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ABSTRACT

This study describes a comparative analysis of characteristics of directors of nonprofit day care centers and directors of proprietary day care centers to discover whether directors exhibited Machiavellian characteristics. Characteristics considered Machiavellian were tendencies toward manipulating other people and using other people to one's advantage. Basic demographic information was collected from 94 directors in 101 day care centers in the St. Louis area, and analyzed with scores on the Mach IV scale, which quantifies a person's general strategy for dealing with other people. Results showed that directors of proprietary day care centers tended to exhibit more Machiavellian characteristics in interaction with others, such as staff members, parents, and children than directors of nonprofit day care centers. Whether the director directs more than one center was also found to be predictive of the Mach IV score. It was suggested that proprietary day care center directors may have to manipulate others for economic survival. (BRT)

AN INVESTIGATION OF THE MACHIAVELLIANISM OF DAY CARE CENTER DIRECTORS IN THE ST. LOUIS METROPOLITAN AREA

by

Susan Marlene Whitney Nall, B.S., M.A.T. in Education

A Digest Presented to the Faculty of the Graduate School of Saint Louis University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

1975

Day care has been emerging as a national social and educational issue since the mid-1960's. This can be attributed to an increased awareness of the crucial early years of a child's life and the growing need for child care. The director of the day care center is the person who is ultimately responsible for the functioning of the day care center. Since directors of day care centers are administrators, they necessarily work with many people--staff, parents, and children. Therefore, they are in a position to exhibit Machiavellian characteristics in their relationships with people.

Machiavellianism is an attribute that can be defined as an orientation toward manipulating other people.

The problem investigated was: Do directors of proprietary day care centers have a higher Machiavellianism score than directors of nonprofit day care centers? Because proprietary day care centers operate for a profit, therefore, a part of the business world, it was hypothesized that their directors would have a higher Machiavellianism score than directors of nonprofit day care centers.

The population for the study consisted of the 94 directors of the 101 licensed day care centers in St. Louis City and St. Louis County. Each director was mailed three items on May 9, 1974: (1) an explanatory

cover letter, (2) the Mach IV Scale, and (3) the Day Care Center and Personnel Data Sheet. Fifty-seven were returned in usable form which was a 61 percent return.

Since the investigation included an exploratory aspect relative to a little-researched population, demographic information was supplied through the research procedure. The results indicated that nonprofit centers were more likely to be located in the city as opposed to the county and offer day care only in their program. Proprietary centers offered day care plus other program options such as after school care or a half-day nursery school program. Directors of nonprofit centers had attained more education than directors of proprietary centers.

The Machiavellianism score for directors of proprietary day care centers was higher than for nonprofit day care center directors. The difference was statistically significant at the .05 level. Thus, the hypothesis in the study was supported.

The study also sought to investigate the contribution of each independent variable to the dependent variable, the Mach score. The full model with all the variables included accounted for 63.8 percent of the total variance in the Mach scores which was not found to be statistically significant. A significant

proportion of the total variance in the Mach scores was accounted for by two variables: knowledge of whether the director directs more than one center and knowledge of type of center--nonprofit or proprietary. The former variable was found to account for 6.9 percent of the total variance in the Mach scores.

The most significant result of the study was the second variable, knowledge of whether the center is operated on a nonprofit or proprietary basis. That variable was found to account for 7.3 percent of the total variance in the Mach score.

This strongly suggested that the Machiavellianism of directors of proprietary day care centers exceeds that of directors of nonprofit day care centers and that the variance in Mach scores is due to knowledge of the type of center. This necessarily suggests that Machiavellian characteristics such as manipulating other people and using other people to one's advantage would be more common among proprietary day care center directors.

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Chapter I

Introduction

Background

Day care programs have been emerging as a national issue since the mid-1960's. It certainly is one of the social and educational issues of the seventies. Although day care has been in existence for many years, several recent developments seem to have prompted the present concern. They may be classified as economic, social, political, and educational.

Economically, it has become necessary for the spouse in many lower- and middle-income families to supplement the primary wage earner in order to attain a comfortable level of living. Due to changing social beliefs concerning divorce and an increase in the number of parents without partners, many females who are the head of the household are in the labor force (Keyserling, 1972).

Pressure for welfare reform has been another contributing economic and social factor. In recent years, people who live at the poverty level have become increasingly articulate about changes they feel should be made. There are many single-parent families on

welfare. If these parents are to be trained for new jobs, they need child care services.

Equal opportunity, as promoted by the women's liberation movement, has demanded quality care for the children of women who wish to work. Minority groups in the United States have demanded care for their children, which would enable the parents to work.

Economic and political factors have served to dramatically increase the number of women in the labor force. The Westinghouse Learning Corporation and Westat Research, Inc., in a survey prepared for The Office of Economic Opportunity (1971), reported that the total number of working mothers has more than doubled since 1950. Projections for 1980 suggest there will be in the work force at least 5.3 million mothers with children under the age of 5--a 43 percent increase between 1970 and 1980. In 1970 the U.S. Office of Child Development reported that about 60 percent of the children in the United States have mothers who work and who are, therefore, away from the home a significant part of the day.

Educationally, a new interest in child development has enhanced the concern for day care. In the past 20 years research relative to the physical, intellectual, social, and emotional development of the young child has expanded considerably. Recently there

has been strong concern with how the young child learns. In the early 1960's, two major works, J. McVicker Hunt's Intelligence and Experience (1961) and Benjamin Bloom's Stability and Change in Human Characteristics (1964) suggested that a child's intelligence could be enhanced markedly in the early years. Since research has indicated that children from birth to age 5 are capable of learning a great deal more than previously thought, it is up to educators to create environments in which children can be challenged, yet feel wanted and secure (LaCrosse, 1971).

Meeting the needs of children is paramount to the whole issue of day care. The Child Development/Day Care Workshop established by the Office of Child Development in the U.S. Department of Health, Education, and Welfare was charged with the responsibility of developing guidelines for day care programs which could be used throughout the country. The Workshop began with the assumption that the primary objective of day care was "to meet the needs of children for experiences which will foster their development as human beings" (LaCrosse, 1971). They considered the following elements of prime concern in the growth and development of children: health and nutrition, security, freedom, structure, understanding,

developmental differences, and the need for challenge.

Although recently day care centers for young children have increased rapidly throughout the United States, the need is still great. Different sources revealed varying statistics.

Griffin (1973) expressed a need for 3,000 to 4,000 new day care facilities a month, for some 3.5 million parents with small children.

The Westinghouse Learning Corporation and Westat Research, Inc. cited the following statistics (1971):

Children under age 6 with working mothers	3,800,000
Children in day care facilities	1,300,000
Children aged 6 to 14 with working mothers	8,500,000
Children in before and/or after school care	233,000

In addition, their survey stated 358,000 low- and moderate-income working mothers were very dissatisfied with their present arrangements for child care. An estimated three-quarters of a million low- and moderate-income mothers were not working because of the lack of satisfactory child care.

The national need for day care has been reflected dramatically in the St. Louis metropolitan area in a report prepared by the Health and Welfare Council of Metropolitan St. Louis for The Child Day Care

Association (1973) in which estimates were made of the number of children who currently were most in need of adequate day care facilities. The Child Day Care Association is the day care planning agency for St. Louis County, St. Louis City, and St. Charles County.

For St. Louis City as a whole, the estimated number of children whose family head or heads were in the labor force was approximately 40 percent of all the children under 6 years of age. Of that percentage, an estimated 90 percent would be availing themselves of day care facilities, if it weren't for the lack of facilities. In St. Louis County the need estimated was approximately 28 percent of the total possible. Of that percentage, an estimated 89 percent are in need of day care facilities. For school-age children, ages 6 to 13, 56 percent of all children need child care in St. Louis and 40 percent in St. Louis County. The report did not indicate the extent to which this need exceeded available day care services.

Federal government agencies and most states recognize three types of day care: (1) the day care center (operated either as a separate institution or as part of another entity such as a factory, hospital, school, church, etc.), (2) a group day care home, and (3) a family day care home (Griffin, 1973). None of

these includes what are commonly called nursery schools or preschools, which are usually operated on a half-day basis and emphasize the child's development of skills.

Three of the major differences between nursery school and day care were delineated by Pizzo in Operational Difficulties of Group Day Care (1972):

1. Day care's essential role is that of supplemental family. Nursery schools need not have the same aspirations.
2. Day care means a long unbroken day for staff and children. Nursery school does not.
3. The interactions of day care parents are fraught with special problems nursery schools don't experience.

The differences serve to intensify the demands made on the day care center directors, as they function in the areas of administration, education, and human relations.

Significance of the Study

In view of the increased awareness of the crucial early years of a child's life and the growing need for child care, the desire to insist, require, and demand that day care programs be of quality became apparent. The Child Welfare League of America (1972) has stated that day care services are inadequate by

almost any measure. Not only must new facilities be created to meet the existing and growing demand, but children and their families require services of a higher quality than those they are presently receiving.

In 1970, to determine priority needs in early childhood research, the Office of Child Development formulated the Interagency Panel on Early Childhood Research and Development. One of the designated areas for investigation and research was day care and its services, including qualifications and characteristics of staff and, more specifically, staff supervision (Grotberg, Searcy & Sowder, 1972).

Good staff supervision and relations are extremely important. In Cost and Quality Issues for Operators (Pizzo, 1972) the statement was made that in day care, more than in most other human services programs, the quality of the results achieved is dependent on the quality, behavior, and happiness of the people involved--staff, children, and parents. The director of the day care center is the person who is ultimately responsible for the center's results. Griffin (1973) stated that the physical plant, the amount of equipment, and the size of the backing are meaningless as compared to the person who directs the center. Since directors of day care centers are administrators, they are in a position to exhibit

Machiavellian characteristics in their relationships with people--specifically parents, children, and staff members.

Machiavellianism is an attribute that can be defined as an orientation toward manipulating other people (Christie, 1970). The measure attempts to quantify a person's general strategy for dealing with other people, especially the degree to which he feels other people are manipulable in interpersonal situations.

Machiavelli's main purpose was to analyze what practices had brought political success in the past, and to deduce from them what principles ought to be followed for political reasons in the present (Jay, 1968).

This study may be viewed as an attempt to discover knowledge of the management of day care centers in Machiavelli terms. It is based on some of Machiavelli's methods; that of taking a current issue and examining it in light of experience and observation. Like Machiavelli who saw the successes and failures of the states stemming directly from the qualities of the leader, the author sees the successes and failures of a day care center directly related to the director.

In light of the growing need for quality day

care, the "state of the art" relative to day care, and the significance of the day care center director, an exploratory study of the St. Louis area day care centers and their directors becomes relevant.

Statement of the Problem

The problem investigated was: Do directors of proprietary day care centers have a higher Machiavellianism score than directors of nonprofit day care centers?

Throughout the literature concerning day care, frequent references were made to the significant role of the director. However, there appeared to be a lack of research pertaining to the specific population of day care center directors.

Day care centers typically are classified according to their basis of operation--nonprofit or proprietary. The primary objective for the existence of the center evolves around this variable. It is speculated that a different type of person would be attracted to the directorship of a nonprofit center than to a proprietary center. The Machiavellianism of that person is seen as one perhaps very basic difference. Because proprietary day care centers operate for a profit and are, therefore, a part of the business world, it is hypothesized that these directors will have a higher

Machiavellianism score than the directors of nonprofit day care centers.

Therefore, the significance of the problem lies in the foundation for future research supplied by the knowledge of the center's basis of operation coupled with the director's Machiavellianism; specifically in terms of the future growth of nonprofit or proprietary centers and the type of people employed as directors.

Statement of Hypothesis

The hypothesis for this study was: The directors of proprietary day care centers will have a higher Machiavellianism score than the directors of nonprofit day care centers.

Definition of Terms

Day care center: A specially designed or adapted facility for the care, during part of the 24-hour day, of groups of 12 or more children.

Day care facility: The building or dwelling, including its outdoor play area, in which a day care program is offered.

Day care program: The activities involved in caring for and protecting a child who is away from his home for some part of the day.

Day care service: A comprehensive service, provided by a professional team that represents the fields of social work, health, and education, for day care children and their parents.

Director: The person who coordinates the overall program and who is responsible for administration of the day care service. The term "operator" often is used interchangeably with director.

Family day care home: A private dwelling in which an individual (generally a mother herself) cares for children other than her own, either as an individual enterprise ("independent day care home") or as part of a community day care service. A family day care home may serve no more than six children, including the family day care mother's own children.

Group day care home: A private dwelling for the care of as many as 12 children. The group day care home is suitable for children who need before- and after-school care and who do not require a great deal of individual care.

Infant: Generally, a child from birth to the age of 18-24 months.

Machiavellianism: An amoral manipulative attitude toward other individuals, combined with a cynical view of men's motives and of their character (Guterman, 1970).

Nonprofit day care: Day care provided by churches, philanthropies, health and welfare and other government agencies without the intention of making a profit.

Preschool child: Generally, a child from the age of 3 to 6 years.

Proprietary day care: Day care provided, by private individuals or business enterprises, as a profit-making activity.

Toddler: A child who can walk unaided, but who is not yet mature enough for group experiences. Toilet training is the usual index in determining when a "toddler" becomes a "preschool child."

Scope and Limitations of the Study

The scope of the study was limited to the population of directors of licensed day care centers in St. Louis City and St. Louis County. Excluded from the study were directors of nonlicensed centers. The major thrust of the study was to seek information pertaining to Machiavellianism as it related to the directors of the two types of day care centers, nonprofit and proprietary. The study also included an exploratory aspect in that demographic information about a little-researched population was supplied.

The study was limited to the point of view of

the directors, with no effort made to correlate their point of view with those of their subordinates. The study did not seek to provide a comprehensive representation of the administrative functions of day care center directors; as Machiavellianism was seen as the underlying trait present regardless of administrative styles.

The extent to which generalizations can be made to directors of nonprofit and proprietary day care centers outside the St. Louis metropolitan area will depend on the degree of similarity between other day care centers and those in the St. Louis area.

Chapter II

Review of Related Literature

Through the years, much has been written in the area of early childhood education. However, the majority of the literature related to day care has appeared only recently. Consequently, research concerning directors of day care centers was sparse. The literature was examined in an attempt to discover knowledge and information relative to the area of day care in general and day care personnel in particular. Therefore, the three divisions of the present chapter were designed to provide a perspective of day care and its reoccurring nature by presenting a historical overview; to discern the related research; and to view the responsibilities of day care center directors.

Historical Overview of Day Care

Day care centers, in some form or other, have been in existence for over 100 years. The concept of day care has been known as a sensitive barometer of national crises; i.e., wars, depression (Fein & Clarke-Stewart, 1973). The first day care center in the United States was established in 1854 in New York City

for children of working mothers who could provide no other care for them (Ruderman, 1968). It was intended as a charitable service to the poor and frequently helpless immigrant women. At that time, the purposes were primarily custodial.

In the 1880's and 1890's the settlement house movement arose in response to the needs of sweatshop toilers, unwed mothers, and the helpless. They became clearinghouses of social service; child care being one of the provisions made necessary as a result of women working.

Although day care centers of the mid- and late-nineteenth century were most concerned with the plight of abandoned and neglected children, habits and skills were not ignored. To say the centers offered only custodial care would be unfair; however, their tone was sober and grim (Fein & Clarke-Stewart, 1973).

During World War I and World War II there existed a substantial number of day care programs because women had to join the work force. Fein and Clarke-Stewart (1973) have suggested day care experienced booms, not only because of the increased number of mothers in the labor market, but also to create jobs for unemployed teachers, nurses, and social workers.

World War II gave the child care movement a major boost. The Lanham Act made funds available for

the group care of young children whose mothers worked in strategic war industries. By 1944 there were in operation in the United States about 90 programs providing some sort of child care (Rowe, 1972).

The period following World War II was characterized by the glorification of the family and the home. Men returned to their jobs in factories and offices, and women returned to their home duties. Day care no longer was seen as a national need or priority; consequently, child care programs shriveled.

During the 1960's and the first four years of the 1970's, day care again received the attention of the American public. Two major works, J. McVicker Hunt's Intelligence and Experience and Benjamin Bloom's Stability and Change in Human Characteristics, have influenced the day care movement. Because both authors have suggested that careful intervention in the early years could greatly enhance a young child's intelligence, the creation of a day care center environment becomes crucial to quality day care.

In addition to the educational concern, homemaking as a career has been questioned by the women's liberation movement. It now is common for women to look outside the home for fulfillment. Ruderman (1968) has written that 100 years after the beginning of day care there is no reason to assume the majority of

working women are destitute, troubled, or inadequate.

Present views of day care have been reflected by Evans, Shub, and Weinstein (1971) who stated that day care is not now a necessary evil; it can be a positive supplement to family relationships. Mattick and Perkins (1973) have asserted that whatever the reasons for day care today, the vision is highly unlikely to be restricted to mere custodial care. Because of the increasing awareness of the crucial early years of a child's life and the growing need for child care due to an increase in the number of women working, day care is once again an issue of public interest.

An eight-step planning model for the development of child care services was presented by Gold (1972). Rationale for the model was founded on the belief that there is a genuine need for expanding child care services, and that day care, by being flexible and providing alternatives, must be responsive to consumer needs. The eight steps were: 1) definition of the planning task, 2) search for solution, 3) evaluation and selection of alternative solutions, 4) consensus, 5) audit, 6) program implementation, 7) authorization, and 8) proposal development.

Information and statistics relative to the two types of day care, nonprofit and proprietary, have been cited in the Day Care Survey, 1970-71. Sixty percent

of all the day care centers were proprietary, and proprietary centers cared for about half of the children enrolled in centers. Among the various nonprofit organizations, churches provided the greatest amount of facilities--about eighteen percent.

Data compiled from visits to 431 day care centers in 90 cities (Keyserling, 1972), indicated that proprietary centers served primarily the middle class, and children from one-parent homes headed by working mothers were a small minority. The quality of day care services had little to do with the rates charged. Less than one percent of the proprietary centers met federal interagency standards as to the ratio of adults to children, space, and the components of being an educational, developmental experience. Nonprofit centers largely enrolled children from low-income families, and children from one-parent homes were given top priority. On the whole, the nonprofit centers presented a more encouraging picture. Nearly a tenth of the nonprofit centers visited as a result of Keyserling's study were regarded as "superior." Qualifications of the directors of nonprofit centers were far higher than those of directors of proprietary centers.

Prescott and Jones with Kritchevsky (1972) found that proprietary centers were more likely to be small in size, keep children ungrouped by age, have

directors who participate in teaching, have men present, and offer morning-only nursery school experience to some children in addition to full day care.

Hostility between public and private centers, an issue common in day care, surfaced in an "Administration of Child Care Centers" course offered at the University of Michigan (Axelrod & Trager, 1972). Several private directors expressed the idea that public centers had more adequate funds, and claimed that, to achieve economy and excellence, competition was necessary. Public center directors who had been voicing their own financial problems complained that private directors were interested in money, not children. Subsequently, the researchers reported that all the directors shared practical suggestions for more economical operations.

Related Studies in Early Childhood Education

There appeared to be a lack of research related specifically to the directors of day care centers. Therefore, studies concerned with day care in general, as well as those with issues related to early childhood education, have been cited...

A study of the professional preparation of directors of day care centers (Willard, 1973) indicated that day care center directors need skill and ability in the fields of administration, education, and human

relations. The purpose of the study was to determine the roles, role expectations, need-dispositions, and personality traits for day care center directors and, using the Getzels and Guba social systems theory, to codify that information into desired skills and competencies. The need to train present and potential directors was recognized. Willard (1973) suggested that day care center directors spend large amounts of time working with adults and that this time was increasing at a persistent rate.

Directors of day care centers have been found to support humanist values. Diamond (1974) surveyed 50 directors of California State Children's Centers for the purpose of gathering data on their opinions of what constitutes a healthy, emotional climate in a child care center. They agreed overwhelmingly that a center should be a place where children can work and play with both older and younger children, express their feelings freely, and work closely with teachers in an environment that is challenging and allows them to take some chances. The important question of whether a center should be a home substitute or a home supplement also was examined. The directors felt strongly that the center should be a supplement, but also have some of the characteristics of a home.

Characteristics of the day care center director have been found to be indicative of the quality of the

center. A Study of Child Care, 1970-71 by Abt Associates, described in a report prepared by the Massachusetts Early Education Project (1972), reported that the successful programs had "warm, resourceful, overworked, energetic directors." The study suggested that the director set the tone for the operation of the center. It further stated:

> An optimistic, caring, responsive, firm director, able to gather resources for the center and to meet the complex and changing needs of children, families, and staff, may be essential to the success of the child care center. Good direction of a child care center seems to require management skills (fiscal planning, budgeting, resource mobilization, and allocation), the ability to delegate authority and responsibility, a sensitivity to the dilemmas of individuals and organizations, and the capacity to work very hard. (p. 55)

Staff-child ratios were found to be key indicators of the "warmth" of the day care center. Centers with low staff-child ratios (1:3, 1:5) appeared to be "warmer" than centers with higher ratios. No correlation was found between formal educational qualifications of the staff and "warmth" of the center.

Leadership style was found to be an important variable in the climate of a day care center. In one of the most extensive studies in day care, reported in Day Care as a Child-Rearing Environment by Prescott and Jones with Kritchevsky (1972), it was hypothesized that there would be differences among day care environments that were related to staff attitudes,

characteristics, and structural variables. Evidence was presented that indicated the director's leadership style of high warmth with situational authority was predictive of teacher performance which was high in encouragement, low in restriction, high in creative lessons, and sensitive in teacher manner. At the other extreme, a leadership style of low warmth with arbitrary authority was predictive of teacher behavior low in encouragement, high in restriction, and high in lessons which emphasized rules of social living and formal skills. Variables such as age, previous experience, and formal education proved of little importance in predicting day care programs. The amount of special training of the directors had some effect on program, but was not as pronounced as was the effect of the teachers' training.

Several studies have been conducted with teachers in day care centers. Jambor (1973) investigated the instructional, maternal, and therapeutic role behavior of day care and nursery school teachers. No significant differences were found between day care and nursery school teachers in their emphasis toward specific role models or, during the same time of day, in their behavior. The study also concluded that younger teachers distributed interactions most evenly among role models and that teachers who majored in early

childhood education didn't emphasize role models any differently than those teachers who majored in an unrelated area.

Highly valued traits for effective teaching or care-giving in a day care setting were emotional warmth, understanding, sensitivity, responsiveness, flexibility, and a willingness to become involved actively with children, according to Fein and Clarke-Stewart (1973). Day care administrators could make it easier for teachers to function effectively "by providing well-organized and suitably equipped physical settings, by grouping children in small numbers, perhaps heterogeneously, and by offering teachers a personal choice whenever possible" (p. 241).

Time and opportunity to learn about the structure, goals, and practices of day care seemed to be a persistent problem for teachers in day care centers. Stent's (1965) study concluded that one of the effective ways in which a teacher in a day care program might continue her education and improve her skills was to participate in an inservice course. The teachers perceived on-the-job help with immediate problems as being the most important facet of inservice education.

Certain objective personality tests and personal information have been found to supply appropriate

data for the selection of day care personnel. Using the personnel of three day care centers in Metropolitan St. Paul, Speer (1966) developed 15 scales which were used in addition to the Minnesota Teacher Attitude Inventory and the Minnesota Multiphasic Personality Inventory. The objectives were to determine whether objective kinds of information existed that specified day care workers who are judged by their supervisors as effective and to explore whether such information might be useful in the selection of prospective day care workers. One specific conclusion stated that women who are less than 55 years of age and who are from higher-income homes, or women who reveal themselves on the Minnesota Multiphasic Personality Inventory as very much like the statistically average person, are likely to be perceived by their supervisors as relatively effective in their jobs.

Research on the results of day care experiences on children were reviewed by Caldwell (1972). Intellectually, studies indicated that children are not harmed by experiences in a day care environment and that many children benefit significantly from such exposure. Research pertaining to the social and emotional development suggested that infants who had extensive contacts with other people tended to develop attachment to more people than infants who had been

isolated. Infants in a day care environment did tend to have a higher rate of respiratory illnesses. In terms of the effect on parents, studies indicated that more of a positive maternal attachment was fostered indirectly.

Significant personality factors have been found to be related to day care experience. Haskel (1952) compared the personalities of children with and without day care experience. The personality factors measured were: external security, internal security, acceptance, adequacy, sexual adjustment, reality, imagination, authority, and overall adjustment. Details of the study were not available.

Related to the day care issue, but somewhat less directly, is that research which employs directors and teachers of nursery schools. Friedberg's (1964) study assessed how nursery school teachers, directors, and early childhood education students view teaching in the nursery school. There was agreement between the three groups relative to the high degree of satisfaction derived from working in a nursery school and to the important contribution nursery school makes to the total growth of the child. The directors emphasized special personal interests in such related fields as psychology and the creative arts.

The professional self-image of preschool teachers has been found to be related to educational

attainment rather than to other attitudes and behaviors that are usually concomitants of professionalism (Handler, 1970). It was suggested that the development of a professional self-image occurs early in the process of professionalization. Another conclusion indicated that preschool teachers present a unique set of circumstances in the impetus for professionalism. This occupational group provides confirmation of the importance of shared values and norms as an essential prerequisite for professionalism.

Some day care staff has been found to be disposed to condemn child behaviors which were either unimportant and wholly natural in view of some experts in child development, and prepared to insist on unrealistic standards for the children under their care (Toole, 1972). Also, the study suggested that day care staff might be reflecting social class orientation to child rearing--in low-income areas staff and parents might be from similar backgrounds; therefore, closer to each other's viewpoints than those of the authorities.

Research pertaining to Machiavellianism in children and how it is related to their parents and teachers was meager, but certainly relevant to the study. Machiavellianism is an attribute that can be defined as an orientation toward manipulating other.

people (Christie, 1970). The measure attempts to quantify a person's general strategy for dealing with other people, especially the degree to which he feels other people are manipulable in interpersonal situations.

A study conducted by Nachamie (1970) constructed and validated an instrument to measure Machiavellianism in children. The conclusion indicated that Machiavellianism can be measured in preadolescents and that the children's scale, known as the Kiddie Mach, was a valid predictor of manipulative behavior.

It has been found that children with high Machiavellianism scores were more successful academically and socially; used manipulative strategies more frequently and effectively, and had greater control over the impression they made on other people than did the children with low Machiavellianism scores (Brazinsky, 1967).

Machiavellianism of parents and their children has also been studied. After studying the Machiavellianism of 48 pairs of fifth grade children, it was concluded that the parents' scores on two Machiavellianism instruments, the Mach IV and Mach V, were unrelated to their children's Machiavellianism score (Brazinsky, 1967). It was found that parental Machiavellianism scores were negatively correlated with their children's manipulative behavior in two independent

experiments designed by Dien (1972). The study was comprised of 4 and 5 year olds and conducted in Japan and the U.S.

A study to determine if Machiavellianism and authoritarian power orientations differed significantly among teacher aspirants divided by choice of teaching specialty was executed by Metze (1968). Conclusions revealed statistically significant differences relative to Machiavellianism. Intermediate teacher aspirants had the highest Machiavellianism score followed by special interest aspirants and secondary aspirants. Primary teacher aspirants had the lowest Machiavellianism scores.

Responsibilities of Day Care Center Directors

Evans, Shub, and Weinstein (1971) divided the responsibilities of day care center directors into two categories: Program Development Responsibilities and Ongoing Responsibilities. Under the former were policy-making decisions, site location, hiring and firing, funding and budget, and recruiting. Supervision and training, authority, staff meetings, and public relations responsibilities were under the latter. The three aforementioned authors emphasize the fact they don't endorse any day care program; and day care programs which function solely to provide baby-sitting services for working parents are unacceptable. They

consider good day care to be an effective, positive educational experience that addresses the needs of children's social, psychological, intellectual, and physical growth and development.

The Child Welfare League of America (1969), an important organization in the development of day care, stated that the director of a day care center should develop and administer the total program, carry responsibility for its operation, and act as a liaison between the board and the staff. According to the League the specific responsibilities are:

1. to support, facilitate, and improve the service within the policies established by the board;
2. to bring before the board the information that will assist it in formulating sound policies; and to make recommendations for changes and improvements in accordance with community needs;
3. to work closely with officers and members of the board, attend board meetings, and participate in the work of appropriate committees;
4. to provide leadership in planning and evaluating the services, in organizing, and in staffing;
5. to select, employ, supervise, evaluate, and, when necessary, dismiss professional, clerical, and maintenance staff;
6. to integrate the various components of the service by providing for and keeping open the lines of communication among staff and by defining clearly the allocation of authority within the agency;

7. to provide a program of staff development;

8. to assist in preparation of the budget, to expend funds within the approved budget, and to provide adequate accountability for such expenditure of funds;

9. to see that good agency relationships are established with parents, with community agencies, and with the community at large;

10. to interpret the service to the community;

11. to participate in or aid in development of research. (p. 94)

Interestingly enough, the duties of the director of a day care center varied only slightly in 1942. A report of the Child Care Committee of the State Defense Council (1942) indicated that the director was the chief executive responsible for administration of a Child Care Center. The director's specific duties were:

1. management and operation of the center

2. employing and discharging staff members, assigning staff duties, supervising the work of the staff

3. development with the staff of the program of the center

4. budget preparation and control, purchasing of food and other routine expenditures subject to budget allocations, and approval of bills

5. menu planning

6. carrying out of the health program under the supervision of the physician

7. induction of volunteers and development of training courses

8. interpretation to the community of recognized standards of child care, maintenance of good public relations, and getting publicity

9. keeping of records and preparation of reports
10. collection of fees
11. holding of staff meetings for discussion of plans and policies and for case conferences aimed at promoting better understanding of individual children
12. maintenance of a close working relationship with parents and fostering of parents' activities. (pp. 59-60)

Consistent throughout the literature that delineated the responsibilities of directors of day care centers was the necessity for the director to work, cooperate, supervise, and interact with a variety of different people. A review of the specific responsibilities served to verify the significance of the role of the director.

The preceding examination of the history of day care, the search of related research, and the inventory of director responsibilities were meant to clarify available information pertaining to day care and support the need for the present investigation of the Machiavellianism of the directors of day care centers.

Chapter III

Procedures

The purpose of the research was to study the St. Louis area day care centers and their directors. Inasmuch as the study sought to investigate the Machiavellianism of the directors of day care centers operated on two different bases, it seemed appropriate to employ two groups of respondents, namely: directors of nonprofit day care centers and directors of proprietary day care centers. The problem was: Do directors of proprietary day care centers have a higher Machiavellianism score than directors of nonprofit day care centers? The purpose of the present chapter is to define the population, explain the data-gathering instruments and procedures, and describe the research design.

Subjects

The population for the study consisted of all the directors of licensed day care centers in St. Louis City and St. Louis County. The most recent information pertaining to the addresses of the centers and names of the directors was obtained from The Child Day Care Association and the Missouri Department of

Welfare which is the licensing agency for day care centers in the state of Missouri.

The population included a total of 94 directors who direct 101 day care centers. There were 37 non-profit directors who direct 40 day care centers and 57 proprietary directors who direct 61 day care centers.

Data-Gathering Instruments

The two instruments used in the study were the Day Care Center and Personnel Data Sheet and the Mach IV scale.

The Day Care Center and Personnel Data Sheet, which the investigator developed, gathered basic demographic information for the purpose of correlation with the Mach score. The data sheet consisted of five questions pertaining to the day care center and seven questions pertaining to the director.

The Mach IV scale was selected because it measured Machiavellianism succinctly and because it was designed for making group comparisons. It attempts to quantify a person's general strategy for dealing with people, especially the degree to which he feels other people are manipulable in interpersonal situations (Christie & Geis, 1970).

Originally 71 items were drawn from the writings of Machiavelli, The Prince and The Discourses. They were conceived as falling into three substantive

areas: (1) the nature of interpersonal tactics, (2) views of human nature, and (3) abstract or generalized morality. An item analysis revealed that about 60 of these correlated at the .05 level with a total Mach score based on the sum of all items. The ten highest related items of those worded in the Machiavellian direction were selected for the Mach IV scale along with the ten highest related items worded in the opposite direction. The counterbalancing was designed to minimize the effects of indiscriminant agreement or disagreement.

The 20-item Mach IV scale was given in a standard six-category Likert format: agree strongly being scored 7, no answer 4, and disagree strongly 1. A constant score of 20 was added to make the neutral score 100. Therefore, the lowest possible Machiavellian score was 40 and the highest 160. The average item-test correlation for the items on the Mach IV scale was .38. Split-half reliabilities determined averaged .79.

The cover letter, the Day Care Center and Personnel Data Sheet, and the Mach IV scale used in the study are in Appendix A.

Data-Gathering Procedures

Each day care center director was mailed three items: (1) an explanatory cover letter, (2) the Mach

IV scale, and (3) the Day Care Center and Personnel Data Sheet. The questionnaires were mailed to all directors on May 9, 1974. Enclosed with each mailing was a stamped, addressed, return envelope for the convenience of the respondents.

To increase the probability of the return of the questionnaires, the cover letter was co-signed by the investigator's doctoral committee chairman. Also, measures were taken to assure the respondent of anonymity. The investigator's address was used as the return address on the return envelope. A code number assigned to the day care center appeared in the lower left corner of the return envelope for calculation purposes and was immediately destroyed upon receiving the returned questionnaires. In addition, an offer to share the results of the study was made to interested respondents.

Return of completed questionnaires began within two days and continued for approximately three weeks. Follow-up telephone calls were made to those directors whose questionnaires were not returned by the stated deadline.

Because of the apparently constant changing status of the population, it became necessary to update much of the information and remail several envelopes after they were returned to the sender because of incorrect information.

These follow-up procedures produced good results. The total length of time involved in collecting the data was approximately six weeks. Of the 94 questionnaires sent to the day care center directors, 57 were returned in usable form which was a 61 percent return.

The following summary of responses from respondents further elucidates information pertaining to their background and to the day care center for which they are responsible. Table 1 indicates the number of directors who returned questionnaires according to the type of day care center.

Table 1

Number of Respondents According to Type of Day Care Center

Type of Day Care Center	Number Mailed	Number Returned Usable Forms	Percentage Returned
Nonprofit	37	30	81%
Proprietary	57	27	47%
Totals	94	57	61%

Returns were fairly well distributed according to the two types of centers. Information supplied was sufficiently representative of each type of day

care center to give the researcher confidence in the N used.

It was interesting to note that circumstances made it impossible for some respondents to return the questionnaire. Three day care centers were without a director temporarily. Two directors were hospitalized for a considerable duration and two day care centers closed about the time of the mailing. In addition to these circumstances, nine directors chose not to complete the questionnaire. Of the 16 reasons supplied for not returning the questionnaires, 3 were from nonprofit centers and 13 were from proprietary centers. Therefore, the possible population was reduced to 78, and, with a return of 57, a 73 percent return was secured.

Table 2 indicates the frequencies or means for each item from the Day Care Center and Personnel Data Sheet concerning the day care center according to the type of day care center.

Table 3 indicates the frequencies or means for each item from the Day Care Center and Personnel Data Sheet concerning the director according to the type of day care center.

In conclusion, the table indicated that directors of nonprofit day care centers were a little older than directors of proprietary day care centers, had a

Table 2

Frequencies and Means for Items from the Day Care Center and Personnel Data Sheet Concerning the Day Care Center

Specific Item Concerning the Day Care Center	Frequency of Response	
	Nonprofit	Proprietary
Basis of Operation	30	27
Proprietary-		
Director and Owner		17
Director only		10
Mean total number of children enrolled in day care center	68	50
Location of day care center		
City	19	3
County	11	24
Program		
Day care only	21	7
Day care plus other program options	9	20

Table 3

Frequencies and Means for Items from the Day Care Center and Personnel Data Sheet Concerning the Director

Specific Item Concerning the Director	Frequency of Response	
	Nonprofit	Proprietary
Sex		
Male	3	3
Female	27	24
Age		
30 years or under	7	9
31-40 years	7	6
41-50 years	10	5
51 + years	6	7
Mean total number of years of work in the area of day care	8.8	9.7
Mean total number of years as a director of a day care center	4	6.7
Level of educational attainment		
High School diploma	0	4
Some college or associate degree	6	8
Undergraduate degree	6	6
Graduate work	5	4
Graduate degree	13	5
Degree in Early Childhood Education	8	5
Directing more than one center	3	0

few less years of experience in the area of day care and as a director, and had more formal education. Nonprofit day care centers enrolled more children than proprietary day care centers and were located in the city more frequently. Nonprofit day care center programs offered day care only while proprietary day care centers offered day care plus other program options.

Research Design

The research design allowed for maximum inference relative to the purpose of the study. The statistical procedures were divided into two general areas: summary statistics and inferential statistics. The summary statistics were preparatory for the inferential statistics. Summary statistics for the continuous data included means and standard deviations. Continuous data were:

1. total number of children enrolled in the day care center
2. total number of years of work in the area of day care
3. total number of years as a director of a day care center
4. Machiavellianism scores

Summary statistics for the categorical data consisted of totaling the frequencies in each category for both the nonprofit and proprietary groups. Categorical data were:

1. type of day care center, nonprofit or proprietary
2. if proprietary, director and owner or director only
3. location of day care center, city or county
4. day care only or day care plus other program options
5. sex of director
6. age of director
7. educational attainment of director
8. Early Childhood Education degree or not of director
9. director of more than one center or not

Inferential statistics included the t test, chi-square, and multiple regression. The data from the t test and chi-square were used to make inferences concerning the population and their Mach scores. Multiple regression was used to determine the contribution of each independent variable, both continuous and categorical, to the dependent variable, the Mach score. Thus, the research design allowed for inference as to the effect each variable had on the Mach score for both the nonprofit and proprietary groups.

Chapter IV

Presentation and Analysis of Data

The nature of the investigation was to study the St. Louis area day care centers and their directors. It was hypothesized that the directors of proprietary day care centers would have a higher Machiavellianism score than the directors of nonprofit day care centers.

The population for the study was the directors of all licensed day care centers in St. Louis City and St. Louis County. Each of the 94 directors was mailed the Day Care Center and Personnel Data Sheet and the Mach IV instrument, along with an explanatory cover letter and an addressed, stamped return envelope. A usable return of 57, which was 61 percent, was received. For the purpose of making inferences concerning the population and their Mach scores, statistical tests used were the t and chi-square tests. The multiple regression approach was used to determine the contribution of each independent variable, both continuous and categorical, to the dependent variable, the Mach score. Information pertinent to the study and an

analysis of the data are included in this chapter.

Since the investigation included an exploratory aspect relative to a little-researched population, demographic information about the specific population of directors of day care centers was supplied. The information was gathered via the Day Care Center and Personnel Data Sheet. In order to compare the means of the continuous variables for the nonprofit and proprietary groups, the t test was used. The results of the t test are presented in Table 4.

Although, on the three continuous variables measured, there was not a statistically significant difference between the nonprofit and proprietary day care centers, an overview of day care centers and their directors in St. Louis City and St. Louis County was presented. Nonprofit day care centers had more children enrolled than proprietary centers. Directors of proprietary day care centers had worked in the area of day care longer and had served in the capacity of director longer than had directors of nonprofit day care centers.

The null hypothesis tested in the study was: The directors of proprietary day care centers will not have a higher Machiavellianism score than directors of nonprofit day care centers. The t test was used to compare the means of the Machiavellianism score for the directors of nonprofit day care centers and the directors of proprietary day care centers. The results are presented in Table 5.

Table 4

Means, Standard Deviations, and Significance Between Means for the Continuous Variables for the Nonprofit and Proprietary Groups

Variable	Mean		Standard Deviation	t Value
	Nonprofit	Proprietary		
Total number of children enrolled in the day care center	68	50	9.68	1.87
Total number of years in the area of day care	8.8	9.7	2.00	0.43
Total number of years as a director of a day care center	4	6.7	1.69	1.43

df = 55 for all t values

The directors of proprietary day care centers had a higher Machiavellianism score than did the directors of nonprofit day care centers. The t test indicated that the difference was statistically significant at the .05 level. Therefore, the null hypothesis for the investigation was rejected. This suggests that there was a significant relationship between the

Table 5

Means, Standard Deviation, and Significance Between Means for the Machiavellianism Score for the Nonprofit and Proprietary Groups

Variable	Mean		Standard Deviation	t Value
	Nonprofit	Proprietary		
Machiavellianism Score	73.1	79.9	3.24	2.09*

df = 55

*p < .05

Note. Machiavellianism scoring is explained in Chapter III, p. 34.

director's Machiavellianism and the basis of the day care center's operation, nonprofit or proprietary.

Further demographic information was gathered from the Day Care Center and Personnel Data Sheet. The frequencies of the categorical variables for the nonprofit and proprietary groups were compared by the chi-square test. The results of the chi-square tests are in Table 6.

Three categorical variables were found to have statistically significant differences at the .05 level. This suggests that the basis of the day care

Table 6

Frequencies, Chi-Square Values, and Significance for the Categorical Variables for the Norprofit and Proprietary Groups

Variable	Frequency Basis of Center's Operation		Chi-Square Value	df
	Nonprofit	Proprietary		
Location of day care center			16.35*	1
City	19	3		
County	11	24		
Program			11.03*	1
Day care only	21	7		
Day care plus other program options	9	20		
Sex of the director			Not Calculable (Expected Frequency <55)	1
Male	3	3		
Female	27	24		
Age of the director			1.92	1
30 years or under	7	9		
31-40 years	7	6		
41-50 years	10	5		
51 + years	6	12		
Level of educational attainment			4.85*	2
High school diploma	0	4		
Some college or associate degree	6	8		
Undergraduate degree	6	6		
Graduate work	5	4		
Graduate degree	13	5		
Degree in Early Childhood Education	8	5	.54	1
Directing more than one center	3	0	Not Calculable (Expected Frequency <55)	1

*$p < .05$

center's operation, nonprofit or proprietary, is indicative of the location, the program, and the director's education. Nonprofit centers are more likely to be located in the city and offer day care only in their program. Proprietary day care centers tend to offer day care plus other program options such as after school care, infant care, etc. Directors of nonprofit centers had more education than directors of proprietary centers.

Although the remaining categorical variables were not found to have statistically significant differences, information concerning the day care centers and their directors in St. Louis City and County was supplied. There appeared to be the same number of males as directors of proprietary day care centers as of nonprofit centers. The frequencies indicated that the age of the directors of the two types of centers was very similar and more nonprofit directors had a degree in Early Childhood Education than did proprietary directors.

The multiple regression approach was used to test for significant relationships between the independent variables, categorical or continuous, and their corresponding dependent variable. The proportion of the total variance in the dependent variable accounted for by each independent variable also was calculated,

so as to determine the effect each variable had on the Mach score.

The multiple regression approach is based on a succession of models which consists of a mathematical relationship between the independent variables and the dependent variables. The models used to calculate the significant proportion of total variance in the dependent variable accounted for by each independent variable are presented in Appendix B.

The design prepared for the Mach score data is in Appendix C. Each variable in the multiple regression equation represented one of the variables of the data. In cases where the t test and the chi-square test showed a significant difference between the nonprofit and proprietary groups on a particular variable, the variable was subdivided into two separate vectors. This has been referred to as "categorical" knowledge (knowledge with regard to type of center, nonprofit or proprietary) in Appendix C and in Table 7.

A summary of the statistics derived from the multiple regression approach is presented in Table 7. For each F test the purpose has been indicated, the model being compared specified, and the R square values, probability, and F ratio given.

The full model, with all the variables included, was found to account for 63.8 percent of the total

Table 7

R Square Values and Differences, Degrees of Freedom, Probabilities, and F-ratios for Comparisons of the Models for the Multiple Regression Design

F Test	Purpose	Full Model	RSQ.	Restricted Model	RSQ.	Difference	df	Probability	F-Ratio
1	$RSQ_f = 0.00$	1	.6376	2	.0000	.6376	34/22	0.381	1.14
2	Curvilinearity present	1	.6376	3	.5894	.0482	6/22	0.811	0.49
3	Director of more than one center	3	.5894	4	.5205	.0689	1/28	0.037	4.70*
4	Degree in Early Childhood Education	4	.5205	5	.5091	.0114	1/29	0.582	0.69
5	Categorical knowledge of educational level	5	.5091	6	.4396	.0694	5/30	0.528	0.85
6	Knowledge of educational level	6	.4396	7	.3478	.0981	4/35	0.243	1.43
7	Categorical knowledge of number of years as a director	7	.3478	8	.3471	.0007	1/39	0.831	0.04
8	Knowledge of number of years as a director	8	.3471	9	.3193	.0277	1/40	0.197	1.70
9	Categorical knowledge of number of years in day care	9	.3193	10	.3086	.0107	1/41	0.568	0.65
10	Knowledge of number of years in day care	10	.3086	11	.3001	.0085	1/42	0.517	0.52

Table 7--Continued

F Test	Purpose	Full Model	RSQ.	Restricted Model	RSQ.	Difference	df	Probability	F-Ratio
11	Knowledge of age of director	11	.3001	12	.2109	.0892	3/43	0.156	1.83
12	Knowledge of sex of director	12	.2109	13	.2085	.0024	1/46	0.141	0.14
13	Categorical knowledge of day care only or day care plus other program options	13	.2085	14	.1865	.0220	2/47	0.529	0.65
14	Knowledge of day care or day care plus other program options	14	.1865	15	.1865	.0000	1/49	1.000	0.00
15	Categorical knowledge of location of day care center	15	.1865	16	.1245	.0620	2/50	0.157	1.91
16	Knowledge of location of day care center	16	.1254	17	.1054	.0190	1/52	0.293	1.13
17	Categorical knowledge of number of children	17	.1054	18	.0742	.0312	1/53	0.176	1.83
18	Knowledge of number of children	18	.0742	19	.0727	.0015	1/54	0.766	0.09
19	Knowledge of type of center	19	.0727	20	.0000	.0727	1/55	0.040	4.32*

*$p < .05$

variance in the Mach scores. While this was not found to be significantly different at the .05 level than that proportion which could be accounted for by chance (the F-ratio was 1.14 with a corresponding probability level of 0.381), this did represent a fairly large proportion of the total variance. Perhaps with the addition of other variables or the refinement of existing variables and a larger population, nearly all of the variance of the Mach scores of the directors of day care centers could be accounted for.

The multiple regression approach indicated that three out of seven categorical variables found to have significant differences at the .05 level by the chi-square test, the location of the day care center, knowledge of day care program, and educational level of the directors did not account for significant proportions of the total variance in the Mach scores. However, categorical knowledge of the location of the day care center, city or county, was found to account for 6.2 percent of the total variance. The F-ratio was 1.91 and corresponding probability level .157, which means the F-ratio obtained would be expected to result by chance 15.7 percent of the time.

Categorical knowledge of the day care program, day care only or day care plus other program options, was found to have an F-ratio of 0.65 with a corresponding probability level of 0.529. Educational level was

found to have an F-ratio of 1.43 with a probability level of 0.243.

Other variables with an F-ratio whose probability level was below .25 but greater than .05 included knowledge of the number of years as a director of a day care center (F-ratio = 1.70, probability level = 0.197), knowledge of the age of the director (F-ratio = 1.83, probability level = 0.155), and categorical knowledge of the number of children enrolled in the day care center (F-ratio = 1.85, probability level = 0.176). Although these variables were not significant at the .05 level, the probability levels for their F-ratios were low enough to be considered for further research.

Two variables were found by the multiple regression approach to be significant at the .05 level of probability. Knowledge of whether the director heads more than one center was found to account for 6.9 percent of the total variance found in the Mach scores. The F-ratio was 4.70 and the corresponding probability level was 0.037. Although these results might be of dubious value since they were based on a total of three directors out of 57, that variable may be of importance for further investigation.

However, the most important and encouraging result of the study was the second variable, found to

be significant at the .05 level of probability by the multiple regression approach. Knowledge of whether the center is operated on a nonprofit or proprietary basis (item #19 in Table 7) was found to account for 7.3 percent of the total variance in the Mach scores. Comparison with the restricted model resulted in an F-ratio of 4.32 with a corresponding probability level of 0.040.

The results indicated that not only did the t test disclose that the proprietary group had a significantly higher Mach score than did the nonprofit group, but through the multiple regression approach, knowledge of the type of center accounted for a significant proportion of the total variance in the Mach scores. Thus, this variable seemed to be a very relevant and highly potential variable to pursue in further research of the relationship of Machiavellianism to the directors of day care centers.

The present investigation has suggested strongly that the Machiavellianism of directors of proprietary day care centers exceeds that of directors of nonprofit day care centers. This implies that proprietary day care center directors would tend to exhibit more Machiavellian characteristics in their interaction with other people--staff members, parents, and children, than directors of nonprofit day care

centers. Characteristics considered Machiavellian are tendencies toward manipulating other people and using other people to one's advantage. The immediate explanation is that since proprietary day care centers operate for a profit, therefore, a part of the business world, manipulating others for economic survival may be a significant factor in the operation of the proprietary center.

The significant role of the director of a day care center has been discussed and emphasized previously. Since the directors are administrators and in a position of leadership, it would necessarily follow from the results of this study, that directors of proprietary day care centers would be more Machiavellian in their relationships with staff members. Director-staff teams concern themselves with the obvious issues associated with operating a day care center--goals, philosophy, curriculum, etc.

In examination of the results of this investigation, it is important to remember three things: (1) The study was meant to be exploratory. (2) Machiavellianism was seen as the underlying trait present in day care center directors regardless of administrative styles. (3) The study was limited to the point of view of the directors, with no effort made to correlate their point of view with those of their

subordinates. Consequently, it might be more appropriate to view the results as a first step in the direction of the much needed research in the fast growing area of day care and as providing the foundation for further research specifically utilizing the baseline data provided by this study. Specifically, future research in day care could evolve around the natural classification of centers--nonprofit and proprietary in terms of the quality of the administration, the staff, and the center as a whole. As a result, the number of nonprofit or proprietary day care centers that emerge may be ultimately affected.

Chapter V

Summary, Conclusions, and Recommendations

Summary

Since the mid-1960's day care programs have emerged as a national social and educational issue. This has been attributed to an increased awareness of the crucial early years of a child's life and the growing need for child care. In the past twenty years a new interest in child development has prompted much research relative to the intellectual, social, emotional, and physical development of the young child. Two major works in the early 1960's, J. McVicker Hunt's Intelligence and Experience (1961) and Benjamin Bloom's Stability and Change in Human Characteristics (1964) influenced the day care movement by suggesting, by careful intervention, a child's intelligence could be enhanced markedly in the early years.

The need for child care nationally has been studied extensively. It has been estimated that of the 3,800,000 children under age 6 with working mothers, only 1,300,000 are in day care facilities (Westinghouse Learning Corporation and Westat Research,

Inc., 1971). In the St. Louis metropolitan area, estimates indicated that approximately 90 percent of children whose family head or heads were in the labor force needed day care facilities.

In light of the need for quality day care and the "state of the art" relative to day care, an exploratory study of the St. Louis area day care centers and their directors was relevant.

The director of the day care center is the person who is ultimately responsible for the functioning of the day care center. Since directors of day care centers are administrators, they necessarily work with many people--staff, children, and parents. Therefore, they are in a position to exhibit Machiavellian characteristics in their relationships with people.

Machiavellianism is an attribute that can be defined as an orientation toward manipulating other people (Christie, 1970). The measure attempts to quantify a person's general strategy for dealing with other people, especially the degree to which he feels other people are manipulable in interpersonal situations.

Problem

The problem investigated was: Do directors of proprietary day care centers have a higher Machiavellianism score than directors of nonprofit day care

centers? Because proprietary day care centers operate for a profit, therefore, a part of the business world, it is hypothesized that their directors will have a higher Machiavellianism score than directors of nonprofit day care centers. The hypothesis tested can be stated: The directors of proprietary day care centers will have a higher Machiavellianism score than will directors of nonprofit day care centers.

Review of the Procedures

The population for the study consisted of the directors of licensed day care centers in St. Louis City and St. Louis County. There were 94 directors who direct 101 day care centers. This population consisted of 37 nonprofit directors who direct 40 day care centers and 57 proprietary directors who direct 61 day care centers.

Data gathering instruments consisted of the Day Care Center and Personnel Data Sheet and the Mach IV scale. The Day Care Center and Personnel Data Sheet, developed by the investigator, gathered basic demographic information pertaining to the day care center and to the director.

The Mach IV scale consisted of 20 items given in a standard six-category Likert format. The scale measured Machiavellianism succinctly, and was designed for making group comparisons.

Each day care center director was mailed three items: (1) an explanatory cover letter, (2) the Mach IV scale, and (3) the Day Care Center and Personnel Data Sheet. The questionnaires were mailed on May 9, 1974, along with a stamped, addressed, return envelope. Of the 94 questionnaires sent to the day care center directors, 57 were returned in usable form which was a 61 percent return.

Conclusions

From an analysis of the data collected for this study several results were found.

Because the investigation included an exploratory aspect relative to a little-researched population, demographic information was supplied through the research procedures. The continuous variables examined according to type of center--nonprofit or proprietary--were: (1) total number of children enrolled in the day care center, (2) total number of years in the area of day care, (3) total number of years as a director of a day care center, (4) Machiavellianism score. The Machiavellianism score for directors of proprietary day care centers was higher than that for the nonprofit day care center directors, and the results of a t test indicated that the difference was significant at the .05 level. Thus, the hypothesis in the study was supported.

On the remaining three continuous variables, there did not prove to be a statistically significant difference between the nonprofit and proprietary day care centers. However, an overview of the particular population suggests that nonprofit centers tend to have more children enrolled than do proprietary centers, directors of proprietary day care centers had worked in the area of day care longer and had served as directors longer than did the directors of nonprofit centers.

From an analysis of the categorical variables, further demographic information was gathered according to the basis of operation--nonprofit or proprietary. Categorical variables examined were: (1) location of day care center, (2) day care only offerings or day care plus other program options, (3) sex of director, (4) age of director, (5) educational attainment of director, (6) degree in Early Childhood Education, (7) directing more than one center. There was a statistically significant difference between the nonprofit and proprietary groups on three of the above variables: location of day care center, day care only offerings or day care plus other program options, and educational attainment of the director. This result indicated that nonprofit centers were more likely to be located in the city as opposed to the county,

and offer day care only in their program. Proprietary centers offered day care plus other program options more frequently. Directors of nonprofit centers had attained more education than had directors of proprietary centers.

The study also sought to investigate the contribution of each independent variable to the dependent variable, the Mach score. The full model with all the variables included accounted for 63.8 percent of the total variance in the Mach scores. This was not found to be significantly different at the .05 level than that proportion which could be accounted for by chance.

A significant proportion of the total variance in the Mach scores was accounted for by two variables: (1) knowledge of whether the director heads more than one center, (2) knowledge of type of center--nonprofit or proprietary. The former variable was found to account for 6.9 percent of the total variance in the Mach scores. Although these results might be of dubious value, since they are based on a total of three directors out of 57, that variable may be of importance in further investigation.

The most significant result of the study was the second variable, knowledge of whether the center is operated on a nonprofit or proprietary basis, found

to be significantly different at the .05 level of probability. Knowledge of whether the day care center is operated on a nonprofit or proprietary basis was found to account for 7.3 percent of the total variance in the Mach scores.

This result strongly suggested that the Machiavellianism of directors of proprietary day care centers exceeds that of directors of nonprofit day care centers, and that the variance in Mach scores is due to knowledge of the type of center. It would necessarily follow that Machiavellian characteristics such as manipulating other people and using other people to one's advantage would be more common among proprietary day care center directors. A conclusion derived from this result would be that the staff, parents, and children involved in a proprietary day care center would tend to be manipulated and "used" more than would those involved in a nonprofit center. Further research could pursue the question of how this affects the center itself.

The investigator believes that the results of this investigation have generally provided a basis for further research in the rapidly growing area of day care, and utilizing the information and results of this study, a specific foundation for further research.

Recommendations for Further Research

The results of this study suggest several problems that are worthy of further study and research.

1. What relationship is there between the quality of the day care center and the Machiavellianism of the director?
2. How does the Machiavellianism of the staff members of a day care center correlate with the Machiavellianism of the day care center director?
3. What are the specific administrative styles or leadership behavior of the directors of day care centers?
4. Besides Machiavellianism, what other variables differ between nonprofit and proprietary day care centers?

Appendix A

7612 Walinca Terrace
St. Louis, Missouri 63105
9 May 1974

Dear

As a professional in early childhood education you are aware of the growing need for quality day care. From reading the literature there appears to be a need for considerable study in this area. I am interested in describing administrative processes of day care center directors. By responding to the two enclosed questionnaires you will be contributing to the knowledge in developing quality day care.

All directors of day care centers in metropolitan St. Louis are being asked to complete the two questionnaires. The Day Care Center and Personal Data sheet will take less than five minutes and the Opinionnaire about fifteen minutes. Please return these two items in the enclosed stamped envelope by May 23. I will be happy to share the results of the study with directors who are interested. Please make your request to me via a postcard.

The two questionnaires were designed to be completed and returned anonymously, however, each day care center has been assigned a code which appears on the envelope. As soon as your questionnaires have been returned the envelope and the card with your code number will be destroyed. Day care centers whose card has not been destroyed will be telephoned to suggest their return.

In order for the study to be valid it is important for every director to respond. I thank you in advance for assisting in what I see as a necessary endeavor if we hope to improve early childhood education.

Sincerely,

Suzi Nall

Enclosure

Saint Louis University
Advisor:
Dr. Joseph Schaefer

DAY CARE CENTER AND PERSONNEL DATA SHEET

The following questions are concerned with specific information about your day care center and your own background. Please answer all the questions. Where choices are indicated, check the correct box.

DAY CARE CENTER

1. The day care center is operated on a:
   - ☐ Non-profit basis
   - ☐ Proprietary basis

2. If proprietary:
   - ☐ I am the director and owner.
   - ☐ I am the director (or serve in that capacity) only.

3. _____ Total number of children enrolled in the day care center.

4. The day care center is located in the:
   - ☐ City
   - ☐ County

5. The center offers:
   - ☐ Day care only
   - ☐ Day care plus other program options (such as nursery school, infant care, etc.

DIRECTOR

1. Sex:
   - ☐ Male
   - ☐ Female

2. Age:
   - ☐ 30 years or under
   - ☐ 31-40 years
   - ☐ 41-50 years
   - ☐ 51 + years

3. _____ Total number of years of work in the area of day care.

4. _____ Total number of years as a director of a day care center

5. Level of educational attainment:
   - ☐ High School diploma
   - ☐ Some college, or Associate Degree
   - ☐ Undergraduate degree
   - ☐ Graduate work
   - ☐ Graduate degree

6. Degree in Early Childhood Education:
   - ☐ Yes
   - ☐ No

7. Presently director of more than one center:
   - ☐ Yes
   - ☐ No

Opinionnaire

Listed below are a number of statements. Each represents a commonly held opinion and there are no right or wrong answers. You will probably disagree with some items and agree with others. I am interested in the extent to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate the extent to which you agree or disagree by circling the number in front of each statement. The numbers and their meanings are indicated below.

If you agree strongly, circle +3
If you agree somewhat, circle +2
If you agree slightly, circle +1

If you disagree slightly, circle -1
If you disagree somewhat, circle -2
If you disagree strongly, circle -3

First impressions are usually best in such matters. Read each statement, decide if you agree or disagree and the strength of your opinion, and then circle the appropriate number in front of the statement. Give your opinion on every statement.

1. Never tell anyone the real reason you did something unless it is useful to do so.
   +3 +2 +1 -1 -2 -3

2. The best way to handle people is to tell them what they want to hear.
   +3 +2 +1 -1 -2 -3

3. One should take action only when sure it is morally right.
   +3 +2 +1 -1 -2 -3

4. Most people are basically good and kind.
   +3 +2 +1 -1 -2 -3

5. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
   +3 +2 +1 -1 -2 -3

6. Honesty is the best policy in all cases.
   +3 +2 +1 -1 -2 -3

7. There is no excuse for lying to someone else.
   +3 +2 +1 -1 -2 -3

8. Generally speaking men won't work hard unless they're forced to do so.
   +3 +2 +1 -1 -2 -3

9. All in all, it is better to be humble and honest than to be important and dishonest.
+3 +2 +1 -1 -2 -3

10. When you ask someone to do something for you, it is best to give the real reason for wanting it rather than giving reasons which carry more weight.
+3 +2 +1 -1 -2 -3

11. Most people who get ahead in the world lead clean, moral lives.
+3 +2 +1 -1 -2 -3

12. Anyone who completely trusts anyone else is asking for trouble.
+3 +2 +1 -1 -2 -3

13. The biggest difference between most criminals and other people is that the criminals are stupid enough to get caught.
+3 +2 +1 -1 -2 -3

14. Most men are brave.
+3 +2 +1 -1 -2 -3

15. It is wise to flatter important people.
+3 +2 +1 -1 -2 -3

16. It is possible to be good in all respects.
+3 +2 +1 -1 -2 -3

17. Barnum was wrong when he said that there's a sucker born every minute.
+3 +2 +1 -1 -2 -3

18. It is hard to get ahead without cutting corners here and there.
+3 +2 +1 -1 -2 -3

19. People suffering from incurable diseases should have the choice of being put painlessly to death.
+3 +2 +1 -1 -2 -3

20. Most men forget more easily the death of their father than the loss of their property.
+3 +2 +1 -1 -2 -3

Appendix B

Models Used in the Multiple Regression Design for the Mach Score Data

Model 1 (the full model) can be represented by the equation $Y_1 = a_0U + a_2X_2 + a_3X_3 \ldots + a_{42}X_{42} + a_{43}X_{43} + E$.

Model 2 asks the question: Is RSQ^2 for the full model probably 0? This allows one to determine if the full model (Model 1), which contains all the variables, accounts for a proportion of the total variance of the Mach scores that is sufficiently different from 0 to be significant at the .05 level. For this we set $a_2 = a_3 = a_4 = \ldots = a_{43} = 0$, resulting in the equation $Y_1 = a_0U + E$.

Model 3 asks the question: Is significant curvilinearity present? For this determination we set $a_{38} = a_{39} = \ldots = a_{43} = 0$, resulting in the equation $Y_1 = a_0U + a_2X_2 + a_3X_3 + \ldots + a_{37}X_{37} + E$.

Model 4 asks the question: Does knowledge of whether the director is head of one or more centers give us additional information with regard to the Mach scores? For this we set $a_{36} = a_{37} = 0$, resulting in the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{35}X_{35} + E$.

Model 5 asks the question: Does knowledge of whether the director has a degree in Early Childhood Education give us additional information with regard to the Mach scores? For this we set $a_{34} = a_{35} = 0$, resulting in the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{33}X_{33} + E$.

Model 6 asks the question: Does categorical (nonprofit vs. proprietary) knowledge of educational level give us additional information with regard to the Mach scores? For this we set $a_{24} = a_{25}$ = a common weight (a_{44}); $a_{26} = a_{27}$ = a common weight (a_{45}); $a_{28} = a_{29}$ = a common weight (a_{46}); $a_{30} = a_{31}$ = a common weight (a_{47}); $a_{32} = a_{33}$ = a common weight (a_{48}). Substituting, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{23}X_{23} + a_{44}X_{24} + a_{44}X_{25} + a_{45}X_{26} + a_{45}X_{27} + a_{46}X_{28} + a_{46}X_{29} + a_{47}X_{30} + a_{47}X_{30} + a_{47}X_{31} + a_{48}X_{32} + a_{48}X_{33} + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_{23}X_{23} + a_{44}(X_{24} + X_{25}) + a_{45}(X_{26} + X_{27}) + a_{46}(X_{28} + X_{29}) + a_{47}(X_{30} + X_{31}) + a_{48}(X_{32} + X_{33}) + E$. Letting $X_{44} = X_{24} + X_{25}$, $X_{45} = X_{26} + X_{27}$, $X_{46} = X_{28} + X_{29}$, $X_{47} = X_{30} + X_{31}$, and $X_{48} = X_{32} + X_{33}$, we obtain the equation, $Y_1 = a_0U + a_2X_2 + \ldots a_{23}X_{23} + a_{44}X_{44} + a_{45}X_{45} + a_{46}X_{46} + a_{47}X_{47} + a_{48}X_{48} + E$.

Model 7 asks the question: Does knowledge of educational level give us additional information with regard to the Mach score? For this we set $a_{44} = a_{45} \ldots = a_{48} = 0$, resulting in the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{23}X_{23} + E$.

Model 8 asks the question: Does categorical knowledge of the number of years that a director has served as director of a day care center give us additional information with regard to the Mach score? For this we set $a_{22} = a_{23}$ = a common weight (a_{49}). Substituting into the full equation (from Model 7), we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_{21}X_{21} + a_{49}X_{22} + a_{49}X_{23} + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_{21}X_{21} + a_{49}(X_{22} + X_{23}) + E$. Letting $X_{49} = X_{20} + X_{21}$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{21}X_{21} + a_{49}X_{49} + E$.

Model 9 asks the question: Does knowledge of the number of years that a director has served as director of a day care center give us the additional information with regard to the Mach score? Setting $a_{49} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{21}X_{21} + E$.

Model 10 asks the question: Does categorical knowledge of the number of years that a director has been in day care give us additional information with regard to the Mach scores? For this we let $a_{19} = a_{20}$ = a common weight (a_{50}). Substituting into the full equation (from Model 9), we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_{19}X_{19} + a_{50}X_{20} + a_{50}X_{21} + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_{19}X_{19} + a_{50}X_{50} + E$.

Model 11 asks the question: Does knowledge of the number of years that a director has been in the field of day care give us additional information with regard to the Mach scores? Letting $a_{50} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{19}X_{19} + E$.

Model 12 asks the question: Does knowledge of the ages of the directors give us additional information with regard to the Mach scores? Letting $a_{16} = a_0U + a_2X_2 + \ldots + a_{15}X_{15} + E$.

Model 13 asks the question: Does knowledge of the sexes of the directors give us additional information with regard to the Mach scores? Letting $a_{14} = a_{15} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_{13}X_{13} + E$.

Model 14 asks the question: Does categorical knowledge of whether the day care center offers day care only or offers day care plus additional facilities give us additional information with regard to the Mach scores? For this we let $a_{10} = a_{11}$ = a common weight (a_{51}; $a_{12} = a_{13}$ = a common weight (a_{52}). Substituting, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_9X_9 + a_{51}X_{10} + a_{51}X_{11} + a_{52}X_{13} + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_9X_9 + a_{51}(X_{10} + X_{11}) + a_{52}(X_{12} + X_{13}) + E$. Letting $X_{51} = X_{10} + X_{11}$ and $X_{52} = X_{12} + X_{13}$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots + a_9X_9 + a_{51}X_{51} + a_{52}X_{52} + E$.

Model 15 asks the question: Does knowledge of whether the day care center offers day care only or day care plus additional facilities give us additional information with regard to the Mach scores? Letting $a_{51} = a_{52} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots a_9X_9 + E$.

Model 16 asks the question: Does categorical knowledge of whether the day care center is located in the city or the county give us additional information with regard to the Mach score? For this we let $a_6 = a_7$ = a common weight (a_{53}); $a_8 = a_9$ = a common weight (a_{54}). Substituting into the full equation (from Model 15), we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_5X_5 + a_{53}X_7 + a_{54}X_8 + a_{54}X_9 + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_5X_5 + a_{53}(X_6 + X_7) + a_{54}(X_8 + X_9) + E$. Letting $X_{53} = X_6 + X_7$ and $X_{54} = X_8 + X_9$, we obtain $Y_1 = a_0U + a_2X_2 + \ldots + a_5X_5 + a_{53}X_{53} + a_{54}X_{54} + E$.

Model 17 asks the question: Does knowledge of whether the day care center is located in the city or county give us additional information with regard to the Mach scores? Letting $a_{53} = a_{54} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + \ldots a_5X_5 + E$.

Model 18 asks the question: Does categorical knowledge of the number of children enrolled in the day care center give us additional information with regard to the Mach scores? For this we let $a_4 = a_5$ = a common weight (a_{55}). Substituting into the full equation (from Model 17), we obtain $Y_1 = a_0U + a_2X_2 + a_3X_3 + a_{55}X_4 + a_{55}X_5 + E$. Collecting terms, we obtain $Y_1 = a_0U + a_2X_2 + a_3X_3 + a_{55}(X_4 + X_5) + E$. Letting $X_{55} = X_4 + X_5$, we obtain the equation $Y_1 = a_0U + a_2X_2 + a_3X_3 + a_{55}X_{55} + E$.

Model 19 asks the question: Does knowledge of the number of children enrolled in the day care center give us additional information with regard to the Mach scores? Letting $a_{55} = 0$, we obtain the equation $Y_1 = a_0U + a_2X_2 + a_3X_3 + E$.

Model 20 asks the question: Does knowledge of the type of center (nonprofit vs. proprietary) give us additional information with regard to the Mach scores? Letting $a_2 = a_3 =$ a common weight (a_{56}), we obtain from the full equation (that of Model 19) $Y_1 = a_0U + a_{56}X_2 + a_{56}X_3 + E$. Collecting terms and letting $X_{56} = X_2 + X_3$, we obtain the equation $Y_1 = a_0U + a_{56}X_{56} + E$.

Appendix C

Multiple Regression Design for the Mach Score Data

Let Y_1 represent a vector with 57 elements, which are the Mach scores for each day care center director.

Let U represent a unit vector with 57 elements.

Let X_2 represent a vector with 57 elements, with a 1 if the element represents membership in the nonprofit group, 0 otherwise.

Let X_3 represent a vector with 57 elements, with a 1 if the element represents membership in the proprietary group, 0 otherwise.

Let X_4 represent a vector with 57 elements, whose elements are the number of children for the nonprofit centers, 0 otherwise.

Let X_5 represent a vector with 57 elements, whose elements are the number of children in the proprietary centers, 0 otherwise.

Let X_6 represent a vector with 57 elements, with a 1 if the element represents a nonprofit center in the city, 0 otherwise.

Let X_7 represent a vector with 57 elements, with a 1 if the element represents a proprietary center in the city, 0 otherwise.

Let X_8 represent a vector with 57 elements, with a 1 if the element represents a nonprofit center in the county, 0 otherwise.

Let X_9 represent a vector with 57 elements, with a 1 if the element represents a proprietary center in the county, 0 otherwise.

Let X_{10} represent a vector with 57 elements, with a 1 if the element represents a nonprofit center that offers day care only, 0 otherwise.

Let X_{11} represent a vector with 57 elements, with a 1 if the element represents a proprietary center that offers day care only, 0 otherwise.

Let X_{12} represent a vector with 57 elements, with a 1 if the element represents a nonprofit center that offers day care and other facilities, 0 otherwise.

Let X_{13} represent a vector with 57 elements, with a 1 if the element represents a proprietary center that offers day care and other facilities, 0 otherwise.

Let X_{14} represent a vector with 57 elements, with a 1 if the element represents a male director, 0 otherwise.

Let X_{15} represent a vector with 57 elements, with a 1 if the element represents a female director, 0 otherwise.

Let X_{16} represent a vector with 57 elements, with a 1 if the element represents a director who is 30 years of age or younger, 0 otherwise.

Let X_{17} represent a vector with 57 elements, with a 1 if the element represents a director who is 31-40 years of age, 0 otherwise.

Let X_{18} represent a vector with 57 elements, with a 1 if the element represents a director who is 41-50 years of age, 0 otherwise.

Let X_{19} represent a vector with 57 elements, with a 1 if the element represents a director who is 51 years of age or older, 0 otherwise.

Let X_{20} represent a vector with 57 elements, whose elements are the number of years a director of a nonprofit center has spent in the field of day care, 0 otherwise.

Let X_{21} represent a vector with 57 elements, whose elements are the number of years a director of a proprietary center has spent in the field of day care, 0 otherwise.

Let X_{22} represent a vector with 57 elements, whose elements are the number of years a director of a nonprofit center has spent as director of a day care center, 0 otherwise.

Let X_{23} represent a vector with 57 elements, whose elements are the number of years a director of a proprietary center has spent as director of a day care center, 0 otherwise.

Let X_{24} represent a vector with 57 elements, with a 1 if the element represents a director of a nonprofit center with a high school diploma, 0 otherwise.

Let X_{25} represent a vector with 57 elements, with a 1 if the element represents a director of a proprietary center with a high school diploma, 0 otherwise.

Let X_{26} represent a vector with 57 elements, with a 1 if the element represents a director of a nonprofit center with some college or an associate degree, 0 otherwise.

Let X_{27} represent a vector with 57 elements, with a 1 if the element represents a director of a proprietary center with some college or an associate degree, 0 otherwise.

Let X_{28} represent a vector with 57 elements, with a 1 if the element represents a director of a nonprofit center with an undergraduate degree, 0 otherwise.

Let X_{29} represent a vector with 57 elements, with a 1 if the element represents a director of a proprietary center with an undergraduate degree, 0 otherwise.

Let X_{30} represent a vector with 57 elements, with a 1 if the element represents a director of a nonprofit center who has done some graduate work, 0 otherwise.

Let X_{31} represent a vector with 57 elements, with a 1 if the element represents a director of a proprietary center who has done some graduate work, 0 otherwise.

Let X_{32} represent a vector with 57 elements, with a 1 if the element represents a director of a nonprofit center who has a graduate degree, 0 otherwise.

Let X_{33} represent a vector with 57 elements, with a 1 if the element represents a director of a proprietary center who has a graduate degree, 0 otherwise.

Let X_{34} represent a vector with 57 elements, with a 1 if the element represents a director who has a degree in Early Childhood Education, 0 otherwise.

Let X_{35} represent a vector with 57 elements, with a 1 if the element represents a director who has no degree in Early Childhood Education, 0 otherwise.

Let X_{36} represent a vector with 57 elements, with a 1 if the element represents a subject who is director of more than one day care center, 0 otherwise.

Let X_{37} represent a vector with 57 elements, with a 1 if the element represents a subject who is director of only one day care center, 0 otherwise.

Let X_{38} represent a vector with 57 elements, whose elements are the square of vector X_4.

Let X_{39} represent a vector with 57 elements, whose elements are the square of vector X_5.

Let X_{40} represent a vector with 57 elements, whose elements are the square of vector X_{20}.

Let X_{41} represent a vector with 57 elements, whose elements are the square of vector X_{21}.

Let X_{42} represent a vector with 57 elements, whose elements are the square of vector X_{22}.

Let X_{43} represent a vector with 57 elements, whose elements are the square of vector X_{23}.

Let E represent a vector with 57 elements, whose elements represent the error values.

Let a_0 through a_{43} represent coefficients of the respective vectors.

Note: Vectors X_{38} through X_{40} are designed to test whether the continuous variables of the data can best be represented by a curvilinear rather than a linear equation.

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