THE RELATIONSHIP BETWEEN PERSONALITY AND PERFORMANCE OF CANADIAN WOMEN INTERCOLLEGIATE BASKETBALL PLAYERS

by

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ABSTRACT

The purpose of the study was to determine if personality characteristics related to successful participants in Canadian women's intercollegiate basketball could be identified. It was hypothesized that a personality profile for female basketball players could be identified. It was also hypothesized that differences in personality profiles existed between sub-groups related to successful performance: regular versus substitute players and members of winning teams versus members of losing teams.

The Athletic Motivation Inventory and the Cattell Sixteen Personality Factor Questionnaire were administered, during a single sitting, to fifty-six female basketball players participating in the Canada West University Athletic Association. F-ratios for the multivariate test of equality of mean vectors were computed between the sub-group personality profiles. Univariate analyses of variance between individual personality traits were also computed.

The results did not identify a specific female basketball personality profile. Therefore no statistical support was given to the premise that there is an identifiable relationship between personality and participation among Canadian women intercollegiate basketball players. In addition the results did not identify

a specific personality profile possessed by the more successful athletes. Therefore no support was given to the premise that there is an identifiable relationship between personality and successful performance. In conclusion the AMI was not found to be more sensitive than the 16PF in the psychometric assessment of athletes.

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INTRODUCTION

Researchers over the past twenty-five years have investigated the relationship between individual personality dimensions and their possible contribution to successful performance in athletics. Kroll and Crenshaw (1970:97) stated that:

> An athlete's psychological structure could be considered as one of the most influential criteria for initially deciding to participate and ultimately becoming successful, in a specific sport.

The goal of such investigations has been to identify specific personality parameters possessed by successful athletes, and isolate significant characteristics within these parameters necessary for success in athletic competition. The ultimate benefit of this psychological knowledge in athletics would be to maximize each athlete's performance. Kroll et al. (1971:1) outlined some of the general benefits that could be obtained:

> ...it would afford an important aid in the understanding of the psychodynamics of athletes, and establish a basis for examining the interrelationships between personality and the social structure in sport situations. For example, knowledge of personality types in athletics would give an initial understanding of the probable personality types possessing a propensity for participating in particular athletic activites.

In addition, some possible implications for coaching were presented by Vanek and Cratty (1970:55):

1. to select individuals who may be expected to exhibit proficiency in future years.

2. to channel individuals into activities for which they are best suited.

3. to identify "problem athletes" as well as devise effective means of dealing with them.

4. to define exact parameters of various types of athletic groups.

5. to develop coaching techniques related to specific psychological needs of the individual.

6. to attempt to modify behavior by creating within the individual a strong psychological framework, which would aid him in achieving his inherent psychological behavior.

A review of the literature revealed a number of inconsistencies between the results of previous independent studies. However, most of the major literature reviewers have summarized and outlined specific personality parameters supporting the emergence of an identifiable relationship between personality traits and athletes (Cooper, 1969; Kane, 1972; Morgan, 1972; Alderman, 1974). In observing the inconsistencies in the literature, Alderman (1974:138) expressed the common belief held by investigators:

> ...there remains a strong intuitive feeling that a significant relationship between athletics, physical activity and personality does exist.

Personality is a highly complex characterization of an individual, with various meanings and interpretations. Husman (1969) pointed out, that there is no classic definition of personality that is universally accepted by psychologists and psychiatrists. Therefore, researchers in the field of sport psychology have used a number of definitions of personality. However, Allport's (1961:28) "essentialist" definition of personality is one of the most often quoted and rates as the most widely accepted in sport psychology:

> Personality is the dynamic organization within the individual of the psychophysical systems that determine his characteristic behavior and thought.

Personality is neither exclusively mental nor exclusively physical, it is an integration of both systems.

There have also been a number of theoretical strategies which investigators have utilized to study the athlete's personality. Kane (1964:201) classified these methods into three basic categories:

1. Those describing a person in terms of external forces acting on him. (ie.) biological and sociological determinism.

2. Those describing interaction between the person and his environment. (eg.) theories of instinct, drive, desire, and need.

3. Those describing a person in terms of basic traits. (eg.) common traits, factors, or types.

One of the most frequently employed methods of identifying personality characteristics has been by the use of personality traits. "Common personality traits," as defined by Allport (1961:340), "are those aspects of personality in respect to which most people of a given culture can be profitably compared." A personality trait, "is generally considered to represent the characteristic tendency a person has for acting or behaving in a certain way" (Alderman, 1974:127).

In attempting to identify personality traits of athletes, researchers have primarily relied on self-report, pencil and paper inventories. Generally they have employed such investigating tools as: the Edwards Personal Preference Schedule (EPPS); the California Psychological Inventory (CPI); the Minnesota Multiphasic Personality Inventory (MMPI); the Cattell Sixteen Personality Factor Questionnaire (16PF); and more recently the Athletic Motivation Inventory (AMI). These self-report inventories, and others like them, with the exception of the AMI, are standard tests designed for clinical and experimental situations.

In view of Allport's (1960:30) comment that, "defined personality will be dependent on the evaluation tools used," consideration must be given to the above tests in relation to their appropriateness for the evaluation of athletic groups. It seems logical that research relating to the personality of a highly complex group such as athletes is task specific, and should be conducted using an instrument specially designed for and related to, the athletic environment.

Rushall (1970b:167) pointed out that the 16PF, used in the majority of personality studies on athletes during the 1960's, "...has only twenty-six questions which could be related to athletic situations." Viewing the fact that the majority of personality inventories presently used in the evaluation of athletes were not constructed for that purpose, it was suggested by Ogilvie (1968), Rushall (1970a), Vanek and Cratty (1970) and supported by Singer (1972), Alderman (1974) and Berlin (1974) that, more valid results would be obtained if personality measures specifically designed to evaluate athletes were developed and utilized. As a result of these concerns the AMI was developed, with four purposes in mind (Tutko et al., 1975:1):

1. To serve as a medium through which the coach and athlete can develop improved channels of communication and motivation.

2. To enable the athlete to better understand his athletic attitudes and to help make his participation in athletics a positive personal growth experience.

3. To serve as an assessment device to determine if changes result from coaching methods, techniques, and/or organized athletic programs.

4. To provide a testing instrument through which research in sport psychology could be conducted.

The AMI provides easily understood, non-technical information regarding eleven relevant personality traits associated with athletic success. These personality traits are divided into two general areas, Desire factors and Emotional factors. Desire factors relate to the individual's expectation from athletics and his willingness to work towards accomplishing his goals and expressed in terms of the traits: Drive, Aggression, Determination, Responsibility, and Leadership. The Emotional factors deal with the athlete's very personal attitudes and feelings about himself, his coach, and the manner in which he feels he is being treated. These factors are expressed in terms of the traits: Emotional Control, Self Confidence, Mental Toughness, Coachability, Conscientiousness, and Trust. Tutko (1970:33) described the test results and the psychological profile of the athlete, in relation to athletic performance and success in the following ways:

> It is not so much whether the athlete has these traits, since all possess each to a certain extent. But it is the degree to which he possesses the trait that will make the difference. If the athlete is above the average of his teammates in each trait he will probably be an exceptional performer, provided that he has some talent.

PURPOSE OF THE STUDY

The present study was conducted in order to determine if specific personality characteristics related to successful participants in Canadian women intercollegiate basketball players could be identified. Although there has been an increasing number of studies regarding women athletes, there have been only two studies reported in the literature relating to the personality characteristics of Canadian women intercollegiate athletes. Higgs and Higgs (1972) studied basketball players and Bird (1970, 1974) analyzed ice hockey players.

The AMI was chosen as the major investigating tool because of its unique development for the psychometric evaluation of athletes. The Cattell 16PF was also selected as a secondary measure for comparative purposes.

The use of the two personality inventories was considered essential in order to gain insight into the relative sensitivity of each test in the discrimination of personality trait differences between and within athletic groups. In addition, in light of the controversy over the AMI as a reliable scientific instrument, the accredited 16PF was employed in order to evaluate consistency. The combined use of the inventories was considered compatible for these purposes based on the significant correlations found between seven traits compared by Hammer and Tutko (1972) (See Appendix A).

STATEMENT OF THE PROBLEM

For the purpose of this investigation the problem was presented in three parts:

1. To determine whether the personality profiles of Canadian women intercollegiate basketball players could be described as being significantly different from female non-athletes (college female population norms).
2. To determine if a relationship exists between individual personality traits and success in women intercollegiate basketball players.
3. To evaluate the relative effectiveness of the AMI and the 16PF as investigating tools for the psychometric research of athletes.

Sub Problems

In attempting to identify personality traits conducive to success in female intercollegiate basketball players answers to the following questions were sought:

1. Using the AMI and the 16PF independently, can certain personality traits be identified as differentiating between a team's regular players and substitute players?
2. Using the AMI and the 16PF independently, can certain personality traits be identified differentiating the profile of members of winning teams from that of losing teams?
3. Is there any relationship between the personality profiles of women intercollegiate basketball players identified by the AMI and the 16PF?

DEFINITIONS

'Regular Players' are defined as those players who carry the majority of the playing responsibility over the course of the season. In most situations they could be considered the starting five players.

'Substitute Players' are defined as those players who are not regular players. In most situations they could be considered as the players who do not participate in the game on a regular basis.

Players were classified as regulars or substitutes based on their coaches' ranking.

'Winning Teams' are defined as the two teams who finished with the best win/loss records in the six team, Canada West University Athletic Association (C.W.U.A.A.), in the 1973-1974 season.

'Losing Teams' are defined as the two teams who finished with the worst win/loss records in the C.W.U.A.A., in the 1973-1974 season (See Appendix B).

'Successful Player', depending on the context used, refers to a member of a winning team and/or a regular player.

DELIMITATIONS

The results of this study will be inferred only to women intercollegiate basketball players in the C.W.U.A.A. The personality traits will be defined as those contained and described in the Athletic Motivation Inventory and the Cattell Sixteen Personality Factor Questionnaire.

ASSUMPTIONS AND LIMITATIONS

The results of this study and its conclusions and inferences are based on the assumption that the validity and reliability coefficients of the AMI and the 16PF are accurate as reported (See Appendices C and D).

The following limitations were considered as possible interferences with the reliability of the results. The two tests were administered during a single sitting at the subjects' respective campuses. The test administration was conducted by the respective team coaches whose personal approach to the administration procedure could not be controlled. All possible steps were taken to minimize these effects and all instructions were given by a standardized, tape recorded message (See Appendix E).

HYPOTHESES

In view of the rationale underlying the AMI, that is, being specifically designed to evaluate an athlete's personality, it was hypothesized that results of the comparisons using the AMI would demonstrate specific differences between players of differing ability levels. It was also hypothesized that these differences would not be manifest under the analysis of the 16PF due to its lack of sensitivity to the athletic situation.

Hypothesis I

As a group, the personality profile of women intercollegiate basketball players is significantly different from the profile of the population norms, when measured by the Cattell Sixteen Personality Factor Questionnaire.

Hypothesis II

As a group, the personality profile of women intercollegiate basketball players is significantly different from reported norms of female athletes, when measured by the Athletic Motivation Inventory.

Hypothesis III

The personality profile of regular players is significantly different from the personality profile of substitute players, when measured by the Athletic Motivation Inventory.

Hypothesis IV

The personality profile of members of winning teams is significantly different from the personality profile of losing team members, when measured by the Athletic Motivation Inventory.

Hypothesis V

The personality profile of members of winning teams when compared to the personality profile of losing team members will show no significant differences, when measured by the Cattell Sixteen Personality Factor Questionnaire.

Hypothesis VI

The personality profile of regular players when compared to the personality profile of substitute players will show no significant differences, when measured by the Cattell Sixteen Personality Factor Questionnaire.

Chapter 2

REVIEW OF THE LITERATURE

The majority of personality studies of athletes reported in the literature have been primarily concerned with males. As this present study dealt with a female athletic group, using the Athletic Motivation Inventory as the primary measurement tool, this review is selective in its reporting and focuses on the following data, for comparative purposes:

1. Major literature reviews
2. Inconsistency of results
3. Related studies
4. Female studies
5. Studies using the Athletic Motivation Inventory

In attempting to identify personality characteristics related to the successful performance of athletes in general and within specific groups, researchers have used various experimental procedures. A variety of personality inventories have been employed and a number of independent variables utilized. Generally, comparisons can be categorized in the following ways: athletes and non-athletes, athletes from various sub-groups, team and individual participants, and athletes of varying levels of ability. Researchers in this field of sport psychology have been cautioned not to misinterpret a cause effect relationship, as Kroll (1970:358) emphasized:

Personality attributes which have been demonstrated as significant differentiators between athletes and non-athletes or between athletes in different sports are certainly personality features somehow linked to athletics. Contending that such traits are essential characteristics for success in a sport, however, is quite a different matter.

MAJOR LITERATURE REVIEWS

In order to make a more meaningful interpretation of the results of various independent studies, a number of researchers summarized the results reported in the literature. Cross comparisons have been made where applicable, in order to identify personality factors commonly isolated and depicted as characteristics of athletes and specific athletic groups (Cofer and Johnson, 1960; Kane, 1964, 1970, 1972; Warburton and Kane, 1967; Ogilvie, 1968, 1972; Husman, 1969; Cooper, 1969; Morgan, 1972; Alderman, 1974; and Berlin, 1974).

Kane (1964) reported that certain personality factors consistently appeared in the results of studies investigating top level athletes. Describing their personality he isolated six factors commonly found:

1. Personal integration: Persistence and high control of emotion.
2. Extraversion: Surgency.
3. Tough-minded: Realistic aggression, self-sufficiency, and a cool reserved outlook.
4. Radicalism: Free-thinking, experimental outlook and a practical direct approach to life.
5. General abstract ability.
6. Ruthlessness: Shrewdness, conscientiousness, and a persistent energetic efficiency.

Again, Kane (1970) reviewed the literature as it related to the personality profiles of athletes at high levels of competition. He identified similar traits as being most often reported, describing top level athletes: aggression, dominance, drive, tough-mindedness, confidence, lack of anxiety, and emotional stability.

Cooper (1969:22) concluded from his review of the literature that, "a fairly coherent picture is emerging as to the relationship between personality factors and athletic activity." Cooper grouped the personality factors which seemed to be indicative of athletes, male and female, at all levels of competition, into the following categories:

1. Outgoing and socially confident.
2. Outgoing, socially aggressive, dominant, and possession of leadership qualities.
3. High social adjustment, self-confidence, and having social prestige and status.
4. Low anxiety and high emotional stability.
5. Less compulsive.
6. High physical pain tolerance level.
7. Low femininity, high masculinity.

Alderman (1974:138) reported that researchers have reached a certain degree of consistency in identifying the following personality traits among athletes: sociability, confidence, extraversion, self-concept, conventionality, mental toughness, and emotional stability. Ogilvie (1968:786) researched the personalities of a large heterogeneous group of athletes, including college football and basketball players, age group

and Olympic swimmers, and athletes at all levels of competition in track and field, using several personality tests. In summarizing the personality profiles of these top level performers he concluded that:

> ...those athletes who retain their motivation for competition will have most of the following personality traits: ambition, organization, deference, dominance, endurance, and aggression. There will be fewer introverted types by adult-level competition. Emotional maturity will range from average to high average and be complimented by self-control, self-confidence, toughmindedness, trustfulness, intelligence, high-conscience development and low levels of tension.

In reviewing sex differences in personality profiles the discriminant ability of the 16PF, presented by Cattell, Eber and Tatsuoka (1970:69) must be mentioned. They stated that, "the differences between men and women, in our own culture and others, show up very clearly on the 16PF."

In regard to women competitors, Ogilvie (1968) concluded that top level women showed a personality similar to those of males, generally exhibiting the following characteristics: strong achievement orientation, organization, deference, dominance, psychological endurance and aggression. Kane (1972b:28) reported that women athletes tended to fit social expectations and described them as being low in dominance and self-sufficiency, emotional, sensitive, anxious and socially warm. Husman (1969) concluded that personality profiles of women closely paralleled those of males of similar performance levels. Other researchers have failed to find any significant differences between means when comparing male and female athletes at different levels of achievement within the same sport: Swimming; Ogilvie (1966); Parsons (1963); Wrestling; Kroll (1965); Karate; Kroll and Carlson (1967).

With the recent increase in the number of women's athletic programs and women participating in more activities at all levels of competition, a need has been created for more research to be carried out in order to evaluate any differences in their personality compared to males of the same sport and females of other sports.

INCONSISTENCY OF RESULTS

The review of literature reveals that a fairly consistent pattern of results is beginning to emerge identifying personality characteristics related to successful athletic performers. However, expected personality parameters are not always supported by the results of repeated studies on similar athletic groups. The theory that identifiable personality characteristics specific to athletic groups and related to successful performance still prevails and is supported by such authorities as Kane (1964), Ogilvie (1968), Kroll et al. (1971), Alderman (1974), and Berlin (1974). Berlin (1974:326) reflected the concern over the present state of the research results in her statement that:

> There is just not sufficient consistency from study to study or within studies to have confidence in more than a superficial descriptive level of information.

Previous inconsistencies have generally been blamed on inconsistent methodology and invalid statistical treatment of the data which does not allow for accurate comparative analysis (Husman, 1969; Kroll, 1970; Morgan, 1970; Rushall, 1970b; Kroll et al., 1971; Morgan, 1972; Cratty, 1973; Alderman, 1974; Carron, 1974). Kroll (1970:353) stated that:

> The goal of synthesis and integration for personality structure and personality dynamics, both singly and together, seems less achievable today than it was before in that we appear to be in an era of such extreme methodological and conceptual specialization that communication between investigators, never satisfactory to begin with, threatens to break down.

It has been suggested that much of the problem is based on a lack of common ground from which to work. Husman (1969:57) pointed out:

> There is no classical definition of personality that is universally accepted by psychologists and psychiatrists,

therefore:

> Since we cannot agree or do not really know what personality is, how do we establish scientific instruments for assessing something we do not fully understand.

Further concern regarding the trait method of personality investigation has come from the general field of experimental psychology. Klein et al. (1967:47) questioned the use of the trait method investigation:

> Pre-occupation with the generality and consistency of a mode of regulation whether called 'trait', 'attitude' or 'control', has been the dominant concern of personality assumption....the specifications of these stabilities and their role in the organismic scheme of things leaves much to be desired. The psychometric strategy of 'test and factor' analysis has commonly been used to specify trait dimensions. Few dimensions proposed as principles of organismic regulations have risen beyond the status of promising.

The major reviews of the literature have all acknowledged the lack of congruency. The tools designed and developed for clinical research have been criticized as unsuitable for athletic personality research (Kroll, 1970; Kane, 1970; Rushall, 1970b; Morgan, 1972; Carron, 1974). The necessity of more rigorous definitions of variables, sampling techniques, and sociological controls have been suggested (Vanek and Cratty, 1970; Carron, 1974; Berlin, 1974), because of their possible influence on the nature of the individuals taking part or being drawn towards a specific sport.

A final criticism has been the lack of suitable statistical techniques or their inappropriate application, to the analysis of personality data. If it can be assumed (Kroll et al., 1971:2) that athletic types do exist and the current tests are adequate for

their assessment, it is possible that the failure to obtain definitive results could have been caused by inadequate theorizing, data collection, and/or data analysis. Data analysis, in particular, has been criticized in the personality research of athletes and an appropriate solution to this concern has been successfully demonstrated and supported by Tiedeman (1951), Kroll and Peterson (1965), Kroll and Crenshaw (1970), Kroll et al. (1971), Morgan (1972), and Carron (1974). It has been suggested that multivariate analysis of variance, taking into account the vector of all individual trait scores, is a more appropriate statistical technique than the extensively used "t-test". This conclusion is based on the fact that the use of multivariate and univariate techniques reduces sampling error and the probability of committing Type I errors.

RELATED STUDIES

In order to give a better insight into the results of individual studies the following research related to male basketball players and players of varying abilities has been reviewed.

Slusher (1964) collected data on selected high school athletes using the MMPI, and reported significantly lower scores for all athletic groups, when compared with the non-athletic groups, on the femininity and intelligence scales.

Differences in personality factors between athletic sub-groups, at various levels of achievement, were investigated by La Place (1954). Using the MMPI, he found that major league baseball players were significantly higher in drive, as expressed by ambitiousness and aggression, than minor league players.

Schendel (1965) used the CPI to examine differences between male athletes and non-participants at different educational levels. Significant differences were found between substitute and regular players on four scales: self-control, achievement via conformance, good impression, sense of well-being.

Winning college football teams were compared with losing teams by Kroll and Peterson (1965), who concluded that winning teams were generally composed of individuals who were more venturesome and had a higher degree of self-confidence and self-control.

Booth (1958), studying college male basketball players with the MMPI, found that dominance was the only statistically significant trait discriminating good and poor competitors. Although statistical significance was not achieved on other traits, he concluded that differences in personality as measured by the MMPI did exist between athletes and non-athletes and between those who participate in individual sports and team sports.

Havel (1959), who compared male basketball players using the EPPS, found that varsity athletes at the college level scored higher in need to achieve, deference, order, abasement, and aggression when compared to junior varsity players. However, no statistical levels of significance were reached, and no particular trait was related to achievement in basketball.

Nelson (1966) compared leaders and non-leaders in male high school basketball players, using the 16PF. Analysis of variance revealed significant differences between group means on five of sixteen factors. Leaders were found to be more sociable, emotionally stable, surgent, adventurous, and shrewd.

Tatum (1973) using the 16PF found male college basketball players more practical, conventional and realistic than gymnasts and wrestlers.

In summary of the studies investigating male basketball players, no specific personality traits have been statistically reported as significant in any two studies. In addition, there is very little support for the identification of similar traits among the more successful performers.

FEMALE STUDIES

A few studies have investigated the relationship between personality traits and success in sports related to female athletes specifically. Malumphy (1968) found that women athletes involved in swimming and tennis at the college level were similar on personality profiles when evaluated with the 16PF. Swimmers were found to be lower in conscientiousness (Factor C), and self-sufficiency (Factor Q_2), whereas tennis players were higher in conscientiousness and emotionally stable (Factor C). She concluded that certain personality traits may be prerequisite for success in various sports.

Kane and Callaghan (1965), using the 16PF, found that comparisons between world class women tennis players and players of less ability revealed that successful players were more emotionally stable, self-confident and lower in frustration.

Peterson et al. (1967) compared women team players and individual sport participants using the 16PF. Team players scored above the mean on mental toughness and realism. Comparisons between top performers and the remainder of the athletes showed top performers to be significantly higher in drive, leadership, and self-confidence. A personality profile, based on the results of the 16PF, described women basketball players as steady, dependable and interested in immediate issues.

Bird (1970), who described the personality profile of Canadian women intercollegiate ice hockey players, using a battery of four tests, consisting of the 16PF; the EPPS; the Jackson Personality Research Form; and the Osgood Semantic Differential, found a trend towards consistency of results between the inventories. More support can be given to specific findings if they are identified in more than one inventory, rather than on the basis of an individual test evaluation. Based on her compounded findings, Bird described ice hockey players as bright, independent, creative, and self-abasing when compared to established norms. Winning team members were shown to be more conscientious, anxious, dependent, introverted, and conservative.

Williams et al. (1970) who studied women fencers using the 16PF and the EPPS found that dominance was the only factor which discriminated the high level achievement group from the low level achievement group.

Brasher (1974), comparing high school girls competing in basketball, debate, drill team, and band with a non-competing control group using the CPI, found the following results. Basketball players fell significantly below the norm in capacity for status, sense of well-being, responsibility, self-control, tolerance, good impression, achievement via conformity, achievement via independence, intellectual efficiency, and psychological mindedness.

Based on the previous studies of female athletes, there does not appear to be sufficient evidence for the identification of a specific athletic profile of female athletes in general or even within any specific athletic groups.

STUDIES USING THE ATHLETIC MOTIVATION INVENTORY

Since 1970 a number of investigators have studied athletic personalities using the Athletic Motivation Inventory (AMI). The results of these studies have either indicated consistent differences between successful and non-successful athletes at a level of statistical significance or shown a trend towards such a significance.

Regular versus Substitute

Stewart (1971) looked at the differences in psychological make up of college male basketball players, as defined by the AMI. Multiple discriminant analysis between starters and substitutes scored the starters significantly higher on the traits of drive, self-confidence, and leadership. Although they did not reach the .05 level of significance, five additional traits showed a positive trend towards significance: aggression, coachability, determination, emotional control, and trust. A similar study of high school male basketball players by Hirst (1973), found starters to be significantly higher than non-starters in the traits of determination, guilt proneness, leadership, self-confidence, and coachability. Hammer and Tutko (1973) found starting college football players to be significantly higher on drive, self-confidence, emotional control, conscientiousness, trust and leadership than their substitute counterparts.

Ability Levels

Slack (1972) used the AMI to investigate differences between three levels of ability within and between male and female tennis players. No differences were found between males and females at all levels. However, she found that the championship players could be discriminated from the players of lesser calibre on two traits,

determination and mental toughness. Acampora (1971), using the AMI, found significant differences among three levels of women field hockey players. The traits that discriminated the three groups included self-confidence, determination, conscientiousness, trust, leadership and emotional control, with the more successful athletes scoring higher on each trait.

A study of female intercollegiate basketball players in Canada was reported by Higgs and Higgs (1972). Top players scored significantly higher than poorer performers on traits of drive, leadership. self-confidence, and conscience development. The successful teams were significantly higher than unsuccessful teams on the traits of coachability, drive, and guilt proneness. Higgs and Higgs concluded that Canadian women basketball players exhibited similar personalities to those of other competitive sportswomen reported in the literature. In addition, the total profile of the basketball players showed them to be high in aggression, mental toughness and low in conscientiousness compared to norms of female athletes tested using the AMI.

Bruce, Harris and Maddies (1973) compared experienced women field hockey players and found the experienced players to be significantly higher on determination, emotional control, coachability and trust.

Douglas (1974) compared superior or nationally recognized female synchronized swimmers to above average, average, and below average swimmers. The superior athletes were significantly higher on the traits of leadership, self-confidence and coachability than the average or below average groups.

Winning versus Losing Teams

Three separate studies have been completed comparing successful or winning teams to unsuccessful or losing teams. Studies of male high school basketball teams by Willis (1970) and Hirst (1971), reported by Tutko et al. (1973), found that winners were significantly higher on the trait of drive. Hammer and Tutko (1973) found the same results in their study of college football teams. Willis also found winners to be significantly less conscientious than losers.

SUMMARY

In reviewing the studies employing the AMI, it can be seen that a consistent pattern of personality traits is identified. Distinct differences were identified between athletic groups and ability levels in independent studies. The two categories discussed in the present study have shown a consistent pattern of results. In general, regular players are significantly higher than their substitute counterparts, on the traits of drive, determination, emotional control, and leadership (See Table I). Winning team members are consistently described as being higher in drive than losing team players (See Table II).

It is evident from reviewing the results of the studies using clinical personality inventories, primarily the 16PF, that a consistent pattern of personality traits describing athletes has not been demonstrated with the same degree of consistency as studies employing the AMI.

TABLE I

Summary of Studies of Regular Players (Top Performers) versus Substitute Players (Poorer Performers) using the Athletic Motivation Inventory

Investigator	Date	Sport	Sex	Significant Differences
Acampora	1971	Field hockey	Female	More successful athletes scored higher on traits of determination, leadership, self-confidence, emotional control, conscientiousness, trust.
Stewart	1971	College Basketball	Male	Starters scored higher on traits of drive, self-confidence, leadership.
Higgs and Higgs	1972	College Basketball	Female	Top performers scored higher on traits of drive, leadership, self-confidence, conscientiousness.
Hirst	1973	High School Basketball	Male	Starters scored higher on traits of determination, guilt proneness, leadership, self-confidence, coachability.
Slack	1971	Tennis	Male & Female	Championship players scored higher on traits of determination, mental toughness.
Douglas	1974	Synchronized Swimming	Female	Experienced performers scored higher on determination, emotional control, coachability, trust.

TABLE II

Summary of Studies of Successful Team versus Unsuccessful Team (based on win/loss record) using the Athletic Motivation Inventory

Investigator	Date	Sport	Sex	Significant Differences
Willis	1970	College Football	Male	Winners scored higher on drive, lower in conscientiousness.
Hammer and Tutko	1972	College Football	Male	Winners scored higher on drive, lower in conscientiousness.
Higgs and Higgs	1972	College Basketball	Female	Winners scored higher on drive, guilt proneness, coachability.
Hirst	1973	High School Basketball	Male	Winners scored higher on drive.

Chapter 3

METHODS AND PROCEDURES

The methods and procedures utilized for the collection and analysis of the personality data of the women intercollegiate basketball players participating in this study are discussed in this chapter. The data was collected at the conclusion of the 1973-1974 season, during the months of February and March of 1974.

SUBJECTS

The subjects were fifty-six female basketball players participating in the Canada West University Athletic Association basketball league which consisted of the following teams: University of Alberta, University of British Columbia, University of Calgary, University of Lethbridge, University of Saskatchewan, and the University of Victoria. Of the total registered league players 82.3% volunteered to participate in the study. The mean age of the subjects was 20.5 years.

TESTING PROCEDURES

The following pencil and paper personality inventories were administered to all subjects, at their respective campuses, during a single sitting. The order of completion was as follows:

1. The Athletic Motivation Inventory (Form A - Team Sports).
2. The Cattell Sixteen Personality Factor Questionnaire (Form A).

The testing sessions were supervised by the respective coaches of each team, in compliance with the following summarized instructions:

1. set a serious mood and ask for each player's cooperation in answering all questions as honestly as possible.
2. administer tests to all players together, prior to a practice session.
3. deliver all instructions via the pre-recorded taped message (See Appendix E).

PERSONALITY INVENTORIES

The Athletic Motivation Inventory

The major justification for the use of the AMI is that it is the only personality inventory designed and constructed for the explicit purpose of describing personality traits specific to athletic competitors. The need for investigations related to athletic personalities using this form of instrument has been suggested by Rushall (1970b), Vanek and Cratty (1970), Ogilvie (1968), Singer (1972), Alderman (1974), and Berlin (1974).

The AMI provides easily understood, non-technical information on eleven relevant personality traits associated with success in athletics. The personality traits are divided into two general areas: Desire factors and Emotional factors. The Desire factors are expressed in terms of the traits Drive, Aggression, Determination, Guilt Proneness, and Leadership. The Emotional factors are expressed in terms of the traits Self-Confidence, Emotional Control, Mental Toughness, Coachability, Conscientiousness, and Trust. A short, non-technical description of each trait is provided in Table III (Tutko et al., 1975).

TABLE III

Descriptions of the Athletic Motivation Inventory
Personality Traits

DRIVE: Desire to win or be successful; aspires to accomplish difficult tasks; sets and maintains high goals for himself in athletics; responds positively in competition; desires to attain athletic excellence.

AGGRESSIVENESS: Believes one must be aggressive to win; releases aggression easily; enjoys confrontation and argument; sometimes willing to use force to get his way; will not allow others to push him around; may seek to "get even" with people whom he perceives as having harmed him.

DETERMINATION: Willing to practice long and hard; works on skills until exhausted; often works out willingly by himself; persevering, even in the face of great difficulty; patient and unrelenting in his work habits; doesn't give up quickly on a problem.

GUILT PRONENESS: Accepts responsibility for his actions; accepts blame and criticism even when not deserved; tends to dwell on his mistakes and to push himself for them; willing to endure much physical and mental pain; will play even when injured.

LEADERSHIP: Enjoys the role of leader and may assume it spontaneously; believes others see him as a leader; attempts to control his environment, and to influence or direct other people; expresses opinions forcefully.

SELF CONFIDENCE: Has unflattering confidence in himself and his capacity to deal with things; confident of his powers and abilities; handles unexpected situations well; makes decisions confidently; speaks up for his beliefs to coaches and players.

EMOTIONAL CONTROL: Tends to be emotionally stable and realistic about athletics; is not easily upset; will rarely allow his feelings to show and his performance is not effected by them; not easily depressed or frustrated by bad breaks, calls or mistakes.

MENTAL TOUGHNESS: Accepts strong criticism without feeling hurt; does not become easily upset when losing or playing badly; can bounce back quickly from adversity; can take rough coaching; does not need excessive encouragement from the coach.

TABLE III

continued

COACHABILITY: Respects coaches and the coaching process; receptive to coaches' advice; considers coaching important to become a good athlete; accepts the leadership of the team captain; co-operates with authorities.

CONSCIENTIOUSNESS: Likes to do things as correctly as possible; tends to be exacting in character, dominated by sense of duty; does not try to "con" his coach or fellow players; will not attempt to bend rules and regulations to suit his own needs; places the good of the team above his personal well being.

TRUST: Accepts people at face value; believes what his coach and teammates say and does not look for ulterior motives behind their words or actions; free of jealous tendencies; tends to get along well with his teammates.

The Cattell Sixteen Personality Factor Questionnaire

According to Buros (1973:820) the 16PF is described as the possible standard questionnaire type personality test of the future. The sixteen factors "are all independent, although not completely uncorrelated, and are all necessary to span the personality area involved." The highly reliable and extensively used inventory yields data on sixteen primary source traits and specific personality factors. Descriptions of the traits are expressed in either popular or professional nomenclature. A short description (Cattell et al., 1970:73-109) of the sixteen primary factors in presented in Table IV.

The 16PF was selected for use in the study for the following reasons outlined by Kroll et al. (1971:3):

1. The instrument has been shown to be a reliable and valid psychological inventory for the purpose of 'group' investigation.

2. The factors it purports to measure appear relevant for the assessment of athletic personality.

3. The instrument has been previously used in athletic research and is seen as a possible means of collecting 'comparative data'.

The use of a combination of inventories in personality investigations is considered necessary by most psychologists. Cronbach (1970) and Cattell (1970) both suggest that personality data must not be based solely on the results of one inventory's data or one objective testing situation. In the case of the present study the two inventories were employed for an additional reason. In light of the limited statistical data regarding the reliability and validity of the AMI, with the exception of the data published by the Institute of Athletic Motivation, the decision was made to utilize the

TABLE IV

Descriptions of the Cattell Sixteen Personality Factor Traits

Low Score Direction	Factor	High Score Direction
Reserved, Detached, Critical, Cool (Sizothymia)	A vs.	Outgoing, Warmhearted, Easy-going, Participating (Affectothymia)
Less Intelligent, Concrete-thinking (Lower scholastic mental capacity)	B vs.	More Intelligent, Abstract-thinking, Bright (Higher scholastic mental capacity)
Affected by Feelings, Emotionally Less Stable, Easily Upset (Lower ego strength)	C vs.	Emotionally Stable, Faces Reality, Calm, Mature (Higher ego strength)
Humble, Mild, Accommodating, Conforming (Submissive)	E vs.	Assertive, Independent, Aggressive, Competitive, Stubborn (Dominance)
Sober, Prudent, Serious, Taciturn (Desurgency)	F vs.	Happy-go-lucky, Impulsively Lively, Enthusiastic (Surgency)
Expedient, Evades Rules, Feels Few Obligations (Weaker superego strength)	G vs.	Conscientious, Persevering, Staid, Rule-bound (Stronger superego strength)
Shy, Restrained, Diffident, Timid (Threctia)	H vs.	Venturesome, Socially-bold, Uninhibited, Spontaneous (Parmia)
Tough-minded, Self-reliant, Realistic, No-nonsense (Harria)	I vs.	Tender-minded, Dependent, Over-protected, Sensitive (Premsia)

TABLE IV

continued

Low Score Direction	Factor	High Score Direction
Trusting, Adaptable, Free of Jealousy, Easy to Get on With (Alaxia)	L vs.	Suspicious, Self-opinionated, Hard to Fool (Protension)
Practical, Careful, Conventional, Regulated by External Realities, Proper (Praxernia)	M vs.	Imaginative, Wrapped up in Inner Urgencies, Careless of Practical Matters, Absent-minded (Autia)
Forthright, Natural, Artless, Sentimental (Artlessness)	N vs.	Shrewd, Calculating, Worldly, Penetrating (Shrewdness)
Placid, Self-assured, Confident, Serene (Untroubled adequacy)	O vs.	Apprehensive, Worrying, Depressive, Troubled (Guilt proneness)
Conservative, Respecting Established Ideas, Tolerant of Traditional Difficulties (Conservatism)	Q_1 vs.	Experimenting, Critical, Liberal, Analytical, Free-thinking (Radicalism)
Group-dependent, A "Joiner" and Sound Follower (Group adherence)	Q_2 vs.	Self-sufficient, Prefers Own Decisions, Resourceful (Self-sufficiency)
Undisciplined Self-conflict, Careless of Protocol, Follows Own Urges (Low integration)	Q_3 vs.	Controlled, Socially precise, Following Self-image (High self-concept control)
Relaxed, Tranquil, Torpid, Unfrustrated (Low ergic tension)	Q_4 vs.	Tense, Frustrated, Driven, Overwrought (High ergic tension)

16PF in an attempt to confirm the results of the AMI. The combined use of the inventories has been suggested by Hammer and Tutko (1972:5), who stated:

1. The format is similar, i.e., multiple choice in selecting the correct option and scoring is on a two point, one point, or a zero point basis.

2. Of the eleven traits on the AMI, eight would appear to have descriptions in common with traits on the 16PF. These common traits are described in Table V.

In actual fact the validation of the AMI has in most cases used the 16PF as the criterion measure.

TABLE V

The Eight Common Traits of the AMI and 16PF

	AMI	16PF	
1.	Aggression	Factor E	Assertiveness
2.	Guilt Proneness	Factor O	Apprehensiveness
3.	Leadership	Factor E	Assertiveness
4.	Self Confidence	Factor O	Self Assured
5.	Emotional Control	Factor C	Emotionally Stable
		Factor Q_4	Relaxed
6.	Mental Toughness	Factor I	Tough Minded
7.	Conscientiousness	Factor G	Conscientious
8.	Trust	Factor L	Trust

RELIABILITY AND VALIDITY

Athletic Motivation Inventory

Two types of reliability have been computed for the AMI. Alpha coefficients, a measure of internal consistency, were computed on a randomly chosen sample of 100 athletes ranging from high school to professional levels. Reliability coefficients ranging between .78 and .93 indicated a high internal consistency (See Appendix C). A Test-retest reliability was completed by Lyon (1972) after an interval of nine weeks. All point biserial correlations were significant at the .01 level for reliability coefficients ranging between .58 and .80.

Several forms of validity were employed in the development of the AMI. They include face validity, content validity, and construct validity (Tutko et al., 1975). No factor analysis statistics on validity have been reported.

A comparison of the AMI with the 16PF was conducted by Hammer and Tutko (1972:5). Significant correlations were predicted between eight common traits and seven were found to be significant, even though they were relatively low. The traits included: leadership (.30), aggression (.47), self-confidence (-.32), emotional control (-.34), mental toughness (-.25), conscientiousness (.42), and trust (-.30) (See Appendix A).

Cattell Sixteen Personality Factor Questionnaire

Scale reliabilities, calculated as dependability coefficients, after a time lapse of one week revealed results between .58 and .83 on the sixteen primary factors, using Form A. Reported split-half reliabilities using Forms A and B, N=450, range from

.71 to .93, with ten coefficients being above .80. Stability coefficients, measured after a two and one-half month interval, were between .36 and .85, with ten factors over .60 (See Appendix D).

Construct validity has been determined by factor analysis, correlating each scale with the pure factor it purports to measure. Validities based on factor loadings using Forms A and B, ranged from .73 to .96 with eleven coefficients exceeding .80 (Cattell and Eber, 1964) (See Appendix D).

INTERNAL RELIABILITY TEST

In view of the fact that the AMI and the 16PF were administered during the same 90-120 minute time period an independent test-retest study was conducted to determine if this extended sitting would have an adverse effect on the results. A concern was held regarding the possible effects of fatigue, boredom, and the influence of the AMI on the responses to the 16PF questions.

The two tests were administered to a volunteer group of thirty-one students, mean age of twenty-two years, from the School of Physical Education and Recreation at the University of British Columbia. The students who had completed the 16PF during the month of June 1974 were then asked to complete the AMI and the 16PF during a single sitting during the month of August. The testing conditions were the same in each situation. The results from the two 16PF questionnaires were then compared.

TREATMENT OF THE DATA

Previous empirical efforts to differentiate between various groups of athletes have often been limited to the comparison of the differences between means on individual traits. This inappropriate procedure was avoided because of the internal weaknesses pointed out by Kroll and Peterson (1965:433-434):

> Profile factors may be highly related, and the possibility exists that less than the entire set of different variables is meaningful, or that other variables non-significant by themselves may be discriminating when viewed as an entire profile rather than individually.

Multivariate and univariate analytical procedures were employed to determine differences between the entire personality profiles investigated, while also taking into account the relationship between individual traits. The use of this type of analysis is currently considered as superior by respected researchers in the field (Tiedeman, 1951; Kroll and Peterson, 1965; Kroll and Crenshaw, 1970; Kroll et al., 1971; Morgan, 1972; and Carron, 1974).

All data was treated in the raw score form. The 16PF results were hand scored and converted to standard ten scores (stens) for plotting on the personality profile sheets. The AMI results were scored by the Institute of Athletic Motivation (IAM), which provided raw scores and percentile scores based on the norms constructed for female athletes previously tested using the AMI.

For the purpose of testing Hypothesis I, the personality data was analyzed normatively. Multivariate techniques were not applicable because of the unavailability of statistical data underlying the established norms.

Hypothesis I. As a group, the personality profile of women intercollegiate basketball players is significantly different from the profiles of the population norms, when measured by the Cattell Sixteen Personality Factor Questionnaire.

For the purpose of testing Hypothesis II, the data was analyzed at the IAM and all subjects were compared to the norms of female athletes. The results were presented in the form of percentile scores.

Hypothesis II. As a group, the personality profile of women intercollegiate basketball players is significantly different from reported norms of female athletes, when measured by the Athletic Motivation Inventory.

Hypotheses III through VI were tested by the application of the multivariate and univariate analysis of variance program Multivar:STAT:-001 (Finn, 1972). The multivariate analysis was applied to determine if any significant differences existed between the sub-groups based upon an interactive analysis of trait components of the personality profile. The univariate analysis was used to determine if any significant differences existed between the sub-groups based on individual traits.

Hypothesis III. The personality profile of regular players is significantly different from substitute players, when measured by the Athletic Motivation Inventory.

Hypothesis IV. The personality profile of members of winning teams is significantly different from members of losing teams, when measured by the Athletic Motivation Inventory.

Hypothesis V. The personality profile of members of winning teams when compared to members of losing teams will show no significant differences when measured by the Cattell Sixteen Personality Factor Questionnaire.

Hypothesis VI. The personality profile of regular players when compared to substitute players will show no significant differences when measured by the Cattell Sixteen Personality Factor Questionnaire.

Chapter 4

RESULTS AND DISCUSSION

RESULTS

To recapitulate, there were three problems that this study was designed to investigate:

1. To determine whether the personality traits of female athletes could be described as being different from those of female non-athletes (norms).
2. To determine if a relationship exists between certain personality traits and success in Canadian women intercollegiate basketball players.
3. To evaluate the relative effectiveness of the AMI and the 16PF as investigating tools in the personality research of athletes.

Hypothesis I

As a group, the personality profile of women intercollegiate basketball players is significantly different from the profile of the population norms, when measured by the Cattell Sixteen Personality Factor Questionnaire.

The range of normal scores is represented by standard ten scores (stens) between 1 and 10. According to Cattell et al. (1974), sten scores of 4 and 7 are considered as departing from the average; stens of 3 and 8 are slightly deviant; stens of 2 and 9 are strongly deviant; and stens of 1 and 10 are extreme deviations from the norm.

Therefore, to have any confidence that there is a real difference between personality traits, a sten score of either 3 or 8 must be achieved.

A normative analysis of the data revealed only a slight departure from the mean on two traits. The basketball players achieved sten scores of 7 on Factors B (less intelligent - more intelligent) and Q_4 (relaxed - tense), based upon the norms calculated for female college undergraduates and corrected to age 21; N=1012 (See Table VI). The 16PF profile presented in Figure I portrays female basketball players as beginning to depart from the norm on the traits of general intelligence and tension level.

General intelligence ability (B+) has previously been documented as a personality characteristic related to athletes in general; however, the validity of this thirteen question measure of intelligence has been questioned. Cattell et al. (1970) reported that Factor B is a measure of general ability relative to other personality factors. "The principal object in measuring it in the 16PF is not to add personality information but to complete the measurement of factors important in most predictions by adding a good general ability measure" (Cattell et al., 1964:11).

High ergic tension (Q_4+) has been identified previously by Kane (1972), as a factor common to female athletes. The majority of studies dealing with males report quite the opposite. In relation to top level athletes Kane (1964) and Ogilvie (1972) state that lack of nervous tension is necessary for success in athletics. Consideration must be given, at this time, to the definition of success, as successful athletes defined in this study may not be on a par skill-wise with athletes investigated by other researchers.

TABLE VI

Means and Standard Deviations, Cattell Sixteen Personality Factor Questionnaire
All Subjects: N=56

Factor	Mean		Standard Deviation
	raw	sten	
A	9.92	5	2.65
B	9.46	7	1.45
C	15.25	6	3.92
E	12.10	6	4.04
F	16.82	6	3.79
G	12.50	5	3.39
H	12.60	5	5.07
I	12.57	5	2.89
L	7.67	5	2.73
M	13.50	6	2.54
N	9.10	5	2.65
O	10.32	6	3.71
Q_1	7.96	5	2.39
Q_2	9.42	5	3.32
Q_3	9.82	5	1.46
Q_4	16.28	7	3.47

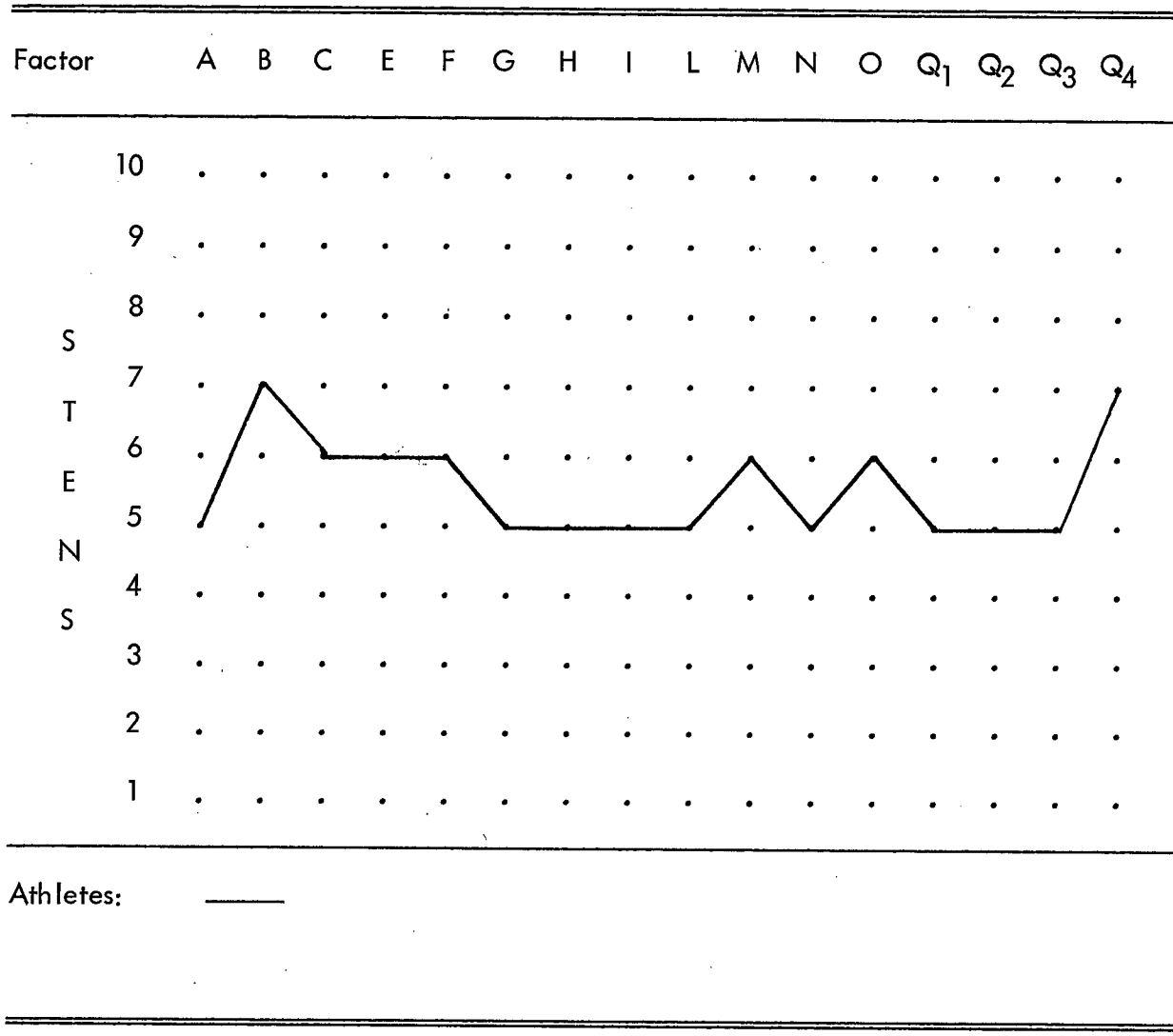


FIGURE I

Cattell Sixteen Personality Factor Profile of Women Intercollegiate Basketball Players (N=56)

In order for a trait to be manifest behaviorally, it must be evidenced by a sten score of at least 3 or 8. All scores between these limits are interpreted as falling within the realm of observable normal behavior. In terms of a real difference in personality profiles between the basketball players and the norms, and in light of the fact that only two of a possible sixteen factors were involved, the hypothesis must be rejected. Essentially, there are no personality trait differences between the two groups. If there are other differences in personality which identify a female athlete as different from female college students, and if these personality characteristics are related to participation in basketball, they cannot be supported by the results of this investigation.

Hypothesis II

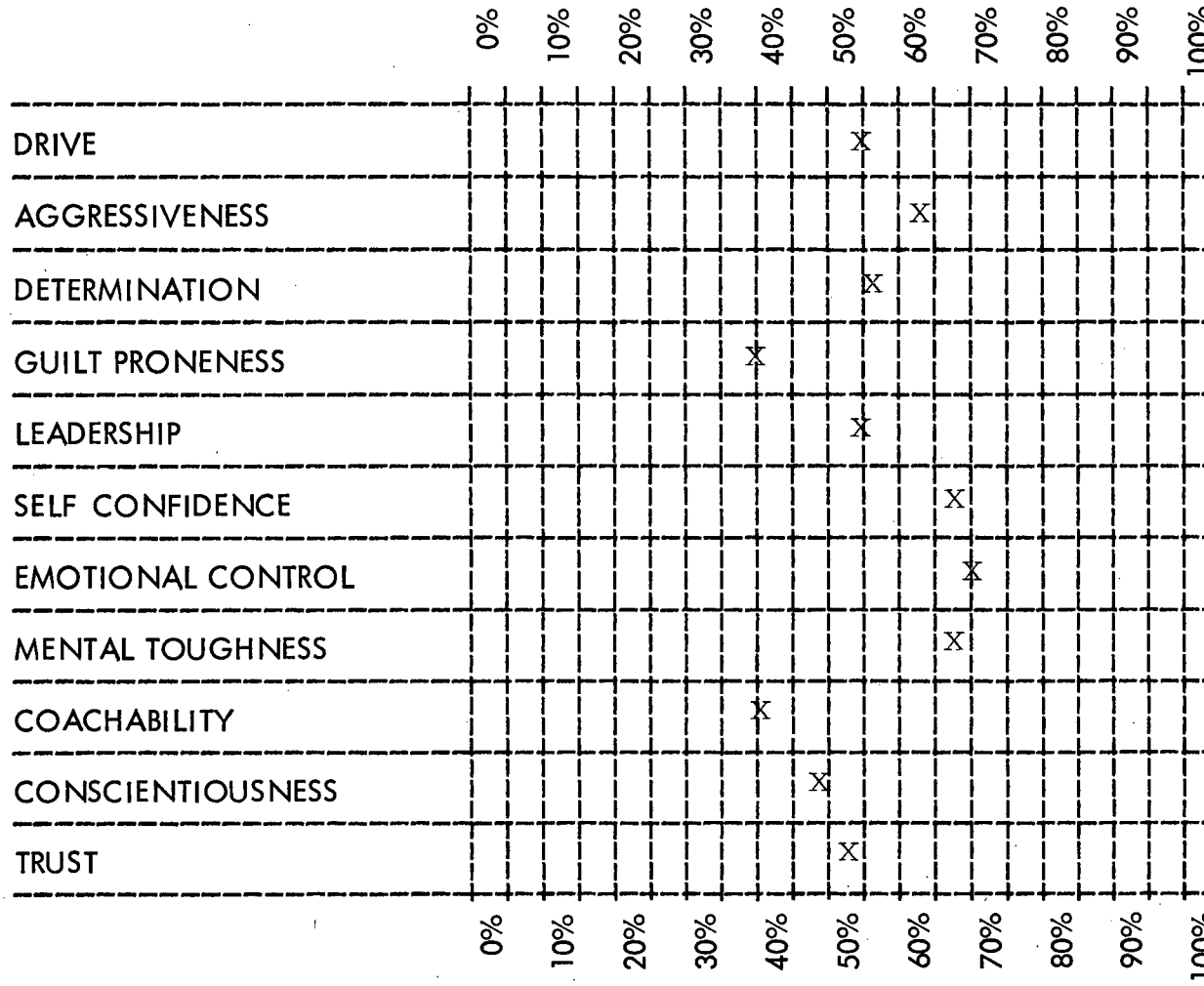
> As a group, the personality profile of women intercollegiate basketball players is significantly different from reported norms of female athletes, when measured by the Athletic Motivation Inventory.

Means, standard deviations, and percentiles for the personality traits measured by the AMI are reported in Table VII. The percentiles were calculated by the Institute of Athletic Motivation (IAM) and represent all data collected on college women athletes tested using the AMI. In comparison to other women athletes, as depicted in Figure II, the basketball players are described as slightly above average in aggression (61.0), self-confidence (66.3), emotional control (70.0), and mental toughness (66.6). These findings are partially supported by Higgs and Higgs (1972), who found female basketball players to be slightly above average in aggression (66.0) and mental toughness (66.0).

TABLE VII

Means, Standard Deviations and Percentiles,
Athletic Motivation Inventory
All Subjects: N=56

Factor	Mean	Standard Deviation	Percentile
Dr	13.41	4.19	54.1
Ag	9.49	3.90	61.0
De	14.08	4.79	55.6
Gu	14.67	3.86	40.1
Le	14.07	5.15	54.8
Se	12.48	6.02	66.3
Em	15.30	5.98	70.0
Me	14.78	5.03	66.6
Co	14.89	3.73	41.4
Cn	16.10	5.24	48.8
Tr	17.53	4.70	51.0
Ae	1.12	1.54	
De	14.26	2.21	



	Dr	Ag	De	Gu	Le	Se	Em	Me	Co	Cn	Tr
Percentiles	54.1	61.0	55.6	40.1	54.8	66.3	70.0	66.6	41.4	48.8	51.0

FIGURE II

Athletic Motivation Inventory Personality Profile of
Women Intercollegiate Basketball Players (N=56)

The range of percentile scores identified by the IAM for the purpose of describing an athlete's personality is as follows: scores between 40 and 60 are considered average; scores between 16 and 39 and between 61 and 84 are considered below and above average, respectively; scores between 1 and 15 and 85 and 99 are described as low and high, respectively.

The results lend support to the prediction that personality characteristics can be used to discriminate between athletic groups by the use of the AMI. However, in terms of a real difference, the basketball players cannot be considered to depart from the norms. Therefore, the hypothesis must be rejected. If selection of, and successful participation in, the sport of basketball is related to personality traits inherent within the female athlete, this cannot be supported by the results of this study.

Hypothesis III

> The personality profile of regular players is significantly different from the personality profile of substitute players, when measured by the Athletic Motivation Inventory.

The results of the multivariate and univariate analyses of the personality trait scores of regular and substitute players on the eleven personality traits of the AMI are illustrated in Table VIII. The regular players did not differ significantly from the substitute players as indicated by the non-significant multivariate $F=1.03$, $p<.44$. Although higher scores were recorded by the regular players on ten of the eleven traits, none of the individual measures revealed a significant univariate F-ratio.

TABLE VIII

A Comparison of Regular and Substitute Players on the Athletic Motivation Inventory: N=56

Factor	$\bar{X}_1$	$\bar{X}_2$	SD_1	SD_2	Univariate F	P Less Than
Dr	14.19	12.44	4.30	3.91	2.48	.12
Ag	10.22	8.60	3.74	3.97	2.46	.12
De	14.22	13.92	5.42	3.96	0.05	.81
Gu	15.32	13.88	4.18	3.33	1.96	.16
Le	14.64	13.36	5.38	4.85	0.85	.35
Se	13.48	11.24	6.21	5.65	1.95	.16
Em	15.64	14.88	6.09	5.94	0.22	.63
Me	14.93	14.60	4.97	5.20	0.06	.80
Co	14.70	15.12	3.73	3.80	0.16	.68
Cn	16.70	15.36	5.89	4.30	0.91	.34
Tr	17.61	17.61	4.73	4.77	0.01	.89

Univariate F ($F_{1,54} = 4.02$, $p<.05$)

Multivariate Test of Equality of Mean Vectors

Multivariate F = 1.03, $p<.44$

($F_{11,44} = 2.01$, $p<.05$)

Regular Players : $\bar{X}_1$, (n=31)

Substitute Players: $\bar{X}_2$, (n=25)

A comparison of the AMI profiles of the two sub-groups, presented in Figure III, portrayed the regular players as being slightly above average in drive (61.6), aggression (66.1), determination (66.3), self-confidence (73.3), emotional control (70.9), mental toughness (67.5), conscientiousness (60.2), and trust (64.7). Substitute players were described as slightly above average in emotional control (68.2), mental toughness (65.6) and trust (62.7) and below average in guilt proneness (24.0).

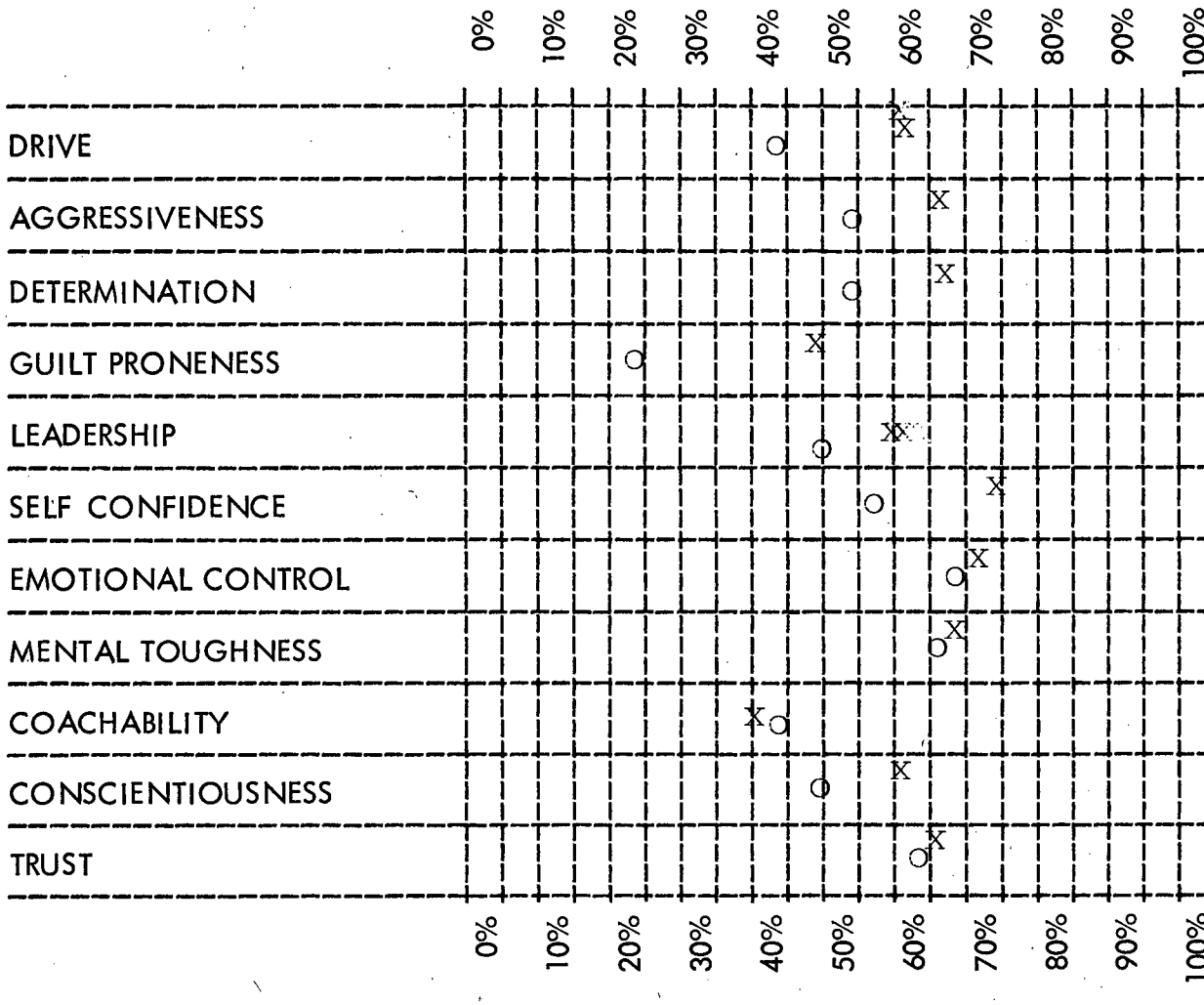
Consequently, the hypothesis was rejected. If significant personality differences between regular and substitute players do exist they were not identified by the AMI.

Hypothesis IV

The personality profile of members of winning teams is significantly different from members of losing teams, when measured by the Athletic Motivation Inventory.

The multivariate test of equality of mean vectors revealed no significant difference between the profiles of the two sub-groups ($F=1.24$, $p < .31$). The results of the multivariate and univariate analyses of the personality trait scores are reported in Table IX. In addition, no significant differences were observed in the univariate analysis on the individual personality traits.

It is noteworthy however, that losing team players scored higher, although not significantly, than the winning team players on the following seven, of the total eleven, personality traits: aggression, determination, guilt proneness, leadership, self-confidence, coachability, and conscientiousness. Figure IV illustrates the comparison between the profiles of the two sub-groups as determined by the AMI. Winning



Percentiles

		Dr	Ag	De	Gu	Le	Se	Em	Me	Co	Cn	Tr
Regular (N=31)	x	61.6	66.1	66.3	47.5	59.4	73.3	70.9	67.5	40.2	60.2	64.7
Substitute (N=25)	o	43.4	53.0	54.3	24.0	49.5	57.4	68.2	65.6	43.2	50.8	62.7

FIGURE III

Comparison of Athletic Motivation Inventory Personality Profiles of Regular and Substitute Players

TABLE IX

A Comparison of Winning and Losing Team Players on the Athletic Motivation Inventory: N=37

Factor	$\bar{X}_1$	$\bar{X}_2$	SD_1	SD_2	Univariate F	P Less Than
Dr	14.00	12.41	4.34	4.09	1.29	.26
Ag	9.40	10.00	4.44	4.16	0.17	.67
De	12.75	15.41	5.03	4.35	2.89	.09
Gu	14.35	16.11	3.11	3.58	2.57	.11
Le	12.80	14.82	5.78	4.53	1.36	.25
Se	12.00	12.41	6.66	5.95	0.03	.84
Em	16.20	16.00	4.88	7.20	0.01	.92
Me	14.55	13.58	4.68	5.64	0.32	.57
Co	14.15	15.88	3.42	4.49	1.76	.19
Cn	15.20	17.11	5.10	5.73	1.15	.28
Tr	18.89	17.58	3.81	4.69	0.88	.35

Univariate F ($F_{1,35} = 4.12$, $p<.05$)

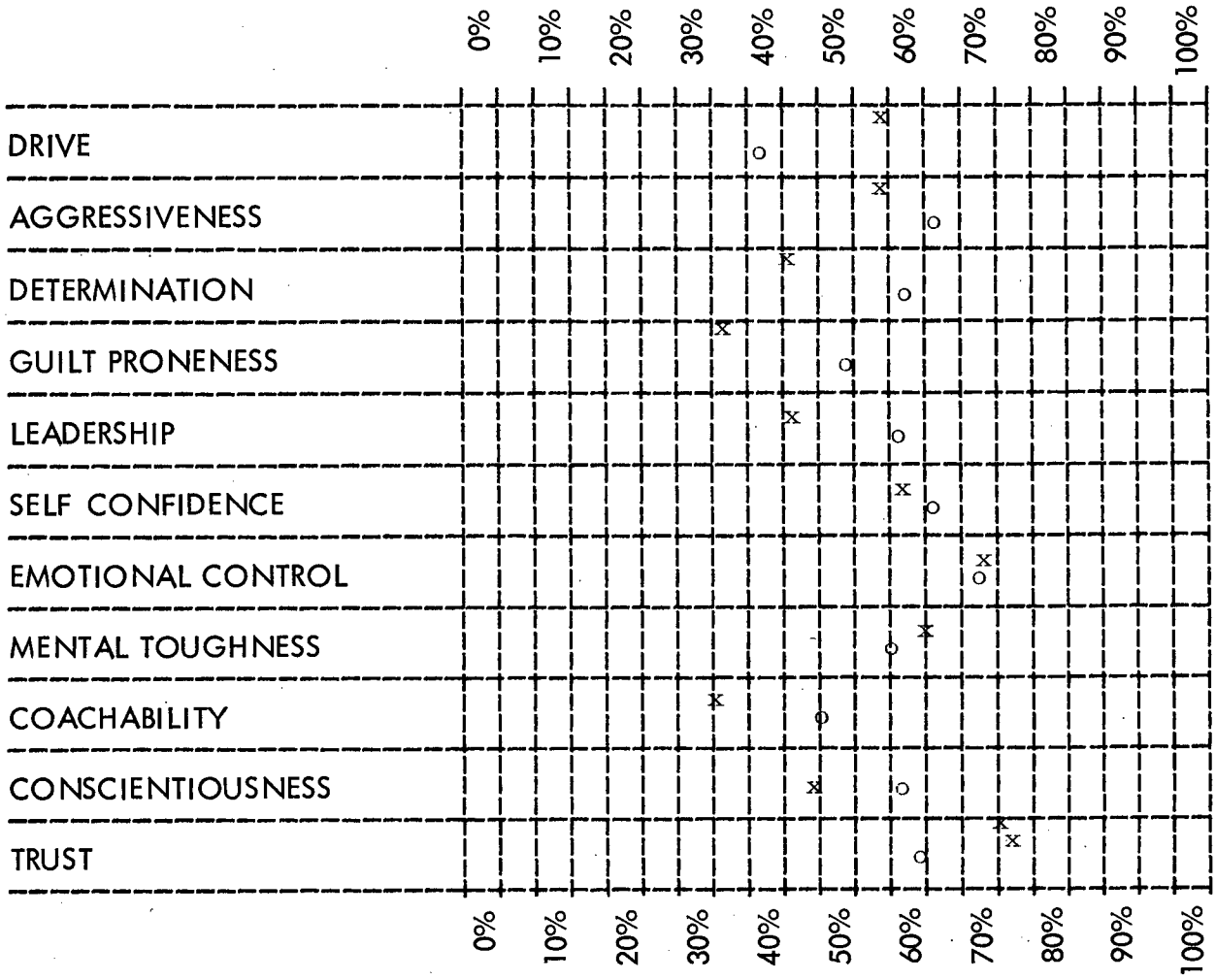
Multivariate Test of Equality of Mean Vectors

Multivariate F = 1.24, $p<.31$

($F_{11,25} = 2.20$, $p<.05$)

Members of Winning Teams: $\bar{X}_1$, (n=20)

Members of Losing Teams : $\bar{X}_2$, (n=17)



Percentiles

	Dr	Ag	De	Gu	Le	Se	Em	Me	Co	Cn	Tr
Winning Teams x (N=20)	60.0	59.8	45.7	36.8	45.4	62.0	73.0	65.3	36.9	49.6	75.2
Losing Teams o (N=17)	42.6	65.0	63.0	53.9	60.7	65.6	72.0	59.9	50.8	62.6	64.3

FIGURE IV

Comparison of Athletic Motivation Inventory Personality Profiles of Winning and Losing Team Players

team players were slightly above the general athletic group average in drive (60.0), self-confidence (62.0), emotional control (73.0), mental toughness (65.3), and trust (75.2) as well as slightly below average in guilt proneness (36.8), and coachability (36.9). Losing teams were slightly above average in aggression (65.0), determination (63.0), leadership (60.7), self-confidence (65.6), emotional control (72.0), conscientiousness (62.9), and trust (64.3). As can be observed, the losing team members were either above average or higher than the winning team members on seven of the traits considered by the AMI as necessary for success.

When interpreting the results of the AMI profiles, Tutko (1970:33) stated that "if an athlete is above the average of his teammates in each trait he will probably be an exceptional performer, provided he has some talent." However, based on these results, it would seem that very little support can be given to the premise that personality traits are related to success in athletic performance.

The hypothesis was rejected. If significant personality differences exist between winning team members and losing team members they were not identified by the AMI.

Hypothesis V

The personality profile of members of winning teams when compared to the personality profile of losing team members will show no significant differences, when measured by the Cattell Sixteen Personality Factor Questionnaire.

The results of the multivariate and univariate analyses of variance of the personality trait scores of the members of winning and losing teams, measured by the Cattell 16PF, are presented in Table X. The multivariate test of equality of mean

TABLE X

Scores of Winning Team and Losing Team Players on All Factors of the Cattell Sixteen Personality Factor Questionnaire: N=37

Factor	$\bar{X}_1$	$\bar{X}_2$	SD_1	SD_2	Univariate F	P Less Than
A	9.85	9.64	2.90	3.35	0.03	.84
B	9.50	9.70	1.63	1.49	0.15	.69
C	15.75	16.29	4.02	4.23	0.15	.69
E	10.75	11.76	3.84	4.39	0.08	.37
F	17.00	16.52	4.80	4.14	0.10	.75
G	11.45	12.35	3.30	2.80	0.78	.38
H	11.95	12.41	6.08	5.31	0.05	.80
I	11.80	11.88	3.87	3.93	0.00	.94
L	7.60	7.41	3.51	3.60	0.02	.87
M	11.80	12.35	3.41	3.65	0.22	.63
N	8.05	7.88	2.52	2.95	0.03	.85
O	10.90	9.35	3.83	4.10	1.40	.24
Q_1	8.50	8.41	2.58	3.46	0.00	.93
Q_2	9.25	8.94	3.30	4.05	0.06	.80
Q_3	11.05	12.05	3.17	3.28	0.89	.34
Q_4	13.75	12.47	4.95	5.70	0.53	.46

Univariate F ($F_{1,35} = 4.12$, $p<.05$)

Multivariate Test of Equality of Mean Vectors

Multivariate F = 0.36, $p<.98$

($F_{16,20} = 2.18$, $p<.05$)

Members of Winning Teams: $\bar{X}_1$, (n=20)

Members of Losing Teams : $\bar{X}_2$, (n=17)

vectors revealed no significant differences between the two sub-group profiles as indicated by the non-significant multivariate $F=0.36$, $p<.98$. Both groups, compared to the norm, were slightly above average (7) on Factor B (less intelligent - more intelligent), and below average (4) on Factor N (forthright - shrewd). Neither trait deviated from the mean to such a degree as to be expected to manifest itself in a person's behavior. Figure V presents the comparison of the profiles of the sub-groups determined by the 16PF.

The hypothesis was accepted. Using the 16PF, significant differences between the personality profiles of winning and losing team players could not be identified.

Hypothesis VI

The personality profiles of regular players when compared to substitute players will show no significant differences, when measured by the Cattell Sixteen Personality Factor Questionnaire.

The results of the multivariate and univariate analyses of variance of the personality trait data of regular and substitute players are presented in Table XI. Once again, $F=1.03$, $p<.45$ for the multivariate test of equality of mean vectors proved to be non-significant. Only one of the individual measures revealed a significant univariate F-ratio, Factor I (sensitive vs. tough minded). Regular players were thus described as more tough minded in comparison to substitute players. Closer observation revealed that statistical significance was just barely achieved. The univariate F-ratio for Factor I was 4.43, $p=.04$ and the univariate F-ratio $p<.05$ equalled 4.02.

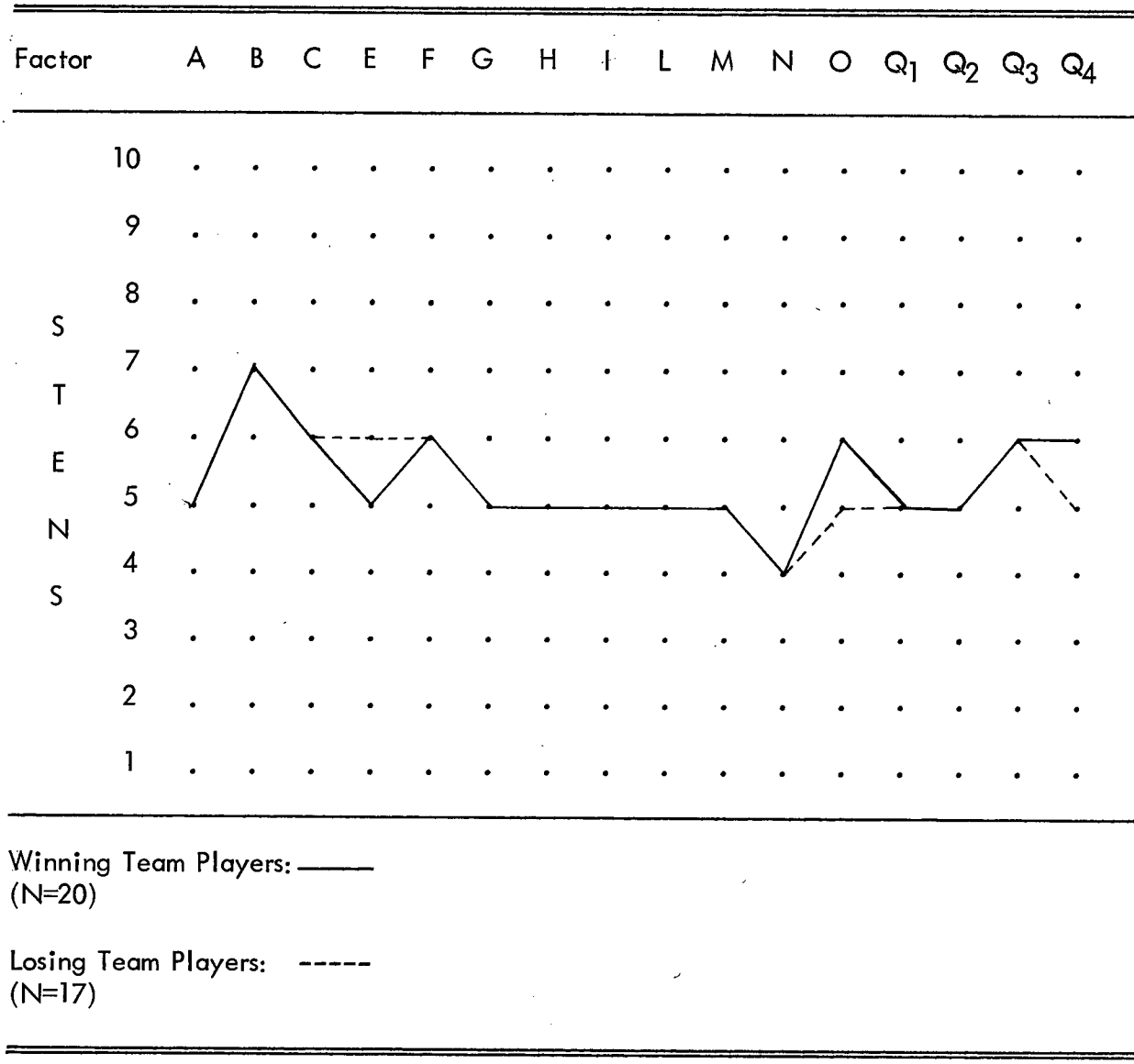


FIGURE V

A Comparison of Cattell Sixteen Personality Factor Profiles of Members of Winning Teams and Members of Losing Teams

TABLE XI

Scores of Regular and Substitute Players on All Factors of the Cattell Sixteen Personality Factor Questionnaire: N=56

Factor	$\bar{X}_1$	$\bar{X}_2$	SD_1	SD_2	Univariate F	P Less Than
A	9.03	10.48	3.01	2.81	3.38	.07
B	9.64	9.64	1.45	1.49	0.00	.98
C	16.19	15.24	3.61	3.82	0.91	.34
E	12.77	11.76	4.45	4.24	0.74	.39
F	17.19	17.03	4.46	4.10	0.01	.89
G	11.77	11.60	3.70	3.01	0.03	.85
H	11.87	13.12	4.86	5.40	0.82	.36
I	11.22	13.20	3.25	3.76	4.43	.04*
L	8.41	7.08	3.74	2.79	2.19	.14
M	12.09	12.92	3.67	2.99	0.81	.37
N	7.93	8.80	2.67	2.32	1.62	.20
O	10.06	10.56	3.80	3.60	0.24	.62
Q_1	8.22	8.92	2.97	2.72	0.81	.37
Q_2	9.48	9.40	3.61	3.18	0.00	.92
Q_3	12.00	11.12	3.30	2.96	1.07	.30
Q_4	13.51	14.40	4.55	5.29	0.45	.50

Univariate F ($F_{1,54} = 4.02$, $p<.05$)

Multivariate Test of Equality of Mean Vectors

Multivariate F = 1.03, $p<.45$

($F_{16,39} = 1.92$, $p<.05$)

Regular Players : $\bar{X}_1$, (n=31)

Substitute Players: $\bar{X}_2$, (n=25)

*significant at $p<.05$

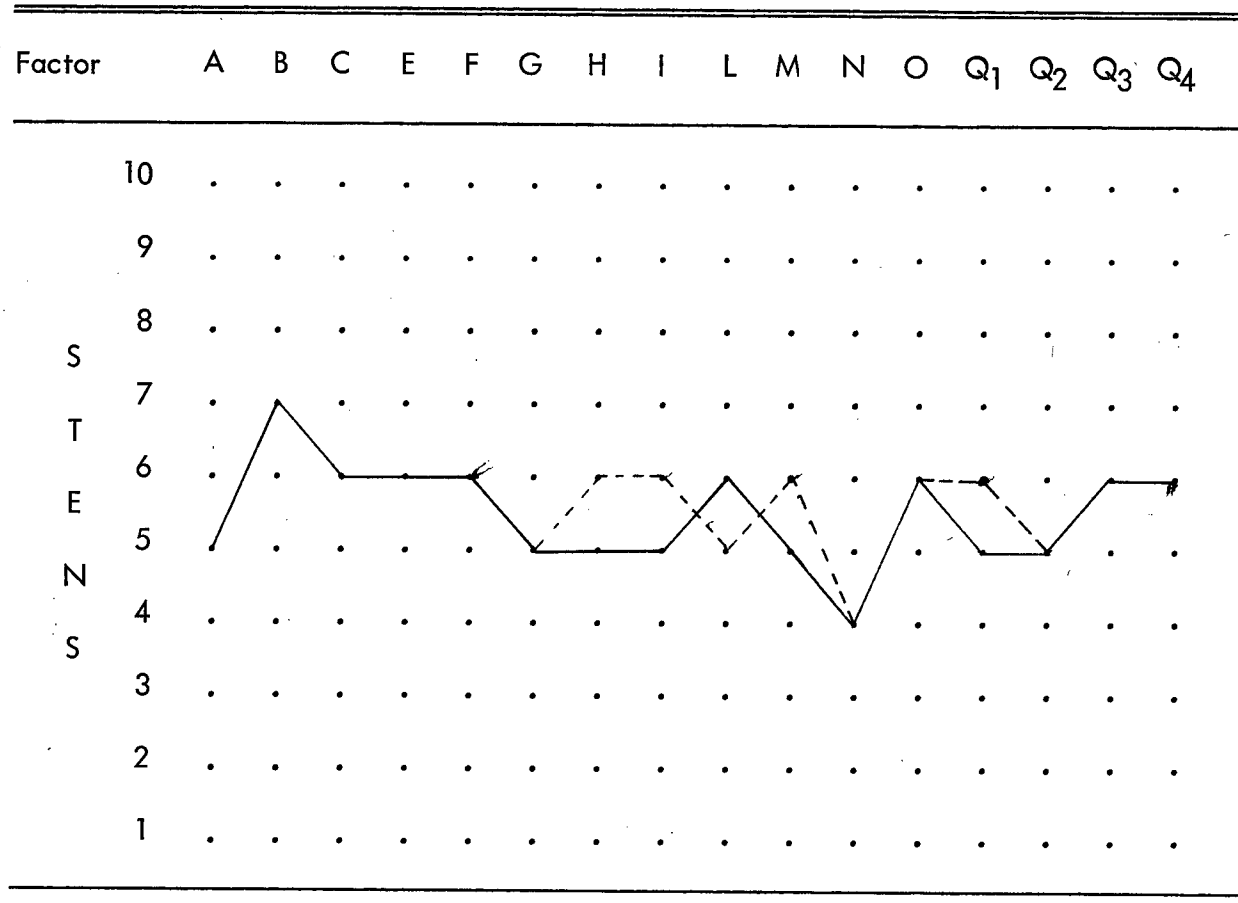


FIGURE VI

A Comparison of Cattell Sixteen Personality Factor Profiles of Regular and Substitute Players

Both groups, compared to the norm, were slightly above average (7) on Factor B and slightly below average (4) on Factor N. Figure VI presents a comparison of the profiles of the sub-groups as determined by the 16PF.

The hypothesis was accepted. Using the 16PF significant differences between regular and substitute players could not be identified.

Summary of Results

The results of this study can be summarized as follows:

1. Women intercollegiate basketball players were found to be slightly above average in general intelligence and to possess a slightly above average level of tension, when compared to the population norms of the Cattell 16PF. No significant differences from the population means could be determined on any of the personality traits.
2. In comparison with other female athletes, basketball players were described as being slightly above average in aggression, self-confidence, emotional control and mental toughness, as measured by the AMI. No significant differences from the mean on any of the traits could be determined by the instruments employed in this investigation.
3. There was no significant difference between the personality profiles of regular players and substitute players, as measured by the AMI.

4. There was no significant difference between the personality profiles of members of winning teams and members of losing teams, as measured by the AMI.
5. There was no significant difference between the personality profiles of members of winning teams and members of losing teams, as measured by the 16PF.
6. There was no significant difference between the personality profiles of regular players and substitute players, as measured by the 16PF.
7. Regular players were significantly lower than substitute players, as measured by the 16PF, on Factor I (tough minded vs. sensitive).
8. No support can be given to the premise that, utilizing the AMI and the 16PF, identifiable personality profiles exist, specific to women intercollegiate basketball players.
9. No relationship between personality traits and successful performance in basketball could be determined through the use of the AMI and the 16PF.
10. No support was given to the premise that the AMI is more sensitive than the 16PF in the psychometric assessment of athletes.

Internal Reliability Study

The results of the internal reliability study, conducted to determine any possible detrimental effects of the lengthy experimental procedure on the subjects, if any, are reported in Table XII. The reliability coefficients comparing the two sets of responses to the 16PF ranged from r=.44 to .93, with twelve of the sixteen factors over .71. It was therefore concluded that the lengthy test administration procedure had little effect on the subjects' responses to the inventories.

DISCUSSION

The results of this study, in general, did not support the premise that specific personality traits are factors which contribute to selection for, and successful participation in, a college women's basketball program. Little statistical evidence was found to support the hypothesis that personality differences contribute to success in an athletic endeavor. Furthermore, the AMI cannot be described as a more sensitive investigating tool in the psychometric assessment of athletes.

Female college basketball players were identified as departing slightly above the norm in general intelligence and tension level, when measured by the 16PF. In comparison to other female athletes, based on the AMI norms, they were slightly above average in aggression, self-confidence, emotional control, and mental toughness. However no statistical differences were found. Therefore, the postulation that a relationship between personality characteristics and selection for, and successful participation in, a particular athletic activity cannot be supported. Further research would be necessary to determine whether basketball players are, in fact, significantly

TABLE XII

Internal Test-Re-test Reliability

$\bar{X}_1$	$\bar{X}_2$	SD_1	SD_2	r.
10.88	11.44	3.16	2.93	.89
9.27	9.61	1.56	1.09	.79
16.00	16.61	3.00	3.51	.78
13.66	13.05	3.74	4.30	.84
16.66	16.66	4.49	4.75	.90
10.89	10.77	2.88	3.05	.57
15.50	15.44	6.27	6.80	.93
11.61	11.83	3.25	3.09	.87
8.94	8.61	3.76	3.46	.80
12.88	14.05	3.12	3.60	.71
7.44	8.66	2.28	2.72	.44
9.72	11.16	3.73	2.35	.59
9.72	9.88	1.93	2.82	.49
9.55	9.33	3.23	3.44	.92
12.44	12.33	3.63	3.58	.82
10.94	11.33	4.60	4.93	.81

$\bar{X}_1$ results of 16PF from first testing situation (only the 16PF was administered).

$\bar{X}_2$ results of 16PF from second testing situation (the 16PF was completed after the completion of the AMI).

different from the female college population and female athletes in general. To achieve this end an investigation should include female athletes participating in different sports as well as a control group.

The multivariate analyses of variance between the personality profiles of regular and substitute players, and between winning and losing team members, revealed no significant differences when measured by the AMI or the 16PF. Only one, of a possible fifty-four, univariate analyses was significant at the .05 level. Using the 16PF, regular players were identified as being significantly lower in Factor I, thus identifying them as being more mentally tough than substitute players who displayed a higher level of sensitivity. The probability of only one univariate analysis out of fifty-four being significant is quite high and was considered to have occurred by chance. Therefore, based on the results, very little support was given to the premise that specific personality characteristics are related to successful performance among Canadian female intercollegiate basketball players.

In view of the recent increase in female athletic programs, Berlin (1974:320) cautioned researchers to consider the universe of female athletes from which previous samples have been drawn:

> Surely, the definition of a woman athlete and the criteria which will in future admit females to such a category for research purposes, may cause us to alter our ideas about a sports woman's personality.

It must be recognized that the athletic population from which the sample group was drawn is relatively small. In addition, at the present stage of development of female athletic programs in Canada, opportunities for a high level of skill acquisition have been relatively limited. Consequently, the definition of a successful athlete is subject to a great deal of regional variation.

An increase in athletic opportunities for women will likely result in an equalization in skill development and playing experience at the college level of competition. Once a consistent definition of skill and performance among female athletes, participating at each level within a particular sport, is developed, then it may be possible to identify personality characteristics associated with participation and success.

The results of this investigation do not support the widely accepted claim that the Athletic Motivation Inventory is a more sensitive psychometric tool for the personality assessment of athletes, than is the Cattell Sixteen Personality Factor Questionnaire.

Chapter 5

SUMMARY AND CONCLUSIONS

SUMMARY

The purpose of the study was to determine if personality characteristics related to successful participants in Canadian women intercollegiate basketball players could be identified. It was hypothesized that differences in personality profiles existed between basketball players and the female college norms. It was also hypothesized that differences in personality profiles existed between sub-groups related to successful performance: regular versus substitute players, and members of winning teams versus members of losing teams.

The AMI and the Cattell 16PF were administered to fifty-six subjects during a single sitting at the conclusion of the 1973-1974 C.W.U.A.A. season. The data was grouped and analyzed in the following ways:

1. Scores of all subjects measured by the Cattell 16PF were compared to the mean scores of the average female college population.
2. Scores of all subjects measured with the AMI were compared to the mean scores of North American female college athletes.
3. F-ratios for the multivariate test of equality of mean vectors was computed between the personality profiles, as determined by the AMI and the 16PF, of regular and substitute players and winning and losing team members.

4. Univariate F-ratios were computed on the means of individual traits between regular and substitute players, and winning and losing team members.

CONCLUSIONS

It was postulated that there is a relationship between personality, selection and participation, and performance, of women engaged in basketball. The results of the study warrant the following conclusions:

1. Canadian women intercollegiate basketball players are slightly above average in terms of general intelligence and tension level, compared to the norm, when measured by the 16PF.
2. In comparison to other female athletes, basketball players in this study were slightly above average in aggression, self-confidence, emotional control, and mental toughness, when measured by the AMI and compared to athletes in general. However, the results did not identify a specific athletic personality profile for female basketball players which was significantly different from population norms or other athletic groups.
3. No statistical support was given to the premise that there is a relationship between personality and participation among Canadian women intercollegiate basketball players.
4. Multivariate analyses of variance between the personality profiles of regular and substitute players and winning team members and losing

team members revealed no significant differences when measured by the AMI or the 16PF.

5. Regular players were significantly lower on Factor I, describing them as mentally tougher than substitute players, when measured by the 16PF.

6. The results did not reveal a relationship between personality characteristics and successful performance among Canadian women intercollegiate basketball players.

7. No support was given to the premise that the AMI is more sensitive than the 16PF in the psychometric assessment of athletes.

RECOMMENDATIONS

It is recommended that in future studies a more rigid definition of the sample group be established, in terms of skill level and experience. It is also recommended that use of a non-athlete control group be employed so that appropriate data can be obtained for statistical analyses using multivariate and univariate techniques.

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APPENDICES

APPENDIX A

Correlations Between Athletic Motivation Inventory and Cattell Sixteen Personality Factor Questionnaire

16PF		AMI	r.
1. Emotionally Stable	C	Emotional Control	.147
2. Assertive	E	Aggression	.469*
Assertive	E	Leadership	.309*
3. Conscientiousness	G	Conscientiousness	.416*
4. Tender Minded	I°	Tough Minded	-.250*
5. Suspicious	L°	Trust	-.301*
6. Apprehensive	O°	Self-Confidence	-.321*
Apprehensive	O°	Guilt Proneness	.066
7. Tense	Q_4	Emotional Control	-.344*

°significantly negative correlations predicted as a result of scoring format.

*significant beyond the .05 level.

APPENDIX B

Canada West University Athletic Association
Final Team Standing
Women's Basketball
1973-1974

UNIVERSITY	W	L	Pct.
British Columbia	18	2	.900
Saskatchewan	15	5	.750
Victoria	13	7	.650
Alberta	9	11	.450
Calgary	5	15	.250
Lethbridge	0	20	.000

APPENDIX C

Reliability Coefficients - Athletic Motivation Inventory

TRAIT	Cronbach's Alpha Coefficient — N=100*	Test-Re-test N=56**
Drive	.80	.61
Aggression	.91	.79
Determination	.78	.64
Guilt Proneness	.88	.80
Leadership	.89	.63
Self-Confidence	.89	.68
Emotional Control	.92	.63
Mental Toughness	.93	.70
Coachability	.89	.60
Conscience Development	.92	.72
Trust	.90	.58
Accuracy	.85	.46
Honesty	.89	.62

*Hammer, W.M., and Tutko, T.A. 1974. "Validation of the Athletic Motivation Inventory," International Journal of Sport Psychology, Vol. 5 - No. 1.

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APPENDIX D

Reliabilities and Validity, Cattell Sixteen Personality Factor Questionnaire

Scale Reliability - Dependability

Form A (Test-Re-test 4-7 days)

A	.86	F	.90	L	.78	Q_1	.82
B	.79	G	.81	M	.75	Q_2	.85
C	.82	H	.92	N	.77	Q_3	.80
E	.83	I	.90	O	.83	Q_4	.72

(Cattell et al., 1970)

Split-half - Reliability

Forms A and B - Spearman - Brown

A	.90	F	.84	L	.77	Q_1	.71
B	.86	G	.85	M	.88	Q_2	.79
C	.93	H	.83	N	.79	Q_3	.76
E	.91	I	.76	O	.85	Q_4	.88

(Cattell and Eber, 1964)

APPENDIX D

continued

Stability Coefficients

Form A

A	.83	F	.74	L	.75	Q_1	.50
B	.43	G	.49	M	.67	Q_2	.57
C	.66	H	.80	N	.35	Q_3	.36
E	.65	I	.85	O	.70	Q_4	.66

(Cattell et al., 1970)

Construct Validity

Forms A and B - Factor Loading

A	.88	F	.91	L	.89	Q_1	.74
B	.80	G	.85	M	.74	Q_2	.81
C	.76	H	.96	N	.73	Q_3	.92
E	.82	I	.84	O	.91	Q_4	.96

(Cattell and Eber, 1964)

APPENDIX E

Tape Recorded Message to All Subjects

The following set of instructions has been pre-recorded to insure consistency of administration in all testing sessions.

The two questionnaires you are asked to complete are self-administrating and self-explanatory.

These questions are being administered in order to gain more insight into the interests, attitudes, and motivational qualities of Canadian women intercollegiate basketball players. The teams taking part in this study are: the University of Alberta, University of Calgary, University of British Columbia, University of Lethbridge, University of Saskatchewan (Saskatoon) and the University of Victoria. I would like to thank all of you for giving up your valuable time to take part in this worthwhile study.

Please open your envelope and check to see that it contains the following items:

1. The blue AMI instruction sheet
2. The blue AMI question book
3. The blue AMI answer sheet
4. The green 16PF question book
5. The green 16PF answer sheet

You are asked to complete the AMI questionnaire first. Please read the instructions carefully before you proceed. The total time to complete this questionnaire should be approximately 40 minutes. Try to work efficiently, but do not rush.

After you have finished, making sure you have answered all the questions, please complete the research data information form on the back of the AMI answer sheet. This information is necessary for data analysis.

Please turn off the tape recorder at this point and turn it back on when all players have had a five minute break after completing the AMI.

APPENDIX E

continued

You are now asked to complete the 16PF questionnaire. Please read the instructions carefully before you begin. Total time to complete this questionnaire should be approximately 40 minutes. Try to work efficiently, but do not rush.

After you have finished both tests place all five items back into the envelope and return them to the person in charge.

Thank you again for giving up your valuable time to complete these questionnaires. I would like to wish you all continued success in all your future athletic and academic endeavors.

Sincerely,

Greg Thomas,
Graduate Studies,
Physical Education and Recreation,
University of British Columbia.

APPENDIX F

Raw Scores

Cattell Sixteen Personality Factor Questionnaire

S's	A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4
A1	9	9	12	19	25	13	19	8	11	12	5	8	4	12	10	18
2	14	11	19	18	24	10	15	13	8	18	7	11	10	13	12	12
3	6	8	17	13	14	17	8	13	9	14	12	9	9	15	13	18
4	9	10	15	20	17	17	11	13	12	12	7	9	10	12	13	21
5	9	9	18	11	12	14	13	14	5	14	13	9	12	11	12	13
6	6	8	19	20	22	5	18	6	14	8	7	6	5	12	7	20
7	14	9	19	17	14	13	16	7	16	9	7	10	8	15	13	15
8	8	10	14	11	16	7	10	13	6	12	6	6	10	15	8	18
9	6	11	10	9	12	10	4	12	12	14	8	16	9	9	13	8
B1	7	12	16	8	8	10	5	7	12	9	9	8	12	15	12	7
2	9	11	19	12	18	14	20	13	12	13	8	6	10	9	18	7
3	12	10	23	21	22	7	23	8	13	12	4	10	11	6	9	7
4	9	11	16	14	18	6	19	18	9	17	6	10	9	9	7	10
5	6	8	12	14	18	13	9	13	9	9	5	17	7	13	11	13
6	14	11	8	16	7	4	11	10	14	12	11	10	7	8	8	19
7	7	11	14	10	10	15	3	18	4	10	8	15	8	11	7	16
8	11	7	11	4	13	11	10	10	9	8	8	12	6	13	10	16
9	8	10	14	13	15	10	10	16	11	14	7	11	6	11	8	12
C1	14	8	12	16	20	12	15	13	6	11	7	15	9	4	6	21
2	9	11	7	19	8	17	6	5	7	8	5	12	8	10	10	9
3	13	9	18	13	15	13	22	17	6	11	5	10	11	5	11	14
4	4	10	15	18	9	13	4	9	6	12	5	11	4	14	11	14
5	10	9	20	18	14	6	13	14	10	16	4	8	10	6	5	20
6	12	11	23	12	19	13	12	7	12	8	6	7	9	5	16	12
7	12	10	21	10	17	14	11	9	3	15	7	3	5	13	15	4
8	13	9	15	5	19	12	19	16	13	8	10	13	5	7	13	11
9	6	11	17	16	21	14	13	6	6	15	10	7	6	15	17	5

APPENDIX F

continued

S's	A	B	C	E	F	G	H	I	L	M	N	O	Q_1	Q_2	Q_3	Q_4
D1	11	11	11	6	19	14	5	12	5	11	8	13	3	5	12	14
2	14	12	20	10	22	17	11	13	6	14	11	4	4	3	16	8
3	4	11	21	8	7	11	5	13	2	20	6	3	15	15	13	5
4	11	8	20	8	16	13	5	10	3	13	8	11	7	10	14	6
5	10	9	18	15	13	12	14	18	13	15	12	10	12	12	12	22
6	9	10	9	9	17	17	19	17	8	14	14	11	11	12	9	17
7	6	6	12	18	20	9	14	8	12	6	3	17	11	7	13	15
8	6	10	12	11	14	12	12	14	10	14	9	11	9	11	12	15
E1	6	8	21	13	22	14	15	8	0	14	8	6	11	8	15	16
2	10	9	17	10	15	14	14	17	6	17	8	6	9	11	10	14
3	11	11	19	14	25	8	20	14	5	17	4	16	5	9	10	20
4	10	9	22	9	13	18	9	12	6	11	14	8	4	8	10	6
5	9	11	20	10	18	11	19	10	5	10	10	5	12	8	10	6
6	12	9	10	7	19	12	11	9	6	15	12	16	4	3	10	20
7	9	7	15	10	15	11	9	5	3	12	8	10	10	10	11	13
8	6	6	17	6	9	7	2	11	5	11	8	9	7	15	11	13
9	16	10	10	9	21	12	12	16	6	11	8	15	12	7	10	23
10	10	10	14	13	22	16	15	13	9	8	7	16	9	3	15	17
11	15	9	15	6	23	13	10	7	12	4	7	11	8	9	11	17
F1	10	12	14	14	23	13	14	7	17	11	14	7	4	4	17	20
2	16	8	18	9	21	16	16	18	6	11	11	9	4	10	13	12
3	7	11	16	15	14	16	14	12	6	11	10	9	8	8	19	9
4	8	11	14	17	17	11	14	8	10	10	8	11	11	9	10	16
5	10	8	14	19	17	13	19	12	9	13	9	17	7	7	11	14
6	9	10	17	13	19	5	15	13	10	14	9	9	14	8	15	15
7	13	9	11	15	21	10	14	10	14	18	11	13	6	8	9	10
8	8	11	15	9	15	13	8	13	3	8	10	10	8	11	11	11
9	8	9	11	11	17	8	11	14	5	12	8	13	11	8	10	16
10	11	11	18	17	15	5	11	18	6	18	10	13	10	8	11	16

APPENDIX G

Raw Scores

Athletic Motivation Inventory

S's	Dr	Ag	De	Gu	Le	Se	Em	Me	Co	Cn	Tr
A1	12	13	10	14	15	13	9	11	14	9	11
2	15	8	10	10	20	14	22	20	12	17	22
3	21	13	21	8	9	18	14	34	13	18	12
4	14	5	17	12	12	16	21	22	21	23	20
5	14	8	6	5	19	13	6	12	13	16	12
6	17	15	7	6	24	16	6	17	13	12	10
7	23	10	22	17	15	21	17	19	20	24	23
8	16	10	11	19	16	18	9	22	11	9	20
9	10	6	16	15	9	8	5	13	14	12	11
B1	12	11	21	17	17	6	16	21	18	23	19
2	17	9	15	8	15	21	25	17	15	16	20
3	25	19	19	20	20	24	20	23	11	16	15
4	11	11	10	11	19	11	17	14	9	10	22
5	15	14	15	18	10	14	13	14	18	17	16
6	12	11	5	16	5	5	13	12	8	9	15
7	11	7	9	12	8	6	13	12	14	10	17
8	16	17	20	12	19	17	23	7	14	16	15
9	8	9	14	14	15	13	14	14	15	14	18
C1	20	21	16	18	25	16	7	12	10	8	13
2	13	10	14	8	11	8	18	17	15	18	19
3	16	6	14	18	13	15	16	13	14	16	14
4	11	5	18	16	12	5	22	14	14	18	18
5	8	14	9	17	15	10	4	5	8	8	14
6	18	12	17	16	20	22	27	6	14	22	19
7	12	6	16	13	17	20	20	17	21	20	22
8	17	11	17	16	17	16	15	11	19	21	20
9	9	8	11	15	15	22	26	21	17	19	24

APPENDIX G

continued

S's	Dr	Ag	De	Gu	Le	Se	Em	Me	Co	Cn	Tr
D1	10	12	23	21	13	11	20	15	21	21	18
2	14	6	21	19	21	13	22	17	22	26	23
3	14	9	24	21	11	7	25	22	17	26	27
4	9	10	16	19	10	6	11	18	23	17	16
5	9	7	11	15	9	12	7	10	10	17	9
6	15	10	11	19	20	18	10	10	18	12	12
7	12	16	11	10	11	5	12	14	16	7	15
8	4	7	13	13	12	5	10	19	11	15	16
E1	11	6	11	11	17	21	23	16	15	23	26
2	17	7	13	19	15	7	13	12	14	22	22
3	14	10	7	12	20	16	11	12	17	18	22
4	15	5	15	16	16	21	21	18	20	19	21
5	12	5	11	10	10	9	23	20	15	13	24
6	8	4	12	14	9	2	8	10	17	20	19
7	18	13	11	16	10	18	18	11	13	11	16
8	8	5	6	14	3	7	16	23	12	10	26
9	14	6	10	17	12	6	11	14	17	15	16
10	21	15	23	17	18	15	11	7	19	22	16
11	15	4	8	15	3	10	15	16	12	9	14
F1	10	10	15	15	13	6	16	10	16	13	9
2	7	9	21	11	11	13	22	23	12	15	21
3	14	8	9	32	32	25	23	10	18	20	21
4	9	10	13	14	17	6	13	12	10	19	16
5	14	7	17	14	11	13	17	16	13	18	11
6	19	6	13	16	23	17	12	10	14	11	15
7	12	14	12	13	11	13	10	15	13	11	8
8	13	12	19	18	10	8	17	19	19	26	24
9	9	5	18	19	10	4	7	18	15	14	19
10	11	5	15	12	12	6	15	13	20	20	20