Intelligence, Dominance, Masculinity-Femininity, and Self-Monitoring:

The Use of Traits in Predicting Leadership Emergence

in a Military Setting

by

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(ABSTRACT)

Organizations today place great emphasis on the selection of their managerial and supervisory personnel. Consequently, the need to develop strong predictors of leadership for use in selection tests is immense. Theoretically and historically, intelligence, dominance, masculinity-femininity, and self-monitoring have been strong indicators of leadership. Accordingly, biographical questionnaires and personality inventories were administered to 1137 Air Force officers attending Squadron Officer School to determine their levels of intelligence, dominance, femininity, and self-monitoring. These traits and individual difference variables were then used in a discriminant analysis to predict the subject's classification into one of four leadership categories. Analyses showed differences between leaders and nonleaders for intelligence, dominance, and femininity, but not for self-monitoring. However, a discriminant analysis and associated cross validation resulted in no predictive capability. A possible reason for the lack of classification capability was the uniqueness of the military sample. Since military individuals seem to share very common experiences and beliefs, the sample appeared to be quite homogeneous

making differences between leaders and nonleaders extremely difficult to detect. Future studies should address this potential problem

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INTRODUCTION

Most organizations today put extreme emphasis on the leadership and managerial positions held within their organization. These organizations strive to have the most "qualified" individual placed into these positions. Consequently, the underlying question is "How does an organization achieve this goal?" The answer to this question derives directly from how the organization defines its own leadership construct.

Jago (1982) provides an insight as to how an organization or an individual might address leadership. Jago defined leadership as:

> "Both a process and a property. The process of leadership is the use of noncoercive influence to direct and coordinate the activities of the members of organized group toward the accomplishment of group objectives. As a property, leadership is the set of qualities or characteristics attributed to those who are perceived to successfully employ such influence." (Jago, 1982, p. 315).

Hollander and Julian (1969) similarly suggested that the failure of the trait approach has in part been due to the failure of the trait theorists to distinguish between leadership as a process and leadership as a property (person). Accordingly, Jago (1982) made two distinctions in categorizing the various perspectives of leadership. First, he stated that there are two different approaches that affect the perception of leadership. The "universal" approach sees leadership as constant and represents a "one-best way" to lead. The "contingent" approach sees leadership as dependent upon the situation. Secondly, Jago stated that our perceptions differ based on how one conceptualizes leadership. From a "trait" viewpoint, leadership is

considered to be relatively stable. From a "behavioral" viewpoint, leadership is reflected in the actions of the leader and can be expressed as behavior patterns.

Implied in Jago's theoretical perspective of leadership are the two basic Industrial/Organizational methods an organization might use in determining who shall occupy its leadership positions. Specifically, if an organization sees leadership as a property, something that is relatively constant as is the trait viewpoint of leadership, the organization would focus on selection and placement. On the other hand, if the organization sees leadership as a process, then implications for training exist. In simpler terms, how an organization gets the most qualified individual into its leadership positions will either be one of training or of selection. The organization may train individuals to be leaders if they see leadership as more of a process; whereas, the organization will attempt to identify leader characteristics of individuals if leadership is seen more as a property.

This study attempted to identify potential predictors (e.g., traits, individual difference variables) of emergent leadership in an applied military setting by exploring leadership from a universal trait approach, what Jago (1982) called a Type 1 perspective of leadership. However, a critical distinction must be made between leadership emergence and leadership effectiveness that Jago did not make. Leadership effectiveness represents how well a leader assists his/her group in goal or task accomplishment. On the other hand, leadership emergence recognizes the phenomenon that in a given group situation, an individual will emerge, as judged by others, as the accepted group leader. The study of leadership emergence typically does not concern itself with the effectiveness of the leader, instead it simply focuses

on who and why an individual emerges as the leader and has typically been measured through the perceptions of group members/observers.

The idea that traits might be related to leadership perceptions has roots deeply embedded in social learning theory (Bandura, 1977). Social learning theory suggests the trait-leadership relationship may have resulted from repeated experiences of individuals who are perceived as leaders with their perceived traits. Biernat (1991) conducted a developmental study on the trait masculinity-femininity and similarly concluded that trait perceptions were probably learned from the previous exposure to a diverse sample of people. Accordingly, if trait perceptions are learned, then the repeated pairing of an individual's salient traits with the individual's position (e.g., leader) would cause additional learning in a social context. Through these repeated pairings of leaders with traits, observers may develop cognitive categories or theories of implicit leadership. Accordingly, individuals may organize these learned traits into categories as a means of reducing cognitive processing demands. Mischel (1986) postulated just such a cognitive processing demands idea in reporting that individuals use trait categories to help them organize their impressions of others as a means of reducing information processing demands. Winter and Uleman (1984) further supported Mischel's hypothesis of cognitive processing in reporting that individuals use trait encoding and categorization to help them organize information and perceptions about others. Accordingly, traits should aid observers in identifying individuals as leaders.

Further clarification of trait categorization is best exemplified by Rosch (1978). She suggested that in order to simplify information (cognitive) processing demands, individuals will segment their environment into categories by which non-

identical stimuli can be treated as equivalent. She further suggested that these categories have both a vertical and horizontal dimension. The vertical dimension concerns the degree of inclusiveness. The broadest level and most inclusive level is the superordinate level. The next level is the basic level with the subordinate level below it. The horizontal level involves the degree to which a given category overlaps another category on the same vertical level. Rosch called this overlapping "family resemblance." She postulated that categories will differ in that each horizontal category member will share common attributes with one or more members, but that few attributes will be common to all category members.

Lord, Foti, & DeVader (1984) provide an excellent example of how Rosch's (1978) categorical structuring might be applied within the field of leadership. Lord et al. established categories of leaders versus non-leaders at the superordinate level, political versus military leaders at the basic level, and liberal versus conservative political leaders at the subordinate level. Based on Rosch's theory of categorization and family resemblance, Lord et al. hypothesized that certain attributes would be common to the leader category and differentiate it from the non-leader category. They reported that several traits (intelligence, honesty, and aggressiveness, to name a few) appear to be perceived as characteristic of leaders, but not of non-leaders. If categorization of leaders exists as suggested by Lord et al., then it is possible that individuals who are perceived as leaders would be seen as possessing attributes that are characteristic of leaders, whether or not the traits were actually observed as being possessed by the individual.

Lord et al. (1984) tested this hypothesis. They reported that their subjects evoked implicit theories of leadership when describing leaders. Consequently,

observers attributed those individuals perceived as leaders with traits typically associated with leadership whether or not the attribute was actually observed. It appears that cognitive capabilities are used to categorize perceptions about others through traits (Foti, Fraser, & Lord, 1982) and as postulated earlier this process may be the result of social learning (Bandura, 1977). Rosch (1978) emphasized that this categorization of attributes by the perceiver was based on fact, the actual co-occurrence of the attributes. This was supported by the Rosch, Simpson, and Miller (1976) study which demonstrated that perceptual categories might have indeed been the result of previous experience. Accordingly, the perceiver's categorization of leaders on the basis of trait structure may result from the perceiver's previous experiences with the leader-trait relationship in the external social world. Given theorists (Lord, Foti, & De Vader, 1984; Lord, De Vader, & Alliger, 1986; Mann, 1957; Stodgill, 1948) have shown the possible existence of a trait-leader relationship, it follows that he identification of those traits would aid organizations in the selection of individuals to fill their leadership positions. The present study, therefore, investigated this potential relationship.

To evaluate this relationship, a military setting was chosen. Specifically, Squadron Officer School (SOS), a seven-week United States Air Force Officer training course was studied (described later). The selection reasons for this particular military organization were four-fold, First, an initial review of the literature revealed only a few recent studies (Atwater & Yammarino, 1990; Waldman, Bass, & Yammarino, 1991) have focused on the military, despite the fact that many individuals often think of military generals when asked to name a great leader. Second, emergent leadership could be studied over a much longer time period (e.g., seven weeks) than

that ordinarily investigated in the more commonly used college arena (e.g., one hour). Third, SOS recognizes at course completion those individuals who emerged as leaders, thereby creating "real world" categories of emergent leadership not often available to the researcher. Finally, the school provided ample opportunities for all individuals to emerge as the leader that are often not available in the more constrained laboratory studies.

With the applied setting chosen, the predictors of leadership emergent were addressed. Three traits (intelligence, dominance, and femininity) and one individual difference variable (self-monitoring) were investigated because of their theoretical connections to leadership and previous research findings (Hills, 1985; Lord, DeVader, & Alliger, 1986; Mann, 1959; Rueb & Foti, 1990; Stodgill, 1948; Zaccaro, Foti, & Kenny, 1991). Accordingly, this study investigated whether intelligence, dominance, femininity, and self-monitoring were predictive of leadership emergence in a military setting.

LITERATURE REVIEW

The desire to identify those traits associated with leaders originally dominated leadership research. Early researchers focused on prominent individuals such as Abraham Lincoln and George Washington in hopes of identifying traits or individual difference variables common to these "Great Men." Alas, the "Great Man" theory was born. Early studies and reviews (Hanawalt & Richardson, 1943, 1944; Mann, 1959; Stodgill, 1948) provided some credence to such an approach by finding some traits (e.g., intelligence, dominance) to be related to leadership. Specifically, both the Stodgill (1948) and Mann (1959) reviews found intelligence to be correlated with leadership. Stodgill (1948) found that 23 of 33 studies reported significant positive correlations, while Mann (1959) reported that 173 of 196 results yielded positive correlations. Similar findings were reported for dominance. Yet, the trait approach fell into disfavor and many researchers have abandoned the trait theory (Siegel & Lane, 1987) due to a misinterpretation of Stodgill's (1948) and Mann's (1959) leadership reviews, and Barnlund's (1962) study. However, recent leadership studies (Atwater & Yammarino, 1990; Zaccaro, Foti, & Kenny, 1991; Rueb & Foti, 1990) indicate this departure may have been premature.

The misinterpretation of the Stodgill (1948) and Mann (1957) reviews was due to researchers failing to recognize their own theoretical perspective, what Jago (1982) previously distinguished as the universal versus contingent approach. Contingency theorists were quick to indicate that the reviews did not find any trait to be entirely indicative of leaders and emphasized the need to redirect leadership research because the reviews suggest the trait approach was inadequate. However, very strong trends indeed were obvious in both of the reviews. Contrary to what

contingency theorists espoused, Stodgill and Mann did not recommend abandoning the trait approach. Rather, Stodgill and Mann suggested studying the possible variations in leadership due to situational differences.

Additionally, the Stodgill and Mann reviews were plagued with unsophisticated statistical techniques. Their approach was simply a tally approach in which the total number of significant versus nonsignificant positive and negative correlational findings were "tallied." They failed to account for sample size or for effect size differences between studies. With the advent of such sophisticated analytical techniques as Hunter, Schmidt, and Jackson's (1982) meta-analysis technique, a more accurate portrayal of the effects of traits on leadership is possible. Meta-analysis is a statistical technique perfected by Hunter et al. to correct for artifactual sources of variance between studies. These sources include sampling error, differences in measurement scales, computational errors, typographical errors, and range restriction. Meta-analysis also provides estimates of the population effect size and also tests for the homogeneity of variance. Lord et al. (1986) used just such a technique in reanalyzing the same studies as those used in the Mann review. They found several traits (intelligence, masculinity, and dominance) predicted leadership perceptions and leadership emergence. As explained, it does appear that the Stodgill and Mann reviews were indeed misinterpreted.

A second reason for the abandonment of the trait approach to leadership was based on the inconclusive and inconsistent research findings concerning the stability of leadership (Barnlund, 1962; Bell and French, 1950; Bogatta, Bales, & Couch, 1950; Carter & Nixon, 1949a). Stability of a trait is a basic assumption underlying all trait leadership research. Typically, a rotation design is used to explore the stability of

leadership. Kenny and Zaccaro (1983, p. 679) stated that these "designs are based on the hypothesis that if leadership is a function of personal qualities (traits) then the same person will emerge as a leader when aspects of the situation are varied." If, however, leadership is a determinant of the situation, then it would be likely that different individuals should emerge as leaders as the situations vary. The rotation designs allows for the occurrence of leader emergence and its stability across groups. Evidence for such stability supports the idea that traits of the leader span multiple situations.

Bell and French (1950) and Bogatta, Bales, & Couch (1954) varied only the group membership in their study. This was accomplished by having groups composed of different individuals each time perform the same or similar tasks during each session. Both studies reported leadership as stable across groups. However, "It is possible that leaders who emerged across groups having different membership did so because of a special skill for that task" (Kenny and Zaccaro; 1983, p. 680). By varying group tasks, one would eliminate this possibility. Carter and Nixon (1949a) varied tasks within their study, while keeping group membership constant. They again reported leadership emergence as consistent across task groups. Yet, two plausible alternative explanations again exist. First, the tasks, although different, may have fallen within a family of situations in which the same individual would emerge as the leader (Carter & Nixon). A second explanation is that the person who emerges as the leader in the first task will be perceived as leader in subsequent tasks because of carry over effects.

To eliminate any possible influences from a "special skill," "situational family," or "carry over," group membership and task characteristics can be varied within the

same design. Barnlund (1962) used a full rotation design of 25 male college freshmen randomly assigned to six task sessions in five-member groups. In direct opposition to the Bell and French (1950), Borgatta et al. (1954), and Carter & Nixon (1949a) findings, Barnlund reported that leadership was not stable across groups or situations. Barnlund's study was so methodically sound that his results were seen as evidence that leadership was not stable. It was not until the Kenny and Zaccaro (1983) article that Barnlund's results concerning leadership stability were really questioned. Kenny and Zaccaro reanalyzed Barnlund's (1962) data using the Social Relations Model developed by Kenny (1981). The Social Relations Model is a statistical model specifically designed to analyze a rotation design. It adjusts each subject's rating by accounting for the biasing effects of the rater, ratee, and their interaction. The resultant score is a more accurate score for the various members involved in the rotation design.

Kenny and Zaccaro (1983) pointed out that Barnlund's findings were not statistically correct, because Barnlund assumed 'N' equaled only five and ignored the fact that his .64 correlation was based on "30 non-independent correlations each based on an 'N' of five;" thus, "it would seem likely that it is statistically significant" (p. 680). After reanalyzing Barnlund's data, Kenny and Zaccaro found that Barnlund's study actually showed that leadership was stable across groups. They also suggested that 49% to 82% of that stability was due to a stable trait or combination of traits.

Zaccaro et al. (1991) used 108 male subjects (12 rotations of 9 persons each) and found that 59% of the leadership scores were stable across situations and that 5% of this stability could be due to the individual difference variable, self-monitoring. In

a similar study, Rueb and Foti (1990) used 45 male subjects (5 rotations of 9 persons each) and found that 65% of the leadership scores were stable and that 32% of that stability could be attributed to a constellation of the attributes self-monitoring, dominance, and intelligence. Since previous rotation studies have found leader emergence to be stable across situations, identification of those traits or combination of traits could better predict which individuals would emerge as leaders.

A review of the recent literature truly indicates a new emphasis for the trait approach to leadership (Atwater & Yammarino, 1990; Cherulnik, Turns, & Wilderman, 1990; Foti & Cohen, 1986; Goktepe & Schneier, 1989; Hughes, Ginnett, & Curphy, 1993; Kent & Moss, 1990; Rueb & Foti, 1990; Zaccaro et al., 1991). These studies used improved methodologies and more reliable instruments in predicting leadership than much of the early leadership research. Additionally, given advances in statistical testing since the earlier abandonment of the trait approach, the confidence placed in these findings has increased. It should be of no surprise then that the trait approach has again gained increased attention.

Traits

A trait is a "descriptive label (e.g., dominance, creativity, agreeableness) applied to a group of interrelated behaviors that may be inherited or acquired" (Cascio, 1991, p. 128) "which predisposes an individual to respond in an equivalent manner to various kinds of stimuli" (Hjelle & Ziegler, 1976, p. 177). For instance, the trait called honesty might predispose an individual to be truthful at work, home, and school, all of which represent different stimuli, yet elicit similar responses, trustworthiness and honesty. A major difficulty with the trait approach is that of validity. Traits are internal processes that can not be observed directly and must be

inferred from other observed behaviors in order to establish their usefulness as intervening constructs. The establishment of traits as constructs has generally been achieved through self-report questionnaires and tests that have been statistically designed and validated to tap a purported trait.

Three traits, intelligence, masculinity-femininity, and dominance, have shown a consistent relationship with leader emergence (Chakraborti, Kundy, & Rao, 1983; Hills, 1985; Lord et al., 1986; Mann, 1957; Stodgill, 1948). Similarly, the individual difference variable self-monitoring has recently been shown to be consistently related to leadership (Caldwell & O'Reilly, 1982; Foti & Cohen, 1986; Rueb & Foti, 1990; Rueb, 1993; Zaccaro et al., 1991). An individual difference variable is an observed stylistic consistency or regularity in people's behavior, affect, or cognition (Leary, 1988) with no psychic or neurological structures traditionally assumed to be associated with traits (Hogan, De Soto, & Solano, 1977).

Intelligence

The Dictionary of Behavioral Science (1973) defines intelligence as "an individual's ability to deal with abstractions, learning and novel situations," the faculty of thought and reason. Within the world of psychology, intelligence has also been defined as a general cognitive ability to adapt to new circumstances and solve problems whether verbal, numerical, conceptual, or spatial in nature (Anastasi, 1982). Since leadership duties often require decisions be made, some cognitive capability must be addressed in this process. Given intelligence taps a general cognitive ability, it stands to reason that a leader would be seen as possessing more intelligence than other group members. Not surprisingly, intelligence has often been shown to be related to leadership (Lord, DeVader, & Alliger, 1986; Mann, 1957; Rueb & Foti,

1990; Stodgill, 1948). Traditionally, intelligence has been evaluated through some form of intelligence quotient (IQ) test which attempts to evaluate intelligence in terms of chronological age, although other indicators such as a student's GPA have also been used.

From the earliest of leadership studies (Cowley, 1931; McCuen, 1929), intelligence has been found to be related to leadership. Stodgill (1948) made one of the first attempts to consolidate the plethora of trait-based leadership studies. He reported that the mean correlation between intelligence and leadership was .28, ranging from -.14 to +.90. Stodgill also stated that if one considers those findings of scholarship (college or high school grades), as suggested by Buttergeit and Caldwell (in Stodgill, 1948), then "Leaders are found, with a degree of uniformity, to make better than average grades than do non-leaders" (Stodgill, 1948, p. 46). In his follow-up review covering the years 1947-1970, he reported an additional 25 studies with positive findings between intelligence and leadership.

Despite the misinterpretation of Mann's (1957) leadership review (emphasis on the low median correlation), intelligence was still reported as related to leadership. He reported that 173 of 196 results yielded positive relationships between intelligence and leadership. Additionally, the median correlation, r=.25, between intelligence and leadership was significant, $p < .01$. Only one result indicated a significant negative finding.

More recent research provides further evidence of the intelligence-leadership relationship. Lord et al. (1986) conducted a meta-analysis of the studies performed in Mann's (1957) and subsequent leadership studies to investigate the trait-leadership relationship. The results of Lord et al.'s meta-analysis indicated a strong relationship

did indeed exist between intelligence and leadership. In comparing the results of the meta-analysis with Mann's review, Lord et al. concluded that Mann's review was not as condemning as originally thought. They indicated Mann had far fewer independent samples than had been reported and had incorrectly reported several of the correlations. Specifically, Lord et al. reported a significant intelligence-leadership correlation of .50 (corrected for attenuation) compared to Mann's median correlation of .25. Based on Lord et al., it appears that the misinterpretation of Mann's review resulted in a premature abandonment of the trait approach.

Atwater and Yammarino (1990) conducted a study involving 107 cadet squad leaders at a military academy to identify potential predictors of leadership. After obtaining both superior and subordinate ratings of the cadet leaders, intercorrelations were calculated between all of the predictors and the superiors and subordinates' ratings. Atwater and Yammarino found a significant relationship between intelligence and leadership ratings.

Rueb and Foti (1990) also explored the possibility of intelligence as a predictor of leadership emergence. They used a rotation design in which tasks and group membership were always varied. The results of their study indicated that numerical intelligence was significantly related to leadership. However, this is contrary to Mann's statement, "There is some indication that verbal intelligence is a better predictor of leadership than such nonverbal factors as memory and numerical ability" (Mann, 1957, p. 248). The authors attributed this to the nature of the tasks and the range restriction found in the use of the intelligence measure. When corrected for within rotation range restriction, verbal and numerical intelligence combined were significantly related to leadership emergence. Given the consistency of previous

research findings and the contention that intelligence should be related to leadership emergence, intelligence will be investigated in this study.

Dominance

Dominance, sometimes called ascendancy or boldness, refers to aggressiveness, confidence, persistence, and independence seen in individuals. Given the qualities associated with dominance, it is not surprising to see that the vast majority of research has found some positive correlation between dominance and leadership emergence. In a series of studies conducted by Richardson and Hanawalt (1943, 1944, 1952), Hanawalt, Richardson and Hamilton (1943), and Hanawalt and Richardson (1944), dominance (measured by the Bernreuter Personality Inventory) was identified as being significantly correlated with leadership across a variety of populations.

In their first study, Richardson and Hanawalt defined leadership as the holding of office in a student organization. They found, regardless of sex, that leaders were found to be significantly more dominant than non-leaders. The second study by Hanawalt et al. (1943) analyzed the responses of leaders versus non-leaders using item analysis and reported distinct response differences between the groups. They concluded "that college leadership is more closely tied up with dominance than with any of the other scales" (p. 266).

The third study (Richardson & Hanawalt, 1944) focused on men in vocational and social activities. The leaders, defined as either office holders (persons with two or more presidencies/chairmanships since age 21) or supervisors (persons with 15 or more persons under their direction), were again reported as being significantly more dominant than non-leaders. An item analysis of the Bernreuter scales by Richardson

and Hanawalt (1944) again indicated that leaders responded significantly different from non-leaders. Richardson and Hanawalt's (1952) final study again used the office holders criteria above to show that women leaders in social activities (e.g., PTA, Bridge Club, YWCA) were more dominant than women nonleaders. They concluded that dominance was indeed related to leadership.

In a more recent study, Hills (1985) administered the Adjective Check List (ACL), a self-report checklist, to 237 managers. After interaction in two six-person groups, the leadership ratings from two staff reporters were correlated with the self-report scores. Hills found that assertiveness (dominance) of the managers was significantly related to leadership. Rueb and Foti (1990) used a rotation design approach in determining that the more dominant individual emerged as leader within each task.

Several leadership reviews (Lord et al., 1986; Mann, 1957; Stodgill, 1948) have also shown that dominance is related to leadership. Stodgill reported that 11 of 17 studies reported a significant positive dominance-leadership relationship. In his 1974 follow-up review, Stodgill reported an additional 12 more studies supported the dominance-leadership relationship. Given these new findings, Stodgill rethought his original claim that dominance was not related to leadership and concluded that "these results suggest that dominance, . . ., may characterize some leaders" (cited in Bass, 1981, p. 80). Mann (1959) found that 73% of the results involving dominance were positive and that 71% of these results were significant, yet neutralized his findings by emphasizing the low median correlation, r=.20. However, Lord et al. reported that dominance was indeed found to be related to leadership perceptions. Keeping in mind Lord et al. analyzed those studies reviewed by Mann in addition to several post-Mann

studies and Stodgill's about-face on the dominance-leadership issue, it would appear that dominance is indeed predictive of leadership.

Masculinity-Femininity

Masculinity represents the degree that an individual's interest or preferences reflect those common to the male sex; whereas, femininity represents those of the female sex. For example, hunting has traditionally been of interest to men, while sewing has traditionally been linked to the interests of women. Very masculine individuals are seen as outgoing, hard-headed, blunt, and direct in action, manipulative, and opportunistic. Patient, appreciative, persevering, sincere, and accepting are indicative of individuals high in femininity. The selection of masculinity-femininity for inclusion into the study is based strongly on its theoretical basis.

Theoretically, one might expect a leader to be more masculine because of the sheer numbers of men holding classically defined positions of leadership (President, Military General, Managers and Chief Executives). Given most of our past experiences of a trait-leadership relationship would result from the interests of men (i.e., masculinity) not the interest of women (i.e., femininity) being paired with leadership, it would be surprising to find otherwise. However, the research findings for masculinity-femininity are inconclusive.

Mann's (1959) review found that although 71% of the results concerning the masculinity-leadership relationship were positive, the results were questionable since only two studies had actually reported significant results. Similarly, Lord et al. (1986) reported that a masculinity-leadership relationship was significant. But upon closer review of the Lord et al. finding, Rueb (1989) discovered a potential discrepancy in

the reporting of the Carter and Nixon (1949b) leadership study correlation. The correlation's sign and verbal description by Lord et al. did not match that of the Carter and Nixon study, leaving the Lord et al. finding suspect.

Similarly, recent studies have shown mixed results. Arkkelin and Simmons (1985) presented managerial profiles of male and female managers described with either masculine or feminine traits to 16 men and 16 women subjects. They reported that managers portrayed as masculine were rated as good leaders significantly more often than mangers portrayed as feminine, regardless of manager's or subject's gender. They attributed this to our pre-exposure to the many man-held leadership positions. Similarly, Powell and Butterfield (1979) examined the masculinity-leadership relationship using the Bem Sex Role Inventory and found that masculinity was predictive of leadership. Goktepe and Schneier (1989) also reported that group members with masculine characteristics emerged significantly more often as leaders than those with feminine characteristics, regardless of their gender."

However, recent studies have also questioned this relationship. Rueb and Foti (1990) investigated the masculinity-leadership relationship and reported no significant finding existed. They postulated that due to the recent shift in trends within the work force, the pairing of men with leadership positions is slowly decreasing and that such a shift would diminish such a relationship. Additionally, a developmental study by Biernat (1991) calls in to question the bipolarity of the masculinity-femininity trait. Biernat suggests that the masculinity-femininity trait may actually be seen as two separate traits rather than one bipolar trait. Given the mixed results, the questionability of the trait dimension, and the uniqueness of the present sample (all military), the masculinity-femininity trait(s) was re-examined.

Self-Monitoring

A relative newcomer to the world of trait leadership research is the individual difference variable called self-monitoring (Snyder, 1974). Self-monitoring is the ability to pick up on salient environmental and social cues and adjust one's behaviors and actions accordingly. It involves three factors: a concern for social appropriateness, a sensitivity to social cues, and an ability to control one's behavior in response to those cues (Briggs, Cheek, & Buss, 1980; Zaccaro et al., 1991; Snyder, 1974). By its definition, self-monitoring suggests the very reasons why it should be related to leadership.

Traditionally, a leader guides (leads) his/her group members toward the achievement of its group goals. The ability to identify possible shortcomings, social requirements, and environmental demands within a group would enable the leader to better foresee possible group difficulties in obtaining its goals. The ability to react appropriately would ensure the group meets those goals. The leader would not only recognize the need for task and consideration behaviors, s/he would also be able to instigate said behaviors.

Although only recently addressed within the arena of leadership research, initial findings have been quite promising. Initial studies by Ellis (1988); Ellis, Adamson, Deszca, and Cawsay (1988); Foti and Cohen (1986); and Garland and Beard (1979) provide evidence for a self-monitoring-leadership relationship. However, only Foti and Cohen altered leader requirements (task versus relationship orientation), an underlying premise of the self-monitoring. They collected data from 186 undergraduates in same-sex three-person groups composed of one high, one medium, and one low self-monitor through a modified version of the manufacturing

game (see Zaccaro et al., 1991). They found that high self-monitors were significantly more likely to emerge as leaders. Additionally, Foti and Cohen reported that high self-monitors would adapt their leadership style to the situation, providing support for the theoretical explanation above.

Zaccaro et al. (1991) used a rotation design with 108 subjects in twelve rotations of nine subjects each. Using the ROTO computer program (Kenny, 1989), they reported that stability of the leadership scores did exist and that 5% of that variance could be attributed to the individual difference variable of self-monitoring. Similarly, Rueb and Foti (1990) conducted a rotation design study using only 45 subjects across five rotations of nine subjects each. They reported self-monitoring could account for up to 18% of the variance in the leadership ratings by itself and in conjunction with intelligence and dominance could account for 33% of the variance.

Only a few studies (Kent & Moss, 1990; Walsh, 1992) have questioned the viability of self-monitoring as a predictor of leadership. Kent and Moss (1990) conducted a two part study investigating the role high self-monitors play within a group. They reported that high self-monitors do indeed see themselves as leaders. However, the researchers suggested that the other members of the group instead saw the high self-monitor as a valuable contributor, not necessarily as the leader. Yet, this was in spite of the regression analysis data which did suggest they emerged as leaders. Walsh (1992) used a rotation design similar to Zaccaro et al. (1991) in which task and group membership were both varied. She hypothesized that self-monitoring would be related to leadership emergence, but found no relationship between the two. Given research generally supports the self-monitoring-leadership relationship and its

strong theoretical connection, the self-monitoring variable was included for investigation.

Squadron Officer School (SOS)

In order to evaluate the usefulness of traits in predicting leadership emergence in a naturally occurring organization, Squadron Officer School was chosen. Squadron Officer School (SOS) is the junior service school of the United States Air Force. Its mission is to "improve the warfighting capability of the Air Force by improving the professional competence of company grade officers and inspiring their dedication to the profession of arms" (SOS, 1990). A company grade officer is an officer whose rank is one of three lowest officer grades (i.e., Second Lieutenant, First Lieutenant, and Captain) in the Air Force. However, only Captains are permitted to attend SOS in residence.

Approximately 650 officers enter the seven-week course and are assigned to groups (flights) of approximately 12-13 individuals each. Each flight is comprised of roughly equivalent proportions of: (1) males and females; (2) singles, married accompanied with family, and married unaccompanied officers; (3) rated and non-rated officers (a rated officer is an officer who is a qualified Air Force navigator or pilot) and (4) international officers, Air Force officer, or federal civilian employees. Additionally, group composition is blocked on athletic ability. The SOS participants are evaluated on the first day of school as to their athletic ability in flickerball and volleyball. These are the two sports played during the school. Blocking by SOS staff is done in an attempt to equalize groups at the start of the school.

Throughout the seven-week training program, selected officers and civilians will undergo an extensive academic and athletic program covering four formal areas:

Officership, Force Employment, Leadership, and Communication Skills. Officership focuses on the roles and responsibilities of an Air Force Officer. Force Employment emphasizes the international environment, national defense policy, and military affairs. Leadership covers leadership and management techniques and provides the opportunities to apply those principles (e.g., leaderless group discussions, athletics, war-gaming exercise, etc.). The Communication Skills area focuses on the development of both written and oral communications. The four areas are interwoven throughout the program, which further emphasizes their interrelatedness.

The overall objective of the school is to provide the officer with an opportunity to improve his/her leadership skills by providing an environment that fosters team work within a group and competition between the other groups. At the completion of the school, selected officers are chosen as distinguished graduates, and/or outstanding contributors. A distinguished graduate is an officer identified by the SOS faculty as having a major impact on the group's performance in all areas of the school. The individual must also receive an excellent on both the writing and the briefing exams, in addition to scoring at least 90% on all of the topic area quizzes. This category represents leader emergence as identified by an outside observer (SOS faculty). An outstanding contributor is an individual who is selected by the flight as the one who contributed the most to the group obtainment of their goals and represents leader emergence as seen by the group members.

Typical historical percentages indicate approximately 14% of the class will be designated as distinguished graduates and/or outstanding contributors. Accordingly, roughly 1 to 2 individuals per group may be classified as a leader. For purposes of this study, the remaining individuals were labeled as non-leaders. This category was

so labeled to avoid incorrectly classifying individuals as followers, when in reality they may be neither a follower or a leader, but rather an autonomous individual.

Given the above review, the theoretical ties between traits and leadership, and its applicability to selection for leadership positions, this study investigated the predictive nature of intelligence, dominance, masculinity-femininity, and self-monitoring for classifying individuals into one of four possible groups: Distinguished graduates, outstanding contributors, both distinguished graduate and outstanding contributor, and non-leaders.

Hypotheses and Summary

Leadership selection has long been an area of great importance among organizations. Consequently, the search for predictors of leadership has been investigated by many psychologists in an attempt to find the ultimate selection criteria. Despite the temporary abandonment of the trait approach during the 1960s and 1970s, a recent resurgence in the trait-leadership literature (Kenny & Zaccaro, 1983; Lord et al., 1986; Atwater & Yammarino, 1990; Rueb & Foti, 1990) has shown the trait approach to leadership to be viable. Based on the literature review combined with the theoretical work by Rosch (1978) and Mischel (1986), this study attempted to identify specific traits/individual difference variables that would predict leadership emergence in an applied military setting. Consequently, four variables (intelligence, dominance, masculinity-femininity, and self-monitoring) were identified as potential predictors.

Accordingly, it was hypothesized that emergent leaders would be significantly different on the following traits from that of non-leaders. Specifically,

(1) Leaders would be more intelligent, more dominant, more masculine, and higher in self-monitoring than non-leaders.

(2) Since the recent Kent and Moss (1990) study suggests that high self-monitors are top contributors to the group and not necessarily leaders, it was hypothesized that the outstanding contributors would be highest in self-monitoring.

METHOD

Subjects

1137 from a possible 1852 junior officers attending the United States Air Force Squadron Officer School voluntarily completed the surveys. This represented an overall response rate of 61.4%. The sample included 959 male and 173 female subjects (5 missing values, Table 1). Age varied from 25 to 41 years of age with a mean of 30.03 (Table 2). The subject volunteers were drawn from each of three consecutive SOS classes, hereafter called Class A (Apr 1993), Class B (Jun 1993), and Class C (Aug 1993), respectively. Class A had 271 volunteers out of 604 (44.9%) participate; whereas, Class B had 416 of 612 (68.0%) and Class C had 450 of 636 (70.8%). Other class demographics are shown in Tables 2-5 and are discussed further in the results section.

Independent Measures

Personal Demographic Survey

A personal demographic survey (Appendix A) composed of 35 items was used to determine the demographics of each individual. These items covered background information such as age, aeronautical rating, time in service, educational background, and athletic experience.

Watson-Glaser Critical Thinking Appraisal

The Watson-Glaser Critical Thinking Appraisal (CTA) (Watson & Glaser, 1980) test is a measure of intelligence which attempts to evaluate the three factors comprising critical reasoning: attitudes, knowledge, and skills. "This composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is

asserted to be true; (2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge (Watson & Glaser, 1980, p. 1)." This measure of intelligence uses five subtests to estimate an individual's overall score.

The five subtests are: (1) Inference - the ability to determine degrees of accuracy of inferences from given data, (2) Recognition of Assumptions - identification of assumptions from a set of statements, (3) Deduction - drawing correct conclusions from a set of statements/premises, (4) Interpretation - correctly evaluating generalizations/conclusions based on the data, and (5) Evaluation of arguments - identifying strong versus weak arguments regarding a particular question.

Each subtest contains 16 questions for a total of 80 questions. The CTA has been evaluated in a series of populations including high school students, college students, teachers, sales representatives, and police officers. Reported split-half reliability coefficients of internal consistency range from .69 to .85. A coefficient of stability for the CTA of .73 indicates adequate stability of the measure over a three month period. The validity of the CTA when correlated with other intelligence measures has ranged from .12 (correlated with first semester GPA in college) to .81 (correlated with the Otis-Lennon Mental Ability Test).

A potential concern with this particular test as a measure of intelligence involves the third factor that the CTA claims to measure, skills. If the test does indeed measure skills, then that portion of the test focusing on skills may be trainable (R. J. Harvey, Mar 1994, personal communication). Consequently, our definition of intelligence as a trait might better be defined as an individual difference variable,

making intelligence slightly amenable to training. Although intelligence as an individual difference variable is not the typical approach to intelligence, this approach is seen as only slightly problematic given the CTA was highly correlated (.81) with other respected tests of intelligence (Otis-Lennon Mental Ability Test). Additionally, Squadron Officer School presents the students with many exercises requiring a high degree of problem solving ability. These problem-solving tasks would require critical thinking ability for which the Watson-Glaser CTA was specifically designed.

The selection of the CTA as this study's measure of intelligence was based on several reasons. First, the administration of the CTA may be untimed. This allowed the test to be sent home overnight and completed prior to the start of classes the next day. Second, the test is most suitable for and is often used to predict success in jobs where critical thinking is known to play an important role such as a leadership/managerial position. Third, many of the exercises undergone at Squadron Officer School require critical thought processes.

California Psychological Inventory

The dominance and masculinity-femininity constructs will be determined using scales from the California Psychological Inventory (CPI). This inventory is very similar to the Minnesota Multiphasic Personality Inventory, but was designed for normal (non-psychiatrically disturbed) subjects. The inventory consists of four categories which contain a total of eighteen personality trait scales. Kelly (1965) concluded in his review of the CPI that "All in all, the CPI in this reviewer's opinion is one of the best, if not the best available instrument of its kind" (p. 169).

The dominance scale of the CPI assesses factors of leadership ability, dominance, persistence, and social initiative. The scale has a test-retest reliability of .72 for high school females, .64 for high school males, and .80 for prison males. In a variety of cross-validation studies, the dominance scale had a validity coefficient of at least .40 with staff ratings for medical school applicants and military officers. Typical dominance subscale items are "I like to give orders and get things moving" and "I'm not the type to be a political leader." For the purpose of this study, a person's total score on the scale represents his/her dominance score.

The femininity scale of the CPI assesses masculinity or femininity of interests. The scale has a proven test-retest reliability of .65 among high school females, .59 for high school males, and .73 for prison males. In convergent validity studies with the Strong Vocational Interest Blank and the Minnesota Multiphasic Personality Inventory, validity coefficients above .40 were reported. Typical items are "'I prefer a shower to a bath" and "I am somewhat afraid of the dark." A high score on this scale represents a feminine individual. A low score represents a masculine individual. Masculinity-femininity and dominance are separate scales representing two independent traits. The CPI achieved subscale independence by factor analyzing items and retaining those items that loaded significantly on a given scale. Only one question out of the 83 questions concerning these two personality trait scales is shared, signifying their independence.

Lennox-Wolfe Self-Monitoring Scale

Self-monitoring was measured by the Lennox and Wolfe (1984) self-monitoring scale (Appendix B). It is composed of a thirteen-item inventory using a six-point Likert scale ranging from 1 - certainly, always false to 6 - certainly, always

true. An example inventory item is "In social situations, I have the ability to alter my behavior if I feel that something is called for." They reported an internal consistency coefficient alpha value of .86. Rueb (1988) conducted factor analyses of both the Snyder and Gangestad (1986) and the Lennox and Wolfe (1984) scale. He reported the Lennox and Wolfe scale was significantly related with the Snyder and Gangestad scale, $r = .91$, $p < .05$., but resulted in a higher internal reliability, .83, than the Snyder and Gangestad scale, .66. He also reported that the Lennox and Wolfe scale was the better of the two scales to use because it more closely matched the proposed factor structure of their self-monitoring model, while maintaining higher internal reliability. Given the superiority of the Lennox and Wolfe scale, this scale was selected as the inventory for measuring the self-monitoring construct.

Leadership Emergence Categories

Four different leadership categories were used as an ordinal dependent measure. These groups were naturally occurring groups, a result of the SOS leadership evaluation process. The four leadership categories (described below) were comprised of: (A) individuals who were both distinguished graduates and outstanding contributors, (B) individuals designated as distinguished graduates only, (C) individuals designated as outstanding contributors only, and (D) nonleaders - those not designated as either an outstanding contributor or a distinguished graduate.

Category A - Distinguished Graduate/Outstanding Contributor (DGOC)

The individuals in this group were selected by the SOS staff as a distinguished graduate (DG) while simultaneously being chosen as the top contributor by the flight members. Total sample size for this leadership group was 35. A complete description of the selection criterion for DG and OC follows.

Category B - Distinguished Graduate (DG)

These individuals (n = 56) were selected from among those individuals who have excelled in all areas of Squadron Officer School. They must have received an excellent (top rating) on their written exercise, an excellent on their oral presentation, and have an overall average of 90% or better for all academic tests. This is accomplished by less than 25% of all SOS attendees. After having met the initial criteria, these individuals may be nominated by the flight commander for distinguished graduate. (A flight commander is the school's representative to each group of approximately thirteen officers (flight) and is responsible for the administration and supervision of activities for each flight. He/She is more of an observer than an actual member of the group.) Nominations are based on what the flight commander perceives to be the leadership ability of the individual in addition to the individual's contribution to the group. Nominations for distinguished graduates are then discussed and voted on by the flight commanders within each squadron (6-8 flights per squadron), attached flight faculty advisors, and the squadron commander. All SOS faculty members have previously been trained on how to recognize leadership ability/behaviors. Distinguished graduates typically number less than 10% of the entire SOS class. It is considered a higher leadership category than the outstanding contributor.

Category C - Outstanding Contributor (OC)

Individuals designated outstanding contributors were perceived by the other members of the group as the individual who contributed most significantly to the group. Outstanding contributors were chosen by a secret ballot of all officers within the group. The total was then tallied by the flight commander and the individual

receiving the highest number of ballots received the outstanding contributor award. Consequently, there was at least one outstanding contributor per flight, although occasionally a tie resulted in two individuals being given the award (n = 38).

Category D - Nonleader (NL)

All individuals not designated as a member of group A, B, or C were placed into group D resulting in a sample size of 794. This group did not represent a category of leadership as designated by SOS, but simply reflected a default categorization by the experimenter in order to create mutually exclusive categories.

Procedure

On the first day, the subjects attending SOS underwent a series of orientation meetings and evaluations. The subjects were then randomly assigned to stratified blocks of 12-13 officers based on aeronautical rating, gender, marital status, and athletic experience variables. This resulted in a total of 50 different groups per class. Each group underwent the same activities, lectures, exercises, and tests as all the other groups, but the dates, times, and the settings (i.e., classroom, athletic field) varied. Additionally, all of the groups competed against some of the other groups, but not all of them, for the various activities. Simply put, the group experiences and subject composition varied resulting in a naturally occurring manipulation within an applied setting.

During the third week, a subject biographical data sheet, the Watson-Glaser CTA, the CPI dominance and femininity subscales, and the Lennox and Wolfe self-monitoring scale were given to three consecutive classes (Class A, Class B, and Class C) attending Squadron Officer School (SOS). Due to organizational demands and time schedules, the administration of the surveys for each class was different. Class A

students were given the surveys to complete at home within one week. However, Class A administration instructions emphasized the voluntary nature of the questionnaires (the SOS administrator estimates that he informed the students that the questionnaire was voluntary at least ten times). In contrast, Class B and Class C administrations were conducted during a three hour period at the end of a class day. Students were told to complete the surveys and turn them in before departing for the day. However, this time the students were only told twice that their participation was voluntary. Only one significant difference in administration existed between Class B and Class C. As a result of comments from Class B, no social security numbers were used for Class C. Instead, a student tracking number was used for each survey and associated leadership data. Finally, the classification of each individual as either a distinguished graduate, an outstanding contributor, or non-leader, as determined by the faculty and group members, in addition to class demographics, was also obtained at the end of the course from the school data base.

RESULTS

The results section is divided into three main analyses. The first part investigated whether each class sample was representative of the entire SOS class. The second portion determined whether the three SOS classes were similar to each other demographically. The final section tested the hypotheses that " leaders would be more intelligent, dominant, masculine, and higher self-monitors than nonleaders" and that "the outstanding contributors would be highest in self-monitoring."

Sample Representativeness

To test sample representativeness, each sample was compared with the actual demographics of the class. As shown in Tables 1-5, there were few significant differences found between the sample means and percentages and the total class means and percentages. All differences between sample and actual class percentages for Tables 1-5 were tested with one-sample independent proportional t-tests. Table 1 shows sample and overall class percentages for gender were relatively the same. Only Class C had a percentage difference for gender that exceeded 1%, although a one-sample proportional t-test indicated this difference was not significant, $p > .05$. One sample t-tests for age between the sample means and overall class means revealed significant differences for Class A and Class B, $t(265) = 2.29$, $t(408) = 3.25$, respectively, $p < .05$ (Table 2). However, the greatest difference between class sample means and class overall means was only .49, suggesting little practical importance given the large sample sizes. Similar to the gender results, aeronautical rating (Table 3) yielded no significant differences between class sample and class population percentages. Only Class C had percentage differences that exceeded 2%. Table 4 shows that leader category percentages were again found to show little differences

between class samples and populations, $p > .05$. The above results suggest that each class sample was representative of its class population.

Sample Homogeneity

To ensure that the three samples were similar to one another, Analyses of Variances (Anovas) were run for intelligence, dominance, femininity, and self-monitoring. As seen by Tables 5-7, there were no differences between classes for intelligence, $p > .05$. Similarly, no class distinction was found for femininity or self-monitoring, $p > .05$. Conversely, a significant finding for dominance between the classes was noted, $F(2, 761) = 5.40$, $p = .0047$ (Table 8). A Tukey-Kramer test revealed that Class C (M = 32.96) was more dominant than both Class A (M = 31.55) and Class B (M = 32.13). However, the $\omega^2 = .0134$ indicates that only 1.3 percent of the variance in the dominance score could be attributed to the class distinction, suggesting little practical importance in this finding.

Several additional Anova analyses revealed that there were no differences between classes for any of the following demographic variables: age, time in service, time in grade, volleyball experience, and flickerball experience. See Table 9 for the pertinent data. Similarly, two-sample tests for proportions revealed no significant differences between the classes for gender, aeronautical rating, and leadership ratings (Tables 1, 3, and 4, respectively). Given the lack of statistical significance, as well as practical importance, it was concluded that the three classes were not different from each other in general demographics. Therefore, initial analyses were based on a composite data set of the three classes.

Hypothesis 1

In order to test the first hypothesis that leaders would be more intelligent, dominant, masculine, and higher in self-monitoring; the four leadership categories discussed previously were used. The sample resulted in 4.33% of all individuals being classified into Category A; 5.77% into Category B; 4.33% into Category C, and 85.56% into Category D. These were roughly the same as the percentages of the entire population obtained from SOS records (Table 4).

With sample representativeness and homogeneity of the samples established, a discriminant analysis was performed to classify the individuals into each of the four leadership categories. Discriminant analysis uses discriminant functions that are linear combinations of the predictor variables to maximally differentiate between the dependent groups (Schulman, Feb 1994, personal communication). Using the SAS statistical package crossvalidation procedure for the whole combined sample (n = 761), an 85.56% prediction accuracy rate was reported (Table 10). Yet, upon closer examination, it was found that this accuracy rate merely reflected all individuals being classified as nonleaders. The derived discriminant functions, although significant (Wilks' λ; $F(12, 1995) = 2.79, p < .001$), were not sensitive enough to make any distinction between the leader and nonleader groups. A look at the canonical variable plots (Figures 1-3) further indicate this lack of classification.

To investigate this anomaly, Anovas were run on each of the independent variables for each of the four leadership categories. As seen in Tables 11-14, significant differences were found for dominance ($F(3, 763) = 8.99, p < .0001$) and femininity ($F(3, 771) = 2.86, p < .05$), but not for intelligence and self-monitoring,

$p > .05$. A look at the means reveals that the trend for dominance (Table 11) and intelligence (Table 13) was exactly as hypothesized. The distinguished graduate/outstanding contributor group had the highest means (D = 35.11, I = 62.40) for both dominance (D - mean) and intelligence (I - mean), followed by the distinguished graduate (D = 35.04, I = 61.69), outstanding contributor (D = 34.27, I = 60.52), and nonleader groups (D = 32.01, I = 59.29), respectively. Conversely, the trends were not as hypothesized for femininity or self-monitoring. Distinguished graduates were most masculine (M = 13.82), followed by outstanding contributors (M = 15.39), distinguished graduates/outstanding contributors (M = 15.56), and nonleaders (M = 15.84). Self-monitoring trends are discussed further in the Hypothesis 2 section.

Since it is possible that this finding may have been due to the small sample sizes of the leadership groups relative to the nonleader group, the leadership groups were combined into one single group of leaders and directional t-tests performed. With the increased sample size and its corresponding decrease in variance for the combined leadership group, significant results occurred for three of the four independent variables: intelligence, $t(901) = 2.36$, $p = .0092$; dominance, $t(186) = 6.32$, $p = .0001$; and femininity, $t(202) = -2.292$, $p = .0020$. The degrees of freedom for dominance and femininity were substantially lower because separate variance estimates were necessary for t-test calculations due to unequal variances, (dominance, F(652, 110) = 1.84, p = .0001; femininity, F(663, 110) = 2.22, p = .0001). Only self-monitoring was not found to be significant, $p > .05$. Leaders were found to be more intelligent and dominant, but less feminine (more masculine).

To further investigate the relationships that existed between the independent and dependent variables, correlations were performed. Pearson correlations were performed for correlations between the independent variables, while Kendall Tau coefficients were computed for the relationships between the independent variables with the leadership variable. In order to conduct a correlational analysis of the leadership variable, each category was converted to a number equivalent to its considered importance at SOS. For example, Category A individuals were quantified as 4, Category B as 3, Category C as 2, and nonleaders (Category D) as 1. As shown in Table 15, significant relationships existed between intelligence with femininity and leadership. Dominance was correlated with every other variable but intelligence. Similarly, femininity was correlated with every other variable. Again, self-monitoring was found not to be related to leadership.

Since the independent variables appeared to be interrelated, partial correlations were performed to determine which independent variables were essentially redundant and, therefore, unnecessary for the next discriminant analysis. Tables 16-17 indicate that when femininity was removed between the independent variables, only dominance and self-monitoring were still correlated, $p = .0001$; while intelligence and dominance were both still found to be related to leadership, $p < .05$. Similarly, when self-monitoring was controlled, only dominance and femininity were correlated among the independent variables. Further analyses revealed that femininity contributed less than half of one percent of unique variance to the overall predictor-criterion relationship. The removal of intelligence appeared to have little effect on the relationship between the variables. Accordingly, it appeared that femininity was somewhat redundant with all the other independent variables, while self-monitoring

was redundant with dominance. Given the t-tests, correlational results, and the redundancy of femininity and self-monitoring with dominance, only intelligence and dominance were determined to be predictive of leadership emergence, providing only partial support for the first hypothesis that "leaders would be more intelligent, more dominant, more masculine, and higher in self-monitoring than non-leaders."

To determine how effective intelligence and dominance were in predicting leadership emergence, two more sets of discriminant function analyses were run. In the first set of analyses, Classes A and B generated discriminant functions to predict Class C. As before, the resulting prediction accuracy rate of 83.11% merely reflected the nonleader category percentage (Table 18). No actual classification had taken place.

Previously all discriminant analyses were based on all four leadership categories. However, this approach may have made actual classification into categories A-C difficult, given the low numbers associated with each of the categories A-C. In an effort to increase total sample size for the leadership groups relative to the existing nonleader group (D), leadership categories A-C were combined into one leadership category and another discriminant analysis was run. As before, when only a two leader categorization was used, the same prediction results occurred (Table 19). A look at Figures 4-5 shows that no real classification could have taken place due to the lack of clustering of the Category D (#4, Figure 4) and Category D (#2, Figure 5) individuals.

The next discriminant analysis again used the variables intelligence and dominance, but this time all three classes were combined and cross validated against itself. No change in the results occurred, regardless of the number of leadership

categories used. The prediction accuracy rate was again the same as the percentage of the nonleaders, as all individuals were simply classified as nonleaders (Table 20).

Given the above tests were based on both theoretical importance and statistical inclusion of the variables, one final set of discriminant analyses was performed based on statistical inclusion only without regard to theoretical implication. Using the backward elimination procedure for the discriminant function model, only the dominance variable was considered to contribute to the overall discriminant capability (Tables 21a, 21b, 22a, & 22b). Accordingly, four discriminant analyses were performed varying leader categorization (2 vs 4 categories of leadership) and crossvalidation procedures (e.g., Classes A & B predict Class C or Classes A, B, & C predict itself). In each case no discriminant capability was found. All individuals for each discriminant function were classified as nonleaders (Tables 23-26). Given the above results, hypothesis one was only minimally supported. No actual leadership classification of the emergent leader was found.

Hypothesis 2

To test Hypothesis 2 that outstanding contributors would be higher in self-monitoring, a one-tailed t-test between the two groups (Category A/C individuals with Category B/D individuals) was run. Individuals who were both the distinguished graduate and the outstanding contributor were also placed into the outstanding contributor group for this analysis, while the second group was comprised of distinguished graduates and nonleaders. The results indicated that there were no differences between the groups, $p > .05$. However, a look at the means further suggests the trend was as hypothesized. Outstanding contributors ($M = 55.76$) were higher self-monitors than the distinguished graduates/nonleaders ($M = 55.61$).

Since it was possible the lack of a significant finding could have resulted from the distinguished graduates being combined with the nonleaders, the distinguished graduates were separated from the nonleader group and an Anova was run between the three leadership groups (distinguished graduates, outstanding contributors, and nonleaders). Individuals who were both the distinguished graduate and the outstanding contributor remained in the outstanding contributor category for this analysis. The results still indicated that there were no differences between the groups, $p > .05$. A look at the means (Table 27) further suggests the trend was not as hypothesized, as distinguished graduates ($M = 57.18$) were the highest self-monitors followed by outstanding contributors ($M = 55.76$), and then nonleaders ($M = 55.50$). The outstanding contributor was second highest followed by the nonleader group. Hypothesis 2 was not supported.

DISCUSSION

Given the emphasis placed on identifying individuals by organizations, this study attempted to identify and develop usable predictors. Unfortunately, this proved an arduous task that resulted in minimal support of the original hypotheses. Specifically, while significant t-test differences between leaders and nonleaders were found for intelligence, femininity, and dominance; partial correlations suggested only dominance and intelligence were usable independent predictors.

The lack of practical importance found for femininity was not surprising. Although the original hypothesis suggested its relationship to leadership emergence, this study's introduction had suggested that this relationship was questionable. Biernat (1991) provides adequate reason suggesting that the femininity-masculinity trait may be dualistic, rather than bipolar as it was operationalized in this study. Furthermore, Ross & Offerman (1991) actually found feminine attributes (not masculine) to be related to charismatic leadership. Similarly, Rueb (1989) suggested the femininity-masculinity and leadership emergence relationship may not exist any longer because women are rapidly filling traditional leadership positions. This is strongly evident in today's Air Force where women are just as likely as men to hold salient leadership positions. Consequently, the repeated pairings of male interests (masculinity) and leadership positions has diminished and is practically nonexistent.

The nonsignificant findings for self-monitoring were unexpected. Although the trend between nonleaders and leaders was as hypothesized, the differences were neither large nor significant. Additionally, the trend among the leaders was not as anticipated (Hypothesis 2), since the outstanding contributor group did not emerge as the highest self-monitors as the Kent and Moss (1990) study suggested. Therefore,

self-monitoring was found to provide no basis for leadership emergence differentiation.

Why this occurred is perplexing, since both previous research (Caldwell & O'Reilly, 1982; Foti & Cohen, 1986; Rueb & Foti, 1990; Zaccaro et al., 1991) as well as theoretical background suggest otherwise. One possible reason is the unique population. Given this is a military sample, many of the attitudes and behaviors that would vary greatly in the civilian sector, just do not present themselves on a regular basis in the military. This coupled with military regulations and traditions may reduce an individual's need to adapt one's behavior to the situation (an important aspect of the high self-monitor). Consequently, this possibility would make it equally likely that low self-monitors as well as the high self-monitors would emerge as leaders. Thus, no difference in self-monitoring scores between leaders and nonleaders was found in this study.

This sample was a highly homogeneous sample when compared to the more traditional subjects (e.g., college students) selected for a large percentage of the leadership studies. To be selected as officers in the United States Air Force, individuals must go through a highly competitive selection process with emphasis placed on educational background, physical prowess, and emotional stability. Once selected, these same officers are regularly evaluated and given performance feedback sessions, as well as training opportunities. Strong expectations and a well established set of norms help to mold common beliefs. Furthermore, all officers are technically leaders by virtue of their rank and position. As a junior officer, one immediately is placed into the top 12% of the military, as 88% of the military force are enlisted personnel and junior to any officer rank. The result is a highly homogeneous sample

that makes differences between the variables, especially an individual difference variable like self-monitoring, more difficult to use for discrimination purposes.

Another is the nature of self-monitoring as an individual difference variable. Since it is an individual difference variable, it is subject to learning principles. Individuals might be able to learn many aspects of self-monitoring, especially behavior adjustment. As a matter of fact, officers in the Air Force undergo a series of training programs that are specifically aimed at improving the ability to react appropriately to given situations. Consequently any effect that self-monitoring might have had would be countered by such a training program. The result would be that found in this study, no difference between leaders and nonleaders for self-monitoring.

As a result, the focus was placed on dominance and intelligence. The positive relationship between dominance and leadership emergence at SOS resulted in an R^2= .03, indicating only 3% shared variance, suggesting minimal practical importance. Similarly, the intelligence-leadership emergence relationship resulted in an R^2 of .01, once again suggesting little practical importance, given the large sample sizes. Consequently, Hypothesis 1 was only partially supported.

Although the intelligence and dominance trends mirror earlier research (Hills, 1985; Mann, 1959; Rueb, 1989; Stodgill, 1948), their practical application and importance were not demonstrated. Attempts to generate prediction lines for group classification fell short. A series of discriminant analyses revealed that these two variables were not sensitive enough to develop reliable discriminant functions. Instead, these prediction lines simply placed all individuals into the nonleader category.

Several different possibilities may explain these apparent inconsistencies. Relative sample sizes of the groups (5% DGOC, 5% DG, 5% OC, and 85% NL) may have made group classification extremely difficult. Since discriminant analysis attempts to maximize the group classification rate, the resulting derived equations placed all members into the nonleader group to achieve what was the best prediction for the obtained sample.

To test this possibility, a final discriminant analysis was run for the variables dominance and intelligence which assumed group compositions were equal. As expected, the resulting discriminant function did classify individuals into each of the four leadership categories (Table 28). However, the resulting overall prediction accuracy rate was much lower, 34%. Using more sensitive trait measures of intelligence and dominance may be a possible solution to this problem.

Previous focus as to what might have caused our unexpected results has been on the predictor variables. Another possibility is the criterion variable. First, the nonleader category was a default category and was not an actual classification of an individual by SOS. This may have forced a group distinction that simply did not exist. As mention before, technically all officers are leaders by virtue of their rank and position. Additionally, the leadership categories were made mutually exclusive by creating a combined distinguished graduate and outstanding contributor category so this a discriminant analysis could be run. This approach at first seemed logical, but may be like mixing apples and oranges since the selection criteria come from two different sources, internal versus external observers, and not one criterion source.

Next, the criterion used by SOS to name a leader may be currently subconsciously overlooked by both students and faculty. Only recently has the United

States been victorious in Persian Gulf War. Consequently, war veterans with combat experience may well be seen as leaders due to a "halo effect", regardless of their actual abilities. Conversely, combat experience may have actually given those officers an edge in leadership ability and this would have resulted in higher numbers of combat experienced individuals being chosen as distinguished graduates and outstanding contributors. Since no data were gather concerning combat experience, this speculation could not be tested.

Similarly, another explanation for the inconsistencies may stem from the actual test administrations. Given the surveys were administered differently in each class, a potential treatment implementation confound exists. The manner or attitude in which each subject answered the questionnaire may have caused the actual results. Although the sample demographics appeared to be roughly equal and representative of each class, certain comments made by students taking the test indicated potential biases introduced into the study. For example, no written comments were made by Class A participants, whereas, Class B and Class C each had comments. In Class B, several students stated they refused to answer because the social security account number was a traceable number. In Class C, one participant commented that the sole reason he completed the surveys was because his section leader ("a really good guy") thought it was important. Similar comments to these suggest each class sample was somewhat a reflection of the test administration procedure.

Of even greater concern may be the mortality confound in the experiment. The discriminant analyses was based on 774 out of 1137 possible observations. This represented a 32% mortality rate. Comments made directly about specific surveys

provide possible reasons. One individual stated that he believed many individuals failed to notice the self-monitoring survey on the last page of the test. Another individual commented that several of the dominance items were offensive and, therefore, refused to answer them. Consequently, the study may have been biased by the self selection/elimination of the subjects.

Another reason for the study's inability to develop accurate prediction capability may be the result of too few predictors. Leadership is a complex construct and the ability to predict it has been difficult. This study chose four variables that theoretically and historically made sense. As shown, two of the variables just did not differentiate between leaders and nonleaders. Additionally, variables like extroversion or self-adjustment (Hughes, Ginnett, & Curphy, 1993) might have been a differentiating factor for the discriminant analysis had they been included. Hogan, Curphy, and Hogan (in press) have also suggested that leadership might be distinguished through variables that deal with the negative aspects of leadership. What they called "dark side " personality traits. These "dark side" traits might have shed some light (pardon the pun) on how to distinguish leaders from nonleaders by placing dark side trait individuals into the nonleader category. This possibility should be explored.

Accordingly, it does appear that leadership prediction is and will be a difficult task. To accomplish the task, one must consider the potential problems encountered in this study and determine ways to circumvent them. Future research might focus on many more predictors than the four used in this study. Additionally, tighter controls on the administration of the questionnaires should also be imposed when possible.

These improvements in addition to investigations involving "dark side" characteristics of leaders/nonleaders might prove successful.

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APPENDIX A

PERSONAL DEMOGRAPHICS SURVEY

Personal Information

The following section requests information concerning your academic, athletic, and military backgrounds. Using a #2 pencil, please code the following information or answers for each question opposite the correct number on the digitek sheet for the questionnaire. Please do not write or mark on the questionnaire itself. If you make an error, ensure the pencil mark is erased entirely. When you finish, please check your digitek to ensure every questionnaire item has been coded.
Place your social security account number in the spaces provided on the answer sheet.

1. SOS Squadron:

A. B. C. D. E. F. G. H. I. J.

2. SOS Flight:

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8 I. 9 J. 0

3. Rank:

A. Captain B. First Lieutenant C. Civilian

4. Sex:

A. Female B. Male

5-8. Air Force Specialty Code (AFSC): Code your numerical AFSC (no prefixes or suffixes) into lines 5 through 8. Example: An AFSC of K1525C would be coded as: 5-A, 6-E, 7-B, 8-E.

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

9-10. Age: Code your age into lines 9 and 10.
Example: An age of 29 would be coded as: 9-B, and 10-I.

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

Time in Grade: Code your time in grade in years (line 11) and months (line 12). Example: 2 years and 11 months in grade would be coded as: 11-B and 12-J.

11. Years:

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

12. Months:

A.	1 month	F.	6 months
B.	2 months	G.	7 months
C.	3 months	H.	8 months
D.	4 months	I.	9 months
E.	5 months	J.	10-11 months

Time in Service: Code your time in service in years (lines 13 and 14) and months (line 15). Example: 6 years and 4 months in service would be coded as: 13-J, 14-F, and 15-D.

13-14. Years - If less than 10 years, darken the J. (0) response circle for answer 13 and mark the appropriate number of years for 14.

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

15. Months:

A.	1 month	F.	6 months
B.	2 months	G.	7 months
C.	3 months	H.	8 months
D.	4 months	I.	9 months
E.	5 months	J.	10-11 months

16. Source of Commission:

A. Officer Training School
B. Reserve Officer Training Corps
C. Service Academy
D. Civilian
E. Other

17. Aeronautical Rating:

A. Navigator B. Pilot C. Nonrated D. Civilian E. Other

18. Type of plane currently qualified in:

A. Bomber B. Cargo C. Fighter D. Helicopter E. Tanker
F. Trainer G. Other H. Nonrated I. Civilian

19. Current SOS TDY status:

A. Single B. Married Unaccompanied C. Married Accompanied

20-21. Total Volleyball Experience in Years (Player or Coach): If less than 10 years, darken the J. (0) response circle for answer 20 and mark the appropriate number of years for 21.

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

22-23. Total Flickerball Experience in Years (Player or Coach): If less than 10 years, darken the J. (0) response circle for answer 22 and mark the appropriate number of years for 23.

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

24. Prior Service: Select the number of years prior service.

A. 1 B. 2 C. 3 D. 4 E. 5
F. 6 G. 7 H. 8 I. 9 or more J. 0

25. Highest College level/experience:

A. BA/BS B. Post BA/BS C. MS/MA D. Post MA/MS E. PhD F. Post PhD

26-28. College GPA: Code your college GPA into line 26-28.
Example: A GPA of 3.50 would be coded as 26-C, 27-E, and 28-J (Use 4.0 scale).

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

29. College Major:

A. Architecture
B. Biology/Zoology
C. Business
D. Chemistry/Physics
E. Computer Science
F. English/Foreign Languages
G. Education/Physical Education
H. Engineering (aeronautical, civil, electrical, mechanical, etc.)
I. Fine Arts (music, dance, theater, etc.)
J. Geography/History
K. Geology/Earth Sciences
L. Mathematics
M. Nursing
N. Psychology/Sociology
O. Religious Studies/Philosophy
P. Social Work
Q. Other

30-32. Masters GPA: Code your Masters GPA into lines 30-32. Example: A GPA of 3.50 would be coded as 30-C, 31-E, and 32-J. (Code 999 if this does not apply) (Use a 4.0 scale).

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

33-35. PhD GPA: Code your PhD GPA into lines 33-35. Example: A GPA of 3.50 would be coded as 33-C, 34-E, and 35-J. (Code 999 if this does not apply) (Use a 4.0 scale).

A. 1 B. 2 C. 3 D. 4 E. 5 F. 6 G. 7 H. 8. I. 9 J. 0

APPENDIX B

LENNOX-WOLFE SELF-MONITORING SCALE

The statements on this page concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. Properly mark your answer in the appropriate place of the Ops Scan answering sheet provided you for the selection that most accurately reflects how you normally act in each situation. It is important for our research that you answer as frankly and honestly as you can. Your answers will be kept in the strictest confidence. Use the following scale to answer the following items.

A. certainly, always true
B. generally true
C. somewhat true, but with exceptions
D. somewhat false, but with exceptions
E. generally false
F. certainly, always false

1. In social situations, I have the ability to alter my behavior if I feel that something else is called for.

2. I am often able to read people's true emotions correctly through their eyes.

3. I have the ability to control the way I come across to people, depending on the impression I wish to give them.

4. In conversations, I am sensitive to even the slightest change in the facial expression of the person I'm conversing with.

5. When I feel that the image I am portraying isn't working, I can readily change it to something that does.

6. My powers of intuition are quite good when it comes to understanding others' emotions and motives.

7. I have trouble changing my behavior to suit different people and different situations.

8. I can usually tell when others consider a joke to be in bad taste, even though they may laugh convincingly.

9. I have found that I can adjust my behavior to meet the requirements of any situation I find myself in.

10. I can usually tell when I've said something inappropriate by reading it in the listener's eyes.

11. Even when it might be to my advantage, I have difficulty putting up a good front.

12. If someone is lying to me, I usually know it at once from that person's manner of expression.

13. Once I know what the situation calls for, it's easy for me to regulate my actions accordingly.

PLEASE ENSURE YOUR SOCIAL SECURITY NUMBER IS ON THE DIGITEK. PLACE BOTH THE QUESTIONNAIRE AND THE DIGITEK BACK IN THE ENVELOPE AND RETURN TO YOUR FLIGHT LEADER.

THANK YOU FOR YOUR TIME AND COOPERATION

APPENDIX C
TABLES

Table 1

Class Demographics - Gender

Class Sample/Population Percentages							
						Missing	
Class	**N**	**Female**	**%**	**Male**	**%**	**Value**	**%**
A^s	271	37	13.6	234	86.4	0	0
A^p	604	76	12.6	528	87.4		
B^s	416	60	14.5	352	85.0	4	.5
B^p	612	97	15.8	515	84.2		
C^s	450	76	16.9	373	82.9	1	.2
C^p	636	91	14.3	545	85.7		

$p > .05$

s - Class Sample

p - Class Population

Table 2

Class Demographics - Age

Class	Sample Size	Sample Mean	Standard Deviation	Class Mean	t-value
A	266	29.91	3.06	30.34	2.29*
B	409	29.85	3.04	30.34	3.25*
C	444	30.27	3.26	30.47	1.29

* $p < .05$

Table 3

Class Demographics - Aeronautical Rating

Class Sample/Population Percentages									
Class	**N**	**Nav**	**%**	**Pilot**	**%**	**Other**	**%**	**Missing Value**	**%**
A^s	271	25	9.2	66	24.4	178	65.7	2	.7
A^p	604	59	9.7	159	26.3	386	64.0		
B^s	416	38	9.2	112	26.9	263	63.2	3	.7
B^p	612	62	10.1	172	28.1	378	61.7		
C^s	448	50	11.2	125	27.9	269	60.0	4	.9
C^p	636	63	9.9	193	30.3	380	59.8		

$p < .05$

s - Class Sample

p - Class Population

Table 4

Class Demographics - Leadership Ratings

		Class Sample\Population Percentages							
Class	**N**	**DGOC**	**%**	**DG**	**%**	**OC**	**%**	**NL**	**%**
A^s	109	5	4.6	8	7.3	8	7.3	88	80.7
A^p	604	20	3.3	47	7.8	31	5.1	506	83.8
B^s	355	16	4.5	29	8.2	10	2.8	300	84.5
B^p	612	30	4.9	46	7.5	20	3.3	516	84.3
C^s	459	14	3.1	19	4.2	20	4.3	406	88.5
C^p	636	23	3.6	27	4.2	27	4.2	559	87.9

$p > .05$

s - Class Sample

p - Class Population

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

Table 5

Class Sample Demographics - Independent Variables

	Class	Sample Size	Mean	Standard Deviation
Intelligence	A	114	61.82	10.30
	B	373	58.54	9.66
	C	456	59.71	10.21
Dominance	A	265	31.55	5.66
	B	412	32.13	5.32
	C	414	32.96	5.16
Femininity	A	267	15.63	3.97
	B	414	15.52	4.15
	C	450	15.51	3.98
Self-Monitoring	A	249	55.69	6.82
	B	415	56.67	6.73
	C	449	55.32	6.38

Note: Sample sizes vary due to missing values

Table 6

Summary of One-way Analysis of Variance

between the Three SOS Classes for Intelligence

Source	df	SS	MS	F	*p*
Between	2	552.51	267.26	2.75	.0642
Within	900	90285.37	100.32		
Total	902	90837.88			

$p > .05$

Summary of One-way Analysis of Variance

between the Three SOS Classes for Femininity

Source	df	SS	MS	F	*p*
Between	2	110.47	55.32	2.73	.0656
Within	772	15598.06	20.20		
Total	774	15708.53			

$p > .05$

Table 7

Summary of One-way Analysis of Variance between the Three SOS Classes for Self-Monitoring

Source	df	SS	MS	F	*p*
Between	2	157.04	78.52	1.56	2106
Within	771	38779.29	50.30		
Total	773	38936.33			

$p > .05$

Table 8

Summary of One-way Analysis of Variance between the Three SOS Classes for Dominance

Source	df	SS	MS	F	*p*
Between	2	319.66	159.83	5.40	.0047*
Within	761	22520.47	29.59		
Total	763	22840.13			

*$p < .01$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Dominance)

Class	Mean
A	31.55a
B	32.13a
C	32.96b

Note: Higher means connote higher dominance scores. Means having the same subscript are not significantly different at $p < .05$.

Table 9

Summary of One-way Analysis of Variance between the Three SOS Classes for Age, Time in Service, Time in Grade, Volleyball, and Flickerball Experience

Variable	Class A Mean	Class B Mean	Class C Mean	F_{obs}	p
Age	29.91	29.85	30.27	2.20	.1113
Time in Service	7.28	7.20	6.96	0.79	.4559
Time in Grade	1.87	2.11	2.12	2.55	.0791
Volleyball	2.81	3.32	3.04	0.73	.4811
Flickerball	0.57	0.60	0.76	1.30	.2728

$p > .05$

Table 10

Four-Leadership Category Classification Hit Rates for Classes A, B, and C Based on the Inclusion of All Independent Variables.

	Leadership Category			
	DGOC	DG	OC	NL
# Classified Into Group	0	0	0	761
% Hit Rate	0	0	0	85.55
Priors	.0434	.0578	.0434	.8555

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

Table 11

Summary of One-way Analysis of Variance

Between the Four Leadership Categories for Dominance

Source	df	SS	MS	F	*p*
Between	3	774.20	258.07	8.99	.0001*
Within	760	22065.93	29.03		
Total	763	22840.13			

*$p < .001$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Dominance)

Category	Mean
A	35.11a
B	35.04a
C	34.27a
D	32.01b

Note: Higher means connote higher dominance scores. Means having the same subscript are not significantly different at $p < .05$.

Table 12

Summary of One-way Analysis of Variance between the Four Leadership Categories for Femininity

Source	df	SS	MS	F	*p*
Between	3	172.64	57.55	2.86	.0363*
Within	771	15535.88	20.15		
Total	774	15708.52			

*$p < .05$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Femininity)

Category	Mean
A	15.56ab
B	13.82a
C	15.39ab
D	15.84b

Note: Higher means connote higher femininity scores. Means having the same subscript are not significantly different at $p < .05$.

Table 13

Summary of One-way Analysis of Variance between the Four Leadership Categories for Intelligence

Source	df	SS	MS	F	*p*
Between	3	625.75	208.58	2.08	.1015
Within	899	90212.14	100.35		
Total	902	90837.89			

$p > .05$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Intelligence)

Category	Mean
A	62.40
B	61.69
C	60.52
D	59.29

All comparisons were nonsignificant, $p > .05$ significance level.

Note: Higher means connote higher intelligence scores.

Table 14

Summary of One-way Analysis of Variance between the Four Leadership Categories for Self-Monitoring

Source	df	SS	MS	F	*p*
Between	3	120.42	40.14	.80	.4961
Within	770	38815.90	50.41		
Total	773	38936.32			

$p > .05$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Self-Monitoring)

Category	Mean
A	55.67
B	57.18
C	55.85
D	55.50

All comparisons were nonsignificant, $p > .05$ significance level.

Note: Higher means connote higher self-monitoring scores.

Table 15

Correlation Matrix of the Independent and Dependent Variables

Variable	Intell	Dom	Fem	SM
Dominance (Dom)	.06			
Femininity (Fem)	-.12**	-.36***		
Self-Monitoring (SM)	.03	.34***	-.29***	
Leadership (LDR)	.07*	.16***	-.07*	-.02

* $p < .05$

** $p < .01$

*** $p < .001$

Table 16

Partial Correlation Matrix of the Independent/Dependent Variables for Femininity

Variable	Intell	Dom	SM
Dominance (Dom)	.02		
Self-Monitoring (SM)	-.04	.28***	
Leadership (LDR)	.08*	.16***	.02

Partial Correlation Matrix of the Independent and Dependent Variables for Self-Monitoring

Variable	Intell	Dom	Fem
Dominance (Dom)	.04		
Femininity (Fem)	-.05	-.28***	
Leadership (LDR)	.07*	.15***	-.06

* $p < .05$

** $p < .01$

*** $p < .001$

Table 17

Partial Correlation Matrix of the Independent/Dependent Variables for Intelligence

Variable	Dom	Fem	SM
Femininity (Fem)	-.30***		
Self-Monitoring (SM)	.30***	-.12***	
Leadership (LDR)	.15***	-.06	.03*

Partial Correlation Matrix of the Independent/Dependent Variables for Dominance

Variable	Intell	Fem	SM
Femininity (Fem)	-.04		
Self-Monitoring (SM)	-.05	-.03	
Leadership (LDR)	.06*	-.03	-.01

* $p < .05$

** $p < .01$

*** $p < .001$

Table 18

Four-Leadership Category Classification Hit Rates for Classes A and B Predicting Class C Based on the Inclusion of Dominance and Intelligence.

	Leadership Category			
	DGOC	DG	OC	NL
# Classified Into Group	0	0	0	367
% Hit Rate	0	0	0	83.11
Priors	.0545	.0763	0381	.8311

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

Table 19

Two-Leadership Category Classification Hit Rates for Classes A and B Predicting Class C Based on the Inclusion of Dominance and Intelligence.

	Leadership Category	
	L	NL
# Classified Into Group	0	397
% Hit Rate	0	87.66
Priors	.1234	.8766

L - DGOC, DG, and OC combined

NL - Nonleader

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

Table 20

Two-Leadership Category Classification Hit Rates for Classes A, B, and C Based on the Inclusion of Dominance and Intelligence.

	Leadership Category	
	L	NL
# Classified Into Group	0	764
% Hit Rate	0	85.47
Priors	.1453	.8547

L - DGOC, DG, and OC combined

NL - Nonleader

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

Table 21a

Summary of Backward Elimination of Canonical Variables for Discriminant Analysis for all Classes for the Four Leader Model

Variable	Partial R^2	F	*p*
Intelligence	0.0050	1.270	0.2836
Dominance	0.0266	6.875	0.0001
Femininity	0.0044	1.107	0.3455
Self-Monitoring	0.0010	0.252	0.8603

Step 1: Self-monitoring removed.

Variable	Partial R^2	F	*p*
Intelligence	0.0051	1.280	0.2802
Dominance	0.0263	6.791	0.0002
Femininity	0.0050	1.256	0.2886

Step 2: Femininity removed.

Table 21b

Summary of Backward Elimination of Canonical Variables for Discriminant Analysis for all Classes for the Four Leader Model (Cont.)

Variable	Partial R^2	F	*p*
Intelligence	0.0053	1.352	0.2562
Dominance	0.0308	8.008	0.0001

Step 3: Intelligence removed.

Variable	Partial R^2	F	*p*
Dominance	0.0322	8.399	0.0001

Table 22a

Summary of Backward Elimination of Canonical Variables for Discriminant Analysis for all Classes for the Two Leader Model

Variable	Partial R^2	F	*p*
Intelligence	0.0044	3.359	0.0672
Dominance	0.0259	20.135	0.0001
Femininity	0.0002	0.138	0.7108
Self-Monitoring	0.0006	0.450	0.5027

Step 1: Femininity removed.

Variable	Partial R^2	F	*p*
Dominance	0.0293	22.876	0.0001
Femininity	0.0005	0.374	0.5411

Step 2: Self-monitoring removed.

Table 22b

Summary of Backward Elimination of Canonical Variables for Discriminant Analysis for all Classes for the Two Leader Model (Cont.)

Variable	Partial R^2	F	*p*
Intelligence	0.0046	3.533	0.0605
Dominance	0.0303	3.533	0.0001

Step 3: Intelligence removed.

Variable	Partial R^2	F	*p*
Dominance	0.0317	24.828	0.0001

Table 23

Four-Leadership Category Classification Hit Rates for Classes A and B Predicting Class C Based on the Inclusion of Dominance

	Leadership Category			
	DGOC	DG	OC	NL
# Classified Into Group	0	0	0	367
% Hit Rate	0	0	0	83.11
Priors	.0545	.0763	.0381	.8311

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

Table 24

Two-Leadership Category Classification Hit Rates for Classes A and B Predicting Class C Based on the Inclusion of Dominance.

	Leadership Category	
	L	NL
# Classified Into Group	0	397
% Hit Rate	0	87.66
Priors	.1234	.8766

L - DGOC, DG, and OC combined

NL - Nonleader

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

Table 25

Four-Leadership Category Classification Hit Rates for Classes A, B, and C Based on the Inclusion of Dominance

	Leadership Category			
	DGOC	DG	OC	NL
# Classified Into Group	0	0	0	764
% Hit Rate	0	0	0	85.47
Priors	.0445	.0576	.0432	.8547

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

Table 26

Two-Leadership Category Classification Hit Rates for Classes A, B, and C Based on the Inclusion of Dominance.

	Leadership Category	
	L	NL
# Classified Into Group	0	764
% Hit Rate	0	.8547
Priors	.1453	.8547

L - DGOC, DG, and OC combined

NL - Nonleader

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

Table 27

Summary of One-Way Analysis of Variance between Distinguished Graduates, Outstanding Contributors, and Nonleaders for Self-Monitoring

Source	df	SS	MS	F	*p*
Between	2	119.88	59.94	1.19	.3046
Within	771	38816.45	50.34		
Total	773	38936.33			

$p > .05$

Tukey's Honestly Significant Difference Procedure for Pairwise Comparisons (Self-Monitoring)

Category	Mean
DG	57.18
OC	55.76
NL	55.50

All comparisons were nonsignificant, $p > .05$ significance level.
Note: Higher means connote higher self-monitoring scores.

Table 28

Four-Leadership Category Classification Hit Rates for Groups A, B, and C Based on the Inclusion of All Independent Variables-Proportional Categories.

	Leadership Category			
	DGOC	DG	OC	NL
# Classified Into Group	107	173	108	376
% Hit Rate	32.35	34.09	15.15	65.24
Priors	.25	.25	.25	.25

DGOC - Distinguished Graduate and Outstanding Contributor

DG - Distinguished Graduate

OC - Outstanding Contributor

NL - Nonleader

APPENDIX D

FIGURES

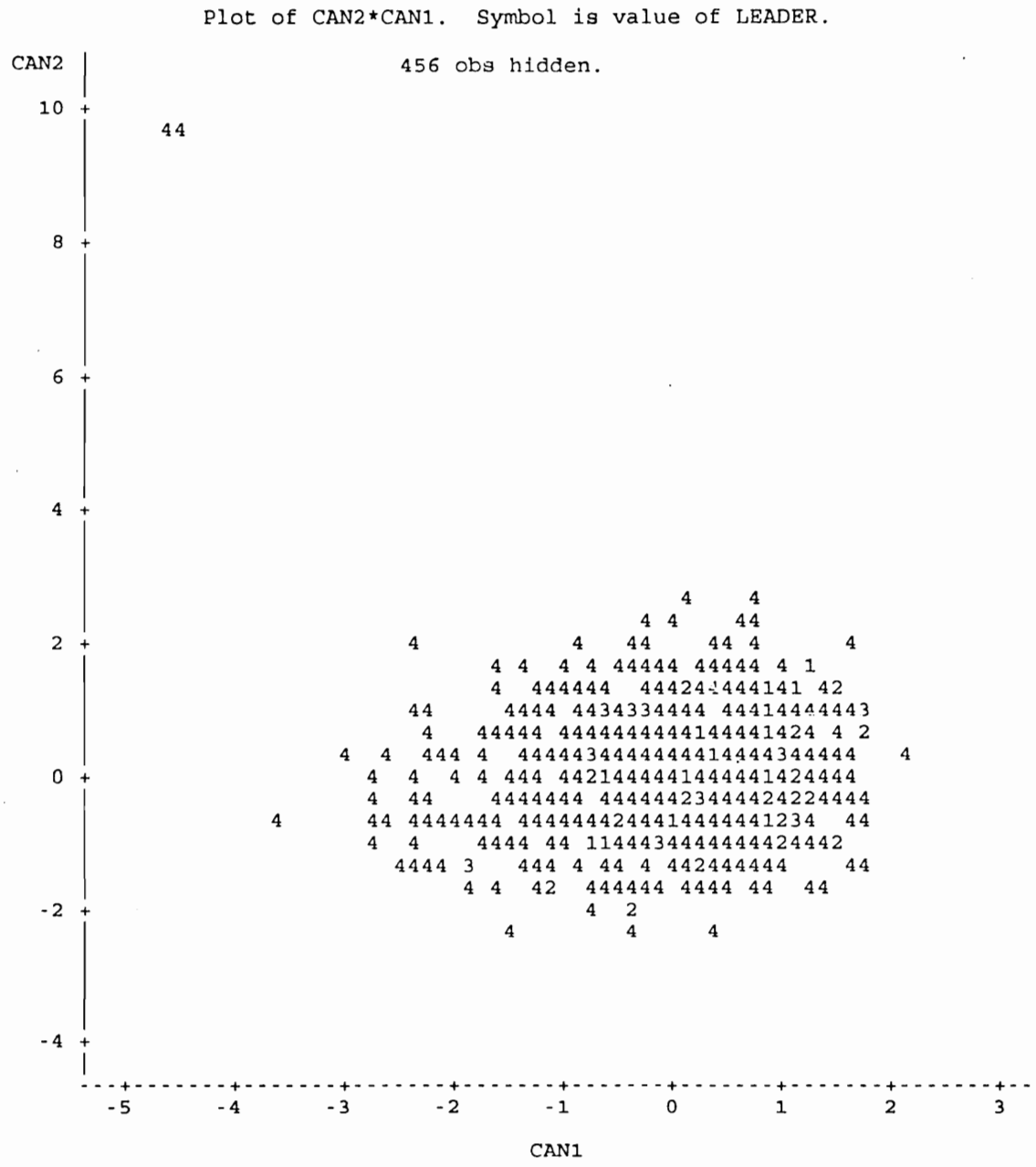

Figure 1. Plot of canonical variables 1 and 2 for four-leadership category discriminant analysis.

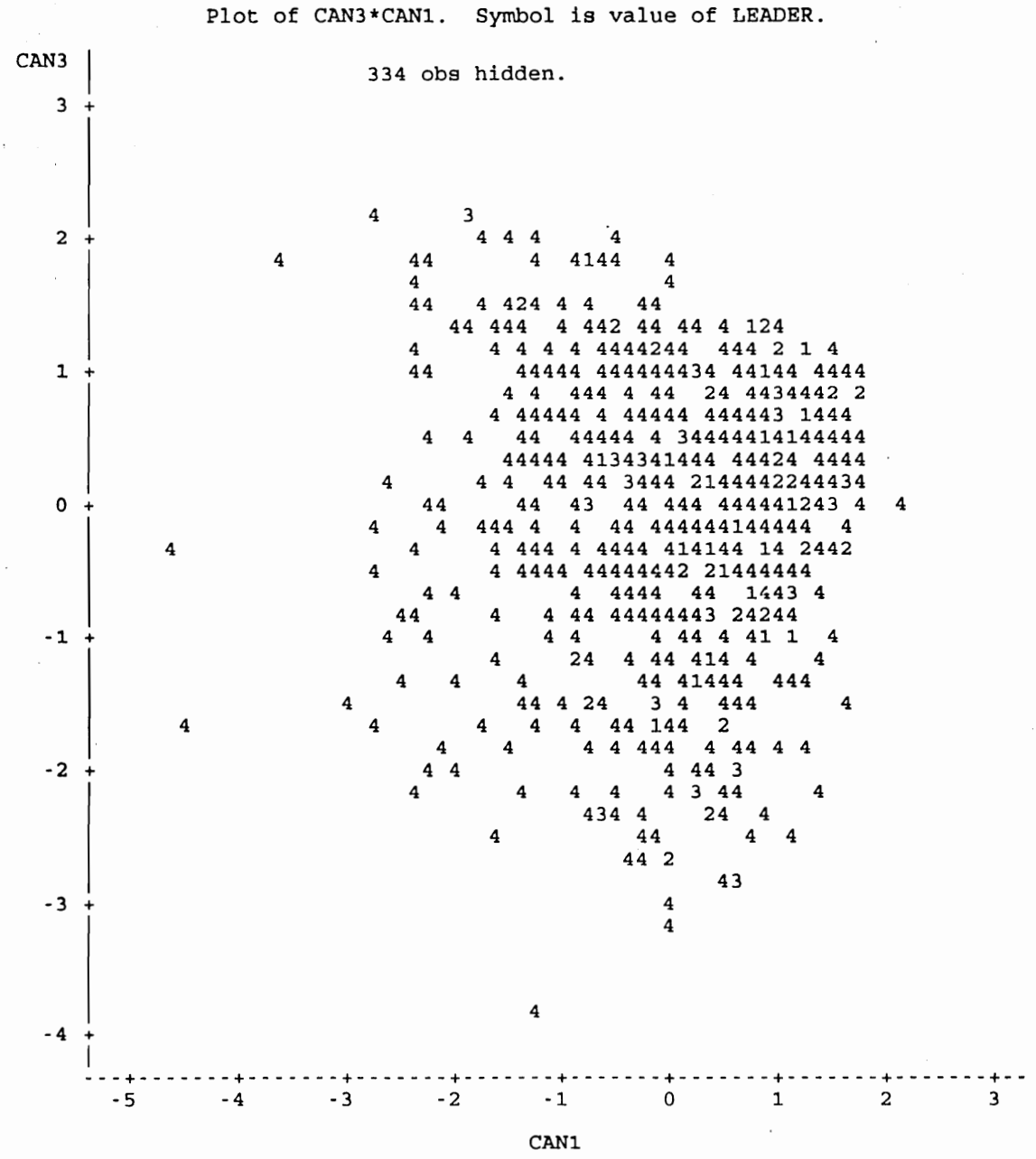

Figure 2. Plot of canonical variables 1 and 3 for four-leadership category discriminant analysis.

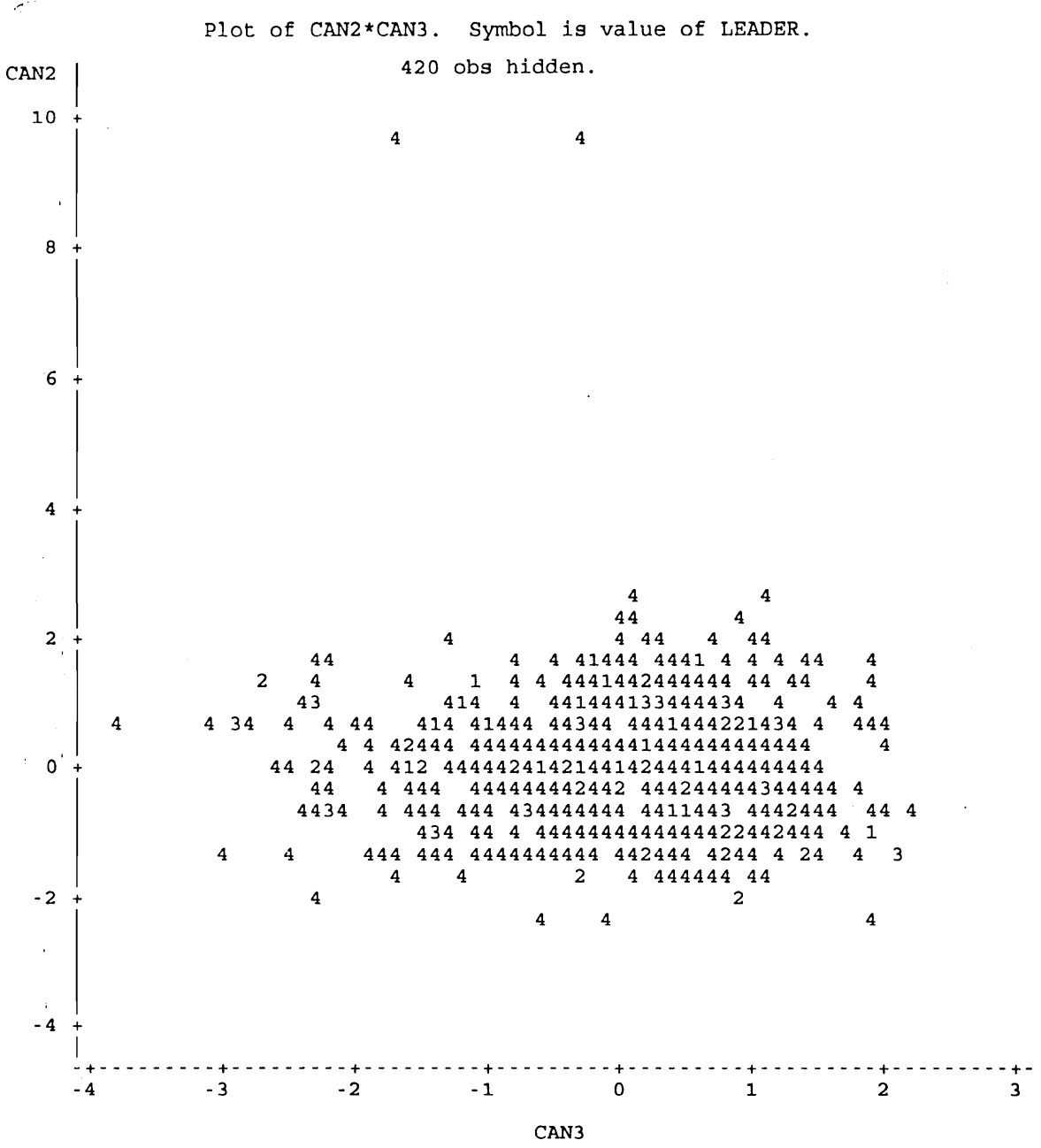

Figure 3. Plot of canonical variables 2 and 3 for four-leadership category discriminant analysis.

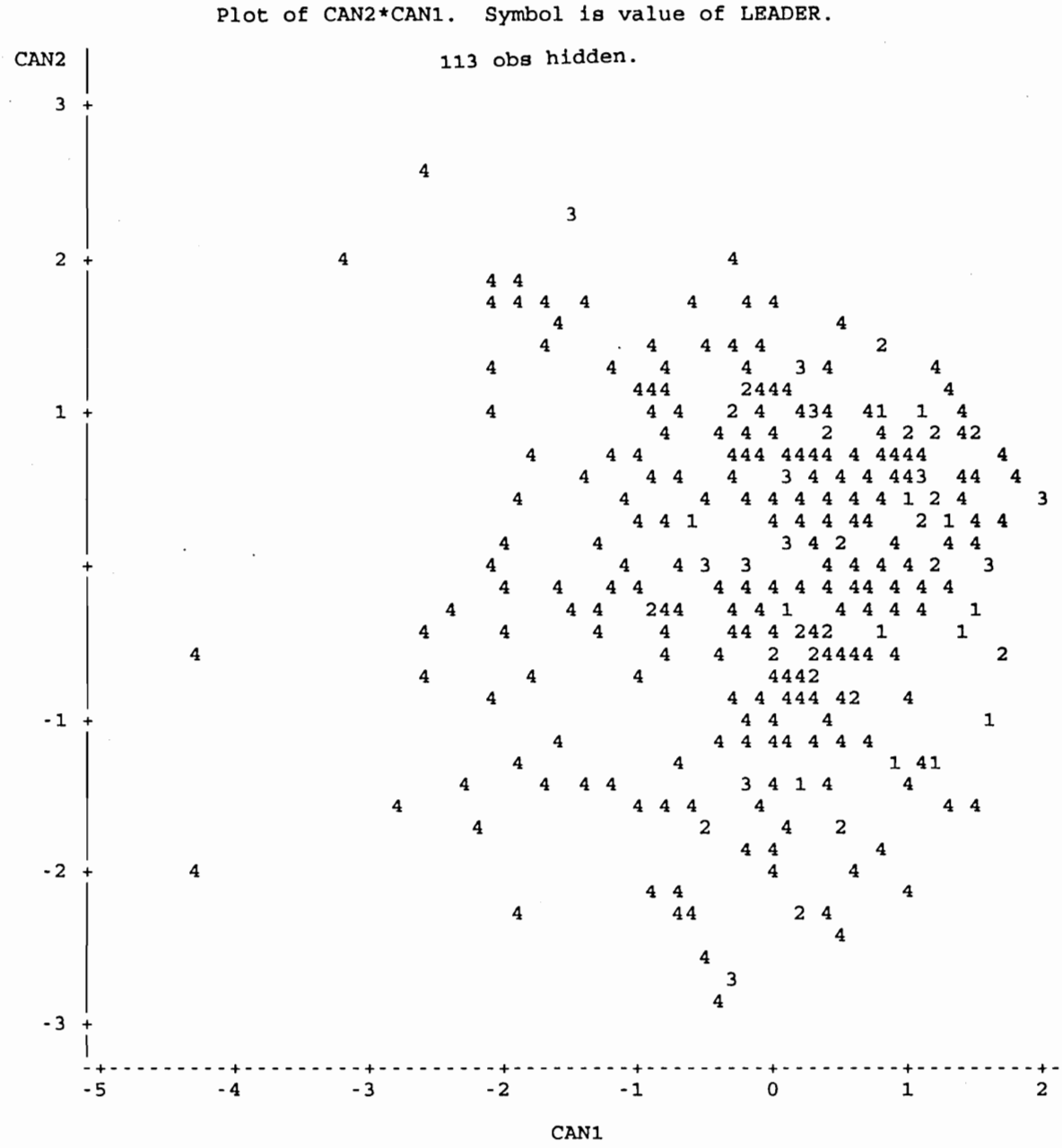

Figure 4. Plot of canonical variables 1 and 2 for four-leadership category discriminant analysis (dominance and intelligence only).

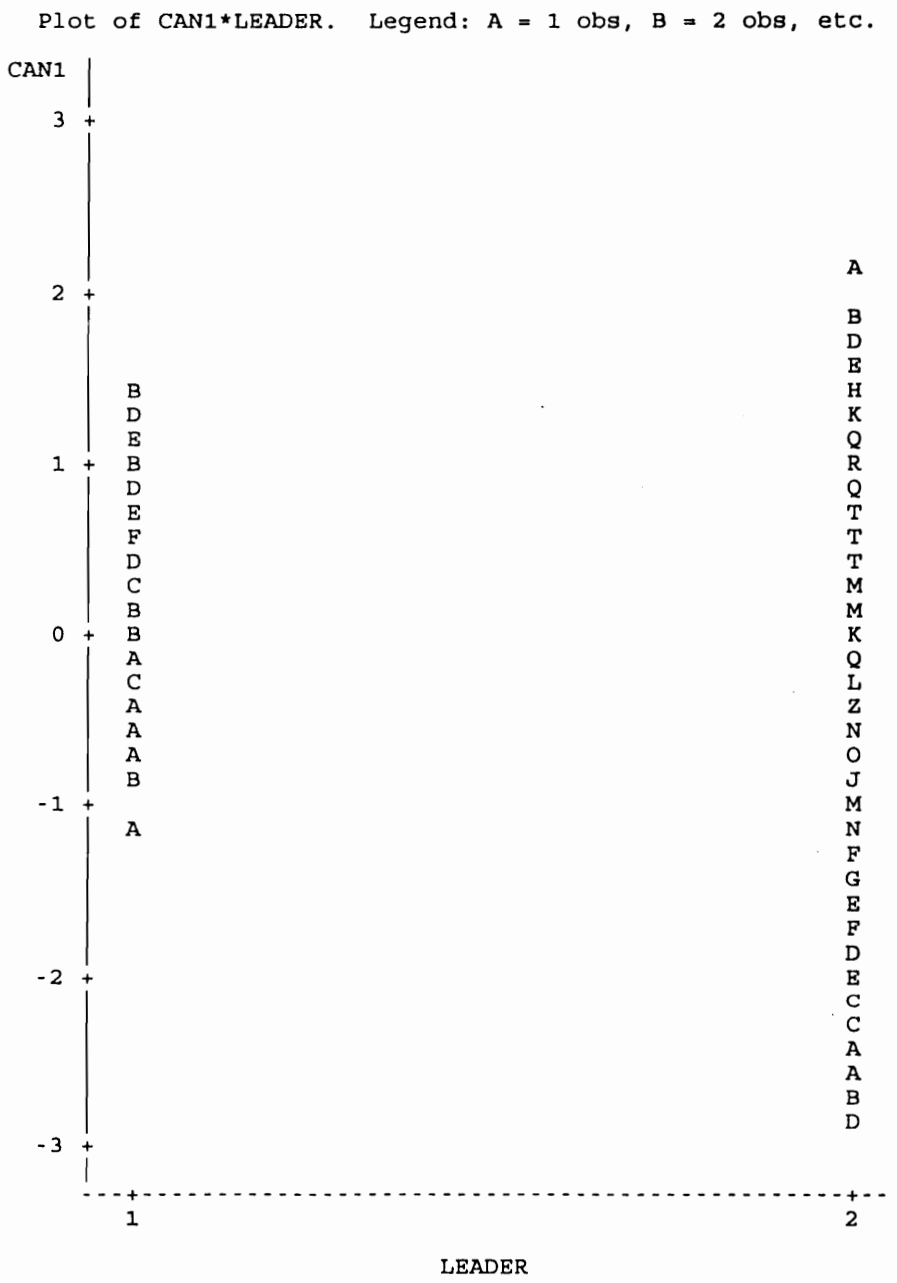

Figure 5. Plot of canonical variate for two-leadership category discriminant analysis (dominance and intelligence only).

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