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AN EMPIRICAL STUDY OF THE EFFECT OF BACKGROUND CHARACTERISTICS AND PERSONALITY TRAITS ON THE PRODUCTIVITY OF REAL ESTATE SALES PERSONNEL

The University of Oklahoma PH.D. 1982

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GRADUATE COLLEGE

AN EMPIRICAL STUDY OF THE EFFECT OF BACKGROUND CHARACTERISTICS AND PERSONALITY TRAITS ON THE PRODUCTIVITY OF REAL ESTATE SALES PERSONNEL

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

Kerry Polk Gatlin

Norman, Oklahoma

June 1982

AN EMPIRICAL STUDY OF THE EFFECT OF BACKGROUND

CHARACTERISTICS AND PERSONALITY TRAITS

ON THE PRODUCTIVITY OF

REAL ESTATE SALES PERSONNEL

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ACKNOWLEDGEMENTS

The writer wishes to express his sincere appreciation to the chairperson of his doctoral committee, Dr. Laura B. Folsom, who was so helpful during the course of the investigation. Gratitude is extended to Dr. Loy Prickett for his encouragement throughout the study. He also acknowledges with appreciation the help and kindness given by Dr. Billie Holcomb , Dr. Terry Robertson, Dr. Don Udell, and Dr. LLoyd Williams who served as members of his doctoral committee.

Deepest gratitude is extended to his friend, Dr. Tommy Fomby, Associate Professor of Economics at Southern Methodist University for his guidance and assistance with the statistical analyses of this study.

Appreciation and recognition are extended to the survey respondents for their cooperation and assistance in carrying on this study. Sincere thanks go to the writer's colleagues and friends for their encouragement throughout this research project. He also wishes to thank Kathy Adams for her help in typing the final manuscript.

Finally, he wishes to thank his wife, Rebecca, and children, Scott and Lisa, for their patience, support, and understanding throughout the time devoted to this study.

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AN EMPIRICAL STUDY OF THE EFFECT OF BACKGROUND CHARACTERISTICS AND PERSONALITY TRAITS ON THE PRODUCTIVITY OF REAL ESTATE SALES PERSONNEL

CHAPTER I

THE PROBLEM

Introduction

The people of the United States have long enjoyed one of the highest standards of living in the world. This standard of living is the result of a productive economy where the output of goods and services has increased more rapidly than the population. This rapid increase in productivity has occurred as our economy changed from an agricultural to an industrial base, and as capital was infused into industry to take advantage of advancing technology.[1]

In recent years our economy has begun to change directions. Rather than a manufacturing economy we are rapidly becoming a service economy.[2] While manufacturing is capital-intensive and lends itself to productivity improvements via technological advances, a service-based

---

[1]Roger L. Miller, Economics Today, 3rd edition (New York: Harper & Row, Inc., 1979), pp. 322-327.

[2]Elbert V. Bowden, Economics: The Science of Common Sense, 2nd edition (Cincinnati: South-Western Publishing Co., 1977), pp. 570-571.

economy is labor-intensive and less responsive to infusions of capital as a method of increasing productivity. Since the service sector of our economy is people-centered, those concerned with improving performance in this sector must look beyond technology and attempt to expand and apply behavioral science concepts in the various occupations that make up the service sector. This need was apparent in the service sector of the economy as a whole, but more particularly in the sales field.

> A very high proportion of those engaged in selling cannot sell.... If American sales efficiency is to be maximized and the appalling waste of money and manpower which exists today is to be minimized, a constructive analysis must be made of what selling really is and how its effectiveness can be enhanced....We must look a good deal further--into the mysteries of personality and psychology--if we want real answers.[1]

Typical of the service occupations is the field of real estate. Here a large number of workers are employed at providing an intangible service as opposed to producing a physical product. The importance of the field can be emphasized by data: "Direct employment in real estate accounts for 2,470,000 employees representing 2.8 percent of the labor force."[2] While this figure includes the many associated jobs in finance, construction, and insurance, the number employed directly in real estate sales is impressive. According to Shenkel, there are approximately 335,000 licensed brokers in the nation and an additional 706,000 real estate salespersons.[3] With the large increase in the age segment associated with

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[1]Robert N. McMurry, "The Mysteque of Super-Salesmanship," Harvard Business Review, March-April, 1961, p. 113.

[2]William M. Shenkel, Modern Real Estate Principles (Revised ed.; Dallas; Business Publications, Inc., 1980), p. 13.

[3]Ibid, p. 5.

family formation and home purchasing, the real estate business can be expected to continue to be a vital part of our economy in the years ahead.

Like other labor-intensive sectors of the economy, the real estate industry is concerned with finding ways to improve the performance of its work force. One factor that traditionally has a negative impact on industry aggregate performance is a high labor turnover rate. The real estate industry has experienced a very high turnover rate for salespersons. The National Association of Realtors estimated that for the nation as a whole, the turnover rate averages 18 percent.[1] In one study, Unger[2] concluded that the turnover in real estate sales positions is as high as 60 percent annually.

In addition to being a problem of quantity, performance problems also arise from quality declines. The transient nature of many salespersons in the profession has resulted in a less-than-desirable level of service for the consumer and thus a poor image for much of the industry.

> In past years too many persons unqualified in one way or another to be successful real estate salespersons have none-the-less been readily acceptable to many real estate firms. This has led to a traditionally large turnover of real estate salesmen and a resultant poor image of the real estate licensee on the part of much of the public.[3]

The high turnover rate in the industry, which helps to cause performance problems, may be a symptom rather than the problem, however.

---

[1]Shirley R. Cossaboom, "Performance and Turnover of Real Estate Salespeople" (unpublihed Ph.D. dissertation, Texas A&M University, 1977), p. 1.

[2]Maurice A. Unger, Real Estate Principles and Practice (5th ed.; Cincinnate: South-Western Publishing Co., 1974), p. 410.

[3]Hyman Maxwell Bertson, California Real Estate Practice (Homewood, Ill.: Richard D. Irwin, Inc., 1968), p. 16.

The poor performance record of the real estate industry may be related to relatively lenient entry standards and poor selection procedures. The problem of entrance standards has been addressed by many state legislatures.

> The ever-growing necessity to protect the general public from unskilled and untrained real estate practitioners has led to legislative requests for more stringent license laws designed to raise the required level of education of brokers in order to make the service and brokerage aspects of the real estate business as professional as possible.[1]

The problem of recruitment and selection of potentially high-performance real estate salespersons is, however, outside the scope of legislation. Of course, every firm that hires salespersons wants good ones. The problem is to determine if the individual is going to be good before hiring. The record of real estate firms in this regard is dismal. Curtis established that under present hiring practices, a realtor must hire eight salesmen to get four good ones.[2]

This study, then, was conducted to determine if there are certain characteristics associated with high performance in the real estate sales field. The intent of the study is to provide a means to improve recruitment and selection of sales workers and thus to increase worker performance in this vital segment of the service sector of the economy.

Purpose of Study

The purpose of this study was to measure the correlation of performance of real estate sales personnel with a number of background

---

[1]Alfred A. Ring, Real Estate Principles and Practices (Englewood Cliffs, N. J.; Prentice-Hall, Inc., 1972), p. 302.

[2]Clayton C. Curtis, Real Estate Project #3 (Tallahassee: Florida Assn. of Realtors, 1962), p. 18.

variables and personality traits. Combinations of variables that tend to distinguish high performers from low performers are reported. From the data collected, a model to predict high performance and low performance in real estate sales was developed and tested.

Statement of the Problem

The problem of this study was to determine if certain background characteristics and/or personality traits exist that might guide real estate brokers in the recruitment, selection, and training of future sales associates who are likely to develop into high performers. Specifically, the question addressed by the study was: "What background characteristics and/or personality traits might discriminate between high-productivity group real estate sales workers and low-productivity group real estate sales workers?"

There are two basic research objectives of this study. Research Objective I is concerned with identifying the existence of and the relationship between selected background characteristics and/or personality traits, and productivity. Research Objective II involves determining whether various aspects of these background data and personality traits so identified can be used to develop a model to predict high- and low-performance real estate sales workers.

The questions relevant to Research Objective I are:

1. Is there a significant relationship between the productivity of real estate sales workers and selected background characteristics?
2. Is there a significant relationship between the productivity of real estate sales workers and selected personality traits?

The questions relevant to Research Objective II are:

1. Is the probability that a person will be in the high-productivity group or low-productivity group in real estate sales affected by any combination of the background characteristics or personality traits of the individual?

2. Will compression of selected background and personality variables via principal components analysis, reduce the predictive ability of the linear probability model developed in this study?

Significance of Study

A better understanding of background data and personality traits that appear to be associated with high-performance real estate sales workers should lead to an improvement in recruitment and selection procedures in the industry. The importance of improving recruitment and selection procedures can be appreciated when one recognizes that these activities impact on turnover and performance in this large and vital part of our economy.

This study attempted to identify characteristics common to high-performance employees in the field so that new employees with these characteristics can be recruited. The usefulness of the study may go beyond selection alone, however. While some characteristics--such as background data--are outside the control of brokerage firms, certain other characteristics that may prove to be significant are capable of being developed through training. Truax and Carkhuff point out that empathy is learnable and that methods have been developed for teaching it.[1]

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[1]Charles B. Truax and Robert R. Carkhuff, Toward Effective Counseling and Psychotherapy: Training and Practice (Chicago: Aldine Publishing Company, 1967).

McClelland has shown that the need for achievement can also be increased in certain situations through training programs.[1]

Finally, the data collected in the study was used to develop a model to predict performance in real estate sales. As pointed out in Chapter II, Review of the Literature, much research has been done in the area of personality as a predictor of job performance; however, very little research has been done in the field of real estate. Likewise, the study of background data as a predictor has gained favor, but again, real estate brokerage has been somewhat overlooked. This study was unique and needed, because it used both personality traits and background data in the development of a predictive model in the real estate field.

Limitations

Certain limitations were present in this study. The major limitations are listed herein.

First, the population was limited to two southeastern United States Standard Metropolitan Statistical Areas (SMSA). No attempt was made to extend the findings to other regions.

Second, the population was limited to real estate sales associates. No attempt was made to extend the findings to other sales occupations or other professional groups. A study conducted with other groups might be expected to yield entirely different results due to differing job and skill requirements.

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[1]David C. McClelland and David G. Winter, Motivating Economics Achievement (London: The Free Press, 1969), p. 88.

Third, the personality characteristics measured were limited to the eighteen traits identified by the Adjective Check List. No attempt was made to identify other latent characteristics. A study conducted to measure a different combination of traits might yield different results.

Fourth, personality, background, and performance data was collected via self-report questionnaires. More sophisticated techniques exist to measure personality traits, and studies using different measurement devices might yield different results.

Population and Sample

The population for this study included all licensed real estate sales associates and brokers in the Huntsville and Florence, Alabama, SMSA who were members of the Multiple Listing Service. Only those brokers with less than four salespersons were included. Those with over three salespersons tend to spend significantly more time in administrative functions than in sales and thus could potentially distort the average sales and listings figures.

Two samples were randomly selected from the membership list of the Huntsville and Muscle Shoals, Alabama, Multiple Listing Service. The primary sample size was determined in accordance with the size of the population to help ensure statistical reliability. The second, or "hold-out" sample included fifty subjects to be used to test the predictive accuracy of the the model generated in the study.

Procedures

The procedures followed in this study consisted of the following: (1) review the literature and research related to personality and background as predictors in sales and real estate sales; (2) sample the population with the questionnaires previously described; (3) analyze the data collected for the research; and (4) write the dissertation.

In analyzing the data collected for the research the following steps were followed: In Step 1, the Pearson product moment correlation was used to test for significant correlation between performance and background data and between performance and personality traits. In Step 2, the linear probability function method of analysis was used to generate a model to predict high and low real estate performers. Step 3 involved testing the accuracy of this model with a "hold-out" sample. Finally, Step 4 involved compression of selected background and personality variables via principal component analysis in order to test whether this compressed model retained the predictive power of the linear probability model.

Organization of Study

An introduction to the investigation has been presented in Chapter 1. Included were the introduction, purpose of study, statement of the problem, significance of study, population and sample, limitations, and procedures.

Chapter II presents a review of the literature which is related to the study. Included are studies of personality traits as predictors of occupational performance, criticism of personality as a performance predictor, and a review of biographical data as a predictor of performance.

Chapter III presents the methodology used in the study. Collection of the data and the methods of analysis are described.

Chapter IV presents the results of the statistical analyses and interpretation of the data collected for the study.

Chapter V presents a summary of the study. Conclusions are drawn and recommendations are made from the results of the study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The study of personality as a determinant of performance has been fertile ground for researchers over the years. More recently, biographical data has received a great deal of attention. While a comprehensive review of studies in these two areas would be of unmanageable proportions, a review of selected studies is helpful in establishing the universal interest and broad practicality of studies dealing with personality and background information in predicting occupational performance.

In this chapter, a review is made of personality traits as predictors of occupational performance. This review is divided into a discussion of the general use of personality characteristics as predictors in a variety of occupational fields, such as predictors in sales, and then includes a review of the limited studies in real estate. The discussion of personality traits as performance predictors also includes a review of important criticisms of personality traits as performance predictors.

In the last part of the chapter, a review is made of the use of background data as a predictor of occupational performance. This

review is divided into a discussion of the use of such data in a number of diverse fields, such as sales, and in real estate.

Personality as a Predictor

One of the most controversial aspects of employee selection is testing. Psychological tests became popular in the 1920's and were hailed as a basis for placing personnel selection on a scientific footing. A great deal of positive results were being reported in such wide-ranging employment fields as clerical work, mechanical work and sales. Instruments being used at that time included intelligence tests, dexterity tests, interest inventories, and most controversial of all, personality questionnaires. Following is a representative review of studies in a number of non-sales occupations.

Personality as a Predictor in Non-Sales Occupations

By administering a personality questionnaire to service employees and non-service employees, Domm found that service-oriented employees were more shrewd, tough-minded, suspecting, and jealous than non-service employees. Also, they were found to differ in personality in that they had a more positive attitude toward serving others than did non-service employees.[1]

Results of a study by Harris reported that successful ministers differed from non-successful ministers in selected personality traits.

---

[1]Donald R. Domm, "A Study of the Personality, Attitude Toward Others, and Attitude Toward Service of the Service-Oriented Employees," Dissertation Abstracts International, 29(1968), 705A (Ohio University).

The more successful group of ministers scored higher on consideration, initiating structure, and external control of reinforcement. The less successful group was higher on dominance, out-goingness, impulsive liveliness, dependency and shrewdness.[1]

Spivey, Munson, and Locander studied selection for retailing and found that personality factors in particular are important.

> Individuals who can be characterized as more 'internal' than 'external' in locus of control, and whose personalities are more 'outgoing' and 'assertive', represent lower termination risks than individuals who do not have these characteristics.[2]

Boland found in studying counselors, that individuals whose personalities indicated a moderate need to make a favorable impression were judged as more successful than those who lacked this personality trait.[3]

In an attempt to link personality to performance in sports, Fries studied the use of a personality instrument in recruiting collegiate football players. From his studies Fries concluded that elements of

---

[1]Willie C. Harris, "The Use of Selected Leadership, Personality, Motivational, and Demographic Variables in the Identification of Successful Ministers," Dissertation Abstracts International, 33(1972), 4833A (University of Tulsa).

[2]W. Austin Spivey, J. Michael Munson, and William B. Locander, "Meeting Retail Staffing Needs Via Improved Selection," Journal of Retailing, 55 (Winter 1979), p. 191.

[3]Barbara K. Boland, "Predicting Counsellor Success in Practice From Selected Measures of Personality, Interest, Temperament, and Open-Mindedness," Dissertation Abstracts International, 34 (1973), 5615A (Oklahoma State University).

personality did in fact affect the probability of success in collegiate sports.[1]

In the same vein, one sports writer reports that the Dallas Cowboys have also relied on an evaluation of non-physical aspects of prospective players--including personality traits. These factors, it was noted, have been helpful in developing the Dallas system into one of the premier teams in the National Football League.[2]

Joseph found that successful job performance for department store buyers was related to factors such as work habits, emotional stability, and a greater need for autonomy.[3]

In a study of counselor effectiveness, Foster indicated that selected personality variables differentiated effective and less effective counselors. Specifically, the results indicated that the less effective counselors were more outgoing, more trusting, and more placid than those in the norms group for the 16 Personality Factor (16 PF) questionnaire and also for those classified in the study as the more effective counselors. The single most important trait for the effective counselor was a high score on the affective sensitivity scale.[4]

---

[1]Jeffrey E. Fries, "The Development and Application of a Personality Instrument Designed for Recruiting Collegiate Football Players," Dissertation Abstracts International, 34 (1974), 3491A (University of Utah).

[2]Florence (Alabama) Times-Daily, 8 March 1981.

[3]Brondel A. Joseph, "Prediction of Successful Job Performance for Department Store Buyers Through an Evaluation of Personality and Background Data," (unpublished Ph.D. dissertation, University of Texas, 1971).

[4]Brian Richard Foster, "The Relationship Among Personality, Empathic Ability, and Counselor Effectiveness," Dissertation Abstracts International, 35 (1974), 6449A (University of North Dakoka).

In a study of characteristics of successful managers, Miles found that personality traits such as originality, dominance, autonomy, and change were significantly related to managerial success.[1]

One study attempted to gather information that provides insights into the most desirable personality traits and personal characteristics related to school bus driver performance. Whisman found that the personality traits of extroversion, conscientiousness, and emotional maturity were positively related to performance evaluations and work habits of school bus drivers.[2]

In his studies of high earning MBA's, Harrell reported that the high earners had distinctly different personalities than low earners.[3] High earners in big business were characterized by high energy and interest level and greater self confidence. High earners in small businesses were shown to have a greater need for independence and autonomy.[4]

In one study attempting to show that personality was related not only to performance within an occupation but also related to occupational choice, DeVoge tested Holland's personality theory of vocational choice.

---

[1]Wilford Glenn Miles, Jr., "An Investigation into the Relationship Between Certain Personality Traits and Management Success," (unpublished Ph.D. dissertation, University of Arkansas, 1968).

[2]A. Whisman, "The Relationship of Selected Personality Traits and Personal Characteristics of Drivers to the Occupational Performance of School Bus Drivers in Ohio," Dissertation Abstracts International, 39 (1978), 844A (Ohio State University).

[3]Thomas W. Harrell, "The Personality of High Earning MBA'a in Big Business," Personnel Psychology, 22 (1969), 461.

[4]Thomas W. Harrell, "The Personality of High Earning MBA's in Small Business," Personnel Psychology, 23 (1970), 369-375.

From a sample of 132 subjects at the University of North Carolina, chosen while freshmen and followed thru graduation, she concluded that the freshmen did not confirm the theory's hypothesis that different personality types were attracted to various majors; but for the same sample the theory did hold true by the time they had become seniors.[1]

Finally, a number of studies have attempted to show that personality affects not only individual performance but also can influence the group. In a study of the effect of executive personality by Leonard, it was found that different organizational climates could be tied to differing personality traits of managers, more so than to differing industries or functions within an organization.[2]

Ellerbrock found that personality was a moderating variable in performance in a participatory group setting. Essentially, it was shown that individuals high in authoritarianism did not perform as well as low authoritarianism personality individuals in group problem-solving situations.[3]

This brief review points out the wide interest in personality as a predictor of occupational performance. It also shows that the various "significant" traits differ greatly by occupational type. One of the areas

---

[1]Susan Dunn DeVoge, "A Test of the Validity of Holland's Personality Theory of Vocational Choice," Dissertation Abstracts International, 34 (1973), 5622A (University of North Carolina).

[2]Robert G. Leonard, "An Exploratory Study of Executive Personality Patterns Within Selected Private Industries," Dissertation Abstracts International, 33 (1972), 18A (The George Washington University).

[3]Geraldine B. Ellerbrock, "A Study of the Interaction Effect Between Personaltiy and a Participatory Environment Upon Performance," Dissertation Abstracts International, 32 (1971), 5941A (University of Utah).

to receive the most attention in studies of personality as a predictor of success has been the sales field. A review of selected studies in this area follows.

Personality as a Predictor in Selected Sales Occupations

The previous section looked briefly at the use of personality questionnaires as predictors of performance in a number of diverse fields. The area that has possibly seen the most attention of researchers, however, is sales.

> Sales managers and academic researchers are continually searching for the relationship between personal characteristics and personality traits and the successful professional salesman.[1]

Miner calls attention to the importance of personality measures in the sales area also.

> One selection approach which has been receiving increased attention has been the use of testing procedures....Testing procedures include personality, ability, and intelligence measures. It has been found that in the sales area, the relationship between ability measures and sales success has been minimal and that intelligence measures are useful only among those in higher level sales positions. However, personality measures, at all levels of sales employment, have been consistently good predictors of job performance.[2]

A study of Atlanta sales executives found that sixty-nine percent used psychological tests for selecting salesmen. Ehlers compares the users with the non-users:

> A comparison of the characteristics of users and non-users of psychological tests points up significant differences. Users are generally from larger companies that have been in business

---

[1]Lawrence M. Lamont and William J. Lundstrom, "Identifying Successful Industrial Salesmen by Personality and Personal Characteristics," Journal of Marketing Research, 14 (Nov. 1977), 517.

[2]John B. Miner, Personnel and Industrial Relations (New York: The MacMillian Company, 1968), p. 302.

> for longer periods of time. Users are actively expanding their sales forces, they rely on higher quality sources for finding new salesmen, and they are more discriminating in the number of men they hire from among those interviewed. Companies using tests have a comparatively lower turnover rate.[1]

In one of the most comprehensive tests up to the time, Miner studied the personality and ability factors of a group of 65 dealer salesmen employed by a major petroleum company in 1962. In the study he used four separate measures of personality and interest and five different ability tests. The personality tests showed that measures of dependence, sociophilia, self-confidence and happiness were associated with successful sales performance. Poor performance was associated with low measures of aggression, sociophobia, and strong superego.[2]

Ernest Carlton studied the relationship between a number of variables and the performance of insurance agents for two large insurance companies. Variables included need for money, achievement, security, self-actualization, role perception, effort-reward probability perception, maturity, optimism, intelligence, self assurance, initiative, and decisiveness. The various items were combined into a "drive index".

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[1]Carrol W. Ehlers, The Use of Psychologicol Tests in Selecting Salesmen in the South, Research Monograph No. 18, (Atlanta: Georgia State University School of Business Administration), p. 7.

[2]John B. Miner, "Personality and Ability Factors in Sales Performance," Journal of Applied Psychology, 46 (Feb. 1962), p. 6-13.

Carlton found this performance index to have a relatively high significant positive correlation with actual performance of the insurance agents ($r = 0.688$).[1]

Guion and Guttier stated that personality tests have predicted success in a number of occupations but in no area as consistently as in the sales field.[2] In one study using the Ghiselli Self Description Inventory to predict sales success in food wholesaling via personality discrimination, researchers concluded that the instrument, while not universally applicable, could be useful in predicting success in certain sales situations.[3]

Ghiselli adds to the arguments supporting the utility of tests as aids in the placement of personnel in high level sales positions. In a study of personality traits of more successful and less successful stockbrokers, he concluded:

> On the whole, then, measures which center around individuality, faith in oneself, forceableness, and intellect seem to give at least reasonably good predictions of success in the selling of stocks and bonds.[4]

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[1]Ernest Lee Carlton, "Motivational, Perceptual, and Attitudinal Variables and the Job Performance of Insurance Agents, Trainees, Managers, and Underwriters," Dissertation Abstracts International, 34 (1974), 6802A (Ohio State University).

[2]R. M. Guion and R. F. Guttier, "Validity of Personality Measures in Pesonnel Selection," Personnel Psychology, 18 (1965), 135-164.

[3]Myron Gable, T. H. Matthesis, and Jan P. Murzyk, "Predicting the Success of Salesmen Through the Use of a Forced Choice Personality Test and Discriminant Analysis," Akron Business and Economic Review, (Summer, 1973), pp. 30-34.

[4]Edwin E. Ghiselli, "Prediction of Success of Stockholders," Personnel Psychology, 22 (1969), 130.

In a test designed to find which, if any, test scores were able to significantly discriminate between high and low production records of 21 wholesale petroleum salesmen, Harrell found that production records were significantly predicted by the following scales on the Bernreuter personality instrument: stability, dominance, self-confidence, aggressiveness and driving power. In addition, tact and diplomacy on the Social Intelligence Test and the sales manager scale of the Strong Vocational Interest Blank were also useful.[1]

Finally, in one study, tests were administered to 556 insurance salesmen to measure intelligence, extroversion, ascendance and interests. Schultz notes that:

> Comparison of results with job performance ratings and sales production records show significant relationships with various criteria of success. Extroversion and ascendance to a moderate degree and intelligence well above the lowest twenty percent are most predictive of success in selling.[2]

Personality as a Predictor of Success in Real Estate

While there is a proliferation of studies attempting to identify personality traits that are important to success in all types of occupations and particularly in sales, there are relatively few research studies purporting to identify the personality traits of successful real estate sales personnel. A review of the literature shows the particular traits associated with success differ greatly from occupation to occupation and

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[1]Thomas W. Harrel, "The Relation of Test Scores to Sales Criteria," Personnel Psychology, 24 (1971), 65-69.

[2]Richard S. Schultz, "Test Selected Salesmen Are Successful," Personnel Journal, (Sept. 1935), 142.

even from different types of assignments within a given occupation. The relative lack of research in real estate adds credence to the need for this study.

While there are limited empirical studies of personality traits in real estate sales, there are, nevertheless, a number of subjective studies purporting to identify the kinds of individuals that are successful in real estate sales. In an article in Real Estate Today a number of successful real estate salesmen identified the traits they felt were important to their success and to those other extremely successful salespersons with whom they associated. The traits identified as important were: decisiveness, initiative, knowledgeable, perceptive, flexible, people-oriented, self-aware, empathic, and unselfish.[1]

A separate article in the same magazine listed the twelve attributes important to a real estate salesperson. According to the list the effective real estate salesperson must possess the following attributes: must like people; should have a great deal of empathy; be ego-driven; be a self-starter; be patient; have a thirst for knowledge; be a good listener; be financially solvent; be team oriented; be emotionally stable; have physical stamina; and have a tolerant spouse.[2]

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[1]Bill Owens, "Profiles in Success," Real Estate Today, July 1975, pp. 4-8.

[2]Herbert M. Greenberg, "Attributes of a Salesman," Real Estate Today, August 1979, p. 22.

One real estate writer notes that a high degree of dedication, determination, imagination, aggressiveness, energy, sense of responsibility and duty and required for high real estate performers.[1]

In a study by the U.S. Department of Health, Education and Welfare in conjunction with the Colorado State Employment Service in 1962, real estate ability was found to be significantly related to four variables on the General Ability Testing Battery (GATB): intelligence, verbal aptitude, numerical aptitude, and clerical perception.[2]

An interview with four commercial-investment real estate sales personnel in Real Estate Tody identified what the salepeople felt was necessary for success. Among the relevant traits mentioned in this interview were a strong ego, average intelligence combined with tremendous drive, ability to accept disappointments, persistence, and enthusiasm.[3]

Herbert Weitzman reports one statistical study performed by the Henry S. Miller Company in an attempt to determine if successful real estate salesmen the company has tested are different from the less successful salesmen who were selected by the firms' commercial assessment battery.[4]

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[1]J. E. Cyr, Training and Supervising Real Estate Salesmen, (Englewood Cliffs, N. J.; Prentice Hall, Inc., 1973).

[2]U. S. Health, Education, and Welfare Department, Office of Education, Technical Report of Standardization of the General GATB for Salesmen, Real Estate, ED065573. Washington, D. C.; U. S. Government, 1976. p. 61.

[3]Bill Biondi, "Success: Means, Methods, and Motive," Real Estate Today, April 1978, pp. 4-10.

[4]Herbert D. Weitzman, "The Statistics Behind Success," Real Estate Today, April, 1978, pp. 11-17.

The firm's battery is said to measure such qualities as intelligence, interests, motivation, emotional composure, interpersonal style, management strength, achievement orientation, and work style. A review of the findings showed that successful real estate sales personnel exceeded less successful real estate personnel in the following areas: objectivity, intelligence, results orientation, practicality, organization, ability to work alone, emotional stability, self control, tolerance, self confidence, drive and energy, trust, persuasion, warmth, and entrepreneurial orientation.

Less successful sales personnel exceeded more successful workers on the following traits: analytical thinking, academic orientation, concern for detail, emotional security, conformity, assertiveness and aggressiveness, comfort with people, artistic inclination, and need for variety.

While the results were an attempt at a statistical study, the author admits that the study was not done with scientific rigor since its purpose was only to provide directional information and ideas. In fact, the author points out that the total sample of unsuccessful workers consisted of only four former real estate salesmen.[1]

Herbert M. Greenberg and David Mayer, probably the best known consultants in the area of personality testing for selection of sales employees--and real estate sales personnel in particular--claim to have identified the true universal factors that are important to sales success: Ego drive and Empathy.

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[1]Ibid.

> After two years of research, we discovered two central characteristics which we felt essential to successful selling. We then set out to measure them. The result is the Multiple Personal Inventory test which has now been used by more than 2,000 clients in the U.S. and abroad to test some 185,000 men and women for sales, management, and various administrative jobs. MPI accurately measures the presence of the two central characteristics we discovered--empathy and ego drive. We found, by extensive research, that the accurate measurement of these traits led directly to the accurate prediction of business performance.[1]

Greenberg is quoted in another article as having tested over 70,000 real estate applicants and/or workers. In the article he notes that education, race, sex, age, and experience all are unimportant. Again, the only dimensions of importance are said to be ego strength and empathy. Statistical tables in the article point out that 48% of real estate sales workers have "strong" ego drive as compared with 41% in auto sales and 36% in insurance sales. Likewise, 57% of real estate sales workers were rated as having excellent empathy, whereas only 33% of auto sales personnel and 48% of insurance sales workers were rated as excellent in this trait.[2] The statistics provided in the article are not completely helpful, however, in that they do not actually compare scores of more successful with less successful sales personnel.

In a recent article, Greenberg again emphasizes the importance of personality in real estate sales. In particular, empathy, ego drive, ego-strength, persistence, and aggressiveness are mentioned. He also points out that his studies show that 55% of the people now attempting

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[1]Herbert M. Greenberg, "Judging the Job Applicant," The Office, July 1972, p. 42.

[2]Herbert M. Greenberg and Jeanne Greenberg, "Its a Bird, Its a Plane, Its Superman (?)," Real Estate Today, April 1974, pp. 4-15.

to sell commercial real estate have neither the empathy nor ego drive to suggest that they should be in sales at all.[1]

Mayer and Greenberg's contention that ego-drive and empathy are all-important has gained widespread acceptance among sales practitioners. One of the earlier articles reporting Greenberg's work was in the July-August 1964 Harvard Business Review. This article received so much acclaim that it was later reprinted as one of the "Fifteen Business Classics" in the Harvard Business Review of 1975. Still, some question the validity of Greenberg and Mayer's MPI. Greenberg published results in September, 1974, that attempted to overcome some of the questions raised about the validity of predicting performance in real estate sales using the MPI. In a study identifying 567 applicants who were predicted to be successful and 564 who were not recommended (but hired anyway), the following performance results were reported fourteen months after initial employment. For those recommended by the MPI, 192 were in the top quarter in terms of performance. Only 52 of the applicants not recommended were in the top quarter. The bottom quarter of performers consisted of 48 that had been recommended and 117 that had not been recommended. Further, of those recommended and hired, 105 (18.5%) had left or been fired in fourteen months. Of those who had not been recommended but hired, 246 (43.6%) had left or been fired.[2]

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[1]Idem, "The Psychology of the Successful Commercial Broker," Real Estate Today, January 1981, pp. 21-25.

[2]Herbert M. Greenberg, "Selecting Top Producers," Real Estate Today, Sept. 1974, pp. 4-11.

While results such as those previously reported appear to be encouraging, there are still many unanswered questions about the validity of the MPI. No mention is made in the previous article about other factors that might have altered the results. Also, no mention is made of the success ratio of those who were not tested by the MPI. It is feasible that the success ratio may not have been significantly different--but there is no evidence to support either view.

While the works reviewed to this point support the contention that personality is a valid and useful predictor of performance in various occupations, particularly sales, the view is not universal. There are a large number of studies which do not support the usefulness of personality as a predictor. In addition there are a number of vocal opponents who argue against the practice on grounds of "invasion of privacy". A brief but representative review of opposing viewpoints follows.

Criticism of Personality as a Predictor

While there is much evidence to support the use of personality testing for placement, there are many who advocate caution in the practice. In one early survey of the validities of personality tests in 1953, Ghiselli and Barthol[1] suggested caution in the use of such tests in personnel selection. They noted that such measures did less well in occupational groups where traits of temperament seemed especially important than where the traits seemed less important.

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[1]E. E. Ghiselli and R. Barthol, "The Validity of Personality Inventories in the Selection of Employees," Journal of Applied Psychology, 38 (1953), 18-20.

Prior to passage of the Civil Rights Act of 1964, which forced a more cautious stance in employment testing, there was a proliferation of new personality measures purporting to improve selection practices. Dunnette[1] urged a moratorium on construction of new tests until those already available could be thoroughly tested and better utilized. He pointed out that each new test had been greeted with an enthusiasm that gradually weakened as evidence accumulated that it had not lived up to its earlier promise.

Opponents of personality testing note that there is no generally accepted meaningful definition of various personality traits. In fact, one study identified 17,953 individual traits![2] Another well recognized problem is "faking" where obvious social bias exists. Another problem concerns the fact that there is no correct "normal" score which truly exists on a personality test. The "normal" score would depend on the norm of the particular group in question. Because of this, some very capable individuals do not always score well according to testing standards. One group of executives were persuaded to take a series of standard tests. Whyte concluded:

> If the tests were literally applied across the board today, half of the most dynamic individuals in our big corporations would be out pounding the streets for a job tomorrow. Not

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[1]M. D. Dunnette, "Personnel Management," Annual Review of Psychology, 13 (1962), 285-314.

[2]G. W. Allport and H. Odbert, "Trait Names, A Psycholexical Study," Psychological Monographs, 47 (1936).

> one corporation president had a profile completely falling within the usually acceptable range, and two failed to make the minimum profile of foreman.[1]

The magnitude of trait categories leads to a problem of deciding what is important to measure. No two researchers seem to agree on what is important. Griselli developed the Self Description Inventory (SDI) to measure personality traits. The scales developed were intelligence, supervisory ability, initiative, self-assurance, perceived occupational level, decision-making approach, and sociometric popularity.[2] Richard Schultz stresses the importance of measures of ascendance versus submission and introversion versus extroversion.[3] Two of the more popular and frequently used personality measurements are the Edwards Personal Preference Schedule (EPPS) and the 16 Personality Factor Questionnaire (16 PF) by Cattell. The EPPS measures fifteen personality variables: Achievement, Deference, Order, Exhibition, Autonomy, Affiliation, Intraception, Succorance, Dominance, Abasement, Nurturance, Change, Endurance, Heterosexuality, and Aggression. Cattell's 16 PF, on the other hand, includes the following trait comparisons: reserved versus outgoing; dull versus bright; lower ego-strength versus higher ego-strength; submissiveness versus dominance; desurgency versus surgency; expedient versus conscientious; shy versus venturesome; tough-minded versus tender-minded; trusting versus suspicious; practical versus imaginative; artless versus shrewdness;

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[1]William H. Whyte, "Personality Tests Are a Joke Because _____," Sales Management--The Marketing Magazine, 102 (July 1969), 37.

[2]Edwin E. Ghiselli, "Manual for the Self Description Inventory," (unpublished document) University of California, 1965.

[3]Schultz, Test Selected Salesmen, pp. 139-140.

self-assured versus apprehensive; conservative versus experimental; group dependent versus self-sufficient; undisciplined versus controlled; and relaxed versus tense.

To further emphasize the point that personality trait testing is subjective at best, one review of psychological tests used for selecting salesmen in Atlanta identified thirty separate inventories, each measuring at least somewhat different dimensions of personality.[1]

Another argument against personality testing involves the issue of privacy. The House Committee on Government Operations held a special inquiry in 1964 investigating certain invasion of privacy practices by the Federal Government. New Jersey Representative Cornelius E. Gallagher, Chairman of the inquiry, stated:

> I am not saying these tests are without merit. I am sure that in some cases the tests are a useful tool in psychiatric evaluation when they are used in a clinical situation where there is a doctor-patient relationship. This is where they should be used--strictly in a medical determination.[2]

During the same Senate hearing, one foe of personality testing testified before the hearing:

> During the three years that I have investigated personality testing in this nation, I was constantly amazed at the callous indiscretion of testers in seeking out the most sacred details of a person--including his sexual life, religion, political beliefs--as if it were necessary to eliminate human dignity in order to be employable in our country.[3]

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[1]Ehlers, The Use of Psychological Tests, p. 10.

[2]Cornelius E. Gallagher, "The Growing Use of Personality Testing," Distribution Age, 64 (Dec. 1965), 40.

[3]Ibid.

In spite of the very real worry of those opposed to testing regarding both the validity of testing and of the issue of invasion of privacy, testing cannot be found completely guilty on either count. There is evidence that testing is valid. In addition to the studies previously reviewed, another study supporting the utility of testing involves the Rochester Institute of Technology's Counseling Center. This center attempts to evaluate individuals for industrial firms. In one study of results, a sample of 135 individuals who had been tested was drawn. Of these, 71 had been hired by the industrial firm. The firm was then questioned at least six months later as to the accuracy of the "predictions" for these employees. Of the 71 employees 53 were said to have been accurately predicted (either accurately predicting that they would be successful or that they would not succeed), for a 75% accuracy rate. When compared to normal turnover rates in the industry, this accuracy rate is quite high.[1]

To study the problem of the offensiveness of personality instruments, Winkler and Mathews tested 154 persons with the Inventory of Factors GAMIN by Guilford and Martin and An Inventory of Factors STDCR by Guilford. The respondents were then asked questions regarding the offensiveness of various questions. None of the 361 items were perceived by a majority of the employees to be personally offensive. In fact, 30 percent of the total group did not find any of the 361 items to be personally offensive. The researchers concluded that the problem of

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[1]Lawrence Lipsett, "How Accurate Are Psychologists' Predictions of Job Success?", Personnel Journal, 47 (June 1968), 91-94.

offending large numbers of employees by pencil and paper personality testing seems to be unfounded.[1]

A review of the literature on the utility and validity of personality testing proves to be inconclusive. While there seems to be merits to testing, there are enough questions to call for caution. A recurrent theme in the various studies is that if personality testing is to be used it should be used in conjunction with other selection techniques.

Several writers have stated that the best predictor of an individual's future performance is a study of his or her past performance. This idea has been operationalized by the use of biographical and/or background data in the selection process.

Biographical Data as a Predictor

In an effort to remove subjectivity from selection decisions and because of the problems with personality testing, a large number of firms attempt to use the data found in the application blank in an effort to distinguish between successful and unsuccessful job candidates. Using historical employment records the firms create a Weighted Application Blank (WAB).

George England, who is generally credited as being the foremost authority in the development of the WAB, outlines the rationale behind WAB development:

1. Personal history information such as age, years of education, previous occupations, and marital status represent important aspects of a person's total background and should be useful

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[1]Ronald C. Winkler and Theodore W. Matthews, "How Employees Feel About Personality Tests," Personnel Journal, 46 (June 1967), 490-492.

in selection. The major assumption is that how one will behave in the future is best predicted by how one has behaved in the past or by characteristics associated with past behavior.

2. Certain aspects of a person's total background should be related to whether or not he will be successful in a specific position. Numerous studies have shown that information contained in application blanks is predictive in selecting employees for certain types of occupations. Personal factors such as age, years of education, previous occupations, and marital status have been found to be correlated with indicators of desirable employee behavior (length of service, supervisory ratings, sales volume, and average salary increase).

3. A way of determining which aspects of a person's total background are important for a given occupation is needed. The WAB technique identifies those items on an application blank which differentiates between groups of desirable and undesirable employees in a given occupation.

4. A way of combining the important aspects of a person's total background is needed so we can predict whether or not he is likely to be successful in a given occupation. By determining the predictive power of each application blank item, it is possible to assign numerical weights or scores to each possible answer. Weights for these items may then be totaled for each individual and a minimum total score established, which, if used at the time of hiring, will eliminate the maximum number of undesirable candidates with a minimum loss of desirable candidates.[1]

The remainder of this chapter will be devoted to reviewing a representative sample of studies using background data to predict job performance and/or tenure. The review will look first at selected non-sales occupations, then sales occupations, and finally studies of background data important to real estate sales.

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[1]George W. England, Bulletin #55: Development and Use of Weighted Application Blanks (revised edition; University of Minnesota: Industrial Relations Center, 1971), pp. 4-5.

Biographical Data as a Predictor in Non-Sales Occupations

In a study of the performance of 52 research personnel, Buel, Albright and Glennon found that selected personal history information had validity correlation coefficients ranging from 0.30 to 0.57.[1]

In a study of the creativity, productivity, publication record, and patent production of a group of 355 scientists, Ellison, James and Carron found that biographical data's correlation coefficient with performance ranged from 0.37 to 0.59.[2]

In a study of 175 government overseas employees, using performance ratings as the criterion, correlation coefficients ranged from 0.33 to 0.37 with background data.[3]

Scollay found a correlation of 0.32 between the success rating of 116 assistant managers and personal history data.[4] In a separate study of miscellaneous factory employees, Scollay found the correlation between background data and salary increases ranged from 0.21 to 0.26.[5] In a study

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[1]W. D. Buel, L. E. Albright, and J. R. Glennon, "A Note on the Generality and Cross Validity of Personal History for Identifying Creative Research Scientists," Journal of Applied Psychology, 50 (1966), 217-219.

[2]R. L. Ellison, L. R. James, and T. Carron, "The Prediction of Scientific Performance Criteria with Biographic Information," unpublished research report (Palo Alto, Calif.; Institute for Behavioral Research in Creativity), 1968.

[3]M. M. Mandell, P. Duckworth, G. C. Leonary, and E. Lehr, "Validity Information Exchange," Personnel Psychology, 9 (1956), 517.

[4]R. W. Scollay, "Personal History Data as a Predictor of Success," Personnel Psychology, 10 (1957), 23-26.

[5]R. W. Scollay, "Validity of Personal History Items Against a Salary Increase Criterion," Personnel Psychology, 9 (1956), 325-335.

showing the highest correlation found in this review (0.70), Taylor, Ellison and Tucker compared biographical data of 800 scientists with government service level.[1]

The studies of background data and tenure have shown an even stronger relationship, on the average. In one study of background data and tenure of 85 female office employees, a correlation coefficient of 0.61 was achieved.[2] Finally, a correlation coefficient of 0.45 between biographical data and tenure was determined for a group of 50 unskilled employees.[3]

Biographical Data as a Predictor in Sales Occupations

Several studies were reviewed to show the power of biographical data in predicting performance and/or tenure in a cross section of sales occupations. Among the data found to have predictive utility in sales careers are: age, height and weight, marital status, number of dependents, education, early family and financial responsibility, previous selling experience, tenure on the last job, salary in the previous job, ownership of home, amount of life insurance carried, club memberships, and years at present address.

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[1]C. W. Taylor, R. L. Ellison, and M. F. Tucker, "Biographical Information and the Prediction of Multiple Criteria of Success in Science," Study III (University of Utah), 1965.

[2]M. D. Dunnette, W. K. Kirchner, J. Erickson, and P. Banas, "Predicting Turnover Among Female Office Workers," Personnel Administration, 23 (1960), 45-50.

[3]R. D. Scott, and R. W. Johnson, "Use of the Weighted Application Blank in Selecting Unskilled Employees," Journal of Applied Psychology, 51 (1967), 393-395.

In a study of 226 salesmen, Baehr and Williams determined that the correlation coefficient of background data and performance rating was 0.42. For mean sales volume rank, the number was 0.50.[1]

In a study of tenure for 50 route salesmen, Livingston determined that there was a correlation coefficient of 0.83 with background information.[2] In another study of tenure, this time with salesclerks, the weighted application blank's correlation coefficient was 0.41.[3]

In one program involving over 20,000 door-to-door salesmen, Apple and Feinberg[4] developed an objective questionnaire that would eliminate three-fourths of unsuccessful sales candidates while only erroneously eliminating 15 percent of potentially successful candidates. The researchers found that the more successful candidates came from middle-class, tightly-knit family units, almost the exact opposite of what company sales executives had previously assumed.

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[1]M. E. Baehr and G. B. Williams, "Prediction of Sales Success From Factorially Determined Dimensions of Personal Background Data," Journal of Applied Psychology, 52 (1968), 98-103.

[2]D. G. Livingston, "Validity Information Exchange," Personnel Psychology, 8 (1955), 388.

[3]J. N. Mosel and R. R. Wade, "A Weighted Application Blank for Reduction of Turnover in Department Store Salesclerks," Personnel Psychology, 4 (1951), 177-184.

[4]Valentine Apple and M. R. Feinberg, "Recruiting Door-to-Door Salesmen by Mail," Journal of Applied Psychology, 53 (Oct. 1969), 362-366.

In a study of 187 textile salesmen, Gunter[1] found that successful salesmen tend to express leadership early in their lives and that successful and unsuccessful salesmen differ in their perception of the difficulty and enjoyability of selected academic courses. Little relationship was reported between success and father's occupation, or between success and early maturation.

In an article reviewing research that had been conducted on salespeople, Cotham[2] notes that in general, findings related to biographical data range from good to questionable. He goes on to note that the factors may be more helpful in rejecting likely failures rather than identifying top performers.

In a final study calling for caution in the use of weighted application blanks, Harrick[3] studied 406 employees of a single firm. He found that while concurrent validation measures support the use of weighted applications, the WAB was not proven as a predictive tool. The need for the present study receives support in Harrick's call for more research of a predictive nature.

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[1]Thomas Hillyear Gunter, "An Analysis of the Backgrounds of Textile Salesmen by Means of a Biographical Inventory: A Study to Determine if Factual Data Can Distinguish Between Relative Degrees of Success," Dissertation Abstracts International, 3 (1970), 2339 (Georgia State University).

[2]James C. Cotham, "Selecting Salesmen: Approaches and Problems," MSU Busines Topics, 18 (1970), 64-72.

[3]Edward John Harrick, "The Impact of the Weighted Application Blank in Personnel Selection," Dissertation Abstracts International, 35 (1974), 2467A (Saint Louis University).

Biographical Data as a Predictor in Real Estate Sales

As was the case with personality studies in real estate, research studies attempting to identify significant background data of successful and/or long-tenure sales workers in real estate is scarce.

In one study using both real estate salesmen and private utility salesmen, Scheilbelhut found that certain components of self/other orientation is related to sales success in real estate.[1] In his real estate book McMichael reports that there is a negative relation between age and real estate sales performance.[2] In another text, Cyr reports a positive relation between real estate performance and an undergraduate degree.[3] In the same text, the author states that there is a positive relationship between real estate sales performance and dedication, determination, imagination, aggressiveness, energy, sense of responsibility and duty--as was reported in the personality review section. It should be noted that these statements were based on his experiences, not a statistical study.

In her dissertation, Cossaboom[4] reviews the individual performance literature and likewise finds very little specific research regarding personal background data related to real estate sales performance.

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[1]John H. Scheibelhut, "An Examination of Self-Other Orientation Characteristics of Salesmen," Dissertation Abstracts International, 32 (1970), 1335A (University of Oregon).

[2]S. L. McMichael, How to Operate a Real Estate Business (revised ed.; Englewood Cliffs, N. J.: Prentice Hall, Inc., 1967).

[3]Cyr, Training.

[4]Cossaboom, Performance and Turnover, pp. 51-55.

As noted previously, Greenberg claims there is no important relationship between real estate sales performance and education, race, sex, age or experience.[1] The studies (or opinions) mentioned in this review seem to contradict Greenberg's contention. These contradictions, along with the relative scarcity of studies in the real estate sales industry further confirm the need for this research project.

Conclusion

This review of the literature has pointed out the usefulness but complexity of personality testing for personnel selection. It is clear that much research remains to be carried out in the area. In particular, important personality dimensions must be identified occupation by occupation (and in some cases firm by firm).

The use of background data as a predictive tool in personnel selection was also examined. While there are concerns, there is much historical support for the validity and usefulness of this approach. As in the case with personality tests, however, the data needs to be tested occupation by occupation.

The review also pointed out the relative scarcity of statistical studies of either personality or background data in real estate sales. Given the need for job-by-job validational studies, this review of literature is generally supportive of the need for the current research project. The following chapter will discuss the research methodology used in the present study.

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[1]Greenberg and Greenberg, Its Superman (?), pp. 4-15.

CHAPTER III

METHODOLOGY

The methodology for this study is discussed under the following sections: definition of terms, data collection, and design of study.

Definition of Terms

For the purposes of this study the following are operational definitions of selected terms:

1. High Performance Worker: For the purposes of this study the high performance worker is defined as that worker whose average monthly sales and listings generated place him/her in the top one-half of the entire sample.

2. Low Performance Worker: For the purposes of this study the low performance worker is defined as that worker whose average monthly sales and listings generated place him/her in the bottom one-half of the entire sample.

3. Real Estate Sales Worker: Real estate sales workers are to include licensed salesmen and licensed brokers who have three or fewer salesmen employed under their supervision.

4. Primary Family Wage Earner: The primary family wage earner is defined as the individual who perceives his/her income from real estate sales as his/her family's main source of income.

5. Secondary Family Wage Earner: For the purposes of this study the secondary family wage earner is defined as the individual who perceives his/her income from

real estate sales as a secondary source of income from his/her family unit.

6. Personality Traits: For the purposes of this study the personality needs as contained in the Adjective Check List (ACL) will be measured. These needs are briefly defined below.[1]

   (A) Achievement: To strive to be outstanding in pursuits of socially recognized significance.

   (B) Dominance: To seek and maintain a role as leader in groups, or to be influential and controlling in individual relationships.

   (C) Endurance: To persist in any task undertaken.

   (D) Order: To place special emphasis on neatness, organization, and planning in one's activities.

   (E) Intraception: To engage in attempts to understand one's own behavior or the behavior of others. To show empathy.

   (F) Nurturance: To engage in behaviors that provide material or emotional benefits to others.

   (G) Affiliation: To seek and maintain numerous personal friendships.

   (H) Heterosexuality: To seek the company of and derive emotional satisfaction from interactions with opposite sex peers.

   (I) Exhibition: To behave in such a way as to elicit the immediate attention of others.

   (J) Autonomy: To act independently of others or of social values and expectations.

   (K) Aggression: To engage in behaviors that attack or hurt others.

   (L) Change: To seek novelty of experience and avoid routine.

   (M) Succorance: To solicit sympathy, affection, or emotional support from others.

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[1]Harrison G. Gough and Alfred B. Heilbrun, Jr., The Adjective Check List Manual (1980 ed.; Palo Alto, Calif.; Consulting Psychologists Press, Inc. 1980) pp. 8-15.

(N) Abasement: To express feelings of inferiority through self-criticism, guilt, or social impotence.

(O) Deference: To seek and maintain subordinate roles in relationship with others.

(P) Self Impression-Favorable: High scorers are seen as adaptable, outgoing individuals, protective of those close to them, cheerful in the face of adversity, and productive as workers.

(Q) Self Impression-Unfavorable: The high scorer may be characterized as a disbeliever, pessimistic about the future, changeable, headstrong, and quick to take offense or umbrage.

(R) Communality: The high scorer appears to be reliable, considerate of others, free of pretense, and comfortable in interpersonal relationships.

Data Collection

Data used in this research project was collected from a sample drawn from the membership list of the Multiple Listing Service roster of the Huntsville and Muscle Shoals Realtors Association. Information was collected from the sample via two instruments, a self description personality questionnaire and an objective background questionnaire.

Sampling Procedure

As one of the objectives of this study was to develop and test the predictive validity of a discriminant function derived from the sample it was necessary to divide the total sample into two separate groups, the "analysis" sample and the "hold-out" or "validity" sample. While no strict guidelines could be found for this division, Hair[1] does point out

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[1]Joseph F. Hair, Jr., Rolph Anderson, Ronald L. Tatham, and Bernie J. Grablowsky, Multivariate Data Analysis with Readings, (Tulsa, Oklahoma; The Petroleum Publishing Co., 1979), p. 94.

that the most frequently used procedure is a single random division with the analysis group being used to develop the function and then applying the function to the hold-out sample. The practice of first using the entire sample to develop the initial discriminant function is challenged on the grounds that it results in an upward bias in the predictive accuracy of the function.

Hair notes that the most common method for determining the proportion of the two samples is simply to divide the total sample in half.[1] He goes on to point out that many researchers prefer to favor the analysis sample with a 60-40 or 75-25 split, however.

George W. England, the leading authority on the development and validation of weighted application blanks indicated that the hold-out sample should normally include a minimum of 50 observations.[2] This study, then, includes 50 observations in the hold-out sample with the analysis sample containing a sufficient number for statistical validity. In determining this number, Kish's formula for sample size was utilized.[3]

Sample Size Formula

$n = n'/1 + n'/N$ Where:

$n' = S^2/V^2$

$S^2 = P(1-P)$

P = .5 (gives the most accurate estimate)

V = .05 (standard error no larger than 5% for any proportion of the population)

N = the number in the population

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[1] Ibid.

[2] England, Appliction Blanks, p.22.

[3] Kish, Leslie. Survey Sampling. New York; John Wiley & Sons, Inc., 1976.

Using this formula with a population of 669 gives a minimum analysis sample size requirement of 100. Combining the analysis sample and the "hold-out" sample gives the total sample size required as 150 observations. The following procedures were utilized to collect the 150 observations. First, the Huntsville and Muscle Shoals Multiple Listing Service Membership lists were obtained from the respective Board of Realtors. Next, the lead broker of firms with over three salespersons was removed. It was felt that these individuals spend a significant portion of their time with administrative responsibilities and their inclusion might distort the productivity figures. Next, the remaining salespersons were assigned a number. Altogether, there were 669 numbers assigned.

Once each potential observation had been assigned a number, it was then necessary to randomly select the sample from this list. A table of random numbers was used for this task.[1] Recognizing the customarily low return ratio for mail questionnaires it was determined that a number larger than 150 would have to be contacted and that a strategy would have to be developed to improve the return percentage due to the cost of each non-response.

A review of literature addressing the problem of improving mail questionnaire response prompted several minor modifications in the design of one of the questionnaires. Most significantly, however, it seemed important to personalize the mailing as much as possible.

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[1]Samuel B. Richmond, Statistical Analysis (2nd ed.; New York: The Ronald Press Company, 1964), pp. 595-596.

As the Multiple Listing Service membership roster included the telephone number of each member a decision was made to use an available Watts line to call each individual randomly selected, to identify the caller and briefly explain the research project and ask if they would be willing to take a few minutes of their time to respond to the survey if mailed a copy. A copy of the call guide used in these calls can be found in Appendix A.

Recognizing the need to receive 150 usable observations a decision was made to randomly select and call 225 individuals from the membership roster. These calls were made over a two-week period in July, 1981. After several attempts a total of 209 individuals were reached and all indicated their willingness to participate. Included in these 209 were 19 who indicated that they were no longer active in real estate. These 19 were asked to provide sales figures for their last active year. A cover letter, two questionnaires, and a self-addressed stamped envelope was then forwarded to each individual contacted. Copies of the cover letter and questionnaires are located in Appendix A.

Of the 209 questionnaires given out, a total of 166 were returned. Nine of the returned questionnaires were discarded as unusable for various reasons. The remaining 157 observations represent an overall return rate of 75%--an extremely high percentage for mail questionnaires but reasonable when considering three important elements of the research design: (1) the individuals were called by the researcher and thanked for their willingness to participate, (2) the returns were actually anonymous, and (3) the questionnaires were relatively brief.

The final samples, then, consist of 107 observations in the "analysis sample" and 50 observations in the "hold-out" sample. Using Hair's suggestions, during the division an attempt was made to place a proportionate share of high and low productivity personnel in each sample.

Personality Questionnaire

Selection of an appropriate personality questionnaire proved to be a difficult task. As noted in the review of the literature, the number of instruments measuring personality traits is extremely large. A study of psychological tests used to select salesmen in Atlanta identified thirty separate inventories--each measuring slightly different traits.[1]

A second problem involves identifying which traits should be included in the instrument chosen. This problem is made difficult due to the large number of traits that have been found. As previously reported, one study identified 17,953 individual traits.[2] In the present study, a third consideration was the choice of an instrument that is reasonably brief. While a comprehensive and detailed instrument might be superior from a purely technical sense, the voluntary nature of response to a mail questionnaire dictated that the instrument chosen should be brief and non-offensive.

With the previous points in mind, a review was made of commonly used instruments with the goal of selecting a questionnaire that measured a number of "generally well recognized" traits, was "non-offensive" and was "brief" in terms of completion time. The instrument chosen for this

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[1]Ehlers, "The Use of Psychological Tests", p. 10.

[2]Allport, "Trait Names", p. 26.

study was The Adjective Check List. A copy of the ACL is located in Appendix A.

The ACL Manual points out that the instrument has been used in over 700 research studies since its introduction in 1952.[1] Of the 100 most frequently used tests in psychology, the ACL had obtained the position of 26th most frequently used instrument according to Buro's Mental Measurements Yearbook of 1978.[2]

For the purposes of this study, a total of 18 traits as measured by the ACL were studied. These personality traits were identified and defined in the first section of this chapter.

An important dimension of any instrument is it's validity and reliability. While the ACL manual makes no mention of validational studies, it does imply more than mere face validity in discussing the long-term popularity of the instrument and its use in a multitude of different types of studies.[3] A thorough recap of the reliability, not only of the instrument but of each scale on the instrument, is included in the ACL manual. Test-retest coefficients range from .34 to .85 on the various scales.[4]

Background Questionnaire

Selection of background information to include on the second questionnaire was essentially subjective. The usual demographic data such as age, sex, etc., was included. Choice of other questions to include

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[1]Gough, The Adjective Checklist, p. 1.

[2]O. K. Buros, ed., Eighth Mental Measurement Yerbook (Highland Park, N. J.: Gryphon Press, 1978), 1:37-39.

[3]Ibid.

[4]Ibid.

was determined after reviewing the articles on successful real estate salespersons that have been previously reviewed in the Literature section of this study and after discussion with a number of realtors regarding their experiences and/or observations. In addition to biographical data, questions regarding how respondents prefer to use their time was included in the background questionnaire. As this may be more a result of personality than background, the results are analyzed in the personality section.

Another important section of the questionnaire gathers information on the productivity of the individual salesperson. Questions are asked regarding the amount of sales closed and listings generated for the past month. This question is asked in an effort to provide a frame of reference for responding to the next question: What is the average monthly sales and listings generated over the past year? From this self-report of average productivity, the sample is divided into a "high" and "low" performance group--which is simply the top half and bottom half, respectively. No attempt was made to validate the self report of performance as the responses were anonymous.

A self-report of this type is admittedly subject to a large margin of error. The significance of this error should be minimized, however, in that the function derived from the study simply predicts group membership (high group or low group) rather than absolute level of productivity.

The productivity or performance figures used include both average sales closed and average monthly listings generated. Justification for this includes the fact that both sales and listings are the measure of success in real estate, not just sales. Also, in the currently depressed real estate market, inclusion of sales alone would depress productivity figures,

even though it might be expected that this depression would be "across-the-board" and would not really affect whether one was in the "top" or "bottom" half of performers. Never-the-less, inclusion of listings generated seems a more reasonable and accurate way of measuring the overall productivity of real estate sales personnel. A copy of the background questionnaire showing specific questions is located in Appendix A.

Design of Study

This study was designed to collect background information and personality traits from a sample of real estate sales personnel. The data gathered was to be analyzed for significant statistical differences and then used to create and test a model to predict top performers in estate sales.

Analysis for Research Objective I

Research Objective I was concerned with identifying the relationship between selected background characteristics, personality traits and productivity. Two primary hypotheses were tested.

Ho_1: There is no significant relationship between the productivity of real estate sales workers and selected background characteristics.

Ho_2: There is no significant relationship between the productivity of real estate sales workers and selected personality traits.

Each primary hypothesis was further broken into a number of secondary hypotheses. The criterion for rejection of each hypotheses was $p = <0.05$.

In testing these hypotheses, the correlation was determined using Minium's Correlation Coefficient Computing Formula.[1]

$$r = \frac{xy}{\sqrt{x^2 \quad y^2}}$$

Next, the significance of the correlation for each of the variables was calculated using Fisher's t test.[2]

$$t = \frac{r}{\sqrt{(1-r)^2/(n-2)}}$$

Analysis for Research Objective II

Research Objective II involved determining if various of the background data and personality traits can be used to develop a model to predict high and low performance real estate sales workers. Two research hypotheses were tested:

Ho_3: The probability that a person will be in the high-productivity group or low-productivity group in real estate sales will not be affected by any combination of the background characteristics or personality traits of the individual.

Ho_4: Compression of selected background and personality variables via principle component analysis will not reduce the predictive ability of the linear probability model developed in this study.

In testing Ho_3, two statistical techniques were available to the researcher. Either discriminant analysis or the linear probability function approach was appropriate. A review of literature revealed that the discriminant analysis is most appropriate when the variables are normally distributed and when the data is metric or continuous. In the

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[1]Edward W. Minium, Statistical Reasoning in Psychology and Education (2nd ed.; New York: John Wiley & Sons, 1978), p. 149.

[2]Ibid.

current study, the assumption of normal distribution could not be strongly supported and more importantly, a number of the independent variables were categorical as opposed to metric. While the use of dummy variables would permit the application of discriminant analysis the total number of variables would then have become burdensome. Further, the linear probability function approach seemed most consistent with the type of data collected and with the purposes of the study. For a thorough discussion of and comparison of the two techniques see Ladd's article in Econometrica.[1] Additional useful references and explanations of computational procedures are contained in an article by McGillivray[2] and in Goldberger's Econometric Theory.[3] The computations for this technique were performed by the Time Series Processor statistical package, revision 3.4, using the computer facilities of Southern Methodist University.

The TSP program was modified to calculate the percentage of real estate sales workers correctly classified by the LPF. A copy of this modification is located in Appendix C. The resulting data concerning correct and incorrect classifications was then subjected to a Chi-Square analysis in order to address Ho_3.

Factor analysis is the statistical technique used to analyze the research data for Ho_4. In their book Multivariate Data Analysis, Hair, et. al. explain the concept:

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[1]George W. Ladd, "Linear Probability Functions and Discriminant Functions," Econometrica, 34(Oct. 1966), 873-885.

[2]R. H. McGillivray, "Estimating the Linear Probability Function," Econimetrica, 38(Sept. 1970), 775-776.

[3]A. S. Goldberger, Econometric Theory (New York: John Wiley & Sons, Inc., 1964), pp. 248-250.

> Factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is data reduction and summarization. Broadly speaking, it addresses itself to the problem of analyzing the interrelationships among a large number of variables, and then explaining these variables in terms of their common underlying dimensions (factors).[1]

Four common functions of factor analysis are:

(1) Identify a set of dimensions that are latent (not easily observed) in a large set of variables; also referred to as 'R' factor analysis.

(2) Devise a method of combining or condensing large numbers of people into distinctly different groups within a larger population; also referred to as 'Q' factor analysis.

(3) Identify appropriate variables for subsequent regression, correlation or discriminant analysis from a much larger set of variables.

(4) Create an entirely new set of a smaller number of variables to partially or completely replace the original set of variables for inclusion in subsequent regression, correlation or discriminant analysis.[2]

There are several categories of factor analysis. Their choice depends upon the purposes of the researcher.

> Numerous variations of the general factor model are available. The two most frequently employed factor analytic approaches are component analysis and common factor analysis. Selection of the factor model depends upon the analysts' objective. The component model is used when the objective is to summarize most of the original information (variance) in a minimum number of factors for prediction purposes. In contrast, common factor analysis is used primarily to identify underlying factors or dimensions not easily recognized.[3]

As this research study is principally concerned with identifying variables that differentiate high and low performers and then creating

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[1]Hair, Multivariate, p. 218.

[2]Ibid, pp. 218-219.

[3]Ibid, p. 221.

a predictive model, the method of principal component analysis was chosen. The computations required by this model were performed with the TSP statistical program. A full discussion of the computational procedures utilized in the principal components technique can be found in Harman's Modern Factor Analysis[1]

Prior to carrying out the Linear Probability and Principal Components analyses, a number of Ordinary Least Squares regressions were made using absolute level of performance as the dependent variable. The purpose of these OLS runs was to suggest possible combinations of variables to be subjected to the LPA and PCA analyses.

Finally, the validity of equations generated by the analyses were tested by runs against the "hold-out" sample, and a combination or "comprehensive" sample consisting of both the primary and hold-out sample. The results of the analysis are reported in Chapter 4.

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[1]Harry H. Harman, Modern Factor Analysis (2nd ed., Chicago; University of Chicago Press, 1967), pp. 136-146.

CHAPTER IV

RESULTS OF STUDY

Introduction

The data for this research study are the completed questionnaires recapitulated in Appendix B. The data were studied and analyzed to determine if certain background characteristics and/or personality traits would discriminate between the top and bottom half of performers in real estate sales. This chapter is divided into the following major sections:

1. Demographic information about the 106 respondents in the primary sample.

2. Personality trait scores of the 106 respondents in the primary sample.

3. Statistical analyses related to Research Objective I.
   A. Test of relationship between productivity and background characteristics.
   B. Test of relationship between productivity and personality traits.

4. Statistical analyses related to Research Objective II.
   A. Test the accuracy of various combinations of background characteristics and personality traits as predictors of performance.
   B. Test the predictive accuracy of background characteristics and personality trait variables after compression by principle component analysis.

One hundred fifty-six usable completed questionnaires were returned. One hundred six were used for the primary sample with fifty

withheld as a hold-out or validation sample. The one hundred six questionnaires in the primary sample represent 15.7% of the population of 669.

Demographic Information

The personal data summarized in this section were taken from the completed questionnaire returns of the survey respondents. Individual data for each category is found in Appendix A. The information taken from the background questionnaire is summarized in Table 1.

TABLE 1

BACKGROUND DATA

(Part A)

Category	Range	Mean	Median	Mode
Age	24-70 years	43.2	42	43
Formal Educ.	11-18 years	14.4	14	12
Real Estate Training	0-480 hours	109.7	80	200
Other Sales Experience	0-30 years	3.7	1	0
Other Bus. Experience	0-35 years	7.4	5	0
Years in Community	2-53 years	19.1	17	10 & 30
Years at Address	1-30 years	7.1	4	1
Firms Employed By	1-6 firms	2.3	2	2

(Continued)

TABLE 1

BACKGROUND DATA (Continued)

(Part A)

Number of Children	0-6 children	1.4	2	2
Years Married	0-47 years	17.1	19	0
Preference-Office Time	0-75 percent	22.9%	20%	25%
Preference-Sales Time	0-90 percent	42.4%	45%	50%
Preference-Listing Time	0-80 percent	35.6%	30%	25%
Preference-Work	0-90 percent	43.1%	50%	50%
Preference-Family	5-100 percent	38.4%	40%	50%
Preference-Hobbies	0-50 percent	19.1%	20%	25%
Number Hobbies	0-10 hobbies	2.2	2	2
Professional Affiliations	0-9 aff.	2.3	2	2

BACKGROUND DATA

(Part B)

	Sex		Type of Hobby		Income		Leader		Parents in Real Estate	
No.:	M	F	Active	Passive	Primary	Secondary	Y	N	Y	N
	34	72	68	38	41	65	44	62	14	92

Source: Completed Questionnaires

Personality Characteristics

The personality data summarized in this section were taken from the Adjective Check List questionnaire completed by survey respondents. A copy of this questionnaire can be found in Appendix A. The standard scores of the respondents on the Adjective Check List is summarized in Table 2.

A composite profile of the "average" real estate salesperson in the primary sample of this study would describe a female aged 43.2, married 17.1 years with 2 children. While this individual works in real estate full-time, she perceives the income received from real estate sales as a secondary source of income for her family. She has had just over two years of college and has approximately 110 clock hours of formal training in real estate. She has been in real estate for just over 5 years. Before this, she worked in other business and sales-related activities for approximately 11 years. During the past 10 years, she has worked for just over 2 firms. She has lived in the community for 19 years and at her present address for 7 years. She is the first person in her family to work in real estate. She belongs to two professional groups but has not held a leadership position.

Given a choice, the "average" real estate salesperson would spend approximately 40 percent of her available time at work, 40 percent with her family and 20 percent pursuing some form of "active hobby". At work, she prefers to spend approximately 20 percent of her time at the office, 45 percent showing property to customers and 35 percent developing listings for future sales.

The strongest personality trait for this composite individual is a strong Achievement Drive. Other strong traits include Dominance,

TABLE 2

PERSONALITY DATA

Category	Range	Mean	Median	Mode
Favorable Adj.	34-72	52.3	55	53
Unfavorable Adj.	37-99	45.7	43	40
Communality	28-63	46.3	46	42
Achievement	21-78	55.8	56	57
Dominance	33-73	54.8	56	60
Endurance	27-72	54.4	56	59 & 60
Order	29-75	52.7	53	52 & 54
Intraception	23-77	48.5	50	52
Affiliation	19-69	54.6	56	53 & 57
Heterosexuality	33-74	54.7	55	50
Exhibition	28-75	54.7	54	55
Autonomy	37-74	52.9	52	50
Aggression	28-84	49.9	49	55
Change	29-74	50	50	50
Succorance	27-69	45.1	45	45
Abasement	29-75	47.2	47	47
Deference	21-72	46.3	46	39
Nurturance	19-69	55	54	53 & 57

Source: Completed Questionnaires

Endurance, Affiliation, Heterosexuality, Exhibition and Nurturance. The weaker personality traits are Communality, Intraception, Succorance, Abasement and Deference.

Statistical Analysis Related to Research Objective I

Research Objective I attempts to answer two questions: Is there a relationship between the productivity of real estate sales workers and selected background characteristics? Also, Is there a relationship between the productivity of real estate sales workers and selected personality traits? To test these questions, a series of hypotheses address each question. A t-value was calculated for the correlation between productivity and variables that were metric and a z-value calculated for the non-metric variables, such as sex.

Table 3 summarizes the individual hypotheses addressing the question of whether productivity is related to selected background characteristics. Table 4 summarizes the findings related to background data.

Hypothesis No. 1(1)

Hypothesis No. 1(1) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and age.

The product-moment correlation between age and productivity was -0.042. The resultant t-value was -0.432, indicating a very low degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(1) as stated in the null form cannot be rejected at either the 0.05

TABLE 3

SUMMARY OF INDIVIDUAL HYPOTHESES ADDRESSING BACKGROUND DATA

Hypothesis	Relationship Between Productivity and:
$Ho_1(1)$	Age
$Ho_1(2)$	Formal Education
$Ho_1(3)$	Real Estate Training
$Ho_1(4)$	Real Estate Experience
$Ho_1(5)$	Other Sales Experience
$Ho_1(6)$	Other Business Experience
$Ho_1(7)$	Years in City
$Ho_1(8)$	Years at Present Address
$Ho_1(9)$	Firms Worked For Last 10 Years
$Ho_1(10)$	Number of Children
$Ho_1(11)$	Number of Years Married
$Ho_1(12)$	Number of Hobbies
$Ho_1(13)$	Number of Professional Memberships
$Ho_1(14)$	Sex
$Ho_1(15)$	Parent in Real Estate
$Ho_1(16)$	Type of Hobbies Pursued
$Ho_1(17)$	Real Estate-Primary or Secondary Income Source
$Ho_1(18)$	Leadership Activities

TABLE 4

SUMMARY OF CORRELATIONS AND T-VALUES

Ho	Correlation	T-Value	Critical Values =0.01	=0.05	Accept/Reject
$Ho_1(1)$	-0.042	-0.432	2.364	1.660	Accept
$Ho_1(2)$	0.161	1.672	2.364	1.660	Reject at 0.05
$Ho_1(3)$	0.155	1.608	2.364	1.660	Accept
$Ho_1(4)$	0.417	4.697	2.364	1.660	Reject
$Ho_1(5)$	0.119	1.227	2.364	1.660	Accept
$Ho_1(6)$	-0.070	-0.721	2.364	1.660	Accept
$Ho_1(7)$	-0.040	-0.411	2.364	1.660	Accept
$Ho_1(8)$	-0.054	-0.557	2.364	1.660	Accept
$Ho_1(9)$	-0.192	-2.004	2.364	1.660	Reject at 0.05
$Ho_1(10)$	0.129	-1.329	2.364	1.660	Accept
$Ho_1(11)$	-0.030	-0.305	2.364	1.660	Accept
$Ho_1(12)$	-0.199	-2.081	2.364	1.660	Reject at 0.05
$Ho_1(13)$	-0.036	0.373	2.364	1.660	Accept

TABLE 5

SUMMARY OF Z-VALUES FOR NON-METRIC DATA

Hypothesis	Z-Value	Critical Values =0.01	=0.05	Accept/Reject
$Ho_1(14)$	0.438	2.32	1.64	Accept
$Ho_1(15)$	-2.060	2.32	1.64	Reject at 0.05
$Ho_1(16)$	1.160	2.32	1.64	Accept
$Ho_1(17)$	3.080	2.32	1.64	Reject
$Ho_1(18)$	0.538	2.32	1.64	Accept

level or the 0.01 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(2)

Hypothesis No. 1(2) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and formal education.

The product-moment correlation between formal education and productivity was 0.161 with a t-value of 1.672, indicating significance at the 0.05 level but not at the 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

At the 0.05 level of significance, the Null Hypothesis No. 1(2) can be rejected. Rewritten in the Alternative Hypothesis form, Hypothesis No. 1(2) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and formal education.

Hypothesis No. 1(3)

Hypothesis No. 1(3) was stated as:

> There is no significant relationship between productivity of real estate sales workers and number of hours of real estate training.

The product-moment correlation between real estate sales training and productivity was 0.155. The resultant t-value was 1.608, indicating no significant correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(3) as stated in the null form cannot be rejected at either the 0.05

level or the 0.01 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(4)

Hypothesis No. 1(4) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and real estate experience.

The product-moment correlation between real estate sales experience and productivity was 0.417. The resultant t-value was 4.697, indicating a high degree of significance at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t test of significance, Hypothesis No. 1(4) as stated in the null form can be rejected at both the 0.05 level and the 0.01 level of significance. Rewritten in the Alternate Hypothesis form, Hypothesis No. 1(4) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and experience.

The results of this test are not surprising. It appears quite logical that successful sales associates would remain in the field whereas those who are less successful would leave with relatively few years experience. Nevertheless, these results may indicate the importance of experience, even for potentially successful young associates.

Hypothesis No. 1(5)

Hypothesis No. 1(5) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and other sales experience.

The product-moment correlation between other sales experience and productivity was 0.119. The resultant t-value was 1.227, indicating

a low degree of significance at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(5) as stated in the null form cannot be rejected at either the 0.05 or the 0.01 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(6)

Hypothesis No. 1(6) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and other business experience.

The product-moment correlation between other business experience and productivity was -0.070. The resultant t-value was -0.721, indicating a very low degree of significance at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(6) as stated in the null form cannot be rejected at either the 0.01 level or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(7)

Hypothesis No. 1(7) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of years of residence in the city.

The product-moment correlation between the number of years residence in the city and productivity was -0.040. The resultant t-value was -0.411, indicating a very low degree of significance at both the 0.05

level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance Hypothesis No. 1(7) as stated in the null form cannot be rejected at either the 0.01 level or 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(8)

Hypothesis No. 1(8) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of years residence at present address.

The product-moment correlation between the number of years of residence at present address and productivity was -0.054. The resultant t-value was -0.557, indicating a very low degree of significance at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(8) as stated in the null form cannot be rejected at either the 0.01 level or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(9)

Hypothesis No. 1(9) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of firms they have worked for during the past 10 years.

The correlation between the number of firms worked for during the past ten years and productivity was -0.192. The resultant t-value was -2.004, indicating a moderate degree of significance. The required

values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

At the 0.05 level of significance, the Null Hypothesis No. 1(9) can be rejected. Rewritten in the Alternate Hypothesis form, Hypothesis No. 1(9) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and the number of firms they have worked for during the past ten years.

As the direction of the correlation is negative, it is noted that stability in employment does indicate a slight positive impact on the productivity of the individual sales person in real estate sales. This should not be construed, however, to imply that a slight degree of mobility is indicative of lower performance. The mean number of employees for the sample was 2.3 for the past ten years. The median and mode were 2.0. However, a review of the survey data indicated that 70 percent of the sales associates employed by four to six firms were in the bottom half of performers.

Hypothesis No. 1(10)

Hypothesis No. 1(10) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of children.

The correlation between number of children and productivity was -0.129. The resultant t-value was -1.329, indicating a low level of significance at both the 0.01 level and 0.05 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(10) as stated in the null form cannot be rejected at either the

0.01 level or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(11)

Hypothesis No. 1(11) was stated as:

There is no significant relationship between the productivity of real estate sales workers and the number of years married.

The correlation between productivity and the number of years married was -0.030. The resultant t-value was -0.305, indicating a very low level of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(11) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(12)

Hypothesis No. 1(12) was stated as:

There is no significant relationship between the productivity of real estate sales workers and the number of hobbies they pursue.

The correlation between productivity and the number of hobbies pursued was -0.199. The resultant t-value was -2.081, indicating a moderate degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1(12) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 1(12) can be stated as being true.

There is a significant relationship between the productivity of real estate sales workers and the number of hobbies pursued.

As the direction of the correlation is negative, it is noted that the number of hobbies pursued has a negative impact on productivity of real estate sales workers.

Hypothesis No. 1(13)

Hypothesis No. 1(13) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of professional memberships maintained.

The correlation between productivity and the number of professional memberships maintained was 0.036. The resultant t-value was 0.373, indicating a very low degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 1 (13) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

The Mann-Whitney U-test was chosen to test Hypotheses No 1(14) through No. 1(18). This test was chosen as it is one of the most powerful non-parametric tests available. The choice to use a non-parametric test resulted from the inability of the survey data to meet all the assumptions required for the parametric T-test, especially the requirements regarding interval or ratio-scaled data, normal distribution, and sample size.[1]

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[1]H. Robert Dodge, Sam D. Fullerton, and David R. Rink, Marketing Research (Columbus, Ohio: Charles E. Merrill Publishing Company, 1982), pp. 279-281.

Hypothesis No. 1(14)

Hypothesis No. 1(14) was stated as:

> There is no significant difference between the productivity of real estate sales workers and their sex.

The Mann-Whitney U-test was used for statistical analysis of Hypothesis No. 1 (14). Calculations are shown in Appendix B. The z-value for the difference between male and female real estate sales workers was 0.438. The required values for significance were 2.32 at the 0.01 level and 1.64 at the 0.05 level.

Based on the results of the Mann-Whitney U-test of significance, Hypothesis No. 1(14) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(15)

Hypothesis No. 1(15) was stated as:

> There is no significant difference between the productivity of real estate sales workers who had and those who did not have a parent in the profession.

The Mann-Whitney U-test was used for statistical analysis of Hypothesis No. 1(15). Calculations are shown in Appendix B. The z-values for the difference between real estate sales workers whose parents were in real estate and those whose parents were not in the profession was -2.06. The required values for significance were 2.32 at the 0.01 level and 1.64 at the 0.05 level.

Based on the results of the Mann-Whitney U-test, Hypothesis No. 1(15) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 1(15) can be stated as being true.

There is a significant difference between the productivity of real estate sales workers who have had and those who have not had a parent in the real estate profession.

As the z-value is negative, it is noted that having had a parent in the real estate profession seems to have a negative impact on the productivity of the sales worker.

Hypothesis No. 1(16)

Hypothesis No. 1(16) was stated as:

There is no significant difference between the productivity of real estate sales workers who pursue active hobbies and those who pursue passive hobbies.

The Mann-Whitney U-test was used for statistical analysis of Hypothesis No. 1(16). Calculations are shown in Appendix B. The z-values for the difference between the productivity of real estate sales workers who pursue active hobbies and those who pursue passive hobbies was 1.16. The required values for significance were 2.32 at the 0.01 level and 1.64 at the 0.05 level.

Based on the results of the Mann-Whitney U-test, Hypothesis No. 1(16) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1(17)

Hypothesis No. 1(17) was stated as:

There is no significant difference between the productivity of real estate sales workers who perceive their income from real estate as the primary source of their income as opposed to those who perceive real estate income as a secondary source of family income.

The Mann-Whitney U-test was used for statistical analysis of Hypothesis No. 1(17). Calculations are shown in Appendix B. The

z-values for the difference in the productivity of real estate sales workers who view their income from real estate as a primary versus a secondary source of family income was 3.08. The required values for significance were 2.32 at the 0.01 level and 1.64 at the 0.05 level.

Based on the results of the Mann-Whitney U-test, Hypothesis No. 1(17) as stated in the null form can be rejected at both the 0.05 and 0.01 levels of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 1(17) can be stated as being true:

> There is a significant difference between the productivity of real estate sales workers who view their income from real estate sales as a primary source of family income versus those who view it as a secondary source of income.

As the z-value was positive, it is noted that those who perceive income from real estate sales as the primary source of family income seem to be more productive than those who perceive this income as a secondary source of family income.

Hypothesis No. 1(18)

Hypothesis No. 1(18) was stated as:

> There is no significant difference between the productivity of real estate sales workers who have held a leadership position in a professional or civic organization and those who have not held a leadership position.

The Mann-Whitney U-test was used for statistical analysis of Hypothesis No. 1(18). Calculations are shown in Appendix B. The z-values for the difference in productivity of real estate sales workers who have or have not taken a leadership role in civic or professional organizations was 0.538. The required values for significance were 2.32 at the 0.01 level and 1.64 at the 0.05 level.

Based on the results of the Mann-Whitney U-test of significance, Hypothesis No. 1(18) as stated in the null form cannot be rejected at

either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 1

Hypothesis No. 1 was stated as:

> There is no significant relationship between the productivity of real estate sales workers and selected background characteristics.

From the analysis of the relationship between the 18 categories of background information and productivity as presented in the discussion of the supporting hypotheses, two (2) of the supporting hypotheses were rejected at the 0.01 level of significance and an additional four (4) were rejected at the 0.05 level of significance.

Based on the results of the tests of significance for the supporting hypotheses, Hypothesis No. 1 as stated in the null form can be rejected. Rewritten in the Alternative Hypothesis form, Hypothesis No. 1 can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and selected background characteristics.

Based on the results of this study, it can be concluded that productivity in real estate sales is positively related to formal education, real estate experience, and work viewed as a primary source of income. Productivity is negatively related to the number of firms worked for over the past ten years, the number of hobbies pursued, and having a parent who was/is in the real estate business.

Personality Traits

The second question pertinent to Research Objective I involves determining if selected personality traits are related to productivity in real estate sales personnel. Table 6 summarizes the relationship between

TABLE 6

SUMMARY OF CORRELATIONS AND T-VALUES FOR PERSONALITY TRAITS

Ho	Trait	Correlation	t-value	critical value = 0.01	= 0.05
$Ho_2(1)$	Fav. Adjective	-0.119	-1.225	2.364	1.660
$Ho_2(2)$	Unfav. Adj.	0.429	4.860	2.364	1.660
$Ho_2(3)$	Communality	-0.225	-2.363	2.364	1.660
$Ho_2(4)$	Achievement	0.179	1.869	2.364	1.660
$Ho_2(5)$	Dominance	0.238	2.512	2.364	1.660
$Ho_2(6)$	Endurance	0.054	0.553	2.364	1.660
$Ho_2(7)$	Order	-0.143	-1.477	2.364	1.660
$Ho_2(8)$	Intraception	-0.207	-2.170	2.364	1.660
$Ho_2(9)$	Affiliation	-0.195	-2.040	2.364	1.660
$Ho_2(10)$	Heterosexuality	-0.143	-1.478	2.364	1.660
$Ho_2(11)$	Exhibition	0.327	3.540	2.364	1.660
$Ho_2(12)$	Autonomy	0.328	3.557	2.364	1.660
$Ho_2(13)$	Aggression	0.282	3.010	2.364	1.660
$Ho_2(14)$	Change	-0.050	-0.512	2.364	1.660
$Ho_2(15)$	Succorance	-0.007	-0.071	2.364	1.660
$Ho_2(16)$	Abasement	-0.318	-3.437	2.364	1.660
$Ho_2(17)$	Deference	-0.302	-3.250	2.364	1.660
$Ho_2(18)$	Nurturance	-0.402	-4.505	2.364	1.660
$Ho_2(19)$	Office Time Pref.	-0.052	-0.529	2.364	1.660
$Ho_2(20)$	Sales Time Pref.	-0.084	-0.866	2.364	1.660
$Ho_2(21)$	Listing Time Pref.	0.146	1.512	2.364	1.660
$Ho_2(22)$	Work Pref.	0.414	4.662	2.364	1.660
$Ho_2(23)$	Family Pref.	-0.348	-3.808	2.364	1.660
$Ho_2(24)$	Hobby Pref.	-0.207	-2.166	2.364	1.660

productivity and selected personality traits of the survey respondents.

Hypothesis No. 2(1)

Hypothesis No. 2(1) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of favorable adjectives identified in a self-description inventory.

The correlation between productivity and the number of favorable adjectives was -0.119. The resultant t-value was -1.225, indicating no significant correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(1) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(2)

Hypothesis No. 2(2) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and the number of unfavorable adjectives identified in a self-description personality inventory.

The correlation between productivity and the number of unfavorable adjectives as 0.429. The resultant t-value was 4.860, indicating a high degree of correlation at both the 0.05 and 0.01 levels of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(2) as stated in the Null form can be rejected at both the 0.05 level and the 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(2) can be stated as being true:

There is a significant relationship between the productivity of real estates sales workers and the number of unfavorable adjectives identified in a self-description personality inventory.

As the relationship was positive, it can be concluded that there is a positive relationship between the number of unfavorable adjectives checked by the respondent and his/her productivity. This result was totally unexpected. There is strong evidence that a positive self-image is an important contributor to performance. It may be possible that the relationship between negative adjectives and performance is a result of a degree of dissatisfaction on the part of the respondent. This dissatisfaction may be prompting a drive to excell as opposed to a negative self-image.

Hypothesis No. 2(3)

Hypothesis No. 2(3) was stated as:

There is no significant relationship between productivity and communality among real estate sales workers.

The correlation between productivity and communality was -0.225. The resultant t-value was -2.363, indicating a significant correlation at the 0.05 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(3) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(3) can be stated as being true:

There is significant relationship between productivity and communality among real estate sales workers.

The negative correlation indicates that the real estate workers scoring lower on the trait communality were also more productive.

Hypothesis No. 2(4)

Hypothesis No. 2(4) was stated as:

> There is no significant relationship between productivity and achievement among real estate sales workers.

The correlation between productivity and achievement was 0.179. The resultant t-value was 1.869, indicating a significant correlation at the 0.05 level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(4) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(4) can be stated as being true:

> There is a significant relationship between productivity and achievement among real estate sales workers.

The positive nature of the correlation indicates that the more productive sales workers were those who scored higher on the achievement trait.

Hypothesis No. 2(5)

Hypothesis No. 2(5) was stated as:

> There is no significant relationship between productivity and dominance among real estate sales workers.

The correlation between productivity and dominance was 0.238. The resultant t-value was 2.512, indicating a significant degree of correlation at both the 0.05 and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(5) as stated in the null form can be rejected at both the 0.05 and

0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(5) can be stated as being true:

> There is a significant relationship between productivity and dominance among real estate sales workers.

The positive nature of the correlation indicates that the more productive sales workers were those who scored higher on the dominance trait.

Hypothesis No. 2(6)

Hypothesis No. 2(6) was stated as:

> There is no significant relationship between productivity and endurance among real estate sales workers.

The correlation between productivity and endurance was 0.054. The resultant t-value was 0.553, indicating a very low degree of correlation. The required values for significance were 2.364 and 1.660 at the 0.01 and 0.05 levels of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(6) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(7)

Hypothesis No. 2(7) was stated as:

> There is no significant relationship between productivity and the trait order among real estate sales workers.

The correlation between productivity and the trait order was -0.143. The resultant t-value was -1.477, indicating a low degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(7) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(8)

Hypothesis No. 2(8) was stated as:

> There is no significant relationship between productivity and the trait intraception among real estate sales workers.

The correlation between productivity and the trait intraception was -0.207. The resultant t-value was -2.170, indicating a significant degree of correlation at the 0.05 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(8) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(8) can be stated as being true:

> There is a significant relationship between productivity and the trait intraception among real estate sales personnel.

As the correlation is negative, it can be concluded that the more productive real estate sales workers score lower on the intraception trait.

Hypothesis No. 2(9)

Hypothesis No. 2(9) was stated as:

> There is no significant relationship between productivity and the trait affiliation among real estate sales workers.

The correlation between productivity and the trait affiliation was -0.195. The resultant t-value was -2.040, indicating a significant

degree of correlation at the 0.05 level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-tests of significance, Hypothesis No. 2(9) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(9) can be stated as being true:

> There is a significant relationship between productivity and the trait affiliation among real estate sales workers.

The negative correlation indicates that the more productive real estate sales workers scored lower on the affiliation trait.

Hypothesis No. 2(10)

Hypothesis No. 2(10) was stated as:

> There is no significant relationship between productivity and the trait heterosexuality among real estate sales workers.

The correlation between productivity and the trait heterosexuality was -0.143. The resultant t-value was -1.478, indicating no significant correlation at either the 0.01 or 0.05 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(10) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(11)

Hypothesis No. 2(11) was stated as:

> There is no significant relationship between productivity and the trait exhibition among real estate sales workers.

The correlation between productivity and the trait Exhibition was 0.327. The resultant t-value was 3.540, indicating a significant degree of correlation at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(11) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(11) can be stated as being true:

> There is a significant relationship between productivity and the trait Exhibition among real estate sales workers.

As the correlation is positive, real estate sales workers who score higher on the trait Exhibition tend to be more productive.

Hypothesis No. 2(12)

Hypothesis No. 2(12) can be stated as:

> There is no significant relationship between productivity and the trait Autonomy among real estate sales workers.

The correlation between productivity and the trait Autonomy was 0.328. The resultant t-value was 3.557, indicating a significant degree of correlation at both the 0.05 level and 0.01 level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(12) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(12) can be stated as being true:

> There is a significant relationship between productivity and the trait Autonomy among real estate sales workers.

As the correlation is positive, it can be concluded that the more productive sales workers tended to score higher on the trait Autonomy.

Hypothesis No. 2(13)

Hypothesis No. 2(13) was stated as:

> There is no significant relationship between productivity and the trait Aggression among real estate sales workers.

The correlation between productivity and the trait Aggression was 0.282. The resultant t-value was 3.010, indicating a significant degree of correlation at both the 0.05 level and 0.01 level. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(13) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(13) can be stated as being true:

> There is a significant relationship between productivity and the trait Aggression among real estate sales workers.

The positive correlation indicates that the more productive real estate sales workers tend to score higher on the trait Aggression.

Hypothesis No. 2(14)

Hypothesis No. 2(14) was stated as:

> There is no significant relationship between productivity and the trait Change among real estate sales workers.

The correlation between productivity and the trait Change was -0.050. The resultant t-value was -0.512, indicating a very low degree of correlation. The required values for significance ere 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(14) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(15)

Hypothesis No. 2(15) was stated as:

There is no significant relationship between productivity and the trait Succorance among real estate sales workers.

The correlation between productivity and the trait Succorance was -0.007. The resultant t-value was -0.071, indicating a very low degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(15) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(16)

Hypothesis No. 2(16) was stated as:

There is no significant relationship between productivity and the trait Abasement among real estate sales workers.

The correlation between productivity and the trait Abasement was -0.318. The resultant t-value was -3.437, indicating a high degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(16) as stated in the Null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(16) can be stated as being true:

There is a significant relationship between productivity and the trait Abasement among real estate sales workers.

The negative correlation of this test indicates that the more highly productive real estate sales workers tend to score lower on the trait Abasement.

Hypothesis No. 2(17)

Hypothesis No. 2(17) was stated as:

There is no significant relationship between productivity and the trait Deference among real estate sales workers.

The correlation between productivity and the trait Deference was -0.302. The resultant t-value was -3.437, indicating a high degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(17) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(17) can be stated as being true:

There is a significant relationship between productivity and the trait Deference among real estate sales workers.

The negative correlation of Deference indicates that the more productive real estate sales workers scored lower on this trait.

Hypothesis No. 2(18)

Hypothesis No. 2(18) was stated as:

There is no significant relationship between productivity and the trait Nurturance among real estate sales workers.

The correlation between productivity and the trait Nurturance was -0.402. The resultant t-value was -4.505, indicating a high degree of correlation. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level.

Based on the results of the t-test of significance, Hypothesis No. 2(18) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(18) can be stated as being true:

> There is a significant relationship between productivity and the trait Nurturance among real estate sales workers.

The negative correlation on Nurturance indicates that the more productive real estate sales workers scored lower on this trait.

Hypothesis No. 2(19)

Hypothesis No. 2(19) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time spent in the office.

The correlation between productivity and the stated preference for time spent in the office was -0.052. The resultant t-value was -0.529, indicating a very low level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(19) as stated in the null form cannot be rejected at either the 0.01 level or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(20)

Hypothesis No. 2(20) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time devoted to sales.

The correlation between productivity and workers stated preference for time devoted to sales was -0.084. The resultant t-value was -0.866,

indicating a low level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(20) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(21)

Hypothesis No. 2(21) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time spent developing listings.

The correlation between productivity and workers stated preference for time spent developing listings was 0.146. The resultant t-value was 1.512, indicating a low level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance. While the correlation was not significant at the 0.05 level, it should be noted that it is significant at the 0.08 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(21) as stated in the null form cannot be rejected at either the 0.01 or the 0.05 level of significance. Therefore, it is accepted as being true.

Hypothesis No. 2(21)

Hypothesis No. 2(22) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time spent at work.

The correlation between productivity and workers stated preference for time spent at work was 0.414. The resultant t-value was 4.662, indicating a high level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(22) as stated in the null form can be rejected at both the 0.05 level and 0.01 level of significance. Rewritten in the Alternate Hypothesis form, Hypothesis No. 2(22) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and their preference for time spent at work.

As might be expected, this is a positive relationship. Those salespersons who expressed a desire to spend time at work as opposed to more time with family or avocational pursuits are significantly more productive.

Hypothesis No. 2(23)

Hypothesis No. 2(23) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time spent with their family.

The correlation between productivity and the workers stated preference for time spent with their families was -0.348. The resultant t-value was -3.808, indicating a high level of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-tests of significance, Hypothesis No. 2(23) as stated in the null form can be rejected at both the 0.01 level

and 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(23) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and their preference for time spent with their families.

As the direction of the correlation is negative, it is noted that preference for more time with family has a negative impact on the productivity of real estate sales workers. These results are to be expected given the results of Hypothesis No. 2(22).

Hypothesis No. 2(24)

Hypothesis No. 2(24) was stated as:

> There is no significant relationship between the productivity of real estate sales workers and their preference for time spent with their hobbies.

The correlation between productivity and workers stated preference for time spent in pursuit of hobbies was -0.207. The resultant t-value was -2.166, indicating a moderate degree of significance. The required values for significance were 2.364 at the 0.01 level and 1.660 at the 0.05 level of significance.

Based on the results of the t-test of significance, Hypothesis No. 2(24) as stated in the null form can be rejected at the 0.05 level of significance. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2(24) can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and their preference for time spent pursuing hobbies.

As the direction of the correlation is negative, it is noted that the preference for more time with hobbies has a negative impact on the productivity of real estate sales workers. Again, these are the

results one would expect given the results of Hypothesis No. 2(22). Furthermore, the findings are consistent with the negative correlation found between the number of hobbies pursued and productivity.

Hypothesis No. 2

Hypothesis No. 2 was stated as:

> There is no significant relationship between the productivity of real estate sales workers and selected personality traits.

From the analysis of the relationship between the 24 personality traits and productivity ten (10) of the supporting hypotheses were rejected at the 0.01 level of significance and an additional five (5) were rejected at the 0.05 level of significance.

Based on the results of the tests of significance for the supporting hypotheses, Hypothesis No. 2 as stated in the null form can be rejected. Rewritten in the Alternative Hypothesis form, Hypothesis No. 2 can be stated as being true:

> There is a significant relationship between the productivity of real estate sales workers and selected personality traits.

Based on the results of this study, it can be concluded that productivity in real estate sales is positively related to the number of unfavorable adjectives an individual checks in a self-description, Achievement drive, Dominance, Exhibition, Autonomy, Aggression, and preference for time spent at work. Productivity was found to be negatively related to Communality, Intraception, Affiliation, Abasement, Deference, Nurturance, preference for time spent with family and preference for time spent with hobbies.

Research Objective II

Research Objective II involved determining if various of the background data and personality traits could be used to develop a model to predict high and low performance real estate sales workers. The statistical analyses related to Research Objective II involved three main stages: Ordinary-Least-Squares (OLS) regression using productivity as the dependent variable; Linear Probability Analysis (LPA) runs on the equations suggested from the OLS regressions and Principal Components Analysis (PCA) of the data. In addition, the equations generated from these analyses were subjected to a validity test via a hold-out sample of 49 observations.

Ordinary Least Squares Analysis

The survey data collected in this study consisted of one dependent variable (productivity) and forty-two independent variables (various background data and personality traits). The correlations calculated for Research Objective I allowed the 42 independent variables to be ranked according to the strength of their correlation with productivity. This ranking served as a beginning point for the OLS analysis and as a method for reducing the data to manageable proportions by eliminating the weakest variables.

The main objective of the OLS analysis was to suggest equations for the LPA. In addition, the "best" OLS equation was to be used for comparison with the "best" LPA equation.

There were a total of 14 computer runs to test various combinations of variables in an effort to generate the "best" OLS equation.

Each run tests several equations. Table 7 gives a summary of the variables, coefficients, t-statistics, standard error of regression, and R^2 values for the "best" combination in each computer run. Runs 7-10 were "theme" runs. The runs were attempts to identify and compare factors such as timidness versus aggressiveness, achievement and education, and professional credentials and performance. The results are omitted as nothing of significance was discovered.

A review of the OLS analysis indicated that run 12 identified the "best" combination of variables to predict productivity. These variables were: number of unfavorable adjectives (X1); Preference for time spent at work (X2); Real Estate Experience (X3); Achievement drive (X18); Parents (not) in Real Estate (X22); Income Source-Primary (X14); Formal Education (X19); Number of firms employed by during the last 10 years (X16); and Exhibition (X7).

A copy of the computer print-out for the best equation from run 12 is included in Appendix C as a representative example of the OLS output from the TSP program. In addition, the coefficients of each of the important variables are given in the print-out.

Linear Probability Analysis

The Linear Probability Analysis was carried out via 11 computer runs (runs 15-25) on the various combinations of variables suggested by the OLS analysis. In addition to generating a regression equation for each function, the TSP program was modified to calculate the percentage of correct classifications that would be attained by the equation against the sample. A copy of the program modification is located in Appendix C.

TABLE 7

ORDINARY LEAST SQUARES RUNS SUMMARY

Computer Run	Variables					Standard Error of Regression	R^2
Run 1	X1	X2	X3	X4	X6		
Coefficient	4.81867	1.63436	6.97763	-.81446	-.398430		
(t-statistic)	(3.599)	(3.153)	(3.619)	(-.530)	(-.305)		
	X7	X10	X12	X14	X16		
	2.11959	-.306335	.469477	30.1406	-6.43223		
	(1.566)	(-.205)	(.351)	(1.603)	(-.882)		
	X18	X19					
	2.50058	7.71273					
	(2.308)	(1.556)				83.3819	.4865
Run 2	X1	X2	X3	X18			
Coefficient	5.22945	2.18045	7.93090	3.15573			
(t-statistic)	(5.273)	(4.625)	(4.225)	(3.184)		84.5742	.4717
Run 3	X1	X2	X3	X11			
Coefficient	4.59567	2.25690	8.19895	2.20859			
(t-statistic)	(4.642)	(4.652)	(4.227)	(1.945)		87.1005	.4397

ORDINARY LEAST SQUARES RUNS SUMMARY
continued

Computer Runs	Variables					Standard Error of Regression	R^2
Run 4	X1	X2	X3	X35			
Coefficient	4.99726	2.20137	8.56260	2.19053			
(t-statistic)	(4.840)	(4.535)	(4.471)	(1.959)		87.0781	.4400
Run 5	X1	X2	X3	X18	X22		
Coefficient	5.05901	2.17576	7.64164	3.32413	-48.0632		
(t-statistic)	(5.155)	(4.682)	(4.117)	(3.389)	(-1.981)	83.3755	.4866
Run 6	X1	X2	X3	X7	X14		
Coefficient	4.89702	1.61835	6.72901	1.40996	36.4743		
(t-statistic)	5.024)	(3.331)	(3.681)	1.370)	(2.019)		
	X18	X19	X22				
Coefficient	2.88520	9.27851	-55.1316				
(t-statistic)	(2.988)	(1.965)	(-2.276)			80.1434	.5256
Run 11	X1	X2	X3	X14	X16		
Coefficient	5.04975	1.61835	6.67261	37.8115	-11.5071		
(t-statistic)	5.323)	(3.360)	(3.673)	(2.105)	(-1.718)		
	X18	X19	X22				
Coefficient	3.01533	9.01700	-69.2210				
(t-statistic)	(3.190)	(1.919)	(-2.882)			79.110	.5307

ORDINARY LEAST SQUARES RUNS SUMMARY
continued

Computer Runs	Variables					Standard Error of Regression	R^2
Run 12	X1	X2	X3	X7	X14		
Coefficient	4.81262	1.59775	6.43381	1.18759	37.1284		
(t-statistic)	(4.965)	(3.525)	(3.525)	(1.151)	(2.069)		
	X16	X18	X19	X22			
Coefficient	-10.4225	2.8113	9.0668	-62.9685			
(t-statistic)	(-1.544)	(2.928)	(1.933)	(-2.561)		79.5780	.5373
Run 13	X1	X2	X3	X14	X16		
Coefficient	5.17506	1.60443	6.47273	45.9165	-12.9656		
(t-statistic)	(5.421)	(3.333)	(3.549)	(2.366)	(-1.901)		
	X18	X19	X22	X30			
Coefficient	3.06131	9.53124	-68.8927	-20.8757			
	(3.239)	(2.020)	(-2.871)	(-1.096)		79.6289	.5317
Run 14	X1	X2	X3	X18	X22		
Coefficient	4.95601	1.59082	6.32344	2.88635	-63.9112		
(t-statistic)	(5.025)	(3.300)	(3.449)	(2.988)	(-2.593)		
	X14	X19	X16	X7	X30		
Coefficient	43.5920	9.45904	-11.7701	.959819	-16.3107		
(t-statistic)	(2.224)	(2.003)	(-1.692)	(.897)	(-.826)	79.7098	.5308

Source: Computer Runs 1-14.

Results are given for the percentage correctly classified in the high-performance group, low-performance group, and for the entire sample.

Information on the variables, coefficients, t-statistics, standard error of regression, and prediction accuracy for each of the 11 LPA runs is summarized in Table 8.

A review of the Linear Probability Analysis indicates that run 23 identified the "best" combination of variables to predict high-performance/low-performance group membership. The variables included in the equation for run 23 were: Number of unfavorable adjectives checked (X1); Preference for time spent at work (X2); Real Estate experience (X3); Achievement drive (X18); Parents (not) in Real Estate (X22); Formal education (X19); and Exhibition (X7). It is notable that each of these variables were also in the "best" OLS equation. Two of the OLS variables, however, were deleted in the "best" LPA equation: Income Source (X14) and Number of Employers during last 10 years (X16).

The equation generated in run 23 correctly identified 75.5 percent of the top half of real estate sales performers and 88.7 percent of the bottom half. For the entire sample, 82.1 percent were correctly classified by the variables in the equation.

A copy of the computer print-out for the best equation from run 23 is included in Appendix C as a representative example of the LPA output from the TSP program.

Validity Runs

At this point, 7 computer runs were generated (runs 26-32) using equations suggested via the OLS and LPA runs. These runs were carried out on a hold-out or validity sample of 49 observations. The sample

TABLE 8

LINEAR PROBABILITY ANALYSIS RUNS

Computer Run	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 15	X1	X2	X3	X18				
Coefficient	.00795566	.00342176	.0297618	.0170707				
(t-statistic)	(3.819)	(2.161)	(6.124)	(5.772)	.953592	71.7%	73.6%	72.6%
Run 16	X1	X2	X3	X18				
Coefficient	.00804656	.00265549	.0273936	.0179634				
(t-statistic)	(3.757)	(1.770)	(5.317)	(6.158)				
	X22							
Coefficient	-.254025							
(t-statistic)	(-2.826)				.945912	73.6%	79.2%	76.4%
Run 17	X1	X2	X3	X18				
Coefficient	.00768537	.00223923	.0289994	.0173293				
(t-statistic)	(3.673)	(1.189)	(5.922)	(5.853)				
	X14							
Coefficient	.080360							
(t-statistic)	(1.156)				.952019	64.2%	71.7%	67.9%

LINEAR PROBABILITY ANALYSIS RUNS
continued

Computer Runs	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 18	X1	X2	X3	X19				
Coefficient	.0107847	.00284717	.0292017	.0575346				
(t-statistic)	(4.563)	(1.787)	(6.187)	(3.000)	.937543	60.4%	75.5%	67.9%
Run 19	X1	X2	X3	X18				
Coefficient	.0101296	.0015585	.0308628	.0163524				
(t-statistic)	(4.290)	(1.116)	(7.627)	(5.651)				
	X22	X19						
Coefficient	-.243666	.0655036						
(t-statistic)	(-2.970)	(3.691)			.939299	77.4%	73.6%	75.5%
Run 20	X1	X3	X18	X22				
Coefficient	.0112284	.0287826	.0182640	-.249472				
(t-statistic)	(5.029)	(6.325)	(7.535)	(-3.119)				
	X19							
Coefficient	.0568938							
(t-statistic)	(3.518)				.953563	69.8%	71.7%	70.8%

LINEAR PROBABILITY ANALYSIS RUNS
continued

Computer Runs	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 21	X1	X2	X3	X18				
Coefficient	.00951041	.00238940	.0279953	.0167598				
(t-statistic)	(3.165)	(1.473)	(5.778)	(5.774)				
	X22	X19	X14	X16				
Coefficient	-.167237	.0645529	.00321885	.00881376				
(t-statistic)	(-2.022)	(3.669)	(.458)	(2.124)				
	X7	X30						
Coefficient	.00881376	.0909697						
(t-statistic)	(2.124)	(1.204)			.968917	69.8%	84.9%	77.4%
Run 22	X1	X2	X3	X18				
Coefficient	.00898913	.00249916	.0270735	.0162396				
(t-statistic)	(3.086)	(1.766)	(6.503)	(6.444)				
	X22	X19	X7	X30				
Coefficient	-.178842	.0611054	.00917417	.0780019				
(t-statistic)	(-2.238)	(3.574)	(2.354)	(-1.170)	.950896	73.6%	83.0%	78.3%

LINEAR PROBABILITY ANALYSIS RUNS
continued

Computer Runs	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 23	X1	X2	X3	X18				
Coefficient	.00776289	.0022792	.0282073	.0158202				
(t-statistic)	(2.971)	(1.596)	(6.543)	(5.779)				
	X22	X19	X7					
Coefficient	-.163994	.0573113	.0107155					
(t-statistic)	(-2.276)	(3.273)	(2.821)		.950851	75.5%	88.7%	82.1%
Run 24	X1	X3	X18	X22				
Coefficient	.0116911	.0287142	.0158196	-.181423				
(t-statistic)	(3.859)	(6.075)	(5.371)	(-.181423)				
	X19	X7	X30					
Coefficient	.0623906	.00656055	.0708775					
(t-statistic)	(3.749)	(1.539)	(-1.052)		1.04790	71.1%	88.7%	80.2%
Run 25	X1	X3	X18	X22				
Coefficient	.0097036	.0286072	.0153541	-.185766				
(t-statistic)	(e.760)	(5.986)	(5.294)	(-2.199)				
	X19	X7						
Coefficient	.0581425	.00819346						
(t-statistic)	(3.203)	(2.044)			.998849	69.8%	88.7%	79.2%

Source: Computer Runs 15-25

initially consisted of 50 observations but one fell exactly at the mid-point between the high and low performance groups in the primary sample and was therefore deleted as it could not be classified.

Run 26 and 27 calculated the t-statistic for each of the variables that were determined to have predictive power in predicting sales levels via the OLS analysis. Table 9 compares the t-statistic for each variable from the primary sample with the t-statistic derived from the hold-out sample.

TABLE 9

VALIDITY RUNS 26 & 27

Variable	Name	Primary Sample t-statistic	Hold-out Sample t-statistic
X1	Unfavorable Adj.	5.025	2.291
X2	Pref. for Work	3.300	0.559
X3	Real Estate Exp.	3.449	1.335
X18	Achievement Drive	2.988	2.541
X22	Parents in R.E.	-2.593	-0.733
X14	Income Source	2.224	-0.144
X19	Formal Education	2.003	0.400
X16	Number of Employers	-1.692	0.770
X7	Exhibition	0.897	1.027
X30	Sex	-0.826	0.957

A review of the results of this test shows that the initial sales forecasting model (from the OLS analysis) did not fare as well in the validity sample. While the core variables X1, X3, and X18 retained a degree of strength, all but two lost power to some extent. In addition, several of the weaker variables (X14, X16, and X30) actually had their signs reversed.

Runs 28-32, summarizing the results of the LPA validity runs on the hold-out sample, are given in Table 10.

An analysis of the results of runs 28-32 show that runs 28 and 31 generate the overall superior equations. Run 28 is best at predicting low-performance group members while run 31 is best at identifying the high-performance group members.

Two results of the validity runs are noteworthy: (1) while the predictive accuracy of the equations fall they are still more accurate than chance (overall accuracy of 69% as compared to chance prediction accuracy of 50%); and (2) the "best" LPA equation help up as one of the "best" validity equations (equation run 28).

A review of the "best" LPA equation (run 23) shows that for the primary sample, 75.5 percent of the high-group performers and 88.7 percent of the low-group performers were correctly classified. Overall accuracy of prediction was 82.1 percent. For the validation sample, the equation (run 28) correctly classified 54.2 percent of high-group performers and 84.0 percent of low-group performers. Overall accuracy for the equation was 69.1 percent.

These results imply that while the LPA is useful in predicting performance, it maintains integrity best at predicting low-group performance. Prediction of high-group performance in the validation sample was only slightly better than chance.

Comprehensive Sample Runs

Following the runs on the hold-out sample, a decision was made to run six (runs 33-38) comprehensive runs (combining the primary and hold-out observations). Five of these were LPA runs and the sixth was a

TABLE 10

LINEAR PROBABILITY ANALYSIS VALIDITY RUNS

Computer Run	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 28	X1	X2	X3	X18				
Coefficient	.0194776	.00265170	.0264961	.00962848				
(t-statistic)	(2.220)	(.793)	(3.022)	(1.522)				
	X22	X19	X7					
Coefficient	-.083331	.018715	.00949037					
(t-statistic)	(-.598)	(1.853)	(1.345)		1.000	54.2%	84.0%	69.1%
Run 29	X1	X2	X3	X18				
Coefficient	.0187658	.0027406	.0221275	.00931447				
(t-statistic)	(2.165)	(.825)	(2.182)	(1.488)				
	X22	X19	X7	X30				
Coefficient	-.0965696	.0179572	.012439	.122154				
(t-statistic)	(-.712)	(1.732)	(1.625)	(.828)	1.001	58.3%	76.0%	67.2%
Run 30	X1	X3	X18	X22				
Coefficient	.0193412	.0272023	.0117378	.0427902				
(t-statistic)	(2.126(	(4.327)	(1.455)	(.330)				
	X19	X7						
Coefficient	.0208648	.0163254						
(t-statistic)	(2.368)	(2.516)			1.000	62.5%	72.0%	67.25%

LINEAR PROBABILITY ANALYSIS VALIDITY RUNS
continued

Computer Runs	Variables				Standard Error or Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 31	X1	X3	X18	X19				
Coefficient	.0162065	.0272023	.00906598	.0191349				
(t-statistic)	(2.011)	(3.128)	(1.665)	(2.198)				
	X7	X30						
Coefficient	.0191349	.0959272						
(t-statistic)	(1.702)	(.654)			.987311	62.5%	76.0%	69.25%
Run 32	X1	X3	X18	X19				
Coefficient	.0168019	.0304092	.00966155	.0196497				
(t-statistic)	2.099)	(4.403)	(1.794)	(2.366)				
	X7							
Coefficient	.0105258							
(t-statistic)	(1.536)				.978158	58.3%	76.0%	67.2%

Source: Computer Runs 28-32

comprehensive run on the "best" sales forecasting equation. A summary of the Comprehensive LPA runs is given in Table 11.

A review of Table 11 shows that runs 33 and 35 are the "superior" equations. Run 33 predicts low-group membership best while run 35 is best at predicting high-group membership. Both equations correctly predicted 75.4% of the comprehensive sample. Noticeably, the "best" LPA equation retained its position in both the hold-out sample and the comprehensive sample runs.

One comprehensive run (38) was made on the "best" sales forecasting (OLS) equation. All of the "core" variables (X1, X2, X3, X18, X22, X19, and X7) held up well in this run. The signs all remained as predicted. Variable X7 gained a substantial degree of significance.

Summary of Linear Probability Analysis

Linear Probability runs were carried out on each of the equations suggested by the OLS analysis. In the OLS analysis, the strongest sales forecasting equation consisted of ten variables: X1 (number of unfavorable adjectives), X2 (preference for work), X3 (real estate experience), X18 (Achievement drive), X22 (parents in real estate), X14 (income source), X19 (formal education), X16 (number of firms worked for during the last 10 years), X7 (Exhibition), and X30 (sex). This equation, however, did not retain its position in the Linear Probability Analysis.

Computer run 23 identified the "best" combination of variables for predicting high-performance group membership and low-performance group membership in real estate sales. This run identified seven variables: X1 (number of unfavorable adjectives), X2 (preference for

TABLE 11

LINEAR PROBABILITY RUNS-COMPREHENSIVE SAMPLE

Computer Runs	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 33	X1	X2	X3	X18				
Coefficient	.0100331	.00095644	.0323725	.0115835				
(t-statistic)	(3.928)	(.770)	(7.173)	(4.204)				
	X22	X19	X7					
Coefficient	-.0809263	.0221816	.00826755					
(t-statistic)	(-1.058)	(4.486)	(2.373)		1.063	61.0%	89.7%	75.4%
Run 34	X1	X2	X3	X18				
Coefficient	.0116546	-.00062307	.0347742	.00906917				
(t-statistic)	(3.972)	(-.470)	(7.467)	(3.108)				
	X22	X19	X7	X30				
Coefficient	-.0263123	.0230626	.00795026	.0344099				
(t-statistic)	(-.325)	(4.434)	(1.964)	(.511)	1.12137	45.5%	92.3%	68.8%

LINEAR PROBABILITY RUNS-COMPREHENSIVE SAMPLE
continued

Computer Runs	Variables				Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 35	X1	X3	X18	X22				
Coefficient	.00859268	.0308271	.0127909	-.0564829				
(t-statistic)	(3.745)	(8.617)	(4.855)	(-.907)				
	X19	X7						
Coefficient	.0209998	.0106413						
(t-statistic)	(4.661)	(3.232)			.97190	63.6%	87.2%	75.4%
Run 36	X1	X3	X18	X19				
Coefficient	.00895784	.0308794	.0117435	.0204253				
(t-statistic)	(3.401)	(8.083)	(4.750)	(4.576)				
	X7	X30						
Coefficient	.0117361	.0173777						
(t-statistic)	(3.497)	(-.280)			.965953	62.3%	83.3%	72.8%
Run 37	X1	X3	X18	X19				
Coefficient	.00872670	.0304122	.0119840	.0206806				
(t-statistic)	(3.799)	(7.894)	(4.832)	(4.623)				
	X7							
Coefficient	.0112882							
(t-statistic)	(3.604)				.962144	62.3%	83.3%	72.8%

Source: Computer Runs 33-37

time at work), X3 (parents in real estate), X19 (formal education), X18 (Achievement drive), X22 (parents in real estate), and X7 (Exhibition).

When the "best" OLS equation was subjected to LPA, 69.8115% of the top producers were correctly predicted. This compares with a prediction accuracy of 75.4717% for the "best" LPA run (run 23). The "best" OLS equation correctly predicted 84.9057% of the low-performance group. This compares with a prediction accuracy of 88.6792% for the "best" LPA equation. The overall accuracy for the "best" OLS equation was 77.3585%. This compares with an overall prediction accuracy of 82.0755% for the "best" LPA equation. As can be seen by this comparison, the function derived from the LPA seems superior to that generated by OLS analysis.

As a further test, the various equations generated in LPA runs were tested via a hold-out sample of 49 observations. Of the various tests, run 28 proved to be the most reliable combination for predictive accuracy. This particular run consisted of the variables that had previously been identified as providing the "best" LPA equation. These variables again were: X1 (number of unfavorable adjectives), X2 (preference for work), X3 (real estate experience), X18 (Achievement drive), X22 (parents in real estate), X19 (formal education), and X7 (Exhibition).

As a final test, the primary sample and hold-out sample were combined into a comprehensive sample. Five of the more accurate equations (based on the primary and validity runs) were tested on the comprehensive observations. Once again, the most accurate equation proved to be that combination of variables previously identified as the "best" LPA equation. This particular equation (from run 33) correctly identified 61.039% of

the high-group performers, 89.7436% of the low-group performers, and 75.3913% of the overall comprehensive sample.

The number of correct and incorrect predictions for the "best" LPA equation derived from the primary sample were subjected to the Chi-Square test of significance.

The X^2 value calculated for the equation's prediction to top-group membership was 6.30. The critical value was 6.63 at the 0.01 level of significance and 3.84 at the 0.05 level of significance.

The X^2 value calculated for the equation's prediction of bottom-group membership was 16.87. The critical value was 6.63 at the 0.01 level of significance and 3.84 at the 0.05 level of significance. The Chi-Square calculations and tables for this test are located in Appendix C.

Hypothesis No. 3

Hypothesis No. 3 was stated as:

> The probability that a person will be in the high-productivity group or low-productivity group in real estate sales will not be affected by any combination of the background characteristics or personality traits of the individual.

Based on the results of the Chi-Square test of significance, Hypothesis No. 3 can be rejected at the 0.05 and 0.01 level of significance for the low-productivity group and at the 0.05 level of significance for the high-productivity group. Hypothesis No. 3 as stated in the null form can be rejected. Rewritten in the Alternative Hypothesis form, Hypothesis No. 3 can be accepted as being true:

> The probability that a person will be in the high-productivity group or low-productivity group in real estate sales will be affected by some combination of the background characteristics and personality traits of the individual.

From the OLS and LPA runs, the variables identified as most significant in combination were: X1 (number of unfavorable adjectives), X2 (preference for time at work), X3 (real estate experience), X18 (achievement drive), X22 (parents in real estate), X19 (formal education), and X7 (exhibition). The coefficients for the equation are located in the copy of the computer run print-out for run 23 in Appendix C.

This "best" equation correctly predicted 75.4717% of the top real estate sales workers and 88.6792% of the bottom half of real estate sales workers. The overall accuracy was 82.0755% for the primary sample. As has been noted, the equation excells at identifying potentially poor performers and is less accurate as predicting potentially strong performers. This same trend was obtained for both the validity sample and comprehensive sample.

Principal Components Analysis

The Time Series Processor (TSP) program, revision 3.4, was also used for the PCA. From the previous analyses, twenty-one variables were identified as potentially significant. The 106 observations in the primary sample were chosen to create the principal components. The TSP program extracts a maximum of 9 components, therefore this number was chosen for the initial compression.

Computer run 39 was simply to construct the 9 principal components from the 21 variables (X1-X20 & X22) chosen for the analysis. Runs 40-43 were regressions of various of the components on the dependent variable. The relevant information from these runs is summarized in Table 12.

TABLE 12

PRINCIPAL COMPONENTS ANALYSIS

Computer Run	Principal Components			Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 40	P1	P2	P3				
Coefficient	.00489851	-.00304653	-.00756131				
(t-statistic)	(9.203)	(-2.452)	(-4.509)				
	P4	P5	P6				
Coefficient	-.0037580	-.00627614	.0244546				
(t-statistic)	(-1.659)	(-1.584)	(5.190)				
	P7	P8	P9				
Coefficient	-.0118717	-.0120549	-.00844868				
(t-statistic)	(-2.414)	(-1.909)	(-4.781)	.996492	71.7%	77.4%	74.6%
Run 41	P1	P2	P3				
Coefficient	.00486083	-.00337492	-.00721213				
(t-statistic)	(9.890)	(-2.958)	(-4.833)				
	P5	P6	P7				
Coefficient	-.00534205	.02400600	-.0120107				
(t-statistic)	(-1.972)	(5.568)	(-2.716)				
	P8	P9					
Coefficient	-.0109294	-.0111285					
(t-statistic)	(-1.825)	(-2.597)		.964840	69.8%	81.1%	75.5%

PRINCIPAL COMPONENTS ANALYSIS
continued

Computer Run	Principal Components			Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 42	P1	P2	P3				
Coefficient	.00469760	-.00342155	-.00436870				
(t-statistic)	(9.167)	(-2.825)	(-3.416)				
	P5	P6	P7				
Coefficient	-.00968504	.0244136	-.00677823				
(t-statistic)	(-4.831)	(5.122)	(-1.546)				
	P8						
Coefficient	-.0112865						
(t-statistic)	(-1.792)			.973088	71.7%	71.7%	71.7%
Run 43	P1	P2	P3				
Coefficient	.00408710	-.00327096	.00106049				
(t-statistic)	(5.405)	(-2.445)	(-.586)				
	P6	P7	P8				
Coefficient	.0141795	.00598659	.00980393				
(t-statistic)	(2.025)	(1.441)	(-1.065)	1.015640	66.0%	64.2%	65.1%

Source: Computer runs 40-43

As can be noted in Table 12, the predictive performance seems to decline with fewer and fewer principal components. Runs 40 and 41, with 9 and 8 components, respectively, seem to be the best equations.

A copy of the computer print-out for run 40, including the program, factor loadings, and output is located in Appendix C.

The final two computer runs (44 & 45) were to check the predictive accuracy of the "best" equations generated from the PCA against the hold-out sample of 49 observations. All 9 principal components were included in run 44 whereas the top 8 were included in run 45. Results of these two runs are summarized in Table 13.

As was the case with the LPA, the predictive performance falls somewhat in the validity sample.

Hypothesis No. 4

Hypothesis No. 4 was stated as:

> Compression of selected background and personality variables via principal component analysis will not reduce the predictive ability of the linear probability model developed in this study.

The "best" equation generated in the LPA was from computer run 23. This equation correctly classified 75.4717% of the top real estate sales producers and 88.6792% of the bottom half of producers. The overall accuracy of the LPA equation was 82.0755%.

The "best" equation generated in the PCA was from computer run 41. This equation correctly classified 69.8113% of the top producers and 81.1321% of the bottom producers in real estate sales. The overall accuracy of this equation was 75.4717%. It is noted that the "best" equation from the LPA function is slightly more accurate than the "best" PCA equation. This is particularly true with regard to the identification of performers who fall in the lower half of the productivity scale. Given

TABLE 13

PRINCIPAL COMPONENTS ANALYSIS VALIDITY RUNS

Computer Run	Principal Components			Standard Error of Regression	Predictive Accuracy Hi-Group/Lo-Group/Average		
Run 44	P1	P2	P3				
Coefficient	.0037704	-.00412713	.00175611				
(t-statistic)	(2.433)	(-1.804)	(.436)				
	P4	P5	P6				
Coefficient	.00984414	.00859694	.0162296				
(t-statistic)	(.904)	(-1.172)	(1.477)				
	P7	P8	P9				
Coefficient	.00231303	-.00220082	.00703538				
(t-statistic)	(.241)	(-.165)	(.425)	.992371	66.7%	64.0%	65.3%
Run 45	P1	P2	P3				
Coefficient	.00448398	-.00415352	.000818996				
(t-statistic)	3.162)	(-1.907)	(.237)				
	P5	P6	P7				
Coefficient	-.0137883	.0204672	.00401412				
(t-statistic)	(-2.872)	(1.981)	(.436)				
	P8	P9					
Coefficient	-.00961832	.0166469					
(t-statistic)	(-.884)	(1.424)		.993907	62.5%	68.0%	65.25%

Source: Computer Runs 44 & 45

the degree of reduction in accuracy of prediction of "poorer" performers, Hypothesis No. 4, as stated in the null form can be rejected. Rewritten in the Alternative Hypothesis form, Hypothesis No. 4 can be accepted as true:

> Compression of selected background and personality variables via principal components analysis will reduce the predictive accuracy of the Linear Probability model developed in this study.

Based on this analysis, one was not able to identify latent variables that would be helpful or descriptive in discriminating between high-group performers and low-group performers. In addition, the number of components in the "best" PCA equation (8) exceeds the number of variables in the "best" LPA equation (7) further substantiating the PCA's lack of usefulness.

Summary

Chapter IV has presented the results of the study. Demographic data and personality trait scores were presented for the 106 respondents in the primary sample. The statistical analyses relevant to the two research objectives were also summarized in this chapter.

The statistical testing of the hypotheses relating to Research Objective I are summarized in Tables 4 and 6. Hypothesis No. 1 was rejected at both the 0.05 and 0.01 levels of significance. Hypothesis No. 2 was also rejected at the 0.05 and 0.01 levels of significance. Restated in the Alternative form, both hypotheses were accepted.

The statistical testing of the hypotheses relating to Research Objective II are summarized in Tables 7, 8, and 12. Hypothesis No. 3 was rejected in the null form. Restated in the alternative form, it was

accepted. Also, Hypothesis No. 4 as stated in the null form was rejected. It was accepted as restated in the alternative form.

From the correlations performed for Research Objective I, the strongest relationships found were between productivity and real estate experience, preference for time at work, preference for time with family (negative), real estate as the primary source of family income, the number of unfavorable adjectives used in a self-description, Exhibition, Autonomy, Aggression, Abasement (negative), Deference (negative), and Nurturance (negative).

The accuracy of the LPA equation was greater than the best equations generated by OLS analysis or PCA.

The PCA used to test Hypothesis No. 4 generated a regression equation that resulted in a loss of predictive power. Hypothesis No. 4 as stated in the null form was therefore rejected.

In addition to losing a degree of accuracy, the PCA resulted in an equation with more variables than the LPA equation. As no latent variables were identified, the PCA was determined to be unhelpful.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter V presents a summary of the study, the conclusions drawn from the study, and recommendations for further research.

Summary

This study involved measuring the correlation of performance of real estate sales personnel with selected background variables and personality traits and then generating and testing the usefulness of these variables in regression equations to discriminate between high-group and low-group performance. The primary sample consisted of 106 usable completed questionnaires obtained from a population of 669 real estate sales personnel listed in the rosters of the Multiple Listing Services of Huntsville and Muscle Shoals, Alabama. In addition, there were 49 observations from the same population that were held out to serve as a "validity" sample.

For the purpose of this study, the problem was stated as: "What background characteristics and/or personality traits might discriminate high-productivity group real estate sales workers from low-productivity real estate sales workers?"

In order to resolve this problem, two research objectives were identified for the study. Research Objective I pertained to measuring the correlations between productivity and selected background characteristics and personality traits. Research Objective II was concerned with developing and testing a model using selected variables and traits to discriminate between the high-group and low-group performers.

Four null hypotheses were formulated for this study. Two of the hypotheses related to Research Objective I and two to Research Objective II. For each of the hypotheses pertaining to Research Objective I, there were supporting hypotheses. Hypothesis No. 1 had a total of 18 supporting hypotheses while Hypothesis No. 2 had a total of 24 supporting hypotheses.

The Pearson product-moment correlation and t-test of significance were used for testing the first 13 of the supporting hypotheses for Hypothesis No. 1 and for all 24 of the supporting hypotheses of Hypothesis No. 2. The remaining 5 supporting hypotheses for Hypothesis No. 1 were tested via the Mann-Whitney U-test and z-test of significance.

The Ordinary Least Squares Analysis, Linear Probability Analysis, and Chi-Square test of significance were used for testing Hypothesis No. 3. Principal Components Analysis was used for testing Hypothesis No. 4. Both Hypothesis No. 3 and Hypothesis No. 4 were addressing Research Objective II.

From the results of the correlations, OLS analysis, Linear Probability Analysis and Principal Components Analysis, conclusions were drawn relative to the background characteristics and personality traits that discriminate between high-productivity group and low-productivity group membership in real estate sales. The conclusions drawn are reported in the next section.

Conclusions

From the results of this investigation, conclusions were drawn that:

1. There is a significant relationship between the productivity of real estate sales workers and selected background characteristics at both the 0.05 and 0.01 levels of significance.

2. There is a significant relationship between the productivity of real estate sales workers and selected personality traits, at both the 0.05 and 0.01 levels of significance.

3. The probability that a person will be in the high productivity group or low productivity group in real estate sales will be affected by some combination of background characteristics and personality traits of the individual.

4. Compression of selected background and personality variables via Principal Components Analysis will reduce the predictive accuracy of the Linear Probability Model developed from the background variables and personality traits. Also, no latent variables are identified by this procedure.

5. There is a correlation between the productivity of real estate sales workers and the following background characteristics: real estate experience, preference for time at work, preference for time with family (negative), real estate as a primary source of family income, preference for time with hobbies (negative), number of hobbies (negative), number of firms worked for during the last 10 years (negative), parents in real estate (negative), and formal education. The variables are listed in descending order by the degree of correlation as determined by the statistical analyses performed in testing the hypotheses.

6. There is a correlation between the productivity of real estate sales workers and the following personality traits: number of unfavorable adjectives checked in a self-description, Nurturance (negative), Autonomy, Exhibition, Abasement (negative), Deference (negative), Aggression, Dominance, Communality (negative), Intraception (negative), Affiliation (negative), and Achievement. The variables are listed in descending order by the degree of correlation as determined by the statistical analyses performed in testing the hypotheses.

7. Regression equations derived from the Linear Probability Analysis approach are more accurate at classifying high and low group membership than are regression equations derived from Ordinary Least Squares Analysis run on the performance variable.

8. A regression equation, generated by the Linear Probability Analysis was able to correctly classify 88.7% of the low-productivity group of real estate performers, 75.5% of the high-productivity group of real estate performers and 82.1% of the entire sample. The variables included in this model were: number of unfavorable adjectives checked, preference for time spent at work, real estate experience, Achievement drive, parents (not) in real estate, formal education, and Exhibition.

In addition to the conclusions stated above, the following generalized statements were made:

1. Formal training in real estate does not appear to increase the performance of real estate sales workers.

2. The personality trait "Empathy" is an often mentioned trait that supposedly contributes to sales success. The findings of this study do not support this contention. Intraception (a closely related trait) is low in significance and has a negative correlation with performance.

3. The personality scale "number of unfavorable adjectives checked" was strongly related to productivity in real estate sales. This suggests that the successful real estate sales worker is somewhat critical of oneself, and is not satisfied. This is manifested in a drive to excel in one's occupation.

4. The literature review notes a number of real estate practitioners have identified characteristics such as age, sex, and Endurance as important to success in real estate. The findings of this study do not support these contentions.

Recommendations

From the findings and conclusions of this study, the researcher recommends that:

1. Additional studies using similar procedures be undertaken to investigate additional background information not included in this study.

2. Additional studies using similar procedures be undertaken to investigate personality traits using a more sophisticated instrument than the self-description Adjective Check List. This would most likely entail a smaller sample or a "captive" type of sample because of the time required to complete a more elaborate personality questionnaire.

3. Additional research be undertaken to investigate other than linear relationships between background and personality variables.

4. A replication be made of this study using actual income earned from real estate sales activities as the dependent variables rather than a self-report of average sales and listings generated as was the case with this investigation.

5. An investigation be made into the underlying significance of the correlation of the trait score "unfavorable adjectives checked" with performance. The purpose of such a study might be to identify a more readily recognized and more easily measured parallel trait.

6. A study be undertaken to identify educational needs of real estate sales personnel in order to improve the significance of the correlation between performance and formal real estate training.

7. A study be undertaken to incorporate the findings of this investigation into a "Weighted Application Blank" to be used to improve the personnel selection process at the many small real estate sales offices.

While this study has provided some insight into the relationship between real estate sales performance, background variables and personality traits, the studies recommended would add to the limited body of knowledge now available and would be an additional step forward in providing useful information to brokers and potential sales workers in an effort to improve productivity in this sector of the economy.

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APPENDICES

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APPENDIX A

Exhibit 1

UNIVERSITY OF NORTH ALABAMA
FLORENCE, ALABAMA 35630

July, 1981

DEAR REALTOR ASSOCIATE:

As a graduate student at the University of Oklahoma and as an Assistant Professor of Marketing and Management at the University of North Alabama, I have a strong interest in the real estate field. I am particularly interested in developing a profile of those who are successful in the field, such as yourself.

Would you be willing to take ten to fifteen minutes of your time to fill out two questionnaires to be used for statistical purposes in my doctoral dissertation? Your brief effort will be of great assistance to me in my study and the results may be useful to you in your profession at some point in the future. I would like to stress that the study is completely anonymous. Please do not sign either questionnaire nor identify your firm. Data from across North Alabama will be entered in a computer for statistical analysis.

Please take a few moments to complete both questionnaires and return them in the stamped envelope I have provided. I need to receive them as soon as possible so that they can be analyzed with one computer run. Your help is sincerely appreciated.

Sincerely,

Kerry P. Gatlin
Assistant Professor

Exhibit 2

CALL GUIDE FOR CONTACTING SAMPLE

Hello. My name is Kerry Gatlin. I'm an Assistant Professor of Marketing and Management at the University of North Alabama. I'm currently involved in a research project in real estate, part of which involves developing a profile of real estate salespeople in the North Alabama area. I am randomly calling a number of real estate professionals in the area to ask if they would be willing to participate in this study. If you would also be willing to participate, I would like to ask your permission to send you two questionnaires to be completed at your convenience and returned to me here at the University. Both questionnaires are anonymous and should only take approximately 10-15 minutes to complete. May I mail you a copy of these questionnaires?

Mr. _____/Ms._____, I sincerely appreciate your willingness to help. You should receive the questionnaires at your office in the next few days. Thanks. Good bye.

(Mr./Ms._____, I understand. Thank you for taking the time to talk with me anyway. Goody bye.)

Exhibit 3

QUESTIONNAIRE

PLEASE RESPOND TO EACH OF THE FOLLOWING QUESTIONS AS ACCURATELY AS POSSIBLE. YOUR RESPONSE IS COMPLETELY ANONYMOUS. THE DATA COLLECTED WILL BE USED FOR STATISTICAL PURPOSES ONLY.

(1)_____Age

(2)_____Female

_____Male

(3)_____Number of years of formal education

(4)_____Approximate number of "class hours" of special training in real estate

(5)_____Number of years of experience in real estate

(6)_____Number of years of sales experience outside real estate

(7)_____Number of years of business experience other than sales or real estate

(8)_____Number of years of residence in this community

(9)_____Number of years of residence at present address

(10)_____Number of firms you have worked for in the past 10 years (real estate and other)

(11)_____Number of Children

(12)_____Did your mother or father work in real estate?

(13)_____How do you view your income from real estate sales?
(A) The primary source of my family's income
(B) A secondary sourceof my family's income

(14)_____If married, how many years?

(15) If you had a choice, approximately what percentage of your time would you prefer to spend on each of the following work activities?

_____Office Floor time

_____Showing property

_____Developing listings

100% Total

(16) If you had a choice, approximately what percentage of your total available time would you spend in the following activities?

_____ Time at work

_____ Time with family

_____ Time with hobbies/recreation

100% Total

(17)_____ What is your favorite hobby or recreational activity?

(18)_____Approximately how many hobbies do you pursue?

(19)_____To how many civic or professional organizations do you belong?

(20)_____Have you recently held a leadership position in any of your civic or professional groups?

(21)_____What is the dollar volume of your sales last month?

(22)_____What was the average dollar volume of your sales per month last year? (Please be as accurate as possible.)

(23)_____What was the dollar volume of listings you generated last month? (Regardless of whether sold or who sold.)

(24)_____What is the average dollar volume of listings you generated per month last year? (Regardless of whether sold or who sold them.)

Exhibit 4

The Adjective Check List

by

HARRISON G. GOUGH, Ph.D.

University of California (Berkeley)

DIRECTIONS: This booklet contains a list of adjectives. Please read them quickly and put an X in the box beside each one you would consider to be self-descriptive. Do not worry about duplications, contradictions, and so forth. Work quickly and do not spend too much time on any one adjective. Try to be frank, and check those adjectives which describe you as you really are, not as you would like to be.



CONSULTING PSYCHOLOGISTS PRESS

577 College Ave., Palo Alto, Calif.

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- ☐ absent-minded 1
- ☐ active 2
- ☐ adaptable 3
- ☐ adventurous 4
- ☐ affected 5
- ☐ affectionate 6
- ☐ aggressive 7
- ☐ alert 8
- ☐ aloof 9
- ☐ ambitious 10
- ☐ anxious 11
- ☐ apathetic 12
- ☐ appreciative 13
- ☐ argumentative 14
- ☐ arrogant 15
- ☐ artistic 16
- ☐ assertive 17
- ☐ attractive 18
- ☐ autocratic 19
- ☐ awkward 20
- ☐ bitter 21
- ☐ blustery 22
- ☐ boastful 23
- ☐ bossy 24
- ☐ calm 25
- ☐ capable 26
- ☐ careless 27
- ☐ cautious 28
- ☐ changeable 29
- ☐ charming 30
- ☐ cheerful 31
- ☐ civilized 32
- ☐ clear-thinking 33
- ☐ clever 34
- ☐ coarse 35
- ☐ cold 36
- ☐ commonplace 37
- ☐ complaining 38
- ☐ complicated 39
- ☐ conceited 40
- ☐ confident 41
- ☐ confused 42
- ☐ conscientious 43
- ☐ conservative 44
- ☐ considerate 45
- ☐ contented 46
- ☐ conventional 47
- ☐ cool 48
- ☐ cooperative 49
- ☐ courageous 50
- ☐ cowardly 51
- ☐ cruel 52
- ☐ curious 53
- ☐ cynical 54
- ☐ daring 55
- ☐ deceitful 56
- ☐ defensive 57
- ☐ deliberate 58
- ☐ demanding 59
- ☐ dependable 60
- ☐ dependent 61
- ☐ despondent 62
- ☐ determined 63
- ☐ dignified 64
- ☐ discreet 65
- ☐ disorderly 66
- ☐ dissatisfied 67
- ☐ distractible 68
- ☐ distrustful 69
- ☐ dominant 70
- ☐ dreamy 71
- ☐ dull 72
- ☐ easy going 73
- ☐ effeminate 74
- ☐ efficient 75
- ☐ egotistical 76
- ☐ emotional 77
- ☐ energetic 78
- ☐ enterprising 79
- ☐ enthusiastic 80
- ☐ evasive 81
- ☐ excitable 82
- ☐ fair-minded 83
- ☐ fault-finding 84
- ☐ fearful 85
- ☐ feminine 86
- ☐ fickle 87
- ☐ flirtatious 88
- ☐ foolish 89
- ☐ forceful 90
- ☐ forenighted 91
- ☐ forgetful 92
- ☐ forgiving 93
- ☐ formal 94
- ☐ frank 95
- ☐ friendly 96
- ☐ frivolous 97
- ☐ fussy 98
- ☐ generous 99
- ☐ gentle 100
- ☐ gloomy 101
- ☐ good-looking 102
- ☐ good-natured 103
- ☐ greedy 104
- ☐ handsome 105
- ☐ hard-headed 106
- ☐ hard-hearted 107
- ☐ hasty 108
- ☐ headstrong 109
- ☐ healthy 110
- ☐ helpful 111
- ☐ high-strung 112
- ☐ honest 113
- ☐ hostile 114
- ☐ humorous 115
- ☐ hurried 116
- ☐ idealistic 117
- ☐ imaginative 118
- ☐ immature 119
- ☐ impatient 120
- ☐ impulsive 121
- ☐ independent 122
- ☐ indifferent 123
- ☐ individualistic 124
- ☐ industrious 125
- ☐ infantile 126
- ☐ informal 127
- ☐ ingenious 128
- ☐ inhibited 129
- ☐ initiative 130
- ☐ insightful 131
- ☐ intelligent 132
- ☐ interests narrow 133
- ☐ interests wide 134
- ☐ intolerant 135
- ☐ inventive 136
- ☐ irresponsible 137
- ☐ irritable 138
- ☐ jolly 139
- ☐ kind 140
- ☐ lazy 141
- ☐ leisurely 142
- ☐ logical 143
- ☐ loud 144
- ☐ loyal 145
- ☐ mannerly 146
- ☐ masculine 147
- ☐ mature 148
- ☐ meek 149
- ☐ methodical 150

DO NOT PRINT

+													
−													

- ☐ mild 151
- ☐ mischievous 152
- ☐ moderate 153
- ☐ modest 154
- ☐ moody 155
- ☐ nagging 156
- ☐ natural 157
- ☐ nervous 158
- ☐ noisy 159
- ☐ obliging 160
- ☐ obnoxious 161
- ☐ opinionated 162
- ☐ opportunistic 163
- ☐ optimistic 164
- ☐ organized 165
- ☐ original 166
- ☐ outgoing 167
- ☐ outspoken 168
- ☐ painstaking 169
- ☐ patient 170
- ☐ peaceable 171
- ☐ peculiar 172
- ☐ persevering 173
- ☐ persistent 174
- ☐ pessimistic 175
- ☐ planful 176
- ☐ pleasant 177
- ☐ pleasure-seeking 178
- ☐ poised 179
- ☐ polished 180
- ☐ practical 181
- ☐ praising 182
- ☐ precise 183
- ☐ prejudiced 184
- ☐ preoccupied 185
- ☐ progressive 186
- ☐ prudish 187
- ☐ quarrelsome 188
- ☐ queer 189
- ☐ quick 190
- ☐ quiet 191
- ☐ quitting 192
- ☐ rational 193
- ☐ rattlebrained 194
- ☐ realistic 195
- ☐ reasonable 196
- ☐ rebellious 197
- ☐ reckless 198
- ☐ reflective 199
- ☐ relaxed 200
- ☐ reliable 201
- ☐ resentful 202
- ☐ reserved 203
- ☐ resourceful 204
- ☐ responsible 205
- ☐ restless 206
- ☐ retiring 207
- ☐ rigid 208
- ☐ robust 209
- ☐ rude 210
- ☐ sarcastic 211
- ☐ self-centered 212
- ☐ self-confident 213
- ☐ self-controlled 214
- ☐ self-denying 215
- ☐ self-pitying 216
- ☐ self-punishing 217
- ☐ self-seeking 218
- ☐ selfish 219
- ☐ sensitive 220
- ☐ sentimental 221
- ☐ serious 222
- ☐ severe 223
- ☐ sexy 224
- ☐ shallow 225
- ☐ sharp-witted 226
- ☐ shiftless 227
- ☐ show-off 228
- ☐ shrewd 229
- ☐ shy 230
- ☐ silent 231
- ☐ simple 232
- ☐ sincere 233
- ☐ slipshod 234
- ☐ slow 235
- ☐ sly 236
- ☐ smug 237
- ☐ snobbish 238
- ☐ sociable 239
- ☐ soft-hearted 240
- ☐ sophisticated 241
- ☐ spendthrift 242
- ☐ spineless 243
- ☐ spontaneous 244
- ☐ spunky 245
- ☐ stable 246
- ☐ steady 247
- ☐ stern 248
- ☐ stingy 249
- ☐ stolid 250
- ☐ strong 251
- ☐ stubborn 252
- ☐ submissive 253
- ☐ suggestible 254
- ☐ sulky 255
- ☐ superstitious 256
- ☐ suspicious 257
- ☐ sympathetic 258
- ☐ tactful 259
- ☐ tactless 260
- ☐ talkative 261
- ☐ temperamental 262
- ☐ tense 263
- ☐ thankless 264
- ☐ thorough 265
- ☐ thoughtful 266
- ☐ thrifty 267
- ☐ timid 268
- ☐ tolerant 269
- ☐ touchy 270
- ☐ tough 271
- ☐ trusting 272
- ☐ unaffected 273
- ☐ unambitious 274
- ☐ unassuming 275
- ☐ unconventional 276
- ☐ undependable 277
- ☐ understanding 278
- ☐ unemotional 279
- ☐ unexcitable 280
- ☐ unfriendly 281
- ☐ uninhibited 282
- ☐ unintelligent 283
- ☐ unkind 284
- ☐ unrealistic 285
- ☐ unscrupulous 286
- ☐ unselfish 287
- ☐ unstable 288
- ☐ vindictive 289
- ☐ versatile 290
- ☐ warm 291
- ☐ wary 292
- ☐ weak 293
- ☐ whiny 294
- ☐ wholesome 295
- ☐ wise 296
- ☐ withdrawn 297
- ☐ witty 298
- ☐ worrying 299
- ☐ zany 300

LOW THIS LINE

Exhibit 5

RAW DATA

```
SHOL 1 155
LOAD Y15
500 425  425 420 410 400 400 400 400 390 345 325 308 300 300 300 291
290 275 260 255 250 250 250 250 250 230 225 210 200 195 193 190 180
175 171 168 165 160 159 154 154 150 150 150 145 140 137 130 125 125
125 125 120 120 117 115 115 111 110 108 105 105 100 99 88 86.5 85
85 83 33  81.5 81 79.5 77 75 71 69 70 68 68 67 66.5 65 63 60 60 52
52 50 50 48 48 45 45 40 40 35 33 31 30 30 29 20 20 20 25 30 32.5
41 42 45 49 50 60 61.5 65 67 69 70 76 80 82 85 86 94 101 105 111
115 121 125 125 130 140 150 151 155.5 160 170 175 183 200 215 238
250 250 260 279.75 295 300 320 350 400 400 5
LOAD Y25
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
LOAD X15
48 99 76 39 52 52 76 59 61 42 43 43 52 67 42 40 47 42 40 40 40 51
48 37 51 41 44 48 53 39 42 41 40 40 40 39 43 40 53 48 39 39 47 42
43 42 43 42 56 40 40 42 51 47 45 48 49 42 43 58 49 51 40 45 43 43
37 37 40 42 46 46 48 47 48 42 39 45 43 51 57 51 46 48 42 42 41 43
43 43 49 40 42 42 40 40 40 46 40 39 38 39 40 54 38 38 43 40 40 40
40 49 49 43 43 39 42 39 39 45 47 46 41 39 42 41 40 41 67 47 40
45 43 46 54 56 33 45 48 47 62 40 43 49 39 62 46 38 41 45 62 58 41
42 61
LOAD X25
90 75 60 65 50 50 60 50 50 60 65 65 50 30 50 50 33 50 40 70 70 60
50 50 1 85 40 40 50 50 25 35 33 20 25 50 40 30 40 75 40 25 25 60
40 50 50 40 20 25 25 50 20 30 70 60 60 60 70 25 50 25 55 50 50
25 50 50 50 45 25 25 25 20 25 30 50 50 50 50 40 50 40 40 70 70 40
25 10 10 0 50 50 30 50 33 50 50 25 30 25 0 40 50 25 25 30 40 20
30 50 35 0 25 70 60 75 20 20 45 20 50 70 40 60 50 50 40 40 75 30
40 80 40 30 75 25 50 75 75 50 35 50 50 40 35 40 50 75 35 30
70 30 50 50 5
LOAD X35
20 8 11 8 5 5 11 5 12 15 9 8 5 5 3 4 4 3 6 11 11 6 3 5 11 3 5 6
9 14 17 3 19 2 2 1 3 3 4 5 4 5 7 1 5 1 7 12 6 3 4 4 25 1 1 6 1 6
2 1 9 1 3 4 6 6 7 8 5 2 2 2 2 3 2 1 1 2 1 3 1 3 3 3 4 4 2 9 1 1
16 6 4 1 7 2 1 1 4 4 2 3 3 1 2 2 4 3 4 2 1 1 14 9 1 1 7 7 7 5 3
2 4 2 7 4 3 14 1 8 1 4 7 1 13 19 5 2 5 25 2 2 1 10 10 6 6 4 12
13 8 6 2 7 123
LOAD X45
51 27 19 27 50 50 19 48 51 54 63 66 50 53 57 56 56 57 61 59 62
48 61 54 48 34 67 53 45 59 69 48 54 61 62 53 44 62 52 51 64 61
56 61 66 54 51 55 43 60 55 53 50 49 53 34 56 57 61 46 39 53 57
58 53 39 64 64 53 55 57 57 48 57 50 58 58 49 48 68 58 60 52 49 59 53
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Exhibit 5 (continued)

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65 58 30 54 62 65 57 58 65 54 53 55 65 64 62 66 66 39 62 63 42
66 61 54 56 45 62 55 50 61 55 54 56 56 54 57 48 55 53 52 60 59
55 41 56 61 51 52 26 50 61 43 51 61 48 61 61 43 53 43 61 54
55 55 48 25 54 54 51 $
LOAD X54
5 15 25 25 25 25 25 25 25 20 20 20 25 45 30 30 50 40 40 20 20
20 30 40 100 10 50 35 25 25 50 50 33 75 50 35 50 50 30 5 40 50
65 30 50 30 40 50 50 65 50 30 65 60 25 30 20 25 15 50 25 50 25
25 50 50 25 35 25 45 50 50 50 40 50 50 30 40 40 45 50 45 40 40
100 5 41 35 60 60 50 60 35 50 40 33 25 30 70 30 50 50 50 40 50
50 30 50 75 33 25 30 50 35 20 20 0 60 60 45 40 25 20 40 20 25
25 31 40 15 50 40 15 50 45 20 50 40 5 15 20 55 40 25 50 55
40 30 15 45 60 20 30 30 25 $
LOAD X55
49 67 58 67 55 55 68 38 81 56 33 33 55 41 50 51 49 50 43 55 55
54 35 47 77 60 46 53 56 49 53 45 57 43
55 41 44 43 38 51 46 47 49 51 59 67 51 41 55 41 38 47 55
52 97 59 50 46 39 63 55 47 53 44 47 44 28 28 53 57 39 39 45
52 45 40 49 52 52 45 41 45 43 43 36 36 60 57 43 43 47 45 45 60 45
59 52 55 56 54 36 49 41 57 38 36 59 41 53 59 52 41 47 57 51 43 53
59 53 45 55 50 38 53 53 44 45 28 67 54 41 48 43 55 59 35 47 57 51
50 62 54 57 54 57 62 43 47 54 45 57 73 59 54 81 $
LOAD X75
57 67 57 67 48 48 67 57 74 55 41 41 48 50 53 54 39 53 50 64 64 53
66 61 73 62 58 59 50 52 56 58 55 60 47 47 55 60 38 44 57 62 43 62
72 53 62 48 45 54 45 59 54 47 61 61 46 47 59 61 50 55 49 57 51 51
37 37 50 57 50 50 38 47 38 38 59 51 51 52 55 52 47 47 42 42 53 64
58 58 54 49 54 62 53 50 50 44 50 52 43 52 59 47 41 43 61 55 50 51
57 43 54 60 47 52 64 46 43 36 47 68 51 54 50 38 55 23 62 49 46
49 55 54 54 48 62 54 48 53 48 74 48 50 48 64 50 51 55 59 58 69 53
55 71 $
LOAD X55
45 26 15 31 45 45 35 48 25 38 55 55 47 72 45 39 58 45 46 43 43 42
65 40 31 39 49 41 48 47 41 42 41 48 41 43 25 50 61 50 46 46 41 33
60 27 39 46 48 56 56 50 43 55 46 29 65 59 50 37 48 50 45 54 50 47
53 53 39 33 66 64 59 42 61 63 41 44 46 52 66 52 50 48 60 60 53 39
39 39 51 52 48 39 52 43 47 42 43 48 55 48 57 35 56 55 61 61 43 43
47 50 31 39 46 56 41 54 54 48 42 45 39 41 52 53 54 64 27 40 55
46 44 48 39 71 46 43 50 42 39 39 37 48 54 36 46 42 38 44 52 29 34
38 25 $
LOAD X75
44 24 19 24 49 49 34 50 35 43 69 69 49 62 47 47 58 49 56 51 49 47 47 45
20 31 57 48 51 52 55 33 43 51 51 60 23 53 63 56 60 48 58 51 38 28 45 58
56 56 56 54 41 53 48 43 56 51 58 43 40 56 49 58 48 48 66 66 48 47 58 58
45 33 45 64 54 48 44 56 61 56 53 53 54 57 53 41 51 51 59 60 49 40 60 47
66 42 52 59 53 56 64 41 53 57 41 64 52 47 46 55 59 41 50 62 41 56 58 54
38 51 42 52 43 53 56 74 30 49 62 53 51 43 47 67 52 45 50 50 45 41 40
51 47 19 54 49 41 55 47 26 47 43 35 $
LOAD X10 $
54 74 76 71 55 55 68 50 68 58 29 29 55 50 48 56 41 48 48 46 46 55 46 52
  68 66 43 50 60 48 50 59 50 44 44 50 51 46 49 41 45 45 47 56 56 35 52 48
48 47 47 50 52 42 48 63 44 47 34 57 61 50 50 51 45 45 36 36 52 57 73 71
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Exhibit 5 (continued)

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50 50 33 35 48 67 58 45 48 45 54 54 41 41 49 52 46 46 47 50 49 43 50 52
43 55 47 49 45 49 44 54 46 46 50 44 47 52 43 56 47 52 54 38 59 50 50 38
50 67 55 54 64 43 52 18 65 58 42 49 58 60 55 48 48 66 41 49 51 53 48
60 47 42 48 50 56 55 61 63 54 58 70 $
LOAD X11$
63 62 57 62 53 51 57 55 59 63 46 46 55 40 60 59 40 60 60 58 60 57 60 64
73 73 63 54 58 61 54 64 66 51 56 59 67 49 46 33 60 59 57 60 70 72 64 61
52 59 54 55 57 49 50 55 42 54 48 62 53 52 64 41 54 56 48 46 61 67 48 51
43 59 43 41 57 61 58 49 43 49 47 51 51 47 58 69 60 62 52 47 64 59 47 50
56 50 55 62 54 58 54 67 54 52 46 50 55 48 56 43 52 69 49 49 69 50 50 52
57 56 64 62 55 49 59 30 58 56 48 54 52 60 55 42 59 64 37 58 53 67 66
58 52 59 62 55 65 64 53 69 58 63 64 $
LOAD X12$
42 21 55 29 48 52 27 38 41 47 57 57 36 36 59 57 53 55 59 53 50 54 42 59
47 33 54 55 52 57 60 46 52 60 55 62 54 50 38 43 53 53 48 44 57 47 52 62
38 45 50 57 43 40 35 33 46 51 77 45 35 56 55 49 64 41 49 53 53 55 51 49
45 59 45 50 50 47 39 48 37 48 50 50 43 43 52 42 52 52 48 39 55 57 45 45
57 43 48 49 52 49 60 57 52 52 36 55 48 45 57 39 48 42 43 45 55 55 52 57
50 47 46 57 45 39 55 46 31 42 42 49 39 42 45 38 53 41 43 61 33 57 67
55 51 42 55 52 54 38 41 44 49 47 28 $
LOAD X13$
45 21 46 28 40 41 46 28 42 58 53 51 42 45 52 42 34 54 42 41 43 53 51 44
36 33 45 54 49 58 45 62 45 31 51 54 51 45 52 36 48 38 60 51 63 54 46 45
39 39 36 36 42 50 42 54 53 37 55 48 42 42 57 54 38 43 58 55 45 51 55 51
48 61 48 58 51 48 48 44 35 39 51 49 38 40 58 42 33 33 49 51 37 44 51 51
58 52 42 54 48 54 60 42 48 41 0 60 39 53 48 54 41 39 46 48 51 54 51 51
61 43 47 60 45 47 39 59 25 40 51 40 41 43 54 45 42 57 36 60 50 35 42
49 45 22 49 41 45 50 47 38 58 56 42 $
LOAD X14$
1 1 1 1 1 1 1 0 0 1 1 1 1 0 0 0 0 0 1 1 1 1 0 0 0 0 1 0 0 0
0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 1 1 0 0 1 1 0
0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 0 1 0 1 0 0 0 1
0 0 0 1 1 0 1 1 0 1 0 1 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0 0 1 0
1 1 0 0 0 0 0 0 1 0 1 1 0 1 0 $
LOAD X15$
5 10 15 10 25 25 15 25 25 20 15 15 25 25 20 20 17 10 20 10 10 20 20 10
0 5 10 25 25 25 25 15 35 5 25 15 10 20 30 20 20 25 10 10 10 20 10 10 30
10 25 20 15 10 5 10 20 15 15 25 25 25 20 25 25 25 25 15 25 10 25 25 25
50 25 20 20 10 10 5 10 5 20 20 20 25 20 40 30 30 50 10 15 20 10 35 25
20 5 40 25 50 10 10 25 25 40 10 5 35 25 50 50 60 10 20 25 20 20 10 40
25 10 20 20 25 25 30 20 10 20 20 5 10 25 5 25 10 20 10 30 10 10 25 10
10 20 20 10 20 10 10 40 10 25 $
LOAD X16$
1 1 2 1 2 2 2 2 3 2 5 5 2 2 2 2 1 2 3 2 2 3 2 5 3 1 2 4 4 5 3 2 2 1 1
2 4 2 3 4 2 3 5 2 2 4 3 3 2 3 4 2 2 1 3 2 2 3 4 3 3 5 2 2 2 4 2
2 4 2 3 4 2 4 2 3 6 4 6 1 1 1 1 2 2 1 2 2 3 3 5 3 3 3 5 2 3 2 4 3
2 2 2 2 3 3 1 1 1 3 3 3 3 3 4 4 5 2 3 1 4 3 1 2 2 4 3 2 2 1 1 3 4 4
2 2 3 4 1 2 3 2 4 3 2 2 2 2 3 $
LOAD X17$
53 33 36 33 51 49 36 42 52 60 63 63 49 42 61 60 48 61 62 69 69 47 63 57
60 38 36 56 49 60 65 51 52 52 67 60 48 67 43 54 64 64 68 55 69 61 59 52
54 53 42 50 50 50 52 54 42 47 66 56 40 56 61 44 55 57 59 59 54 63 58 58
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Exhibit 5 (continued)

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41 43 39 66 64 53 53 54 47 54 50 50 61 59 74 66 62 58 55 52 51 57 52 50
63 37 58 55 60 55 63 50 60 60 55 63 58 48 58 41 49 66 50 54 58 44 46 54
43 52 45 52 52 54 58 58 35 39 45 62 56 54 37 42 68 38 48 63 51 64 56
47 62 43 64 51 58 69 51 43 63 62 52 $
LOAD X18$
63 54 52 54 61 63 52 50 52 62 59 59 59 46 62 64 52 62 62 55 53 52 53 64
72 69 60 59 64 61 60 68 66 60 60 64 68 53 53 34 62 64 53 56 65 78 52 68
59 52 53 50 61 55 46 55 43 60 60 50 41 44 49 21 49 49 59 59 59 62 46
66 53 56 53 57 62 67 65 52 34 52 56 36 56 56 56 62 51 61 41 52 63 58 52
52 70 48 55 53 60 53 47 66 50 60 49 47 55 52 70 41 41 62 48 45 70 53 53
62 55 47 60 61 72 59 53 46 49 53 51 57 46 51 53 47 64 53 34 56 47 69
63 64 65 57 62 58 67 54 50 75 74 62 52 $
LOAD X19$
12 11 14 13 17 17 12 16 14 16 16 16 17 13 14 18 12 13 14 16 13 13 14 15
12 15 14 14 15 13 15 15 16 14 16 13 12 16 17 16 13 14 14 12 14 17 14 14
13 12 13 16 13 14 12 13 14 16 14 16 12 14 12 13 14 13 17 12 12
14 14 13 12 12 12 13 14 12 15 16 16 15 16 16 16 14 14 12 13 16 18 13 16
12 12 12 14 13 12 13 12 13 14 14 12 12 15 12 16 12 16 13 15 15 13 13 16
14 12 17 17 15 15 13 19 14 16 16 12 12 45 15 15 14 14 16 12 16 12 16
16 12 15 12 18 16 13 14 15 15 16 13 $
LOAD X20$
50 50 60 70 300 250 50 160 300 60 200 200 300 200 50 300 100 60
60 0 0 100 60 200 220 35 120 0 225 200 480 200 140 0 80 36 150 38 80 200
120 75 300 180 400 20 200 12 30 45 32 56 16 80 45 0 0 200 85 65 200
38 375 72 100 80 125 150 80 40 120 100 30 200 45 140 45 250 80 125
120 150 90 75 100 125 75 24 50 60 50 200 150 160 250 250 160 600
75 110 80 72 65 40 80 45 120 65 140 210 200 120 45 24 48 24 50 40
30 60 150 38 200 45 500 60 120 200 70 30 60 140 140 45 40 260 80
40 200 500 150 110 30 225 200 90 40 300 160 500 60 60 120 50 500$
LOAD X22$
0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0
0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0
0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1
0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 0 1 0
0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 0 $
LOAD X15$
61 52 50 52 51 50 50 51 46 60 66 66 46 49 61 62 55 59 62 56 53 41
47 62 56 58 61 56 50 59 62 58 55 59 66 67 69 55 58 40 61 59 59 57 50
64 49 71 46 57 57 43 60 58 48 57 50 55 56 48 37 46 55 27 54 51 55
62 61 56 48 45 45 62 45 61 62 55 64 60 38 60 43 43 59 59 46 49 60 60
43 43 52 61 49 69 72 44 60 53 50 53 49 64 59 59 47 49 60 43 72 45
43 49 41 49 53 52 52 61 62 43 62 62 71 57 52 55 33 51 57 60 47
49 55 34 59 48 60 57 42 58 64 63 64 43 59 58 60 58 34 65 63 60 41$
LOAD X13$
0 1 1 1 0 1 0 0 1 1 1 1 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 1 0 0
0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 1
1 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 0 1 1 0 0 1 1 0
0 0 0 1 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 0 0 1
0 0 0 1 1 0 1 0 0 0 0 0 1 0 1 0 1 1 0$
LOAD X10$
4 0 1 3 2 2 1 3 3 5 3 3 2 3 4 9 0 4 2 1 1 1 0 2 0 3 2 0 6 3 6 3 4 2
3 2 2 2 2 1 2 4 2 3 3 3 4 3 2 4 3 2 1 0 2 2 3 3 2 2 2 1 4 2 3 3 1

1 2 2 4 4 2 1 2 1 1 2 1 1 1 1 4 3 3 4 5 4 3 3 3 0 3 2 1 3 7 2 1 3 1 1
6 6 2 1 1 1 6 3 6 2 2 2 0 3 1 1 2 3 4 3 3 1 2 2 3 3 1 5 6 3 0 2 4 4
3 1 2 4 2 1 2 1 2 6 5 3 2 2 9 3 4 4 3 3 5 3$
END$
```

Exhibit 6

IDENTIFICATION OF VARIABLE NAMES

X1 : Number of unfavorable adjectives checked

X2 : Preference for time at work

X3 : Real estate experience

X4 : Nurturance

X5 : Preference for time with family

X6 : Autonomy

X7 : Exhibition

X8 : Abasement

X9 : Deference

X10: Aggression

X11: Dominance

X12: Intraception

X13: Communality

X14: Income source (primary vs. secondary)

X15: Preference for time spent with hobbies/recreation

X16: Number of firms worked for during the past 10 years

X17: Affiliation

X18: Achievement

X19: Formal education

X20: Real estate training

X22: Parents who are/were in real estate

APPENDIX B

Exhibit 1

CORRELATION PROGRAM

```
10 CLS:PRINT:PRINT:PRINT
14 Y2SUM=0
15 YSUM=0:I2SUM=0:ISUM=0:IYSUM=0
16 F$="THE CORRELATION  OF I                    I WITH I                    I IS #.### WITH A T-VALUE OF ##.###"
20 PRINT TAB(15)"MULTIPLE CORRELATION PROGRAM"
30 PRINT:PRINT TAB(20)"BY PHILIP D JONES"
40 PRINT:PRINT TAB(20)"  MIS    UNA "
50 PRINT:PRINT:PRINT"PRESS ENTER TO CONTINUE":LINEINPUT I$
60 CLS:PRINT:PRINT:PRINT:INPUT"ENTER THE NUMBER OF INDEPENDENT VARIABLES IN YOUR MODEL";V:PRINT:PRINT "ENTER THE NUMBER OF OBSERVATI
ONS ";:INPUT N
65 PRINT:PRINT:PRINT:PRINT "DO YOU WANT PRINTED OUTPUT (Y/N)";:INPUT P$
68 IF P$="Y" PRINT"TURN ON PRINTER":LINEINPUT"PRESS ENTER WHEN READY";A$:LPRINT CHR$(15)
70 DIM Y(N),I(N)
75 READ Y$
80 FOR I = 1 TO N
90  READ Y(I)
100 Y2SUM = Y2SUM + Y(I)[2
110  YSUM = YSUM + Y(I)
120 NEXT I
130 FOR I = 1 TO V
140  READ I$
145   I2SUM=0:ISUM=0:IYSUM=0
150   FOR J = 1 TO N
151 ON ERROR GOTO 4000
160   READ I(J)
170   ISUM=ISUM+I(J)
180   I2SUM=I2SUM+I(J)[2
190   IYSUM = IYSUM + I(J)*Y(J)
200   NEXT J
210  R = (N*IYSUM - ISUM*YSUM)/SQR((N*I2SUM-ISUM[2)*(N*Y2SUM-YSUM[2))
215 IF R >= .999999 OR R <= -.999999  THEN T = 9999999:GOTO 230
220 T = R*SQR((N-2)/(1-R[2))
230 PRINT USING F$;Y$,I$,R,T
240 IF P$="Y" GOSUB 300
300 NEXT I
499 END
```

Exhibit 2

CORRELATION OUTPUT

THE CORRELATION OF PRODUCTIVITY	WITH AGE	IS -.042	WITH A T-VALUE OF -0.432
THE CORRELATION OF PRODUCTIVITY	WITH EDUCATION	IS 0.161	WITH A T-VALUE OF 1.677
THE CORRELATION OF PRODUCTIVITY	WITH RE TRAINING	IS 0.155	WITH A T-VALUE OF 1.608
THE CORRELATION OF PRODUCTIVITY	WITH RE EXPERIENCE	IS 0.417	WITH A T-VALUE OF 4.697
THE CORRELATION OF PRODUCTIVITY	WITH OTHER SALES EXP	IS 0.119	WITH A T-VALUE OF 1.227
THE CORRELATION OF PRODUCTIVITY	WITH OTHER BUSINESS EXPERIENCE	IS -.070	WITH A T-VALUE OF -0.721
THE CORRELATION OF PRODUCTIVITY	WITH YRS IN CITY	IS -.040	WITH A T-VALUE OF -0.411
THE CORRELATION OF PRODUCTIVITY	WITH YRS AT ADDRESS	IS -.054	WITH A T-VALUE OF -0.557
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER OF FIRMS EMPLOYED B	IS -.192	WITH A T-VALUE OF -2.000
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER OF CHILDREN	IS -.129	WITH A T-VALUE OF -1.329
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER OF YRS MARRIED	IS -.030	WITH A T-VALUE OF -0.305
THE CORRELATION OF PRODUCTIVITY	WITH OFFICE TIME PREFERENCE	IS -.052	WITH A T-VALUE OF -0.529
THE CORRELATION OF PRODUCTIVITY	WITH SALES PREFERENCE	IS -.084	WITH A T-VALUE OF -0.866
THE CORRELATION OF PRODUCTIVITY	WITH LISTINGS GENERATION	IS 0.146	WITH A T-VALUE OF 1.512
THE CORRELATION OF PRODUCTIVITY	WITH PREFERENCE FOR WORK	IS 0.414	WITH A T-VALUE OF 4.662
THE CORRELATION OF PRODUCTIVITY	WITH PREFERENCE FOR FAMILY	IS -.348	WITH A T-VALUE OF -3.808
THE CORRELATION OF PRODUCTIVITY	WITH TIME WITH HOBBIES	IS -.207	WITH A T-VALUE OF -2.166
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER OF HOBBIES	IS -.199	WITH A T-VALUE OF -2.081
THE CORRELATION OF PRODUCTIVITY	WITH PROF MEMBERSHIPS	IS 0.036	WITH A T-VALUE OF 0.373
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER FAVORABLE ADJECTIVE	IS -.119	WITH A T-VALUE OF -1.225
THE CORRELATION OF PRODUCTIVITY	WITH NUMBER UNFAVORABLE ADJECTI	IS 0.429	WITH A T-VALUE OF 4.866
THE CORRELATION OF PRODUCTIVITY	WITH COMMUNALITY	IS -.225	WITH A T-VALUE OF -2.363
THE CORRELATION OF PRODUCTIVITY	WITH ACHIEVEMENT	IS 0.179	WITH A T-VALUE OF 1.869
THE CORRELATION OF PRODUCTIVITY	WITH DOMINANCE	IS 0.238	WITH A T-VALUE OF 2.512
THE CORRELATION OF PRODUCTIVITY	WITH ENDURANCE	IS 0.054	WITH A T-VALUE OF 0.553
THE CORRELATION OF PRODUCTIVITY	WITH ORDER	IS -.143	WITH A T-VALUE OF -1.477
THE CORRELATION OF PRODUCTIVITY	WITH INTRACEPTION	IS -.207	WITH A T-VALUE OF -2.170
THE CORRELATION OF PRODUCTIVITY	WITH NURTURANCE	IS -.402	WITH A T-VALUE OF -4.505
THE CORRELATION OF PRODUCTIVITY	WITH AFFILIATION	IS -.195	WITH A T-VALUE OF -2.040
THE CORRELATION OF PRODUCTIVITY	WITH HETEROSEXUALITY	IS -.143	WITH A T-VALUE OF -1.478
THE CORRELATION OF PRODUCTIVITY	WITH EXHIBITION	IS 0.327	WITH A T-VALUE OF 3.540
THE CORRELATION OF PRODUCTIVITY	WITH AUTONOMY	IS 0.328	WITH A T-VALUE OF 3.557
THE CORRELATION OF PRODUCTIVITY	WITH AGGRESSION	IS 0.282	WITH A T-VALUE OF 3.010
THE CORRELATION OF PRODUCTIVITY	WITH CHANGE	IS -.050	WITH A T-VALUE OF -0.512
THE CORRELATION OF PRODUCTIVITY	WITH SUCCORANCE	IS -.007	WITH A T-VALUE OF -0.071
THE CORRELATION OF PRODUCTIVITY	WITH ABASEMENT	IS -.318	WITH A T-VALUE OF -3.437
THE CORRELATION OF PRODUCTIVITY	WITH DEFERENCE	IS -.302	WITH A T-VALUE OF -3.250

Exhibit 3

$Ho_1(20)$: There is no significant difference between the productivity of real estate sales workers according to their sex.

HYPOTHESIS NO. 1(20)

Rank - Male (n_1=34)		Rank - Female (n_2=73)		
2.5	76.0	1.0	38.0	72.5
4.0	78.0	2.5	40.0	72.5
5.0	87.0	7.5	41.5	74.0
7.5	88.5	7.5	44.0	75.0
7.5	88.5	15.0	44.0	77.0
10.0	90.5	15.0	44.0	79.0
11.0	92.5	16.5	46.0	80.0
12.0	92.5	16.5	48.0	81.0
13.0	94.5	19.0	49.0	82.5
24.0	100.0	20.0	51.5	82.5
24.0	102.0	21.0	51.5	84.0
27.0	106.5	24.0	51.5	85.0
32.0		24.0	55.5	86.0
39.0		24.0	57.5	90.5
41.5		28.0	60.0	94.5
47.0		29.0	61.0	96.5
54.0		30.0	62.0	96.5
55.5		31.0	63.0	98.5
58.5		33.5	64.5	98.5
69.0		33.5	64.5	101.0
70.5		35.0	66.0	103.5
		36.0	67.0	103.5
		37.0	68.0	105.0
		38.0	70.5	106.5

MANN-WHITNEY U-TEST

$$U = n_1 n_2 + \frac{n_1 (n_1+1)}{2} - R_1 \qquad U = (34)(73) + \frac{34(34+1)}{2} - 1770.5$$

$U = 1306.5$

$$\text{Value of } Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1+n_2+1)}{12}}}$$

$Z = .438$

Exhibit 4

$Ho_1(21)$: There is no significant difference between the productivity of real estate sales workers who had and those who did not have a parent in real estate.

HYPOTHESIS NO. 1(21)

Rank -Parent in R.E. (n_1)	Rank - No Parent in R.E. (n_2)				
24.0	1.0	24.0	51.5	78.0	100.0
33.5	2.5	27.0	51.5	74.0	101.0
36.0	2.5	28.0	54.0	76.0	104.0
39.0	4.0	29.0	55.5	77.0	105.5
58.5	5.0	30.0	55.5	78.0	105.5
61.0	7.5	31.0	57.0	79.0	
69.5	7.5	32.0	58.5	80.0	
75.0	7.5	33.5	60.0	81.5	
86.0	7.5	35.0	62.0	81.5	
87.5	10.0	37.0	63.5	83.0	
97.5	11.0	38.0	63.5	84.0	
102.5	12.0	40.0	65.0	85.0	
103.0	13.0	41.5	66.0	87.5	
107.0	15.0	41.5	67.0	89.5	
	15.0	44.0	68.0	89.5	
	17.5	44.0	69.5	91.5	
	17.5	44.0	71.5	91.5	
	19.0	46.0	71.5	93.5	
	20.0	47.0	71.5	93.5	
	21.0	48.0	73.0	95.5	
	24.0	49.0	74.0	95.5	
	24.0	51.5	76.0	97.5	
	24.0	51.5	77.0	99.0	

MANN-WHITNEY U-TEST

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \qquad U = (14)(93) + \frac{(14)(15)}{2} - 979.5$$

$U = 427.5$

$$\text{Value of } Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)\ (n_1+n_2+1)}{12}}}$$

$Z = -2.06$

Exhibit 5

$Ho_1(22)$: There is no significant difference between the productivity of real estate sales workers who pursue active hobbies and those who pursue passive hobbies.

HYPOTHESIS NO. 1(22)

Rank -Active Hobbies (n_1)			Rank - Passive Hobbies (n_2)	
1.0	41.5	76.0	5.0	54.0
2.5	41.5	77.0	7.5	55.5
2.5	44.0	78.0	10.0	55.5
4.0	47.0	79.0	13.0	58.5
7.5	51.5	81.5	15.0	65.0
7.5	51.5	84.0	17.5	71.5
7.5	51.5	85.0	20.0	80.0
11.0	57.0	86.0	21.0	81.5
12.0	58.5	87.5	24.0	83.0
13.0	60.0	89.5	24.0	89.-
15.0	61.0	91.0	28.0	92.0
17.5	62.0	93.5	31.0	95.5
19.0	63.5	93.5	32.0	104.0
24.0	63.5	95.5	33.5	105.5
24.0	66.0	97.5	36.0	105.5
24.0	67.0	97.5	37.0	
27.0	68.0	99.0	40.0	
29.0	69.5	100.0	44.0	
30.0	69.5	101.0	44.-	
33.5	71.5	102.0	46.0	
35.0	73.0	103.0	48.0	
38.0	74.0	107.0	49.0	
39.0	75.0		51.5	

MANN-WHITNEY U-TEST

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \qquad U = (38)(69) + \frac{(38)(39)}{2} - 1873.5$$

$U = 1489.5$

$$Z \text{ Value} = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)\ (n_1+n_2+1)}{12}}}$$

$Z = 1.16$

Exhibit 6

$Ho_1(23)$: There is no significant difference between the productivity of real estate sales workers who perceive their income from real estate as the primary source of their income as opposed to those who perceive real estate income as a secondary source of family income.

HYPOTHESIS NO. 1(23)

Rank - Primary Income (n_1)		Rank - Secondary Income (n_2)			
1.0	38.0	7.5	46.0	77.0	105.5
2.5	39.0	7.5	47.0	78.0	105.5
2.5	41.5	15.0	48.0	79.0	107.0
4.0	54.0	15.0	49.0	80.0	
5.0	58.5	17.5	51.5	81.5	
7.5	60.0	17.5	51.5	81.5	
7.5	63.5	19.0	51.5	83.0	
10.0	63.5	24.0	51.5	84.0	
11.0	65.0	29.0	55.5	85.0	
12.0	68.0	30.0	55.5	87.5	
13.0	69.5	31.0	57.0	89.5	
15.0	69.5	32.0	58.5	89.5	
20.0	75.0	33.5	61.0	91.0	
21.0	86.0	35.0	62.0	93.5	
24.0	87.5	36.0	66.0	95.5	
24.0	92.0	37.0	67.0	97.5	
24.0	93.5	40.0	71.5	100.0	
24.0	95.5	41.5	71.5	101.0	
27.0	97.5	44.0	73.0	102.0	
28.0	99.0	44.0	74.0	103.0	
33.5		44.0	76.0	104.0	

MANN-WHITNEY U-TEST

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \qquad U = (41)(66) + \frac{(41)(42)}{2} - 1732.5$$

$U = 1834.5$

$$Z \text{ Value} = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1+n_2+1)}{12}}}$$

$Z = 3.08$

Exhibit 7

$Ho_1(24)$: There is no significant difference between the productivity of real estate sales workers who have held a leadership position in a civic or professional organization and those who have not held a leadership position.

HYPOTHESIS NO. 1(24)

Rank - Leadership Activity (n_1)		Rank - No Leadership Activity (n_2)		
5.0	51.5	1.0	41.5	86.0
7.5	58.5	2.5	44.0	87.5
10.0	60.0	2.5	49.0	87.5
13.0	61.0	4.0	51.5	89.5
15.0	62.0	7.5	51.5	92.0
19.0	63.5	7.5	51.5	93.5
24.0	65.0	11.0	54.0	93.5
24.0	66.0	12.0	55.5	95.5
29.0	67.0	15.0	55.5	95.5
30.0	69.5	15.0	55.5	99.0
31.0	71.5	17.5	58.5	100.0
32.0	71.5	20.0	63.5	101.0
33.5	73.0	21.0	68.0	103.0
33.5	79.0	24.0	69.5	105.5
35.0	81.5	24.0	74.0	105.5
36.0	84.0	24.0	75.0	107.0
38.0	85.0	27.0	76.0	
41.5	89.5	28.0	77.0	
44.0	91.0	37.0	78.0	
46.0	97.5	39.0	80.0	
47.0	97.5	40.0	81.5	
48.0	104.0	17.5	83.0	

MANN-WHITNEY U-TEST

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \qquad U = (44)(63) + \frac{(44)(45)}{2} - 2291.0$$

$U = 1471$

$$\text{Z Value} = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1+n_2+1)}{12}}}$$

$Z = .538$

APPENDIX C

Exhibit 1

ORDINARY LEAST SQUARES ANALYSIS OUTPUT

EQUATION 4

ORDINARY LEAST SQUARES

DEPENDENT VARIABLE Y1

SUM OF SQUARED RESIDUALS =	.607936.
STANDARD ERROR OF THE REGRESSION =	79.9760
MEAN OF DEPENDENT VARIABLE =	158.142
STANDARD DEVIATION OF DEP. VARIABLE =	116.362
R-SQUARED =	.9724
ADJUSTED R-SQUARED =	.9323
F-STATISTIC(9., 46.) =	14.7783
LOG OF LIKELIHOOD FUNCTION =	-609.090
NUMBER OF OBSERVATIONS =	106.000
SUM OF RESIDUALS =	.267357E-08
DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) =	.7986

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-488.614	108.543	-4.502
X1	-4.81262	.969302	-4.965
X2	1.59775	.481240	3.320
X3	6.43381	1.82533	3.525
X18	2.81134	.960041	2.928
X22	52.9685	24.5832	2.901
X14	37.1284	17.9414	2.069
X19	9.06680	4.59159	1.973
X16	-10.4225	6.75102	-1.544
X7	1.18759	1.03185	1.151

Exhibit 2

LINEAR PROBABILITY PROGRAM MODIFICATION

```
LINE  ********************************************************************

  1.  $$NAME,KERRY GATLIN REAL ESTATE DATA$
  1.  LOAD$
  2.  PROC,LPROB,YH,W,YH,CH$
  3.  SMPL 1 1065$
  4.  GENR D = YH .GE. 1.0$
  5.  DEPL$
  6.  SMPLIF D$
  7.  GENR YH = .99$
  8.  NODEPL$
  9.  SMPL 1 1065$
 10.  GENR D0 = YH .LE. 1.0$
 11.  DEPL$
 12.  SMPLIF D0$
 13.  GENR YH = .025
 14.  NODEPL$
 15.  SMPL 1 1065$
 16.  GENR W = 1/(YH*(1-YH))$
 17.  GENR YW = Y2*(W**.5)$
 18.  GENR CH = W**.5$
 19.  ENDP;LPROB$
 20.  PROC,CNT,YHH,W$
 21.  SMPL 1 1065$
 22.  GENR YHH=YHH/(W**.5)$
 23.  SMPL 1 53$
 24.  GENR IND1= YHH .GE. .5$
 25.  MAKE VEC1,IND1$
 26.  INPROD 53,1,1,VEC1,VEC1,SUM1$
 27.  SMPL 54 1065$
 28.  GENR IND2 = YHH .LT. .5$
 29.  MAKE VEC2,IND2$
 30.  INPROD 53,1,1,VEC2,VEC2,SUM2$
 31.  SET PROP1 = (SUM1*100)/53$
 32.  SET PROP2 = (SUM2*100)/53$
 33.  SET PROP = (PROP1 + PROP2)/2$
 34.  PRINTV PROP1 PROP2 PROP$
 35.  ENDP,CNT$
 36.  SMPL 1 1065$
 37.  OLSQ Y2 C X1 X2 X3 X18$
 38.  RETRV,YH,S3,T$
 39.  LPROB,YH,W,YH,CH$
 40.  GENR X1W = X1*(W**.5)$
 41.  GENR X2W = X2*(W**.5)$
 42.  GENR X3W = X3*(W**.5)$
 43.  GENR X18W = X18*(W**.5)$

 44.  OLSQ YW CW X1W X2W X3W X18W$
 45.  RETRV,YHH,S3,T$
 46.  CNT,YHH,W$
 47.  STOP$
 48.  END$
```

Exhibit 3

LINEAR PROBABILITY ANALYSIS OUTPUT (best equation)

EQUATION 1
****

ORDINARY LEAST SQUARES

DEPENDENT VARIABLE Y2

SUM OF SQUARED RESIDUALS =	16.7489
STANDARD ERROR OF THE REGRESSION =	.413410
MEAN OF DEPENDENT VARIABLE =	.500000
STANDARD DEVIATION OF DEP. VARIABLE =	.502375
R-SQUARED =	.3680
ADJUSTED R-SQUARE =	.3228
F-STATISTIC (7., 98.) =	8.15065
LOG OF LIKELIHOOD FUNCTION =	-52.6170
NUMBER OF OBSERVATIONS =	106
SUM OF RESIDUALS =	-.275291E-11
DURBIN-WATSON STATISTIC (Adj. FOR 0. GAPS)	.4369

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-2.32530	.529335	-4.393
X1	.917474E-02	.502323E-02	1.826
X2	.217049E-02	.234937E-02	.924
X3	.333965E-01	.929374E-02	3.593
X18	.172515E-01	.498043E-02	3.464
X22	-.219512	.123913	1.772
X19	.528954E	.241360E-01	2.192
X7	.871079E-02	.530562E-02	1.642

Exhibit 3 (continued)

EQUATION 2
****

ORDINARY LEAST SQUARES

DEPENDENT VARIABLE YW

SUM OF SQUARED RESIDUALS =	88.6034
STANDARD ERROR OF REGRESSION =	.950851
MEAN OF DEPENDENT VARIABLE =	1.68689
STANDARD DEVIATION OF DEP. VAR.=	2.31031
LOG OF LIKELIHOOD FUNCTION =	-140.906
NUMBER OF OBSERVATIONS =	106.000
SUM OF RESIDUALS =	.812158
DURBIN-WATSON STATISTIC =	.4309

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
CW	-2.33984	.321412	-7.280
X1W	.776289E-02	.261321E-02	2.971
X2W	.227920E-02	.142785E-02	1.596
X3W	.282072E-01	.431109E-02	6.543
X18W	.158202E-01	.273774E-02	5.779
X22W	-.163994	.720579E-01	-2.276
X19W	.573113E-01	.175106E-01	3.273
X7W	.107155E-01	.379854E-02	2.821

Exhibit 3(continued)

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

	CW	X1	X2	X3	X18	X22
CW	.103306	-.295411E-03	.238236E-04	.426338E-03	-.237886E-03	-.184648E-02
X1W	-.295411E-03	.682887E-05	-.147213E-05	.150124E-06	.709328E-06	.122920E-05
X2W	.238236E-04	-.147213E-05	.203876E-05	-.695996E-06	.375070E-06	.267409E-04
X3W	.426338E-03	.150124E-06	-.695996E-06	.185855E-04	-.405270E-05	-.280891E-04
X18W	-.237886E-03	.709328E-06	.375070E-06	-.405270E-05	.749521E-05	-.290838E-04
X22W	-.184648E-02	.122920E-05	.267409E-04	-.280891E-04	-.290838E-04	.519234E-02
X19W	-.397210E-02	.183498E-04	-.686951E-05	-.664473E-05	-.888346E-05	-.174826E-03
X7W	-.433991E-03	-.492644E-05	.678998E-06	-.439313E-05	-.117095E-05	.677721E-04
	1	2	3	4	5	6

	X19W	X7W
CW	-.397210E-02	-.433991E-03
X1W	.183498E-04	-.492644E-05
X2W	-.686951E-05	.678997E-06
X3W	-.664473E-05	-.439413E-05
X18W	-.888346E-05	-.117095E-05
X22W	-.174826E-03	.677721E-04
X19W	.306622E-03	-.507834E-05
X7W	-.507834E-05	.144289E-04
	7	8

PROP1 = 75.4717

PROP2 = 88.6792

PROP3 = 82.0755

Exhibit 4

PRINCIPAL COMPONENTS ANALYSIS LOADING AND MODIFICATION

```
LINE  ....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8

  1.  TSNAME,KERRY GATLIN REAL ESTATE DATAS
  1.  LOADF
  2.  SMPL 1 105$
  3.  GENR P1= .559*X1 + .270*X2 + .279*X3 -.783*X4 -.157*X5 + .834*X6
  3.    +.665*X7 -.758*X8 -.881*X9 +.808*X10 +.571*X11 -.538*X12
  3.   -.319*X13 +.230*X14 -.253*X15 -.204*X16 -.482*X17 +.224*X18
  3.   -.077*X19 -.095*X20 -.073*X22$
  4.  GENR P2= .554*X1+.239*X2 -.046*X3 -.396*X4 -.325*X5 -.193*X6
  4.   -.343*X7 + .402*X8 +.191*X9 +.054*X10 -.701*X11 -.579*X12
  4.   -.221*X13 +.124*X14 +.104*X15 -.118*X16 -.672*X17 -.690*X18
  4.   -.116*X19 -.064*X20 +.063*X22$
  5.  GENR P3= .154*X1 -.738*X2 -.178*X3 -.050*X4 +.836*X5 +.164*X6
  5.   +.052*X7 +.071*X8 -.057*X9 +.198*X10 -.004*X11 -.175*X12
  5.   -.111*X13 -.512*X14 +.130*X15 +.073*X16 -.140*X17 -.182*X18
  5.   -.569*X19 -.243*X20 -.195*X22$
  6.  GENR P4= .038*X1 +.316*X2 +.001*X3 +.093*X4 +.026*X5 +.168*X6
  6.   +.152*X7 -.007*X8 +.070*X9 -.027*X10 -.146*X11 +.095*X12
  6.   +.170*X13 -.615*X14 -.627*X15 +.520*X16 +.061*X17 -.167*X18
  6.   -.379*X19 +.232*X20 -.735*X22$
  7.  GENR P5= .052*X1 -.233*X2 +.100*X3 +.047*X4 -.043*X5
  7.   +.245*X6 -.154*X7 -.103*X8 -.094*X9 +.172*X10 -.068*X11
  7.   +.038*X12 +.5?0*X13 +.114*X14 +.486*X15 +.435*X16 -.128*X17
  7.   +.097*X18 +.027*X19 +.654*X20 +.122*X22$
  8.  GENR P6= .148*X1 -.116*X2 +.773*X3 +.143*X4 -.006*X5 -.029*X6
  8.   +.235*X7 +.013*X8 +.160*X9 -.067*X10 -.045*X11 -.049*X12
  8.   -.035*X13 +.093*X14 +.242*X15 -.534*X16 +.217*X17 -.183*X18
  8.   -.093*X19 +.053*X20 -.304*X22$
  9.  GENR P7= .012*X1 +.187*X2 -.092*X3 -.063*X4 -.291*X5 +.098*X6
  9.   +.051*X7 -.035*X8 +.077*X9 +.157*X10 +.056*X11
  9.   +.009*X12 +.635*X13 -.284*X14 +.134*X15 -.180*X16 +.172*X17
  9.   -.152*X18 -.316*X19 -.381*X20 +.040*X22$
 10.  GENR P8= .133*X1 -.061*X2 -.307*X3 +.038*X4 -.075*X5 +.143*X6
 10.   +.314*X7 -.167*X8 -.015*X9 -.003*X10 -.072*X11 +.072*X12
 10.   -.071*X13 -.096*X14 +.235*X15 +.109*X16 +.132*X17 -.335*X18
 10.   +.575*X19 -.172*X20 -.245*X22$
 11.  GENR P9= .010*X1 +.077*X2 -.171*X3 +.082*X4 -.012*X5 -.035*X6
 11.   +.015*X7 +.092*X8 +.073*X9 +.203*X10 -.003*X11 -.143*X12
 11.   +.013*X13 -.337*X14 -.134*X15 -.414*X16 +.068*X17 +.017*X18
 11.   +.144*X19 +.482*X20 -.040*X22$
 12.  PROC,LPR03,YH,W,YW,CH$
 13.  SMPL 1 105$
 14.  GENR D = YH .GE. 1.0$
 15.  REPL$
 16.  SMPLIF D$
```

Exhibit 4 (continued)

```
17.   GENR YH = .98$
18.   PRINT YH$
19.   NOREPL$
20.   SMPL 1 136$
21.   GENR DD = YH .LE. 0.0$
22.   REPL$
23.   SMPLIF DD$
24.   GENR YH = .02$
25.   PRINT YH$
26.   NOREPL$
27.   SMPL 1 105$
28.   GENR W = 1/(YH*(1-YH))$
29.   GENR YW = Y2*(W**.5)$
30.   GENR CW = W**.5$
31.   ENDP,LPROB$
32.   PROC,CNT,YWH,WH$
33.   SMPL 1 105$
34.   GENR YHH=YWH/(W**.5)$
35.   SMPL 1 53$
36.   GENR IND1= YHH .GE. .5$
37.   MMAKE VEC1,IND1$
38.   INPROD 53,1,1,VEC1,VEC1,SUM1$
39.   SMPL 54 105$
40.   GENR IND2 = YHH .LT. .5$
41.   MMAKE VEC2,IND2$
42.   INPROD 53,1,1,VEC2,VEC2,SUM2$
43.   SET PROP1 = (SUM1*100)/53$
44.   SET PROP2 = (SUM2*100)/53$
45.   SET PROP = (PROP1 + PROP2)/2$
46.   PRINTV PROP1 PROP2 PROP$
47.   ENDP,CNT$
48.   SMPL 1 105$
49.   OLSQ Y2 C P1 P2 P3 P4 P5 P6 P7 P8 P9$
50.   RETRV,YH,33,T$
51.   PRINT YH$
52.   LPROB,YH,W,YW,CW$
53.   PRINT YH$
54.   GENR P1W = P1*(W**.5)$
55.   GENR P2W = P2*(W**.5)$
56.   GENR P3W = P3*(W**.5)$
57.   GENR P4W = P4*(W**.5)$
58.   GENR P5W = P5*(W**.5)$
59.   GENR P6W = P6*(W**.5)$
60.   GENR P7W = P7*(W**.5)$
61.   GENR P8W = P8*(W**.5)$
62.   GENR P9W = P9*(W**.5)$
63.   OLSQ YW CW P1W P2W P3W P4W P5W P6W P7W P8W P9W$
64.   RETRV,YWH,33,T$
65.   CNT,YWH,WH$
66.   STOP$
67.   END$
```

Exhibit 5

PRINCIPAL COMPONENTS ANALYSIS OUTPUT (best equation)

EQUATION 1

ORDINARY LEAST SQUARES

DEPENDENT VARIABLE Y2

SUM OF SQUARED RESIDUALS =	18.5022
STANDARD ERROR OF THE REGRESSION =	.439012
MEAN OF DEPENDENT VARIABLE =	.500000
STANDARD DEVIATION OF DEP. VARIABLE =	.502375
R-SQUARED =	.3018
ADJUSTED R-SQUARED =	.2363
F-STATISTIC(9., 96.) =	4.61077
LOG OF LIKELIHOOD FUNCTION =	-57.8935
NUMBER OF OBSERVATIONS =	106.000
SUM OF RESIDUALS =	-.221156E-11
DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) =	.3955

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	.270263	.538511	.502
P1	.5322 92E-02	.106490E-02	4.998
P2	-.3197 17E-02	.180256E-02	-1.774
P3	-.7138 38E-02	.305339E-02	-2.337
P4	.4374 23E-02	.796139E-02	.549
P5	-.4092 04E-02	.591158E-02	-.692
P6	.2868 80E-01	.834755E-02	3.435
P7	-.1337 75E-01	.762775E-02	-1.754
P8	-.1565 98E-01	.105293E-01	-1.487
P9	-.1796 15E-01	.145138E-01	-1.237

Exhibit 5 (continued)

EQUATION 2

ORDINARY LEAST SQUARES

DEPENDENT VARIABLE YW

SUM OF SQUARED RESIDUALS =	95.3277
STANDARD ERROR OF THE REGRESSION =	.995492
MEAN OF DEPENDENT VARIABLE =	1.53930
STANDARD DEVIATION OF DEP. VARIABLE =	2.21351
LOG OF LIKELIHOOD FUNCTION =	-144.783
NUMBER OF OBSERVATIONS =	106.000
SUM OF RESIDUALS =	1.26242
DURBIN-WATSON STATISTIC (ADJ. FOR 0. GAPS) =	.4008

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
CW	.292019	.317565	.920
P1W	.4898516-02	.5322786-03	9.203
P2W	-.3042536-02	.1246916-02	-2.452
P3W	-.7561316-02	.1676976-02	-4.509
P4W	-.3758306-02	.5704466-02	-.659
P5W	-.6276146-02	.3961576-02	-1.584
P6W	.2445466-01	.4712126-02	5.191
P7W	-.1187176-01	.4917196-02	-2.414
P8W	-.1205496-01	.6314436-02	-1.919
P9W	-.8448686-02	.8180026-02	-1.033

Exhibit 5 (continued)

ESTIMATE OF VARIANCE-COVARIANCE MATRIX OF ESTIMATED COEFFICIENTS

	CH	P1H	P2H	P3H	P4H	P5H
CH	.100847	-.191208E-04	.241258E-03	-.283487E-03	-.179345E-03	-.893086E-04
P1H	-.191208E-04	.283329E-06	.557276E-07	.151473E-06	-.793280E-06	-.323046E-06
P2H	.241258E-03	.557276E-07	.153987E-05	.260561E-07	.473326E-05	.352081E-06
P3H	-.283487E-03	.151473E-06	.260561E-07	.281222E-05	.221778E-05	.523533E-06
P4H	-.179345E-03	-.793280E-06	.473326E-06	.221778E-05	.325408E-04	.164189E-04
P5H	-.893086E-04	-.323046E-06	.352081E-06	.523533E-06	.164189E-04	.156940E-04
P6H	-.333211E-03	.556144E-06	.179172E-05	.215426E-05	.108863E-05	-.444178E-05
P7H	-.113198E-02	.682828E-06	-.117523E-05	.613404E-05	-.141915E-06	.243881E-05
P8H	.629235E-04	-.824456E-06	-.181875E-05	-.480250E-05	-.263587E-05	-.253074E-05
P9H	-.663476E-03	.108171E-05	.198008E-05	.224736E-05	-.386191E-04	-.276501E-04
	1	2	3	4	5	6

	P6H	P7H	P8H	P9H
CH	-.333211E-03	-.113198E-02	.629235E-04	-.663476E-03
P1H	.556144E-06	.682828E-06	-.824456E-06	.108171E-05
P2H	.179172E-05	-.117523E-05	-.181875E-05	.198008E-05
P3H	.215426E-05	.613404E-05	-.480250E-05	.224736E-05
P4H	.108863E-05	-.141915E-06	-.263587E-05	-.386191E-04
P5H	-.444178E-05	.243881E-05	-.253074E-05	-.276501E-04
P6H	.222041E-04	.314315E-05	-.716799E-05	.374988E-05
P7H	.314316E-05	.241738E-04	-.178871E-04	.114516E-04
P8H	-.716799E-05	-.178871E-04	.398720E-04	.242008E-05
P9H	.374988E-05	.114516E-04	.242008E-05	.669127E-04
	7	8	9	10

PROP1 = 71.5331

PROP2 = 77.3535

PROP = 74.5293

Exhibit 6

CHI-SQUARE FOR A 2X2 CONTINGENCY TABLE

	Top Half	Bottom Half	
Top Producers Predicted:	A 40	B 13	53
Expected by Chance:	C 26.5	D 26.5	53
	66.5	39.5	n = 106

Formula

$$x^2 = \frac{n\,[\,|AD - BC|\, - (n/2)]^2}{(A+B)\,(C+D)\,(A+C)\,(B+D)}$$

Where: A = Top half of producers correctly classified
B = Top half of producers incorrectly classified
C = Expected correct classifications by chance (.5)
D = Expected incorrect classifications by chance (.5)

$$x^2 = \frac{106[\,|(40)(26.5) - (13)\,(26.5)|\, - (106/2)]^2}{(40+13)\,(26.5+26.5)\,(40+26.5)\,(13+26.5)}$$

$X^2 = 6.30$ Critical Values = 3.84 at the .05 level of significance
6.63 at the .01 level of significance

Conclusion: Prediction of Top Producers does not exceed chance by a significant degree at the .01 level of significance.

Prediction of Top Producers does exceed chance by a significant degree at the .05 level of significance.

Exhibit 7

CHI-SQUARE FOR A 2X2 CONTINGENCY TABLE

	Top Half	Bottom Half	
Bottom Producers Predicted:	A 6	B 47	53
Expected by Chance:	C 26.5	D 26.5	53
	32.5	73.5	n = 106

Formula:

$$x^2 = \frac{n[\,|AD - BC\,| - (n/2)]^2}{(A+B)(C+D)(A+C)(B+D)}$$

Where: A = Bottom half of producers incorrectly classified
B = Bottom half of producers correctly classified
C = Expected incorrect classification by chance (.5)
D = Expected correct classification by chance (.5)

$$x^2 = \frac{106[\,|(6)(26.5) - (47)(26.5)| - (106/2)]^2}{(6+47)(26.5+26.5)(6+26.5)(47+26.5)}$$

$x^2 = 16.87$ Critical Values = 6.63 at the .01 level of significance
3.84 at the .05 level of significance

Conclusion: Prediction of Bottom Producers exceeds chance at both the .05 and .01 level of significance.