actors. The actors of proven worth and ability were drawn from the Performing Arts Company of Michigan State University and the Trinity Square Repertory Company of Providence, Rhode Island. The beginning actors of high and low potential were drawn from undergraduate students of acting at Michigan State University. They were placed in either the high or low category on the opinion of faculty judges. The non-actors were drawn from the general student population of Michigan State University. Members of this observational group were individually questioned to determine that they had never acted, and that they had no desire to do so.

The six testing instruments were administered to the sample in several testing sessions. The data obtained were analyzed by analysis of variance to determine what factors constituted significant differences. Criterion level was held at alpha .05.

Four factors differentiated significantly between actors and non-actors. They were ability to differentiate rhythms, sense of responsibility, communality, and solipsism. Actors were better able to distinguish

rhythms, had a lower sense of responsibility, a lower feeling of communality, and less tendency toward solipsism. It was concluded that these four factors constituted a measurable difference between actors and non-actors. Neither these factors nor the other factors under consideration successfully differentiated high from low potential actors.

An additional four factors differentiated between actors and non-actors, but only at the 10 per cent level. These factors were Tonal Memory, Self-acceptance, Socialization, and Feminine Interest. It was concluded that further research was needed in these factors to determine the extent to which they constitute measurable differences between actors and non-actors.

SOME PSYCHOLOGICAL AND PHYSIOLOGICAL FACTORS
AFFECTING EXCELLENCE IN ACTING

By

William H. Stock

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To Dr. E. C. Reynolds for his understanding
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To Dr. James McCroskey for patience in
helping me to understand

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This study is dedicated with my deepest respect and
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CHAPTER I

INTRODUCTION

Purpose

This study is predicated on the assumption that there do exist certain measurable psychological and physiological differences between actors and non-actors, and also between persons with high and low potentials for success in acting. The purpose of this study is to examine a group of psychological and physiological factors within a controlled observational situation in order to determine the extent to which these factors constitute measurable differences.

Limitations

This study is an attempt to establish certain measurable differences in a creative field where little previous quantitative study has been carried out. The problem is a complex one. The infinite number of possible factors involved in the art of acting seemingly precludes that a single study could encompass all possible factors.

There exist at least two distinct approaches to the problem. One is the approach of this study, which

attempts to use existing group testing instruments to determine the existence of differentiating factors in groups selected according to the level of their skill and potential in acting. The other approach, which in the case of some physiological factors might be more fruitful, would be to use medico-physiological machines like the Technicon Multiple Sequential Blood Analyzer to seek differentiating factors. The present study is limited to the first approach for several reasons.

First, while the medico-physiological approach may be more valid for certain physiological factors, it cannot by its very nature reveal the existence of factors within the equally important psychological area, which is the main focus of this investigation. Second, both the use of such machines and the time of technicians who are needed to operate them are prohibitively expensive for the researcher working without benefit of funding. Finally, reviewing the literature which does exist has led this researcher to conclude that there is a strong possibility that there may be more detectable factors in the psychological area than in the medico-physiological area.

The single exception to the use of existing research instruments in this study is the Stock Index of Solipsism. The SIS is a psychological testing instrument which the researcher developed specifically for this

study. It was developed both because there was no other instrument available in the factor area, and to give the researcher experience in test development. The instrument and its development are discussed in Chapter III.

Importance of the Study

That there has been a sharp increase in theatrical activity in recent years both in the live and mechanical media is a fact of which even those not directly concerned with the theatre are aware. Because of this increased interest, attention has been given on several fronts to serious deficiencies in the way in which we as a nation train young artists who desire a place in the world of the professional performing arts. Perhaps the most notable of these is the recent report of the Rockefeller Panel on the Performing Arts. The Panel, which was composed of leaders in all of the performing arts, made the following comment on the present status of performing arts education:

If the performing arts are to fulfill their cultural mission in the United States, marked improvement in the quality of the training of professional artists will be required. It has been authoritatively asserted that much of the dance instruction available in this country is harmful physically as well as aesthetically. In the theatre there is widespread complaint of ill-trained craftsmanship on the part of those seeking professional status.¹

Despite this rather dark view of the present state of performing arts education, the Panel outlined several

¹The Performing Arts, Problems and Prospects (New York: McGraw-Hill Book Company, 1965), p. 18.

hopeful prospects for the future. Among these prospects is the increasing commitment being made to training the performing artist by American colleges and universities. The Panel feels these institutions, ". . . have begun to assume increasing responsibilities for training future performers."²

Colleges and universities have encountered some problems in assuming this new responsibility. Despite the fact that change is taking place, an attitude still exists in some faculty quarters which is inimical to professional training in the performing arts. Such training is equated with "skills" training, which should be relegated to "trade schools" of the arts. Persons of the opposite persuasion are hindered in replying to these charges because at present no objective criteria for measuring aptitude in the performing arts exist. There are on the other hand, objective criteria for measuring aptitude for more traditional approaches to scholarship. Thus admissions procedures are weighted against the student with little aptitude for traditional university study, but high aptitude for the performing arts.

The difficulty of determining who may be profitably admitted to a professional training program in the performing arts in general, and particularly in theatre, is

²Ibid., p. 173.

not unique to university departments. It is shared by private professional training schools. Both are faced with the troublesome task of working out admissions procedures which are both fair and fruitful in an area where quantitative measures of potential excellence are largely non-existent.

The two horns of the theatre educator's dilemma are manifest in the following statements from the Rockefeller Report and the American Educational Theatre Association's Conference Report: "At present admissions criteria in the university emphasize academic attainments and have little relevance to creative ability in the arts."³ While on the other hand:

Research is needed on the possibility of developing psychometric instruments which will measure at some useful level the probability of success in actor training programs . . . or on the development of new instruments capable of identifying those children who should be encouraged to seek careers in the arts, or discouraged from pursuing such career aspirations.⁴

In effect, if one can accept the authority of these two studies, persons conducting actor training programs are faced with the fact that existing standards for admissions bear little relationship to identifying individuals with a potential for success in professional

³Ibid., pp. 176-177.

⁴Kenneth L. Graham, "Relationships Between Educational and Professional Theatre; Actor Training in the United States," Educational Theatre Journal, Special Issue (November, 1966), p. 332.

training programs. They are also faced with the fact that the development of these new admissions procedures is being delayed by a failure to develop or discover appropriate measurements of potential for success at any meaningful level.

Obviously, the first step in developing such a set of measures is to establish what things may profitably be measured. In other words, before measuring instruments may be developed it is necessary to establish what factors differentiate the successful actor from the unsuccessful one. It is necessary to determine quantitatively and objectively what our judgments reflect about the behavior of the person whom we judge to be capable of excellence in the art of acting. This study seeks to establish a group of these factors, and thus to take a first step toward establishing meaningful measures of acting potential.

Definitions

The term "proven actor" will be used to indicate an actor who has performed in at least twenty roles, who earns money by the art of acting, and who is found by a significant majority of the directoral staff of the producing organization by which he is employed to be a more than usually talented actor or actress.

The term "beginning actor with small potential" will be used to indicate persons who have been judged, either on the basis of class work, performance, or both,

to be clearly deficient in potential excellence in acting by the faculty in acting of Michigan State University.

The term "beginning actor with large potential" will be used to indicate persons who have been judged on the basis of both class work and actual performance to be clearly possessed of large potential for excellence in acting by the faculty in acting at Michigan State University.

The rationale for the definitions in the two paragraphs above is that the only real basis which exists at present for differentiating between high and low potential in acting--either potential for the successful completion of a course of study or potential for the successful rendition of a specific role by an experienced actor--is a subjective decision by an experienced producer, director, or teacher. Since these subjective decisions are the basis of most current theatrical selection, there seems little choice but to allow them to form the basis for the categorizations of subjects in this study.

The term "non-actor" will be used to designate those persons, drawn from the Michigan State University student population who have never acted in a play, and who, moreover express no desire to do so.

"Acting" will be taken to mean the act of creating roles within plays, film plays, or television plays. It will not be taken to include the conscious or unconscious

role-playing which is a part of the daily life of most normal human beings, or the peripheral role-playing of such performers as night-club comedians or radio announcers. While it is freely admitted that a penchant for such activity might bear some relationship to excellence in acting, the examination of that relationship is held to be outside the purpose of this study.

"Creativity" will be used as a term in the extremely limited sense proposed by Dr. Sarnoff Mednick of the University of Michigan. Dr. Mednick views creativity as a process "of seeing relationships between seemingly 'mutually remote' ideas and forming them into new associative combinations which are either useful or meet specified criteria."⁵

The term "factor" will be used to indicate an area of human behavior in which a measurable difference between actors and non-actors is hypothesized to exist. "Physiological factors" will be taken to mean those areas of human behavior which are primarily governed by the makeup of the subject's body, as in the ability to hear sounds of a given pitch level. "Psychological factors" will be used to indicate those areas of human behavior which are primarily dependent on the particular bent of

⁵Sarnoff A. Mednick and Martha T. Mednick, Examiner's Manual Remote Associates Test (Boston: Houghton Mifflin Company, 1967), p. 1.

the subject's mental makeup, as, for example, the tendency to attempt to dominate a social group.

For purposes of this study, all of the above terms are strictly limited to the above stated definitions.

Organization

The study will be divided into five chapters with appendices and tables. The five chapters include the present introduction, a review of the literature in the area of the study; a chapter discussing the subjects, the testing instruments, and the experimental procedures used; a chapter devoted to the results of the experiment; and finally, a chapter of summary, conclusions, and suggestions for further research.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter is a review of the existing literature in the area of this study. It is divided into two main sections; literature in acting and literature in psychology.

Literature in Acting

In approaching the present study, there is a strong temptation to disregard entirely the past literature in acting. In effect, the literature in the field of acting has primarily concerned itself with questions of method. It has asked, and has attempted to answer, questions relating to how the actor performs the task of moving an audience. While this question remains a vital one, it is not the main focus of this inquiry. This study seeks not to discover what means an actor may best use, but rather attacks the question of what peculiarities of human constitution contribute significantly to what is called "talent in acting." It is an inquiry not into the actor's means, but into the nature of the actor himself. As such, it is somewhat remote from the question of means so prevalent in the literature. Naturally, it must be added that the discovery of quantitative data about the nature of talent

may ultimately affect the question of the means by which that talent may best be employed.

In brief, the traditional literature in acting, in attempting to answer the question of means, polarized at the earliest possible date into two general schools of thought. These two camps, which have used differing terminologies depending upon time and place, may be categorized as the inspirational view and the view of technique. The former holds that the actor best affects the audience when he is inspired to feel the emotions of his role. The latter holds that the actor should not feel the emotions, but rather should make the audience feel them by the artistic use of his physical instrument.

In the third century before Christ, Plato concluded in the Ion that actors, poets, and rhapsodes are directly inspired from above, and thus may work without the aid of art. Indeed, this researcher has taken the terms "inspiration" and "art" from Plato. Plato's view of direct inspiration was magnificently lampooned by Aristophanes in his characterization of the inspired poet in The Birds, the "zealous slave of the Muses."¹ The view implied by Aristophanes' satire was stated in the following somewhat more philosophic form by Plutarch in his Symposiacs four centuries later:

¹Aristophanes, The Birds (tr. anonymous), line 904. In Whitney Oates and Eugene O'Neill, Jr., The Complete Greek Drama, Vol. 2 (New York: Random House, 1938), p. 768.

. . . he that only represents excels him that really feels, inasmuch as he doth not suffer the misfortunes; which we knowing are pleased and delighted on that account.²

Thus both points of view were quite firmly established even in the ancient world.

The pattern of opposing inspiration to art continues through the literature in the oppositions of Horace versus Cicero, Kean versus Kimble, Irving versus Coquelin, down to the Stanislavski versus Dean controversy of recent times. While the contemporary critic of acting would usually recognize that, taken alone, either side of the argument represents only half of the truth, there still exists some suspicion that one way or the other may be superior.

The question of the actor's means has been the subject of some excellent contemporary scholarly research, which has used not only the more traditional critical methodology, but also the newer means of creative and quantitative research. Isaiah Sheffer made good use of the traditional critical methodology in his "Emotional Memory in Acting Technique."³ Sheffer, by gathering and examining the existing literature in emotional memory,

²Plutarch, Symposiacs, Book V, cited by Toby Cole and Helen Chinoy in Actors on Acting (New York: Crown Publishers, 1949), p. 13.

³Isaiah Sheffer, "Emotional Memory in Acting Technique" (unpublished Master's thesis, Michigan State University, 1958).

managed to clarify the actor's use of this technique, but, in his own words, "The project of trying to verify the suppositions of the theatrical artist in the light of modern psychological knowledge is specifically excluded."⁴

"Creative" research into the actor's means may take the form of an actor-student's describing his creative methodology in the task of forming a single role, as in Mariam Alexanian's 1952 study of the role of "Elizabeth the Queen."⁵

As early as 1952, Whitehall and Kodman attempted, with somewhat inconclusive results, to make a quantitative analysis of the reactions of audiences to stereotype character.⁶ Only five years ago, Allen Neal Kepke successfully applied quantitative methodology to the problem of character communication by the use of the Q-sort technique.⁷ This interesting study explores the

⁴Ibid., p. 3.

⁵Mariam Alexanian, "Elizabeth the Queen" (unpublished Master's thesis, Michigan State University, 1950).

⁶Buell Whitehall, Jr., and Francis Kodman, Jr., "A Study of Audience Reaction to a Stereotype Character," Educational Theatre Journal, Vol. IV, No. 2 (December 1952), 139-192.

⁷Allen Neal Kepke, "A Study of Communication of Perception of Character Among Actors, Director, and Audience Using Q Methodology" (unpublished Ph.D. dissertation, Michigan State University, 1963).

difficulties in communicating concepts of character with enviable thoroughness, but remains within the traditional literature in confining itself to the study of the actor's means rather than the actor's nature.

It is only in very recent times that writers on acting have turned from the pattern of inquiring after the actor's means to question what an actor is, and what makes up the "being" of a successful actor. Perhaps the most notable of these works is Yoti Lane's The Psychology of the Actor.⁸ While this work suffers, from the viewpoint of this researcher, from deficiencies of methodology, it must be regarded as something of a landmark in the literature in its effort to describe the psychological makeup of the actor. Lane's "analysis" of the problem consists of a series of observations, and deductions from those observations, set down in a pseudo-psychoanalytic style.

The works of Jerry Blunt⁹ and James Ching,¹⁰ which seek to describe the actor's psychology, suffer from the same methodological deficiency. Blunt, for example,

⁸Yoti Lane, The Psychology of the Actor (New York: John Day Company, 1960).

⁹Jerry Blunt, The Composite Art of Acting (New York: Macmillin, 1966), p. 23.

¹⁰James Ching, Performer and Audience (Oxford: Hall Publishers, 1947).

speaks of the actor's need for "sensitivity," but makes no attempt to define the nature of that sensitivity, or that to which the actor need be sensitive. While these observations have the ring of truth, they provide no more objective data about the nature of actors than the considered judgment of any experienced theatre person.

Despite deficiencies of method and lack of objectivity, the present study is deeply indebted to these authors, and to Lane especially, for providing invaluable insights as to which factors to investigate. It is hoped that this study, and additional quantitative research, may help to make a meaningful proof of their observations.

Before leaving the literature of the theatre area, it should be noted that there have been growing efforts to apply experimental methods to studies in the field. These studies have been various in scope and application. Both E. C. Mabie and Raymond Smith attempted to use the reaction of the audience during performance through the use of response indices. Mabie worked in the area of audience, reaction,¹¹ while Smith attempted to develop a semantic differential for use in the theatre area.¹² Besides the

¹¹E. C. Mabie, "The Responses of Theatre Audiences, Experimental Studies," Speech Monographs, Vol. XIX, No. 4 (November 1952), 235-243.

¹²Raymond G. Smith, "A Semantic Differential for Theatre Concepts," Speech Monographs, Vol. XXVII, No. 1 (March 1961), 1-8.

work of these two men, studies have ranged from inquiries into the nature of attenders and non-attenders of college theatres to the author's own modest attempt to develop a new base for scene paint.¹³ These studies are mentioned in passing since they contribute to a growing confidence in the use of experimental methodology within the field, although not a part of the literature of acting.

Literature in Psychology

Ten minutes spent reading titles in any university library will confirm that the literature in the behavioral sciences, is, to say the least, vast. Catalogue listings in the psychology of creativity alone range from the philosophical Creative Intuition in Art and Poetry¹⁴ by Jacques Maritain to the somewhat unscholarly How to Be a More Creative Executive¹⁵ by Joseph Mason. Since any brief attempt to survey so huge a sea of information is doomed by the very size of the area to be charted, this discussion will be limited to the two areas which are most relevant to the present study: the literature in

¹³William H. Stock and Robert Grubbs, "MLL, A New Base for Scene Paint," Educational Theatre Journal, Vol. XVLL, No. 4 (December 1965), 237-239.

¹⁴Jacques Maritain, Creative Intuition in Art and Poetry (New York: Pantheon Books, 1953).

¹⁵Joseph Mason, How to Be a More Creative Executive (New York: McGraw-Hill, 1960).

creativity, and the literatures surrounding the testing instruments which form the basis for this study.

Within behavioral science research, there is little unanimity of opinion as to the root definition of creativity. Not a little of the literature is devoted to seeking just such a root definition. Since this study has chosen to adopt one particular definition of creativity,¹⁶ and since, as Alan Downer remarked at the recent conference on theatre research, "Conversations on this subject revealed that we were rather sure that many kinds of creativity were involved in the theatre,"¹⁷ a detailed treatment of the varying opinions as to what constitutes creativity would seem superfluous. For a complete, concise, and comprehensive discussion of the varying points of view on the subject of creativity, it is suggested that the interested reader consult Morris Stein's Survey of the Psychological Literature in the Area of Creativity.¹⁸

Turning to the rationale of the definition of creativity which this study accepts, the noted acting

¹⁶See p. 8.

¹⁷Alan S. Downer, "Conference on Theatre Research," Educational Theatre Journal, Special Issue (June 1967), p. 247.

¹⁸Morris I. Stein, Survey of the Psychological Literature in the Area of Creativity (New York: Macmillan, 1962).

coach, I. Rapoport, made the following remark on the creative working of the actor's imagination:

It is impossible to imagine something non-existent, but to unite different parts of the existing into a new whole--creating thereby a new "artistic image"--can be done with the help of the creative fantasy.¹⁹

This point of view agrees with the definition of creativity which this study accepts: Sarnoff Mednick's notion of creativity as facility for bringing together mutually remote things in new and fruitful ways.²⁰

Beginning in 1958 with "Ease of Attainment of Concepts as a Function of Response Dominance Variance,"²¹ and "An Orientation to Research in Creativity,"²² Dr. Mednick, working in collaboration with his wife, J. L.

¹⁹I. Rapoport, "The Work of the Actor," in Acting: A Handbook of the Stanislavsky Method, edited by Toby Cole (New York: Lear Publishers, 1947), p. 42.

²⁰The repeated attribution of this definition to Dr. Mednick is a matter of linguistic facility, and is by no means meant to underestimate the contributions of Dr. Mednick's many collaborators who helped in the formation and refining of the concept, among whom J. L. Freedman and Dr. Martha Mednick should be mentioned as most notable.

²¹J. L. Freedman and Sarnoff A. Mednick, "Ease of Attainment of Concepts as a Function of Response Dominance Variance," Journal of Experimental Psychology, LV (1958), 463-466.

²²Sarnoff A. Mednick, "An Orientation to Research in Creativity," Research Memo No. 2 (Berkeley, California: University of California, Institute of Personality Assessment and Research, 1958).

Freedman, and others,²³ began to explore and expand the "remote associates" definition of creativity. Working mainly from the idea of scientific creativity, Mednick and his associates repeatedly tested the validity of their definition of creativity until they were able to apply it satisfactorily to a testing instrument which would seek to measure creativity as they had defined it. This instrument is the Remote Associates Test which Houghton Mifflin published in 1967, and which this study is attempting to use with reference to the problem of acting. For a complete listing of the literature leading to its development and refinement, the interested reader is referred to the bibliography of the present study and to that of the Mednick's study, "The Associative Basis of the Creative Process."²⁴ It is to be hoped that this study will help to make clear the relationship of creativity, as Mednick defines it, to the art of acting.

The interested reader whose technical competencies do not include a general knowledge of the area of testing may find an excellent introduction to the subject in either Anne Anastasi's Psychological Testing,²⁵ or in

²³Notably C. C. Jung, S. Halpern, and J. P. Houston.

²⁴Sarnoff A. Mednick and Martha T. Mednick, "The Associative Basis of the Creative Process," HEW Cooperative Research Project No. 1073, University of Michigan, 1965.

²⁵Anne Anastasi, Psychological Testing (2nd ed.; New York: Macmillan, 1961).

Edgar Anstey's Psychological Tests.²⁶ Either book can provide a good general view of recent thinking in the field.

The Seashore Measures of Musical Talents is one of the oldest and most widely used testing instruments still in print. It was first developed by Carl E. Seashore in 1919, and later revised in 1939 to make the stimuli to which the testee is asked to respond more precise. A detailed discussion of the construction, content, and analysis of the 1939 revision, which is still current, and which is used in this study, is available through the University of Iowa Press.²⁷ The Seashore Measures has been repeatedly tested to determine both its reliability and validity, and to determine its usefulness in various kinds of testing.²⁸

²⁶Edgar Anstey, Psychological Tests (London: Nelson, 1966).

²⁷D. Lewis, J. G. Saetveit, and C. E. Seashore, "Revision of the Seashore Measures of Musical Talents," University of Iowa Studies Aims Progress Research No. 65 (Iowa City: University of Iowa Press, 1940).

²⁸Vide S. E. Farnum, "Prediction of Success in Instrumental Music" (unpublished Ph.D. dissertation, Harvard University, 1950); A. S. Kane, "A Correlative Study of Musical Aptitude and Music Appreciation as Measured by the Seashore Measures of Musical Talents and the Fisher Measurements of Musical Appreciation" (unpublished Master's thesis, Boston University, 1950); J. E. Karlin, "The Factorial Isolation of the Primary Auditory Abilities" (unpublished Ph.D. dissertation, University of Chicago, 1942); and W. S. Larson, "Practical Experience with Music Tests," Music Education Journal, XXIV (1938), 68-74.

Normative information for the Seashore Measures has been obtained by testing programs in some nineteen secondary school systems and colleges.²⁹

Dealing as it does with the ability to hear certain aural stimuli with precision, the Seashore Measures obviously deals with the most physiological of the factors examined by this study. The Seashore Measures has been used with success to study problems as diverse as aptitude testing in music,³⁰ aptitude testing in telegraph,³¹ spelling competence,³² and aphasia.³³

²⁹They are the Northbrook, Ill.; Grand Haven, Mich.; Spring Lake, Mich.; Onamia, Minn.; Harlowtown, Mont.; Niagara Falls, N. Y.; Olean, N. Y.; and Windsor, N. Y. school districts, and the University of Maine, Union College, and Caspar Junior College.

³⁰Vide May V. Seago and J. C. Gowan, "The Relation Between Interest and Aptitude Tests in Arts and Music," California Journal of Educational Research, VIII (1957), 43-45; and J. Goldstein, "Will Your Students Succeed in Music," Etude, LXVIII (1950), 16-17.

³¹Vide E. A. Fleishman, "Predicting Code Proficiency of Radio-Telegraphers by Means of Aural Tests," Journal of Applied Psychology, XXXIX (1955), 150-155; and E. A. Fleishman, M. M. Roberts, and M. P. Friedman, "A Factor Analysis of Aptitude and Proficiency Measures in Radio-telegraphy," Journal of Applied Psychology, LXVII (1963), 344-349.

³²T. Damgaard, "Auditory Activity and Discrimination Differences as Factors in Spelling Competence" (unpublished Ph.D. dissertation, Florida State University, 1958).

³³H. S. Edmondson, "The Seashore Measures of Musical Talents as a Prognostic Guide in Language Rehabilitation for Persons with Aphasia" (unpublished Ph.D. dissertation, University of Michigan, 1954).

Insofar as has been possible to determine, it has never been applied to the problem of excellence in acting. This study would hope to be able to point to the relevance of musical talent, as measured by the Seashore Measures, to that problem.

The history of intelligence testing is a long one, dating back seventy years to Ebbinghaus' Completion Test in 1897. The first really practical scale for testing intelligence level and expressing it in numerical units was developed by the French psychologist Alfred Binet in 1905.³⁴

The problem of measuring human intelligence proved a compelling one, and has remained a compelling one to the present day.³⁵ It has given rise to one of the largest literatures within the general field of psychology. It is a literature, moreover, which ranges in scope and quality from David Engler's How to Raise Your Child's IQ³⁶ to Wallace Kennedy, Vernon Van De Riet, and James White's

³⁴P. E. Vernon, Intelligence and Attainment Tests (New York: Philosophical Library, 1961), p. 9. This work has an excellent introduction to the history of intelligence testing.

³⁵e.g., the recent inquiries of American Mensa--a society of the top 2 per cent of high scorers on intelligence tests--into the basic nature of intelligence, as reported in Kansas City FOR. U. Ms. (Kansas City, Mo.: Privately Printed, 1966).

³⁶David Engler, How to Raise Your Child's IQ (New York: Criterion Books, 1958).

The Standardization of the 1960 Revision of the Stanford-Binet Intelligence Scale on Negro Elementary-school Children in the Southeastern United States.³⁷

Binet's work, which was directed primarily toward the detection of feeble-mindedness, was extensively revised in 1916 by L. M. Terman of Stanford University to cover a much wider range of intelligence than Binet's original battery. Terman, working with the suggestions of the German psychologist Wilhelm Stern, also introduced the idea of the Intelligence Quotient. In brief, the Stanford-Binet scale measures mental age. This mental age is then divided by the subject's chronological age, and the quotient is multiplied by 100 to give the subject's I. Q.³⁸

It is important to note that the idea of I. Q., which has had both supporters and detractors among psychologists,³⁹ is of little importance to this study. While it is possible to calculate a subject's I. Q. from the results of the Intelligence testing instrument used in

³⁷W. Kennedy, V. Van De Riet, and James White, The Standardization of the 1960 Revision of the Stanford-Binet Intelligence Scale on Negro Elementary-school Children in the Southeastern United States (Tallahassee: Florida State University Press, 1961).

³⁸Vernon, op. cit., pp. 10-11.

³⁹Vide Paul L. Boynton, Intelligence, Its Manifestations and Measurement (New York: D. Appleton and Co., 1933), pp. 49-50.

this study, the Otis Quick Scoring Mental Ability Test, Gamma Fm, such a calculation has not been made. Rather, the researcher has used the Otis Test as a measure of an individual's ability to think in a particular manner or pattern. He has, therefore, disregarded the notion of I. Q. and simply used the Otis Test raw scores as a numerical basis for comparison between and among the groups tested for the particular thinking ability which the test measures. The comparison attempts to determine the relation of this ability to ability in acting.

The procedure described above is not without precedent. The Binet test was developed as an individual testing instrument in which ". . . the child gives his answers in his own words and the tester assesses their adequacy."⁴⁰ The Otis Test, on the other hand, was developed as a group test, and came out of the work of Arthur Otis on the Army Alpha and Army Beta tests, which were the first large-scale attempts at group intelligence testing.⁴¹ Vernon notes, ". . . the scoring of group tests is objective--a matter of totaling the correct responses," and, "Army Alpha scores were not usually translated into Mentages or I. Q.'s, but graded arbitrarily on a letter scale from A to E."⁴²

⁴⁰Vernon, op. cit., p. 17.

⁴¹Ibid.

⁴²Ibid.

The Otis Test was chosen for this study from the many tests available in the intelligence testing area for several reasons. First, a group test rather than an individual test was required because of the size of the sample. The Otis Test is a group test which is highly thought of in the field, as evidenced by the following comment from Boynton:

The Otis Self-Administering tests are among the most satisfactory of the present group tests for at least four reasons. First, in the ordinary group where the scholastic background for all the individuals is approximately the same [a condition of the sample of this study] the validity of these tests as measured by scholarship prediction is approximately as high as, or perhaps equally as high as any of the other intelligence examinations. Second, the tests have a very high reliability.⁴³

Boynton's third and fourth reasons are that the Otis Test is easy to administer and easy to score. The second reason for using the Otis Test in this study was that a test which took the minimum amount of time to complete was required in order to keep the imposition on the subjects' time low. The Otis Test takes less time than any comparable test to complete. Finally, it is inexpensive both in money cost and in time for scoring.

The general area of mechanical ability and aptitude testing is somewhat more narrow than that of intelligence testing, possibly because it has not appealed so strongly to the public fancy. It tends to contain material of a

⁴³Boynton, op. cit., pp. 242-243.

more strictly technical nature. There are, for example, no books on "How to Improve Your Child's Mechanical Abilities Quotient." The literature does, however, have considerable breadth, and runs from Glen Grimsley's "Draftsmen Aptitude Tests Cut Turnover"⁴⁴ to C. E. Thompson's "Motor and Mechanical Abilities in Professional Schools."⁴⁵ For an introduction to the literature in this area, the interested reader is directed to the work of McDaniel and Reynolds in Educational and Psychological Measurement.⁴⁶

Since the actor's creation is limited by his ability to control his physical instrument, mechanical ability would seem to relate to excellence in acting. Mechanical aptitude is essentially a physiological phenomenon. Like the Seashore Measures, the MacQuarrie Test has been tested and validated both by its author,⁴⁷ and by other

⁴⁴Glen Grimsley, "Draftsmen Aptitude Tests Cut Turnover," Western Industry, (January 1944).

⁴⁵C. E. Thompson, "Motor and Mechanical Abilities in Professional Schools," Journal of Applied Psychology, XXV (1946), 24-37.

⁴⁶J. W. McDaniel and William A. Reynolds, "A Study of the Use of Mechanical Aptitude Tests in the Selection of Trainees for Mechanical Occupations," Educational and Psychological Measurement, IV (1944), 191-197.

⁴⁷T. W. MacQuarrie, "A Mechanical Ability Test," Journal of Personnel Research, V (1927), 329-337.

researchers.⁴⁸ Its value has been determined as a prognostic instrument in both education and industry.⁴⁹ Moreover, the instrument has been used for studies as diverse as predicting aptitude for mechanics and typists,⁵⁰ examining the relationship of mechanical ability to intelligence,⁵¹ guiding the mentally defective⁵² and

⁴⁸Vide H. Babcock and M. R. Emerson, "An Analytical Study of the MacQuarrie Test for Mechanical Ability," Journal of Educational Research, XXX (1938), 50-55; R. L. Chapman, "The MacQuarrie Test for Mechanical Ability," Psychometrika, XIII (1948), 175-179; H. S. Curtis, "A Statistical Study of the MacQuarrie Test for Mechanical Ability" (unpublished Ph.D. dissertation, University of Michigan, 1942); and W. Harrell, "A Factor Analysis of Mechanical Ability Tests," Psychological Bulletin, XXXVI (1939), 524.

⁴⁹Vide O. Garretson, "Relationships Between Expressed Preferences and Curricular Abilities of Ninth Grade Boys," Journal of Educational Research, XXIII (1931), 124-132; and E. Ghiselli, "Tests for the Selection of Inspector-Packers," Psychological Bulletin, XXXVIII (1946), 586-595.

⁵⁰W. Harrell and R. Faubion, "Selection of Tests for Aviation Mechanics," Journal of Consulting Psychology, IV (1940), 104-105; and J. M. Overhaltzer, "A Study of the Possibilities of Predicting Typing Ability" (unpublished Master's thesis, University of Southern California, 1928).

⁵¹L. W. French, "Some Factors in the Relationship of Intelligence and Mechanical Ability" (unpublished Master's thesis, Columbia University, 1936); and L. W. Murphy, "The Relation Between Mechanical Ability Tests and Verbal and Non-verbal Intelligence Tests," Journal of Psychology, II (1936), 353-366.

⁵²E. T. Burr, "Vocational Guidance of Mental Defectives," Psychological Clinic, XX (1932), 55-64.

determining scientific aptitude.⁵³ A complete bibliography of studies relating to the MacQuarrie Test is available to the interested reader from its publishers, the California Test Bureau.⁵⁴

The MacQuarrie Test has never been applied to the problem of excellence in acting. This study would hope to show the degree to which mechanical ability as measured by the MacQuarrie Test relates to acting ability.

The literature in the area of personality and personality testing is as large as, or larger than, the literature in intelligence testing. The interested reader who wishes a general background in the field might be referred to either Anastasi,⁵⁵ or to G. W. Allport's Pattern and Growth in Personality.⁵⁶ Even confining oneself to research which makes use of the personality measurement

⁵³M. Mercer, "An Analysis of the Factors of Scientific Aptitude as Indicated by Success in Engineering Curricula" (unpublished Master's thesis, Pennsylvania State College, 1938).

⁵⁴J. C. Durna, MacQuarrie Test for Mechanical Ability Summary of Investigations Number Two (Monterey, California: California Test Bureau, 1950), pp. 14-17. This work also contains an excellent introduction to the area of Mechanical Abilities testing.

⁵⁵See p. 19.

⁵⁶G. W. Allport, Pattern and Growth in Personality (New York: Holt, Rinehart, and Winston, 1961).

device used by this study, the California Psychological Inventory, one is faced with studies as diverse as Unmarried Mothers, by C. Vincent,⁵⁷ and "The Stability Over Time and Under Stress of Conscious and Unconscious Masculinity-Femininity," by L. M. Lansky.⁵⁸ For a complete listing of studies using and concerning the CPI, the interested reader is directed to the bibliography of the Manual for the California Psychological Inventory.⁵⁹

The CPI was developed by Dr. Harrison G. Gough as a convenient, large-scale testing instrument to measure personality elements which ". . . have a wide and pervasive applicability to human behavior, and which in addition are related to the favorable and positive aspects of personality rather than to the morbid and pathological."⁶⁰ Each of the eighteen individual scales which make up the inventory has been tested for individual

⁵⁷C. Vincent, Unmarried Mothers (New York: Free Press of Glencoe, 1961).

⁵⁸L. M. Lansky, "The Stability Over Time and Under Stress of Conscious and Unconscious Masculinity-Femininity," American Psychologist, XVII (1962), 302-303.

⁵⁹H. G. Gough, Manual for the California Psychological Inventory (Palo Alto, California: Consulting Psychologists Press, Inc., 1964), pp. 26-33.

⁶⁰Ibid., p. 5.

validity and reliability.⁶¹ Each individual scale is regarded as a separate factor for this study.

The inventory has been applied to studies as disparate as the prediction of professional success,⁶² the prediction of scholastic success,⁶³ the study of national differences,⁶⁴ and the study of parent-child relationships.⁶⁵ It has not yet been applied to the problem of assessing the personality of persons who achieve excellence in acting. This study attempts to make such application.

⁶¹Ibid., pp. 19-24. Also see J. V. Mitchell and J. Pierce-Jones, "A Factor Analysis of Gough's California Psychological Inventory," Journal of Consulting Psychology, XXIV (1960), 453-456.

⁶²T. Pouncey, "Psychological Correlates of Journalism Training Completion" (unpublished Ph.D. dissertation, University of Minnesota, 1954); and L. J. Carleton, "A Study of the Relationship of Rated Effectiveness of School Administrators and Certain of Their Personality and Personal Background Characteristics" (unpublished Ph.D. dissertation, University of Oregon, 1956).

⁶³H. G. Gough, "A First Report on the Use of the California Psychological Inventory to Predict Grades in High School," American Psychologist, VIII (1953), 501; and M. B. Fink, "Self-concept as It Relates to Academic Under-Achievement" (unpublished Ph.D. dissertation, University of California, Berkeley, 1961).

⁶⁴J. C. Brenglemann, "Differences in Questionnaire Responses Between English and German Nationals," Acta Psychology, XVI (1959), 339-355.

⁶⁵D. E. Payne and P. Mussen, "Parent-child Relations and Father Identification Among Adolescent Boys," Journal of Abnormal Psychology, LII (1956), 358-362.

There is, of course, no literature surrounding the Stock Index of Solipsism, since the test was developed specifically for use in this study. The Index was developed both because there was no existing instrument which measured solipsism, or the tendency to view the world as happening through self, and to broaden the author's ability in test development. It is essentially a test of a personality factor which utilizes a subjective response to obtain a numerical rating of the testee's tendency toward that personality factor. The response device used is sentence completion. The test thus utilizes the same testing theory as other, more general, measures of personality like the Thematic Aperception Test or the Rorschach. For a full discussion of this theory, the interested reader is directed to Anstey.⁶⁶ The development of the SIS is discussed in Chapter III.

⁶⁶See p. 20.

CHAPTER III

SUBJECTS, INSTRUMENTATION, AND PROCEDURES

Subjects

The data on which this study is based were drawn from a sample of 100 persons. Of these 100, eighty-seven were students and faculty members of Michigan State University. The remaining thirteen were members of the professional acting company of the Trinity Square Repertory Theatre of Providence, Rhode Island. Care was taken to insure that the thirteen persons from the Trinity company had the experience of a university education to avoid bias in the sample.

The 100 persons in the sample were distributed into four separate observational groups; actors of proven worth and ability, beginning actors with large potential, beginning actors with small potential, and non-actors. Males and females were equal, or nearly equal, in number in each group. The four groups were tested under uniform conditions, providing data which were compared and contrasted statistically both within and among groups.

Ten of the actors of proven worth and ability were drawn from the Performing Arts Company of Michigan State University. Two were drawn from the Michigan State faculty in acting. The final thirteen were drawn from the Trinity Square professional company.

The ten Performing Arts Company actors were un-animously judged to be of significantly high quality by the theatre faculty of Michigan State University.¹ The thirteen professional actors from the Trinity company were screened for membership in that company from among professional applicants by the directoral staff of the Trinity theatre in a series of rigorous auditions.

Several operations were undertaken to guard against bias being introduced by the fact that the proven actor group was taken from two geographically remote populations. The proven actors from Michigan State and those from the Trinity Square Company were treated as two sub-samples, one of twelve persons, and one of thirteen. Means and rank sums were calculated for the two sub-samples, and tested for significant difference for each factor. Interval data were tested by the t test, and ordinal data were tested by the Mann Whitney U Test.² Criterion level was held at alpha .05.

¹The technical and design faculty was not asked to participate in the judging since their expertise does not normally include skill in the judging of actors.

²Statistical sources and procedures are discussed on pp.69-71.

There was no difference significant at alpha .05 or greater on any of the interval data. The critical value of t was 2.069 or greater. The following were the values for t for the individual factors tested:

TABLE 1.--Values for t for the individual factors tested.

Factor	Value of <u>t</u>
Pitch	1.95363
Loudness	0.11811
Rhythm	0.46500
Time	1.06528
Timbre	0.66913
Tonal Memory	1.46016
General Intelligence	0.61324
Tracing	1.49631
Tapping	0.29392
Dotting	1.16050
Copying	0.73738
Location	1.12573
Blocks	0.27099
Pursuit	0.43723
MacQuarrie Sum	1.06257
RAT Creativity	0.46198

Difference significant at the alpha .05 or greater level existed on six of the factors yielding non-parametric data. These factors were all part of data tested by the California Psychological Inventory. They are the following: Dominance, Well-being, Responsibility, Communality, Achievement via Conformance, and Flexibility. While this difference is further discussed in Chapter IV, it should be noted here that in each case where significant difference

existed, the difference between the actors working in the university and those working in the professional theatre was in the same direction as the difference between the university actor sample and the non-actor sample. In the simplest of terms, the actors from the professional theatre tended to be what the university actors were, only more so. This trend becomes quite comprehensible when one considers that the factors in question were all psychological-social in nature, and that the actors working in the profession and living the vie de bohème are not subject to the same restrictions as are those working in the university. Thus, actors tended to be less dominant than non-actors, and the professional actors tended to be less dominant than the university actors; actors tended to be lower in communality than non-actors, and the professional actors tended to be even lower than the university actors, etc.

Critical value for the Mann-Whitney U at alpha .05 was 41 or less. The values for U for the individual factors tested are shown in Table 2.

The twenty-five actors with large potential were drawn from a population of persons judged to be of large potential by the faculty in acting at Michigan State. All twenty-five were judged both on the basis of class work and performance.

TABLE 2.--Values for U for the individual factors tested.

Factor	Value of <u>U</u>
Dominance	33.500*
Capacity for Status	66.000
Sociability	74.000
Social Presence	77.500
Self Acceptance	52.500
Well-being	40.000*
Responsibility	17.000*
Socialization	48.000
Self-control	57.000
Tolerance	51.000
Good Impression	68.500
Communality	29.500*
Achievement by Conformance	40.500*
Achievement by Independence	68.500
Intellectual Efficiency	70.000
Psychological Mindedness	65.000
Flexibility	40.000*
Femininity	52.000
Solipsism	77.000

*Significant values.

The twenty-five actors with small potential were drawn from a population of persons judged by the faculty in acting at Michigan State to be deficient in acting talent potential. Eighteen were judged on the basis of classroom work in acting, while the remaining seven were judged on the basis of performance in plays at Michigan State.

It is recognized that the assigning of these persons to one sample group or the other is made largely on

the basis of subjective decisions. It must be pointed out that at present the only basis available for differentiation between high and low potential in acting is a subjective decision by an experienced producer or director. This is equally true of the differentiation between two experienced actors for a particular role.

Since these subjective decisions regarding relative excellence form the basis of theatrical selection practices, there seemed to be little choice but to allow them to form the basis of the categorization of subjects for this study. Care has been taken to insist that the judges make their choices on the basis of the person in question's being clearly on the parameters of a condition of excellence; being without question of either high or low potential. Persons whose potential was in question were not selected for the sample. It might be remarked that perhaps our very systems of decision-making in the field of acting are part of what this study is testing.³

The only possible definition of a non-actor seemed to be a person who had never had the experience of acting in a play, and who had expressed no desire to do so. The control group for this study was, therefore, drawn from

³For example, in choosing the preliminary observational group for the actors of proven ability, this researcher compiled a list of thirty persons who, in his opinion, had proven their ability in acting. The judges who determined the composition of this observational group were in agreement at the alpha .05 level of significance on only twelve of the original thirty.

the general student population of Michigan State University, with care taken to assure that the persons selected had never acted, and had no wish to do so. These persons provide the norm against which the results of the other three groups are measured, although consideration was given to the normative information available for four of the six testing instruments which the study uses.

Instrumentation

The six tests which were used to gather data for this study will be discussed in the order in which they were administered to the sample. Five of the six were chosen on the basis of their being among the best instruments in the area in which the existence of factors was being tested. The sixth test was developed by the author specifically for this study in the absence of a reliable testing instrument in the factor area of solipsism. Broadly speaking, the six areas under study are the following:

1. The ability to hear musical sounds and patterns.
2. General intelligence as measured by standard "intelligence" testing instruments.
3. Mechanical ability and dexterity.
4. Creative thinking ability.
5. Personality make-up.
6. Solipsism or "I-mindedness."

The following test instruments were used to measure differences in these areas between the observational groups:

1. The Seashore Measures of Musical Talents
2. The Otis Quick-Scoring Mental Ability Tests,
Gamma Fm
3. The MacQuarrie Test for Mechanical Ability
4. The Remote Associates Test
5. The California Psychological Inventory
6. The Stock Index of Solipsism

Each subdivision of each test is regarded as a single factor.

The literature surrounding these six instruments, including that with reference to their past use, was discussed in the preceding chapter. Their development, reliability, and validity will be discussed here.

The Seashore Measures of Musical Talents was developed in 1917 as a practical measure of an individual's ability to accurately differentiate between six different types of aural stimuli relating to music. Pitch, loudness, rhythm, time, timbre, and tonal memory are the areas in which stimuli are presented. As a predictive instrument in music, the test is based on the hypothesis that the ability to differentiate accurately in these areas is essential to competent musicianship. This study examines

the relation of ability to differentiate in these areas to observed excellence and non-excellence in acting.

The original set of stimuli were revised in 1939 in the presence of more accurate laboratory instruments for the production of sound stimuli. This revision is the one currently available. The sets of stimuli are recorded on a 33 1/3 rpm. high fidelity phonograph record, and are presented by playing that record on a phonograph capable of reproducing the stimuli without distortion. The six tests are on separate bands of the record, and are administered separately. The stimuli were originally recorded under laboratory conditions on magnetic tape. This tape was then edited to eliminate imperfections, and the edited tape recorded on a master disc from which copies are struck for distribution and testing. Subjects indicate their responses on specially designed IBM answer sheets.

In the test for pitch, the subject is asked to determine whether the second tone is higher or lower than the first in fifty pairs of tones. The stimuli were recorded from a beat-frequency oscillator through a circuit which insures pure tones free from harmonics and overtones. The tones vary around a 500 cycle frequency with an individual duration of six-tenths of a second. The following table indicates the frequency differences between the pairs.

TABLE 3.--Frequency differences between the pairs--test for pitch.

Item Number	Differences in Cycles
1- 5	17
6-12	12
13-22	8
23-32	5
33-40	4
41-45	3
46-50	2

In the test for loudness, the subject is asked to determine whether the second tone of fifty pairs of tones is stronger or weaker than the first. The stimuli were obtained through the same apparatus as the stimuli for the pitch test. The frequency was held constant at 440 cycles. The following table shows the intensity differences between the pairs.

TABLE 4.--Intensity differences between the pairs--test for loudness.

Item Number	Difference in Decibels
1- 5	4.0
6-10	2.5
11-20	2.0
21-30	1.5
31-40	1.0
41-50	0.5

In the test for rhythm, the subject is asked to determine whether thirty pairs of rhythmic patterns are the same or different. The stimuli were recorded from a beat-frequency oscillator set at 500 cycles at a tempo of ninety-two quarter notes per minute. The rhythmic patterns are shown in Table 5.

TABLE 5.--Rhythmic patterns--test for rhythm.

Item Number	Rhythmic Pattern
1-10	5 notes in 2/4 time
11-20	6 notes in 3/4 time
21-30	7 notes in 4/4 time

In the test for time, the subject is asked to determine whether the second tone of fifty pairs of tones is longer or shorter than the first. The stimuli were obtained from the beat-frequency oscillator set at 440 cycles. Duration was controlled by an automatic device for which a predetermined schedule of time intervals was prepared. The differences in duration between the pairs is shown in Table 6.

In the test for timbre, the subject is asked to determine whether each of fifty pairs of tones are the same or different in timbre or tonal quality. The stimuli were obtained with a special generator which

TABLE 6.--Differences in duration between the pairs--
test for time.

Item Number	Difference in Seconds
1- 5	.30
6-10	.20
11-20	.15
21-30	.125
31-40	.10
41-45	.075
46-50	.05

produces a tone with a fundamental component of 180 cycles, and its first five overtones. For this test, the generator varies the intensity of the third and fourth harmonics by reciprocal alteration. The following table shows the decibel variations from the levels in the standard tone used in the variable tones.

TABLE 7.--Decibel variations from the levels in the
standard tone used in the variable tones--test for timbre.

Item Number	4th Harmonic	3rd Harmonic
1-10	10	9.6
11-20	8.5	4.0
21-30	7.0	2.4
31-40	5.5	1.2
41-50	4.0	0.7

In the test for tonal memory, there are thirty pairs of tonal sequences. The sequences are divided into ten sequences of three tones each, ten of four tones each, and ten of five tones each. In each pair, one tone is changed in the second playing of the sequence. The subject is asked to determine which tone is changed, and to note it by number. The stimuli were derived from a Hammond organ, using the eighteen chromatic steps upward from middle C, with tempo and loudness carefully controlled.⁴

The only requirements for the administration of the tests are good acoustics and minimum noise disturbance in the test room, and that the record be played on a machine capable of reproducing the stimuli without distortion. No subject is to sit closer than five feet from the loud speaker. The test may be given either individually or to groups as large as 100. The smallest group tested for this study was two, and the largest forty-seven. The conditions required by the test were rigorously adhered to by the researcher.

"Reliability," in psychological testing, "is used to indicate the trustworthiness or stability of a test itself, apart from its representativeness or capacity

⁴The preceding six paragraphs were condensed from developmental information in Carl E. Seashore, Manual of Instructions and Interpretations for the Seashore Measures of Musical Talents (New York: The Psychological Corporation, 1960), pp. 3-4.

for predicting anything else."⁵ The reliability of the Seashore Measures was tested with internal consistency coefficients (Kuder-Richardson formula 21). This statistic differs from the often used Pearson rho in being more likely to underestimate reliability than to overestimate it. It is, in essence, a more conservative statistic. Reliability has been tested for grade, high school, and college levels. Since this study is concerned only with the college level subjects, only the coefficients for college level students are given here.⁶

TABLE 8.--Consistency coefficients for college level students.

Test	Consistency Coefficient
Pitch	.85
Loudness	.74
Rhythm	.64
Time	.71
Timbre	.68
Tonal Memory	.83

⁵For a full discussion of reliability and validity, see Philip E. Vernon, Personality Tests and Assessments (London: Methuen & Co., 1953), pp. 21-23, from which this citation is taken.

⁶Seashore, Manual of Instructions . . ., op. cit., p. 7.

Validity is commonly measured against external criteria. A test of dominance, for example, would be tested on the basis of its ability to differentiate persons who had experienced problems with excessive dominance from persons who were normal in this personality trait. The Seashore Measures has not been validated by this procedure. The senior author of the Measures felt that such validation would be fruitless in the face of the fact that there were more factors involved in musical talent than those measured by the Seashore Measures. Since this study does not attempt to use the Seashore Measures as a predictive instrument, but rather examines the relationship of the raw Seashore data to observed excellence in acting, external validity is of little consequence. Nevertheless, the following statement of opinion from Seashore himself is illuminating:

The Measures have been validated for what they purport to measure. . . . When we have measured the sense of pitch, that is, pitch discrimination, in the laboratory with high reliability, and we know that pitch was isolated from all other factors, no scientist will question but that we have measured pitch. . . . It is easy to show that we cannot find a good violinist who does not have a good sense of pitch; or a good pianist who does not have a good sense of intensity, . . . But it does not follow that goodness in these capacities alone will make a good artist.⁷

⁷Ibid.

Seashore felt, in other words, that the primary question was the reliability of the tests. Since this inquiry does not seek to relate the Seashore Measures to musical talent, but rather to examine its relationship to observed excellence in acting, reliability would appear to be the prime question for this study.

In 1916, Arthur S. Otis began working on a series of sets of analogies, opposites, and other items which involved intellectual comprehension. His work with these items led to the development of the first group test of intelligence, the Otis Quick-Scoring Mental Ability Tests.⁸ This study makes use of the 1939 revision of the Gamma Fm, or adult form, of that test.

Philip Vernon, in The Measurement of Abilities, made the following valuable generalization about the construction of group intelligence tests:

Group tests generally include a "battery" of some half-dozen (between about four and twelve) "sub-tests," each containing some twenty (between ten and fifty) questions or items. Alternatively they are arranged in "omnibus" form, where items of all kinds are mixed up. In the battery type, each sub-test has its own instructions and sample items, and is timed separately. In the omnibus form the instructions and samples may be printed along with the questions, or included in a preliminary practice sheet, and one time limit suffices for the whole test. An omnibus test is therefore easier to give, but a test battery has the advantage of providing rest pauses every few minutes.⁹

⁸Philip E. Vernon, Intelligence and Attainment Tests (New York: Philosophical Library, 1961), p. 17.

⁹Philip E. Vernon, The Measurement of Abilities (London: University of London Press, Ltd., 1956), p. 156.

The Otis Test is in omnibus form, with instructions and samples on a preliminary practice sheet. The short time required to complete the test, thirty minutes, makes it valuable in a study like this one which requires large blocks of the subjects' time. Its reputation for excellence is discussed on page 25.

It has been remarked that group intelligence tests in general, and the Otis Test in particular, tend to be influenced by the scholastic level and ability of the subject.¹⁰ Because of this fact, and because the norms for the Otis Test extend only to the undergraduate level, care was taken to insure that all subjects had completed the freshman level of college course work. It has not been shown that course work beyond the freshman college level significantly affects the results of the Otis Test, Gamma Fm.

The Otis Test, Gamma Fm is composed of eighty items in omnibus form, and is printed on two sides of one long piece of paper. This single sheet is specially folded to form six letter-size pages. Pages one and two, printed on opposite sides of the paper, contain instructions, example questions, and an answer sheet in IBM form. Pages three through six contain the test items.

¹⁰Cf. Ibid., pp. 157-158 and David Wechsler, The Measurement of Adult Intelligence (Baltimore: Williams and Wilkins Co., 1941), p. 21.

The subject is instructed to separate pages one and two from the rest of the sheet. The answer sheet, which is on page two is then placed under the remaining sheets, and aligned with the question sheet by means of arrows placed on the question sheet and in the appropriate columns of the answer sheet. This arrangement is meant to reduce confusion in answering. The items are numbered from one to eighty. The subject responds by blacking a space under the appropriate answer number on the IBM sheet.

Only for the purpose of description, the items used by the Otis Test, Gamma Fm are quadrachotomized into four types: Verbal Comprehension and Reasoning, Opposites, Spacial Reasoning, and Numerical. The following are examples of each type from the Otis Test, Gamma Fm:

Verbal Comprehension and Reasoning

1. A house is most likely to have a
 (1) telephone (2) doorbell (3) window
 (4) carpet (5) radio.
18. Which of the following words is most like
 punctuality, reliability, and honesty?
 (1) intelligence (2) loyalty (3) skill
 (4) divinity (5) eventuality.

Opposites

11. The opposite of accept is--
 (1) concept (2) take (3) forfeit
 (4) reject (5) object.
58. If the following letters were placed in the
 order opposite to that in which they appear
 in the alphabet, what would the fourth letter
 be?
 (1) Q (2) V (3) L (4) F (5) H

Spacial Reasoning

19. This P is to this Δ as this F is to this--
 (1) $\sqcup$ (2) $\neg$ (3) $\sqcap$ (4) $\sqcup$.

Numerical

12. A party consisted of a man and his wife, his four sons and their wives, and three children in each son's family. How many were there in the party?
 (1) 9 (2) 12 (3) 13 (4) 20 (5) 22
22. One number is wrong in the following series. What should that number be?
 1 4 16 64 128 1024.
 (1) 7 (2) 256 (3) 128 (4) 80 (5) 96

The Otis Test, Gamma Fm has the following numerical frequency of these item types:

	<u>Verbal Comprehension and Reasoning</u>	<u>Opposites</u>	<u>Spacial R.</u>	<u>Numerical</u>
# Item:	42	11	11	15

The high number of items relying on verbal comprehension and ability may account in part for the high correlation between scholastic ability and score on the Otis Test.

Reliability for the Otis Test, Gamma Fm has been measured by coefficients of correlation between odd and even items corrected by the Spearman-Brown formula at .92. The mean validity index of the test items was approximately .50, and was determined by the use of the Flanagan table.¹¹

The MacQuarrie Test of Mechanical Ability was first published by Dr. Thomas W. MacQuarrie in 1925. It was

¹¹Arthur S. Otis, Manual of Directions for Gamma Test (New York: Harcourt, Brace & World, Inc., 1954), pp. 5-6.

the result of his efforts to develop a paper and pencil test of manipulative skills which would provide stimuli as accurate as stimuli experienced under laboratory conditions, and which would also "present a situation which would require mechanical performance and not the alert comprehension of complicated directions."¹² The skills tested include hand and finger dexterity, visual acuity, muscular control, and spacial relations, all of which are required of the actor in using his physical instrument to create a role.

The present form of the MacQuarrie Test was developed from an experimental version of twenty-four parts. Each of these parts which showed a test-retest reliability of less than .70 was rejected, reducing the number of parts to twelve. Further research reduced the number of parts in the test to seven. The seven parts which make up the present form are Tapping, Tracing, Dotting, Copying, Location, Blocks, and Pursuit. A total score, computed as the sum of all scores divided by three, is given in addition to the individual part scores. The subject is given the opportunity to practice the operation required by each test before actually performing the test on which his results are recorded. A stopwatch is used to time each individual test.

¹²Thomas W. MacQuarrie, "A Mechanical Ability Test," Journal of Personnel Research, Vol. V, No. 9 (January 1927), 329-337.

In the Tracing test, the subject is asked to draw a line through a series of staggered small openings in a series of vertical lines. His score is the number of lines he successfully passes without touching in fifty seconds.

The Tapping test requires the subject to make three dots with the point of his pencil in a series of regularly spaced circles. He is instructed to work as quickly as possible. His score is the number of circles which he successfully completes in thirty seconds.

The Dotting test uses much the same testing principle, as the Tapping test, but tests for accuracy rather than for speed. The subject is asked to put one dot in the middle of each of a series of very small circles which are connected by a line. The small circles are spaced irregularly along the connecting line. The dot may not touch the circumference of the circle. The subject's score is the number of circles successfully dotted in thirty seconds.

The Copying test requires the subject to copy a series of simple designs into prescribed spaces. The designs are composed entirely of straight lines. The subject's score is the number of lines correctly drawn in 150 seconds. Correctness is judged on the basis of length and direction of line. The lines are judged by

being matched against a standard transparent overlay provided to the tester.

In the Location test, the subject locates a series of points in a large scale, and transposes them to an area drawn in a smaller scale. The points are described by letters of the Roman alphabet. The subject's score is the number of points correctly transposed in 120 seconds.

The Blocks test presents the subject with a series of drawings of piles of regularly sized blocks. Certain of the blocks are marked with the letter "X". The subject is asked to determine how many of the blocks in the pile touch each block marked with the letter "X", and to write that number next to the letter "X". The subject's score is the number of blocks correctly marked in 150 seconds.

The final test in the battery is the Pursuit test. The subject is asked to follow a line through a tangle of lines by eye alone from a beginning square to an ending square. He identifies the ending square with a number which was written in the beginning square. The subject's score is the number of squares correctly identified in 150 seconds.

The following reliabilities were determined by Professor MacQuarrie by the test-retest method, based on 365 cases.

TABLE 9.--Reliabilities determined by MacQuarrie by the test-retest method, based on 365 cases.

Test Name	Test-Retest <u>Rho</u>
Tracing	.80
Tapping	.75
Dotting	.74
Copying	.86
Location	.72
Blocks	.80
Pursuit	.76
Total Score ($\frac{\Sigma}{3}$)	.90

There was a six-week interval between test and retest.

Much the same argument about validity which Seashore used applies to the MacQuarrie Test.¹³ While a typist may require the same muscle control to type as she requires to score high on the Tapping test, that does not make the Tapping test a test of typing. If it is reliable, the Tapping test tests the ability to make dots in circles quickly. Thus the prime question is reliability and not validity in this case. There have been many studies which have examined the correlation between scores on the subtests of the MacQuarrie battery and observed success in work requiring mechanical ability. The most pertinent

¹³See p. 46 of this study.

of these are listed in the Summary of Investigations for the MacQuarrie Test.¹⁴ This study seeks to make a similar comparison of score on the MacQuarrie Test and observed excellence in acting.

Sarnoff Mednick first evolved and described the theoretical background on which the Remote Associates Test (RAT) is based in 1962.¹⁵ Briefly stated, that theory is that the creative thinking process is one of combining associative elements into new forms or concepts which either meet specified requirements, or are in some way useful. This definition does not really present anything new to persons in fine arts fields. The sculptor who takes a pair of legs from one model, a face from a second, and a body from still a third has been creating according to this definition. The image of a lost mother may combine in a writer's mind with an incident read in a newspaper to form the basis for a novel or a play. Similarly, an actor may combine an experience from his past life with an experience from his imagination to form the motivational subtext for a character. The more mutually remote the associative elements, the more creative must be the process or the solution.

This definition suggested a basis for testing individual differences in creative thinking. The RAT attempts

¹⁴See p. 28.

¹⁵See pp. 18-19.

to use that basis in a reliable test instrument.

Mednick calls the RAT, ". . . an operational statement of this definition," in which "the test items are intended to require the examinee to perform creatively."¹⁶

In order to form an "operational statement," it was necessary to present stimuli from mutually remote realities which would be familiar to all or nearly all of the tests potential subjects. The subjects, placed on an equal footing, could then be required to provide the criteria-meeting missing link between them. The need for stimuli which were common to all elements of American culture led Mednick to use verbal materials which make up a root part of American verbal associations. The stimuli are thus made up of word association clusters like "ham-eggs," "kill-joy," and "red-hot."

The RAT presents thirty sets of three words. The subject is asked to find a single word which will associate with all three in some manner. The manner of association differs with each stimulus-set of three words. The following are three typical items from the RAT:

- | | | | | |
|-----|----------|---------|---------|-------|
| 6. | Sea | home | stomach | _____ |
| 14. | note | dive | chair | _____ |
| 16. | Southern | console | station | _____ |

¹⁶Sarnoff A. Mednick and Martha T. Mednick, Examiner's Manual; Remote Associates Test (Boston: Houghton Mifflin Co., 1967), p. 1.

The subject is asked to write the word which relates to the other three in the space at the right of the item. In this case the correct responses would be "sick," "high," and "comfort" in that order. The subject's score is the number of correct responses.

Reliability has been determined by the odd-even method at .91 based on a sample of 503 persons.

There have been a number of studies which have attempted to establish the validity of the RAT, virtually all of which have shared the common difficulty of establishing a viable external criterion for creativity. The two criteria most used were ratings of individuals for their level of creativity, and ratings of creative products. Since individual raters may vary widely in their judgments, some caution is advisable in attaching meaning to the results of these studies.

Mednick and Halpern studied the relationship of instructors' ratings of design students' creativity in producing new designs and scores on the RAT. The correlation between students' scores and faculty ratings was .70, significant at the alpha .01 level.¹⁷ Similarly, Martha Mednick examined the relationship between the ratings which graduate advisers gave their advisees on a creativity checklist and the advisees' scores on the

¹⁷S. A. Mednick and S. Halpern, "Ease of Concept Attainment as a Function of Associative Rank," Journal of Experimental Psychology, VI (1962), 628-630.

RAT. She found that the two factors correlated at .55, which was significant at alpha .005. This correlation seems particularly significant in the light of the fact that the creativity checklist had been found to have an odd-even correlation of .93.¹⁸ In studies examining the relationship of creative products to RAT scores, Dodd¹⁹ and Gordon²⁰ found that there was a considerably greater correlation between creative production and RAT score than would be indicated by chance alone. The levels of significance which they found ranged between alpha .05 and .001.

It should be added that the RAT has not been applied to creativity in actors. Thus the sections of the present study which deal with the RAT are in a sense a validity study determining how well the RAT score relates to observed excellence in acting.

The California Psychological Inventory was first issued in 1957. Its author is Harrison G. Gough. The CPI was developed to answer a need for a measure of a

¹⁸M. Mednick, "Research Creativity in Psychology Graduate Students," Journal of Consulting Psychology, XXVII (1963), 265-266.

¹⁹W. E. Dodd, A Preliminary Study of Creativity (New York: IBM Corporation, 1962).

²⁰G. Gordon, "The Identification and Use of Creative Abilities in Scientific Organizations," Seventh National Research Conference on Creativity (Greensboro, N. C., 1966).

subject's general personality make-up administrable under non-clinical conditions which was related to the aspects of personality which relate to normal life and social interaction.

The CPI is composed of eighteen individual scales. A subject's score on the scales is determined by his responses to 480 items. Different item-responses relate to different scales, although the test is in omnibus form. The subject is asked to respond by indicating on a special answer sheet whether an item is true or false as it relates to himself. Thus answering true to the item, "I have strong political opinions," would add +1 to the subject's score on the Dominance scale. Answering false would add 0. The eighteen scales are as follows:

1. (Do) Dominance
2. (Cs) Capacity for Status
3. (Sy) Sociability
4. (Sp) Social Presence
5. (Sa) Self-Acceptance
6. (Wb) Sense of Well-being
7. (Re) Responsibility
8. (So) Socialization
9. (Sc) Self-control
10. (To) Tolerance
11. (Gi) Good Impression
12. (Cm) Communalility

- 13. (Ac) Achievement by Conformance
- 14. (Ai) Achievement by Independence
- 15. (Ie) Intellectual Efficiency
- 16. (Py) Psychological Mindedness
- 17. (Fx) Flexibility
- 18. (Fe) Femininity

Each of the eighteen scales was developed individually, and was individually tested for reliability and validity. The development, reliability testing, and validation for each scale was then reported in a separate article or study before the scales and items were gathered into the present form of the CPI. It would seem that a detailed reporting of the results of these studies would be somewhat tedious. The following several paragraphs, therefore, are a précis of these investigations. For a complete and detailed treatment of the research leading to the present form of the CPI, the reader is directed to the Manual for the California Psychological Inventory.²¹

The basic method of scale construction was what Dr. Gough calls the "empirical technique."²² It consists of several steps. First a criterion dimension is defined; dominance, for example. Second, statements which seem

²¹Gough, Manual for the California . . ., op. cit., pp. 18-33.

²²Ibid., p. 18.

to have a bearing on the criterion dimension are made into a preliminary battery. Third, subjects are assembled on the basis of their being rated very high or very low on the criterion dimension. Fourth, these subjects take the preliminary battery. Fifth, the battery is analyzed to determine which items are answered in a differential manner by the subjects; that is, which questions are consistently answered "true" by the very high dominance persons and "false" by the very low dominance persons. The result of these steps is the isolation of thirty to forty items which favorably relate to the criterion dimension.

Reliability has been determined for each of the scales by the test-retest method. Table 10 shows the correlations based on one study with 200 subjects.²³

TABLE 10.--Correlations based on one study with 200 subjects.

Scale	Correlation	Scale	Correlation
Do	.80	To	.87
Cs	.80	Gi	.81
Sy	.84	Cm	.58
Sp	.80	Ac	.79
Sa	.71	Al	.71
Wb	.75	Ie	.80
Re	.73	Py	.53
So	.80	Fx	.49
Sc	.68	Fe	.73

²³Ibid., p. 19.

The three least reliable scales, Cm, Py, and Fx, also contain the fewest items per scale of all the scales. They are thus more affected by a change of response to a single item than the longer scales.

Each of the scales of the CPI has been cross-validated against external criteria in individual studies. In all validation studies, the correlation between external criterion and score on the scale was significant at the alpha .01 level of significance or higher.

This study seeks to use the CPI to determine if any of the scales can be used as differentiating factors between actors and non-actors. Each scale is treated as an individual factor, although consideration is given to the fact that the eighteen scales are divisible into four different classes of measurement. The four classes are the following:

1. Measures of poise, ascendancy, and self assurance Do, Cs, Sy, Sp, Sa, Wb.
2. Measures of Socialization, Maturity, and Responsibility Re, So, Sc, To, Gi, Cm.
3. Measures of Achievement Potential and Intellectual Efficiency Ac, Ai, Ie.
4. Measures of Intellectual and Interest modes Py, Fx, Fe.

It is recognized that there is something of a case against the use of inventory instruments. The following comment from Vernon illustrates this argument:²⁴

The majority of the questions deal with personal matters which one might discuss with a sympathetic and trusted friend, or a psychoanalyst, but would certainly hesitate to commit to writing for some relatively unknown tester to read. Many experiments have in fact shown that when people do not have to give their names they admit to larger numbers of symptoms of maladjustment.

Because of this difficulty, and because the individual subject's identity was not important to this study except with regard to observational group membership, tests were marked with a code number and subjects requested not to put their names on the answer sheets.²⁵

The Stock Index of Solipsism (SIS) was developed by the author especially for use in this study. It is intended as a projective test of solipsism, or the tendency of an individual to view events as happening through self since self is the only knowable thing.

The test is made up of fifty items. Each item consists of a noun accompanied by the article "the" in the following form:

²⁴Vernon, Personality Tests . . ., op. cit., p. 137.

²⁵This code number was in the form of a date, with the month designating the observational group, and the day designating the individual test. Thus, Jan. 01 = Proven actor #1.

22. _____ the Kitchen _____

The test form is labeled "Sentence Invention Score" to avoid any bias being introduced by the subject's knowing what factor is being tested.

The subject is given the following instructions and examples:

This is a test of your ability to create complete sentences from nouns quickly. You may use the noun in each question below as either the subject or the object of your sentence. Length of the sentences is not important. In order to complete the test as rapidly as possible, please be sure to use the first sentence which the noun suggests to you. Do not take time to think twice.

Examples

- a. The wind blows the snow _____
- b. _____ the sun warms me
- c. I see the man riding over the hill

Additional verbal instructions were given to re-enforce the idea that the subject should use the first sentence which the noun suggested to him, and that if he wished he might strike out the article "the," and substitute another word.

It was hypothesized that persons who were high in solipsism would tend to include themselves in the sentences through the words "I, me, my, mine" a significantly greater number of times than would persons who were low in solipsism. A score of +1 is thus assigned to each sentence containing the words "I, me, my," or "mine." The subject's total score on the test is the

number of sentences which contain "I, me, my," or "mine." The words "we, our" and "us," were held to include persons outside the subject and were excluded from consideration.

The nouns were placed on the test form in random order, and were re-randomized to make a second form of the test for reliability testing. The instrument was tested for reliability by both the test-retest and odd-even methods. The instrument was administered to forty-five students enrolled in a specially peered class of Speech 108, Voice and Articulation at Michigan State University on two separate occasions and in the two separate randomized forms. Eight days were allowed to elapse between test and retest.

The tests were scored by hand, and the results analyzed by the Spearman Rho on the Michigan State Computer Laboratory IBM CDC 3600 with the following result:

	<u>Correlation</u>	<u>Significance Level</u>
Odd-even	.81	.01
Test-retest	.77	.05

On the basis of these results, the decision was made that the instrument was sufficiently reliable to be included in the study.

The SIS has not been validated against external criteria. Rather than attempt to establish external criteria for solipsism, this study simply examines the test's relation to observed excellence in acting.

Procedures

The six testing instruments which were used to gather data for this study are intended for use under a broad variety of testing conditions. The only specific requirements were a quiet, comfortable, well-lighted room with sufficiently good acoustics for the stimuli of the Seashore Measures to be clearly heard in all parts of the room. Uniform conditions of quiet, comfortable writing desks, and good lighting were observed in all rooms used for the testing. The rooms were pre-tested to make certain that the Seashore stimuli could be heard with equal clarity in all parts of the room.

The tests were administered to the 100 persons comprising the sample in seven separate testing sessions. The smallest number tested at one time was two. The largest number tested in a single session was forty-seven. Time required to administer all six instruments was just slightly in excess of three hours, with some variation in the time required to issue instructions, pick up completed tests, etc., for groups of differing sizes.

It was hypothesized that the three actor groups, the individual members of which commonly spend blocks of time in excess of three hours in production work requiring a high degree of concentration, might complete all six instruments at a single sitting without undue fatigue. The control group of non-actors, who did not have this

background of production experience, were offered the option of taking two one-and-one-half-hour sessions to complete the six instruments to reduce the effects of fatigue. Fourteen of the twenty-five persons in this group took advantage of this option. The remainder preferred to complete the six instruments in a single session.

The six tests were administered in the following uniform order to all subjects in the sample:

1. The Seashore Measures of Musical Talents
2. The Otis Quick-Scoring Mental Ability Test,
Gamma Fm
3. The MacQuarrie Test for Mechanical Ability
4. The Remote Associates Test
5. The California Psychological Inventory
6. The Stock Index of Solipsism

The tests were administered in the above order to provide a maximum of variety for the subject and thereby reduce the effect of fatigue in any given test area. The response, and the action needed to respond, to each of the tests is quite different from the test which precedes it and the test which follows it.

As was noted on page 63, the accuracy of personality inventories increases if the subject does not have to put his name on the inventory. Since the subject's individual identity was of no importance to the study, and



since the study made use of a personality inventory, the subjects were asked not to identify themselves in any way on their answer sheets. Complete tests were identified as to group and subject by means of the code number. Subjects were asked to indicate their sex by writing an m or an f on each answer sheet. This procedure was followed because the subject's sex makes a difference in raw score interpretation on the California Psychological Inventory.

All tests were scored by hand by the researcher. Raw scores were used as data for all tests but the CPI. The CPI raw scores were converted to standard scores which may be interpreted without reference to the sex of the subject by means of a table provided with the test instrument for this transformation.

The data obtained were punched onto FORTRAN statement cards on a standard IBM 24 Card Punch. Two cards were punched for each subject. The first card contained the subject's code number,²⁶ and the results of the first four tests, which yield interval data. The second card contained the code number and the results of the CPI and SIS, which yield ordinal data. Two cards per subject

²⁶This code number was derived from the code number on the subjects' tests and their indication of their sex. The number had four digits. The first digit (1-4) indicated the observational group to which the subject belonged. The next two digits (01-25) indicated the subject. The fourth digit indicated sex, with a 1 indicating male, and a 2, female. Thus, 4241 = non-actor, #24, a male.



were used because different statistical analyses are necessary for ordinal and interval data.

The punched cards were then run through an IBM 407 Accounting Machine which had been wired to print out the contents of punched cards on paper. The contents of the cards were verified by comparing the print-out from the IBM 407 to the data on the completed test forms. Mispunched cards were corrected, and the cards re-run through the IBM 407, and the results re-checked against the completed test forms.

The data were then submitted to a one-way analysis of variance for each factor by two separate analysis of variance programs on the Michigan State University Computer Laboratory's IBM CDC 3600. The interval data were analyzed by the laboratory's UNIQ1 program, which provides a one-way analysis of variance for data in cells with unequal sample sizes.

The ordinal data were analyzed by a non-parametric program prepared by the Michigan State University Computer Institute for Social Science Research. This program is largely based on the non-parametric statistics given by Seigal.²⁷ It is called NPAR, and is written in ASA FORTRAN IV for use on the CDC 3600.²⁸ The data for

²⁷Sidney Seigal, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Company, 1956).

²⁸John Morris, Computer Institute for Social Science Research Technical Report No. 41.01--Non-parametric Statistics (East Lansing: Michigan State University,

this study were analyzed by a sub-program of the NPAR system which provides for the use of the Kruskal-Wallis One Way Analysis of Variance by Ranks.²⁹ This sub-program is designated KWAOV.³⁰

Normal behavioral science research design procedure would include the presetting of a specific criterion level. The author has chosen to discard this procedure. It was felt that the paucity of quantitative data on acting, and more particularly on the difference between actors and non-actors, obliged the researcher to report all findings at the level of significance at which they occurred. It must be noted, however, that conclusions are based only on results which are significant at alpha .10 or greater. It was felt that results at a lower level permit the element of chance to enter too strongly for conclusions to be drawn from them.

Interval factors which showed variance significant at alpha .10 or greater were then further analyzed by testing the differences between the four group means by the t test.³¹

1967), p. F-1. Also see CISSR Technical Reports 40-47.

²⁹Seigal, op. cit., pp. 184-193.

³⁰Morris, op. cit., CISSR TR 41.01, p. F-2.

³¹Analyzed with the formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{2M^2_w}} .$$

Ordinal factors which showed significant variance at the alpha .10 or greater level were further analyzed by testing for significant differences between rank sums of the six possible permutations of the four groups. This operation does not give as clear an analysis of the cause of the variance as does a comparison of means by the t test because the sum of the ranks differs with the number of groups being tested. In the case of the Kruskal-Wallis H, four groups are being tested, and ranked, together, whereas in the case of the Mann-Whitney U, two groups are ranked together.³² It is, therefore, arithmetically possible to obtain two differing levels of significance by doing the two different comparisons on the two same groups. It is possible to obtain some information as to the cause of variance in the Kruskal-Wallis H by the simple inspection of the four-group rank sums. However, this information tells the source of the variance, but not its significance. It is hoped that the inclusion of the Mann-Whitney U may help to clarify the significance of the non-parametric variance for the reader. The results of these analyses are discussed in detail in the next chapter.

³²Seigal, Op. Cit., pp. 184-193.



CHAPTER IV

RESULTS

Both results and conclusions will be discussed in terms of factor, rather than in terms of tests. Each subsection of each test is regarded as a separate factor on those tests where subsections exist. Thus the results of the Seashore Measures are discussed as the factors of Pitch, Loudness, Time, Timbre, and Tonal Memory; the Otis Test results are discussed as the factor of Intelligence; the MacQuarrie Test results are discussed as the factors of Tapping, Tracing, Dotting, Copying, Location, Blocks, Pursuit, and Sum;¹ etc.

Four of the factors under consideration by this study made a clear differentiation, significant at alpha .05 or greater, between actors and non-actors. Four other factors differentiated between the four groups, but only at alpha .10 or greater, and not between actors and non-actors. A third set of factors differentiated between actors and non-actors, but only

¹The MacQuarrie Test regards the sum of the testee's results, divided by three, as having a significance apart from the individual sub-test results. Please refer to pages 51-55 above.

at alpha .10 or greater. Conclusions are drawn from the first and third of these groups in the following chapter. The second group is dismissed as uninterpretable.

The four factors which differentiated between actors and non-actors at alpha .05 or greater were rhythm, from the Seashore Measures, Responsibility and Communality from the CPI, and Solipsism from the SIS. Actors were higher in Rhythm, and lower in Responsibility, Communality, and Solipsism than non-actors.

The five factors which showed difference significant at alpha .10 or greater, but with no discernable direction of difference were Pitch, from the Seashore Measures, Tapping, Location, and Sum, from the MacQuarrie Test, and Capacity for Status from the CPI. In the case of Pitch, the high potential actors were higher than both the proven actors and the non-actors. This result is uninterpretable.

In the case of Tapping, Location, Sum, and CS, the difference was between the two potential groups and the actor and non-actor groups. There was no significant difference between actors and non-actors. This would suggest that the difference was due to chance, or to some hidden bias in the sample with regard to these particular factors. It is obvious, since the Sum factor is made up from the scores on all of the other MacQuarrie factors, that difference on the other scores would tend to influence the results of the Sum score.



The factors which did differentiate between actors and non-actors, but at alpha .10 or greater, were Tonal Memory, from the Seashore Measures, and Self Acceptance, Socialization, and Femininity from the CPI. Actors were higher than non-actors in Tonal Memory, Self Acceptance, and Femininity. They were lower than non-actors in Socialization.

The results did not indicate that measurable differences existed in any of the other factor areas under consideration.

Complete results for all factors may be found in Tables 11 through 16 on the following six pages. The interpretation of these results and conclusions which may be drawn from them are discussed in Chapter V. For simplicity of reference, proven actors are referred to as Group 1, high potential actors as Group 2, low potential actors as Group 3, and non-actors as Group 4.

TABLE 11.--Parametric analyses of variance.

Factor	F Statistic	Significance
Pitch	2.43953	.07
Loudness	0.61877	.60
Rhythm	5.13442	.002
Time	0.99235	.40
Timbre	1.32127	.27
Tonal Memory	2.29485	.08
Intelligence	1.12573	.34
Tracing	1.56081	.20
Tapping	2.44312	.07
Dotting	1.80541	.15
Copying	1.90880	.13
Location	2.41985	.07
Blocks	0.89104	.44
Pursuit	0.67500	.56
Sum	2.19538	.09
Creativity	0.21967	.88

TABLE 12.--Results of t-tests.

Factor	Group Mean Difference Tested	t	Significance
Pitch	2-1 = 3.64	2.410	.025
	2-3 = 1.20	0.794	<.10*
	2-4 = 3.04	2.013	.05
	3-1 = 2.44	1.615	.10
	3-4 = 1.84	1.218	<.10
	4-1 = 0.60	0.397	<.10
Rhythm	1-2 = 2.16	2.734	.01
	1-3 = 1.84	2.329	.05
	1-4 = 3.00	3.797	.005
	2-4 = 0.84	1.063	<.10
	3-2 = 0.32	0.405	<.10
	3-4 = 1.16	1.468	.10
Tonal Memory	1-3 = 0.84	0.705	<.10
	1-4 = 2.44	2.050	.05
	2-1 = 0.44	0.369	<.10
	2-3 = 1.28	1.075	<.10
	2-4 = 2.88	2.420	.025
	3-4 = 1.60	1.344	.10
Tapping	1-4 = 1.00	0.529	<.10
	2-1 = 3.84	2.031	.05
	2-3 = 2.68	1.417	.10
	2-4 = 4.84	2.560	.01
	3-1 = 1.16	0.613	<.10
	3-4 = 2.16	1.142	.10
Location	1-4 = 0.56	0.284	<.10
	2-1 = 0.56	0.284	<.10
	2-4 = 1.12	0.568	<.10
	3-1 = 4.24	2.152	.025
	3-2 = 3.68	1.868	.05
	3-4 = 4.80	2.436	.01
Sum	2-1 = 2.46	0.835	<.10
	2-4 = 1.00	0.316	<.10
	3-1 = 7.72	2.443	.01
	3-2 = 5.08	1.607	.05
	3-4 = 6.08	1.924	.05
	4-1 = 1.64	0.518	<.10

* <.10 indicates alpha level less than .10.

TABLE 13.--Non-parametric analyses of variance.

Factor	H Statistic	Significance
DO	3.5584	.31
CS	6.7335	.08
SY	5.5004	.13
SP	0.8259	.83
SA	6.8108	.08
WB	1.0850	.78
RE	9.9655	.02
SO	6.2852	.09
SC	0.6079	.89
TO	2.4975	.48
GI	0.7828	.85
CM	9.5494	.02
AC	0.3545	.95
AI	3.4829	.32
IE	1.9160	.59
PY	1.7970	.62
FX	5.4755	.14
FE	7.0533	.07
SIS	11.8111	.008

TABLE 14.--Rank sums.

Factor	Rank Sum Group			
	1	2	3	4
DO	1104.00	1310.00	1461.50	1174.50
CS	*1120.50	1294.00	1556.50	1079.00
SY	997.50	1275.00	1469.50	1308.00
SP	1343.00	1188.00	1311.00	1208.00
SA	*1351.50	1364.50	1397.50	936.50
WS	1173.50	1202.00	1335.00	1339.50
RE	* 875.50	1463.50	1329.00	1382.00
SO	*1035.00	1261.00	1213.00	1541.00
SC	1191.50	1308.50	1326.50	1223.50
TO	1164.00	1334.50	1412.00	1139.50
GI	1240.00	1276.00	1355.50	1178.50
CM	* 923.00	1276.00	1302.00	1549.00
AC	1268.50	1203.50	1324.50	1253.50
AI	1372.50	1351.50	1291.50	1034.50
IE	1159.50	1364.50	1361.00	1165.00
PY	1407.00	1292.50	1190.00	1160.00
FX	1400.00	1275.00	1392.50	982.50
FE	*1584.00	1197.50	1193.50	1075.00
SIS	* 933.50	1319.50	1177.50	1619.50

*Indicates difference significant at alpha .10 or greater.



TABLE 15.--Results of U tests.

Factor	Group Difference	U	Significance
CS	1-2	267.5	.19
	1-3	311.5	.50
	1-4	171.0	.003
	2-3	246.4	.10
	2-4	233.5	.04
	3-4	220.0	.03
SA	1-2	214.0	.03
	1-3	198.0	.01
	1-4	301.5	.41
	2-3	191.0	.009
	2-4	269.5	.20
	3-4	218.0	.03
RE	1-2	209.5	.02
	1-3	246.0	.09
	1-4	295.0	.37
	2-3	211.5	.02
	2-4	188.5	.008
	3-4	194.0	.01
SO	1-2	156.5	.001
	1-3	186.5	.007
	1-4	148.5	.0007
	2-3	243.5	.09
	2-4	300.5	.40
	3-4	272.0	.22
CM	1-2	298.5	.39
	1-3	304.0	.44
	1-4	310.5	.49
	2-3	274.5	.74
	2-4	275.0	.14
	3-4	199.5	.01
FE	1-2	293.5	.36
	1-3	231.0	.05
	1-4	245.5	.10
	2-3	283.0	.28
	2-4	233.0	.06
	3-4	202.0	.02
SIS	1-2	200.5	.02
	1-3	298.0	.39
	1-4	234.0	.06
	2-3	249.0	.10
	2-4	280.5	.26
	3-4	199.0	.01

TABLE 16.--Results of $\underline{U}$ or $\underline{t}$ tests, group 1.

Factor	$\underline{t}$ or $\underline{U}$ l_a and l_b	Significance	Direction l_a and l_b	Direction l_a and 4
Pitch	1.954	.10	a is greater than b	4 is greater than l_a
Rhythm	0.469	<.10	a is equal to b	l_a is greater than 4
Tapping	0.294	<.10	a is greater than b	l_a is greater than 4
Location	1.126	<.10	a is greater than b	l_a is greater than 4
Sum	1.062	<.10	a is greater than b	4 is greater than l_a
DO	33.50	.02	a is greater than b	4 is greater than l_a
WB	40.00	.05	a is greater than b	4 is greater than l_a
CM	29.50	.002	a is greater than b	4 is greater than l_a
AC	40.50	.05	a is greater than b	4 is greater than l_a
FX	40.00	.05	b is greater than a	l_a is greater than 4

Please notice that where a significant difference exists at alpha .10 or greater, the direction of difference is the same between professional actors and actors in the academic world as between actors in the academic world and non-actors. This suggests the possibility of the existence of a trend which may be worthy of further research.



CHAPTER V

CONCLUSIONS

Some care must be taken in drawing conclusions from the results of this study. If only because there is so little quantitative data about the nature of acting and the actor, there is some temptation to attach undue significance to such data as this study uncovered.

The study attempted to establish some areas where measurable differences might exist between actors and the general population, and between persons of high and low potential in the art of acting. Because no truly comprehensive definition of what constitutes success in the art of acting exists, the researcher was at some disadvantage in firmly establishing observational categories for the study. This lack of a basic, quantifiable term to differentiate the observational categories led the researcher to a research design which was somewhat "looser" than a strict behavioral scientist might desire.

The conclusions should be treated accordingly. They should not be taken to have significance outside the limits of the sample on which this research is based until the results of this study are corroborated



by further studies. While the researcher believes that this study will satisfy the experimentalist's requirement of repeatability, he would prefer to regard his results only as guideposts to further research until the experiment has been, in fact, repeated.

There appeared to be some tendency for the professional actors in Group 1 to score higher or lower on some factors than their university counterparts. This tendency was discussed in Chapter III under Subjects, and in Chapter IV. Since the differences were almost entirely on the section of the CPI which deals with social attitudes, it is possible that university life places certain strictures on the artist. His social behavior can not be quite as free as that of the artist who lives and works outside the university. The person who is able to function within the university framework on the level on which the university subsample of Group 1 functions, of necessity, must have altered his social attitudes sufficiently to permit him to live within the restrictions of university life. It is probably this softening of attitude which is reflected in the differences between the two subsamples. It is possible that repeating this study with two observational groups, actors and non-actors, with the criterion for placement in the actor group being membership in Actor's Equity, or a certain mean income earned only at acting, might provide useful results.

Perhaps the clearest fact which emerges from this study is that the systems used to differentiate between Groups 2 and 3, the students of high and low potential, were defective. For the most part, these two groups showed little difference from one another, and showed little tendency to score either in the direction of the proven actors, or in the direction of the non-actors. Because these two groups show no significant difference, they are removed from consideration in these conclusions. Conclusions will be based only on the differences between Groups 1 and 4, the proven actors and the non-actors.

It should be remarked that the very failure of the high and low potential groups to show significant differences in factor areas where significant differences existed between the actor and non-actor groups is not without its own significance. The high and low potential groups were chosen on the basis of their being on the parameters of a condition of excellence in the opinion of qualified judges. Put more simply, these were the people who the judges were sure were either of high or low potential. If the instruments used for this study have any validity at all as differentiators between actors and the general population, this lack of significant difference between high and low potential actors would argue that judgments about students' potential should be made with extreme caution. On the basis of

the results of this study, some doubt is raised as to whether these judgments are accurate. One cannot help but be reminded of the acting coach who told James Dean that he should become an insurance salesman since he was clearly without potential as an actor.

All of the factors under consideration in this study did not show significant difference between actors and non-actors. That the factors which did not show significant difference failed to do so may be attributable to one of, or a combination of, the following causes:

1. The factor concerned may not constitute a measurable difference between actors and non-actors.
2. The sample may have had some unknown bias for the particular factor in question.
3. The testing instrument used for the factor in question may not have been of sufficient power and accuracy to discern existing differences.

The eight factors from the MacQuarrie Test, and the factors Intelligence, Creativity, Pitch, Loudness, Time, Timbre, Do, Sy, Sp, Wb, Sc, To, Gi, Ac, Ai, Ie, Py, and Fx were the factors which did not show significant difference between actors and non-actors.

Five factors did show significant difference, but not between actors and non-actors. They were Pitch, Tapping, Location and Sum, and Cs. In the case of Pitch, the high potential actors' scores were greater than both the proven actors and non-actors. The proven actors were the lowest of all. In the case of Tapping, Location, Sum, and Cs, the difference was between the two potential groups on the one hand, and the actors and non-actors on the other. There was no significant difference between actors and non-actors. This would suggest that the difference was due to chance, or to some bias in the sample with regard to these particular factors. It is obvious that, since the Sum factor is made up of the scores of all the other MacQuarrie factors, difference on the other scores would tend to influence the results of the Sum score. While the failure of most of the non-differentiating factors to show as measurable differences is readily understandable in the light of the probable causes listed above, the failure of Intelligence, Creativity, and the four Seashore factors requires some additional comment.

The Intelligence factor was included in the study because the researcher's observations while working in production led him to hypothesize that the more gifted actor tended to be somewhat deficient in the verbal and mathematical reasoning ability which makes up the

bulk of the items on most "Intelligence" tests. This deficiency seemed to be accompanied by a corresponding richness of emotional life which led to success in acting. The results do not bear this hypothesis out. That they do not do so may possibly be due to the fact that no effort was made to discover experimentally the degree to which actors differ with regard to intelligence. It is entirely conceivable that there are at least two distinct categories of successful actors, one which is highly literate and has good verbal-mathematical reasoning skills, and one which does not. One thinks by way of example of the impression of bipolarity left by reading interviews with Sir Laurence Olivier and with Paul Scofield. This is an area in which further study is of critical importance since verbal and mathematical reasoning play such an important part not only in "intelligence" tests, but also in college entrance examinations.

The failure of the Creativity factor, as measured by the RAT, to show significant difference between actors and non-actors is somewhat more puzzling. The evidence which Mednick offers as validation for his instrument appears to be sound, and logical analysis would indicate that his definition of creativity as the act of bringing mutually remote clusters into new and useful patterns does apply to the actor and to other artists. Indeed,

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in taking the RAT himself in a practice session, the researcher found that the mental sensation of finding a "right" answer on the RAT was quite similar to the mental sensation of finding a "right" answer to a production problem. On this basis one might assume that Mednick's test should have differentiated between actors and non-actors. It did not do so.

At least a partial solution to the problem may lie in the structure of the RAT. The mutually remote clusters or associations which it presents are offered as word groups in which the three known words all relate in some common way to the unknown word. "Sea, home," and "Stomach" all relate to the word "sick" in the common American word associations of "seasick, homesick," and "sick to your stomach." The difficulty with using this instrument to differentiate actors from non-actors is that the remote associations which he makes in his creative work are non-verbal in nature. The actor's creative work is done much more with remembered intonations, images of one kind or another, and sensitivities to psychological states than it is with words. While he very probably does work creatively by bringing mutually remote sets of these stimuli and reactions into new and fruitful patterns, he does not normally work by bringing verbalized sets of concepts into new patterns as a writer, or a scientist might very well do. Research



should be done on the problem of finding a way to prepare an instrument in which the mutually remote sets in which a pattern must be found would relate more directly to the stimuli with which the actor works.

It is possible that either pictorial or aural stimuli may prove more applicable to the actor's work than do verbal stimuli. It is also possible that the task of bringing three unrelated words into any sort of pattern, however fantastic, might prove more related to acting skill than the task of finding a predetermined "remote association" between several words. In any case, the application of Mednick's theory of creativity to the actor is a problem which should not be abandoned without further study.

A cursory examination of the actor's work would indicate that since the actor does transmit message units about the state of his character's being through the medium of changes in pitch, loudness, time (duration) and occasionally timbre, he should show a corresponding increase of skill in hearing pitches, loudnesses, durations, and timbres over the non-actor. That the results of this study show that the actors were no more skillful in differentiating one pitch, loudness, duration, or timbre from another than were non-actors would seem at first examination to belie the basic premise. A careful examination of the

Seashore Test results offers a solution to the apparent belial.

The two sections of the Seashore Test which did successfully differentiate between actors and non-actors were Rhythm and Tonal Memory. In the first of these two sections the testee is asked to respond to a rhythmic pattern, and in the second to a pattern of pitches. He is asked to say whether the pattern is the same or different from the pattern which precedes it in the first case, and to say where the pattern is changed in the second. In the other four sections of the Seashore Test the testee is asked to determine whether a specific single tone is higher or lower than a preceding specific single tone; whether one tone is louder or softer than another; whether one is longer or shorter than another, and whether one timbre is different from another. In none of these sections is he asked to differentiate one pattern from another.

A moment's reflection about the way in which an actor communicates a message unit about the state of being of his character will show that it is through patterns of pitches, loudnesses, durations, and timbres that the message unit is carried rather than by being able to successfully establish a particular pitch, loudness, duration, or timbre. An actor on tour, for example, may vary the general level of loudness of his

voice to suit the size of different auditoria, but he will usually maintain a similar pattern of changes in loudness in all of them. Much the same is true of pitch, duration, and possibly even timbre. It is the pattern of change which carries the message unit, not the specific single tone or duration.

The two Seashore factors which did show significant difference between actors and non-actors were the two in which the instrument required the testee to be able to perceive a pattern of stimuli, Rhythm and Tonal Memory. The results for these factors show that the actors scored significantly higher on both of these factors than did the non-actors. It seems reasonable to conclude from this that a superior ability to differentiate rhythmic patterns, and a superior ability to remember series of tones constitute a measurable difference between actors and non-actors. Since this is true, further research in developing instruments to measure the ability to perceive patterns of change in loudness, duration, and timbre would seem imperative.

Six other factors differentiated between actors and non-actors at a significant level. They were Re, Cm, Sa, So, Fe, and Solipsism. All of these factors deal with personality. The fact that they did differentiate actors from non-actors would strongly suggest that measurable differences of personality make-up exist between the actor and the non-actor.

The results for the Re factor show that actors scored lower than non-actors, and in fact lower than both of the potential groups. This would suggest that actors have a deficient sense of responsibility with respect to the norms of American society. It is important to note that the items in the CPI Re scale refer to things about which the normal population feels a sense of responsibility, and do not extend to the actor's craft. It might be suggested that the responsibility which the actor feels to his art impairs his "normal" sense of responsibility. The student actor who cuts classes in order to rest for a university theatre production is not an unfamiliar phenomenon.

The results for the Communality factor show that actors were significantly lower in this factor than non-actors. The Cm scale of the CPI is made up of items which normally correlate their scores highly with the mode established for the general population on the entire CPI. While it must be recognized that the Cm scale has the third lowest reliability rating, .58, of any of the CPI scales, this result would add further weight to the argument that the actor's personality is measurably different from the non-actor's.

The results for the Sa factor show that all three of the actor groups were higher on this factor than were the non-actors. This would lead one to conclude that actors do have a greater acceptance of themselves than

do non-actors. This acceptance of self would probably lead them, if the suggestions in the CPI manual are correct about this scale, to be more self-assured and at ease than non-actors. This result and this conclusion would also seem to be in accordance with the fact that one normally assumes that a person who enjoys performing before other people is a reasonably self-assured person.

The results for the So factor show that the actors were remarkably lower in this factor than the non-actors. This scale is intended as a measure of social maturity. Persons who score low on the So scale tend to be "given to excess, exhibition, and ostentation in their behavior," according to the CPI manual.¹ If one can ignore the somewhat negative tone of the manual's comment, the need to display himself, to draw attention to himself to a degree beyond the norm of American society, is very probably one of the actor's driving needs. It would appear to be a necessary abnormality. Without this drive, the actor would hardly be likely to expose his inner being on the stage in the way that makes exciting theatre.

The results for the Fe factor show that the actors were higher in this factor than were the non-actors.

¹Gough, Manual for the California . . ., op. cit., p. 10.

The CPI manual gives the name Femininity to this scale for the sake of convenience. It is actually intended to assess the femininity or masculinity of interests rather than femininity or masculinity in any sexual sense.

Items on this scale tend to center around a commitment to activities and attitudes which are considered to be in the province of the female by most American males. Thus an expressed interest in mechanical things is taken to be a masculine interest, and an expressed interest in decoration is taken to be a feminine interest. It is obvious that by his very commitment to an artistic profession, the actor will be more interested in things which the instrument regards as being feminine. It must be noted here that the two groups were equal, or nearly equal, in the number of males and the number of females in them. Thus the Fe result was not skewed by a high number of females.

Further research is needed on all of the CPI factors to isolate the items which contribute to the individual scales which showed significant difference between actors and non-actors, and to test these items in isolation from the rest of the instrument to determine if they can be used to differentiate actors from non-actors without the influence of the remainder of the instrument working on them. It might very well be of value to test other personality inventories such as the Minnesota Multiphasic

Inventory to determine whether they have scales which differentiate between actors and non-actors.

Results for the Solipsism factor showed that actors were far lower than non-actors. Since the instrument tests the tendency to view the world as happening through oneself by counting the number of times which the testee includes himself in sentences in a non-directed situation, it would seem reasonable to conclude that actors see the world as happening less through themselves than do non-actors. This conclusion would seem to fit logically with the fact that an actor must of necessity adopt the point of view, the life position as it were, of the character he is portraying. Viewing the world from divergent points of view would probably tend to break down the "I-it" relationship which the solipsist maintains with the world at large. Corroborative research should be done on the SIS to see if the results of this study can be replicated.

Research might also be carried out with profit in determining if the basic form of the SIS, a projective sentence completion test, can be used to investigate other facets of the actor's personality. As a specific instance, this researcher has come to suspect that if the sentences formed by the SIS testees were dichotomized into "real" and "fantastic," actors would tend to write a significantly higher number of "fantastic" sentences

than non-actors. A sentence like, "The tree has green leaves," would be considered "real." A sentence like "The tree is my friend," would be considered "fantastic."

Certainly one way to corroborate the results of this study would be to extract the items, scales, and tests which did differentiate actors from non-actors from the body of the six tests used in this study and repeat the study using them alone. If such a study were undertaken and did prove that the results of this study were repeatable, a good next step might be to administer this battery of items, scales, and tests to a series of entering classes of acting majors, and correlate their scores with individual ratings of their performances as seniors.

The factor area which was specifically excluded from this study, medico-physiological factors, might be examined with profit. Having, for example, blood samples from a group of actors and a group of non-actors analyzed by a Multiple Sequential Analyzer might reveal the existence of measurable differences in blood composition. Certainly the work which has been going on for years in the field of psychology in applying measures of changes in physiology in persons of varying occupations might be applied to the actor.

As a final note, it has been the experience of this researcher that certain theatre artists resist strongly the idea that theatre art can be profitably

studied through quantitative methodology. These persons seem to feel that the process of quantitative or behavioral analysis would inevitably take something away from the art. This researcher would feel that the opposite is actually true, and that only through the use of quantitative tools can we, as scholars, arrive at answers to the problems of theory which have for so many years resisted solution by more subjective methods of analysis.

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APPENDIX

SENTENCE INVENTION SCORE
Form B

Student Number _____

INSTRUCTIONS

This is a test of your ability to create complete sentences from nouns quickly. You may use the noun in each question below as either the subject or the object of your sentence. Length of the sentences is not important. In order to complete the test as rapidly as possible, please be sure to use the first sentence which the noun suggests to you. Do not take time to think twice.

EXAMPLES

- a. The wind blows the snow _____
b. _____ the sun warms me
c. I see the man riding over the hill

QUESTIONS

1. _____ the night _____
2. _____ the gas _____
3. _____ the phone _____
4. _____ the worm _____
5. _____ the bottle _____
6. _____ the pencil _____
7. _____ the cane _____
8. _____ the silk _____
9. _____ the boat _____
10. _____ the book _____

SIS
Form B

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11. _____ the whip _____
12. _____ the shore _____
13. _____ the snail _____
14. _____ the friend _____
15. _____ the wine _____
16. _____ the carrot _____
17. _____ the car _____
18. _____ the farm _____
19. _____ the can _____
20. _____ the tree _____
21. _____ the hole _____
22. _____ the kitchen _____
23. _____ the stars _____
24. _____ the mother _____
25. _____ the window _____
26. _____ the ink _____
27. _____ the match _____

SIS
Form B

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28. _____ the shoe _____

29. _____ the cloud _____

30. _____ the bird _____

31. _____ the chair _____

32. _____ the woman _____

33. _____ the grass _____

34. _____ the wool _____

35. _____ the tub _____

36. _____ the roof _____

37. _____ the desk _____

38. _____ the beast _____

39. _____ the sea _____

40. _____ the bed _____

41. _____ the scales _____

42. _____ the photo _____

43. _____ the arm _____

44. _____ the children _____

SIS
Form B

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45. _____ the fish _____

46. _____ the mask _____

47. _____ the home _____

48. _____ the moon _____

49. _____ the glass _____

50. _____ the road _____

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