PERSONALITY OF ATHLETES

IN

INDIVIDUAL AND TEAM SPORTS.

BY

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THESIS

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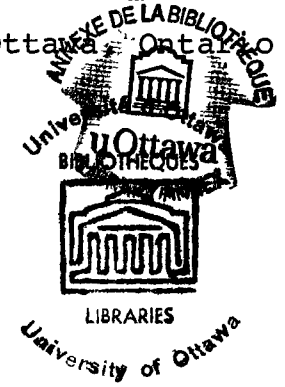

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CHAPTER I

THE PROBLEM

The purpose of this investigation was to examine further those differences in personality factors which had been found to exist between athletes involved in team sports and those involved in individual sports in order to discover if there is any overall difference in personality, and how these factors contribute to this difference. Other personality factors were also examined to discover if any additional difference could be found.

Definitions of Terms

Personality: For the purposes of this study, the term "Personality" referred to the profile of qualities measured by the Cattell Sixteen Personality Factor Questionnaire.

Team Sport and Individual Sport: Sports were defined as "Team" or "Individual" by means of a "Questionnaire" (see Appendix A). The sports classified as "Team Sports" by this method were found to be Football, Basketball, Soccer, Volleyball, Hockey, Water-Polo, and Curling. "Individual Sports" were found to be Swimming, Gymnastics, Fencing, Judo, Skiing, and Golf.

Athlete: In this study, the term "Athlete" referred to male university students participating in and regularly playing (i.e. not "bench-warming") a sport at the inter-collegiate level during the academic year 1972 - 1973.

Hypothesis

Certain factors of the 16 PF; namely factors E (dominance), H (adventurousness), I (sensitivity), M (imagination), N (sophistication), and Q_2 (self-sufficiency); contribute differentially to an overall difference in personality between athletes involved in team sports and those involved in individual sports.

Significance of the Study

Much has been written concerning the personality traits found in athletes in specific sports, or comparing two sports (individual and/or team). There have been few studies published concerning the personality traits found in types of sports (eg. team or individual). Those studies which have been published have tended to use test instruments designed to test only social aspects of personality (eg. Lakie, 1962), or instruments such as the Minnesota Multiphasic Personality Inventory (eg. Booth, 1958), considered to be a weak general test of personality because of its "saturation with pathological items" (Buros, 1970).

Many studies appear to have used weak statistical analysis (eg. multiple *t* tests used in some studies make a chance finding of significance highly probable).

The test instrument employed in the present study, the Cattell Sixteen Personality Factor Questionnaire, appears to be more appropriate for this type of study than many of the instruments used in earlier studies. The intent in these studies was to discover if there is a "sport personality type" within the normal range. The 16 PF "purports to measure all the main dimensions of personality" (Buros, 1970).

The statistical procedure used in analysing the results, discriminant analysis, seems to be an improvement on earlier procedures used with data of this type. Rather than simply listing the factors which are found to be significantly different, this procedure provides us with a "linear combination" (i.e. "profile") of the factors which best differentiates between the two groups. This takes into account the correlations among the factors. (Tatsuoka, 1970.)

Attempts have been made recently to develop a battery of tests to find the potentially great athletes in a variety of sports as quickly and simply as possible. Most of these attempts have concentrated on physiological variables or basic skills. It was the author's belief that we must consider psychological as well as physiological variables in developing such batteries. Of two competitors of equal physical strength

and skill, the winner will be the one who "wants it most" i.e. the better psychological competitor. It was hoped that the present study would give an indication of those psychological variables we should look for when selecting athletes for certain types of sports. It was also hoped that this study would go beyond earlier studies in this area by examining those differences which these studies have found to determine a personality profile for the two groups of athletes.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

As stated previously, the purpose of this study was to examine the differences in personality found to exist between athletes involved in team sports and those in individual sports. A review of the literature in this area has revealed certain trends.

General Studies

There have been a number of studies in the general area of personality and athletics. In a review of the literature, Cooper (1969) pointed out that there has been a consistent tendency to certain findings. In general, athletes in any sport (usually male, varsity athletes) have been found to be (a) more outgoing and socially confident; (b) more outgoing and socially aggressive; (c) higher in social adjustment as rated by both teachers and peers, higher in prestige and social status, and higher in self-confidence; (d) stronger competitors; (e) less anxious and more emotionally stable; (f) less compulsive; (g) greater in tolerance for physical pain; (h) lower in feminine interests and higher in masculine ones. Although Cooper is speaking primarily of male athletes,

there have been findings similar to the latter with female athletes (Williams et al., 1970 showed female fencers to be higher in such typically "masculine" traits as aggressiveness and low need for nurturance).

In studies using high school subjects, athletes have been found to be low in femininity and intelligence (Slusher, 1964), high in personal and social adjustment (Biddulph, 1954) and more sociable and group dependent (Stebbins, 1969). The last of these studies (Stebbins, 1969) was excellent, as it used a general test of personality (16 PF) and appropriate statistics (multivariate analysis). Slusher (1964) used the M.M.P.I., which is not considered to be appropriate as a general test of personality (Buros 1970). Biddulph (1954) used the California Test of Personality, which is a good test for social adjustment, but does not examine other areas of personality (Buros, 1970).

A few studies have been conducted on other groups Brunner (1969), using the adjective check list, found adult participants in vigorous physical activity to be significantly higher in Intraception, Number of Favourable Adjectives Checked, Defensiveness, Achievement, Dominance, and Self-confidence, and lower on Succorance and Counselling Readiness than non-participants.

Johnson, Hutton, and Johnson (1954) tested twelve "outstanding" athletes (National Champions or All-Americans) with two projective tests, the Rorschach and the House-Tree-Person. On the Rorschach, the athletes exhibited extreme aggression, uncontrolled affect (emotions lacking strict controls), high and generalized anxiety, high level of intellectual aspiration, and exceptional feelings of self-assurance. On the House-Tree-Person, they showed exceptional ability to concentrate on desired objectives and unusual concern for physical power and physical perfection. This last study, although interesting, presents some problems. Replication could be extremely difficult, as interpretation of answers on projective tests is subjective, depending on the person administering and interpreting the test.

Team Sports

Many studies have been conducted to discover a typical personality in specific sports. A few of these studies have dealt with various team sports. For example, Singer (1969) found that basebell players were low in autonomy and intraception and high in abasement on the Edwards Personal Preference Schedule. La Place (1954), using the M.M.P.I., found that successful professional baseball players were able to apply drive through self-discipline, adjust to occupations requiring social contact, and exercise initiative.

Berger and Littlefield (1969) found no significant differences (at 99% level of confidence) between football players and non-athletes on the C.P.I.

Cattell and Eber (1962) state that "a good team member" should score lowly on factor L (i.e. be "trusting") of the 16 PF. "A team member" here appears to have been used in the broad sense of anyone who must work in a group.

In summary, indications are that team athletes may be low in autonomy and intraception and high in abasement, trusting, self-disciplined, and able to adjust to occupations requiring social contact and to exercise initiative. However, most of these have been shown with only a small group of athletes (i.e. baseball players). Cattell and Eber's statement seems to be based only on their expectations, as no evidence is offered to support this.

Individual Sports

There appears to have been more work done with the various individual sports. Wrestlers, for example, have been found to be high on factor I of the 16 PF (Kroll, 1967), indicating that they are tough-minded, self reliant, and masculine. Johnson and Hutton, (1945) found that wrestlers exhibited a decrement of functioning intelligence, and increased aggressivness and neurotic signs, on the House-Tree-Person (a projective test) when administered four to

five hours before the first intercollegiate match of the season. Darden (1972) found that bodybuilders showed less surgency and more suspicion and weightlifters more dominance and more suspicion when compared to the norms on the 16 PF. Thune (1949), using "several standard personality inventories," found that YMCA weightlifters were more shy, lacking in self-confidence, and concerned with body build than non-weightlifters. (Thune's definition of "Weightlifter" should more closely resemble Darden's definition of "Bodybuilder".) This study is difficult to interpret because of inadequate explanation of the scales used. Kroll and Carlson (1967) found that no profile patterns from the 16 PF discriminated between karate participants and the norms. This study used discriminant analysis, as is recommended for the 16 PF.

Tennis players have been found to be high in achievement and aggression on the Edwards Personal Preference Schedule (Singer, 1969). Newman (1968) found that certain traits on the Thurstone Temperament Schedule were correlated with performance in the various competitive swimming events. The Dominance trait was positively correlated with the results of the 100 yd. freestyle; the Sociable trait was negatively correlated with the results of the 100 yd. breaststroke; and the Reflective trait was negatively correlated with the results of the 200 yd. freestyle. These correlations were found to be significant at the 95% level of confidence.

However, in view of the large number of correlations calculated in this study, this may have been a chance finding. Williams et al. (1970), using the 16 PF and Edwards Personal Preference Schedule on thirty national level female fencers, found a definite "fencer's personality". The fencers were found to be reserved, self-sufficient, autonomous, below average in desire for affiliation and nurturance, high in need to be best, intelligent, creative, experimenting, imaginative, assertive, and aggressive.

In summary, individual athletes have been found to be tough- minded, aggressive, suspicious, reserved, self-sufficient, intelligent, and creative. Again, most of these have been shown in specific sports. There is some overlap, however. Aggressiveness, for example, was demonstrated in several groups.

Comparison of Team vs. Individual Athletes

Because of the small number of studies on team sports, few comparisons can be made from the above review. However, there have been several studies comparing groups of athletes. For example, McHugh (1970) found no significant differences between sports which (a) involved body contact, (b) involved implement contact, and (c) involved no contact.

Several studies have compared athletes in team sports only, athletes in individual sports only, and athletes in

both. Booth (1958) found that individual athletes were higher than team athletes in depression and higher than the team and individual group in psychasthenia on the M.M.P.I. Merriman (1960), using the C.P.I., found that individual athletes were higher in "intellectual efficiency" than team athletes, and that the team and individual group scored higher than the team athletes in capacity for status, sociability, responsibility, and intellectual efficiency. Lakie (1962) found that scores on the Omnibus Personality Inventory differentiated among sports groups within a state university and a private university, but not within two state colleges.

In a study of female athletes, Malumphy (1968) tested five groups. She found that athletes in individual and subjectively judged sports tended to be alike and similar to non-participants on the Sixteen PF, while team and team-individual athletes tended to be alike and different from the other three groups. Peterson, Weber, and Trousdale (1967) found that women in individual sports scored higher on the 16 PF than women in team sports in dominance, adventurousness, sensitivity, introversion, radicalism, and self-sufficiency, and lower in sophistication. For this study, the questionnaires were mailed to the subjects. Multiple $\underline{t}$ tests were used to analyse the results.

Summary

The literature presented above seems to point to certain findings. Team athletes have been shown to be (as expressed in the factors of the 16 PF) less intelligent, assertive, venturesome, imaginative, experimenting, and self-sufficient, and more tough-minded and shrewd than individual athletes (see Appendix C).

CHAPTER III

RESEARCH METHODS

A review of the literature has revealed certain trends in personality in athletes. From this, we may expect that on the 16 PF individual athletes will score higher on intelligence (B), dominance (E), adventurousness (H), sensitivity (I), imagination (M), radicalism (Q_1), and self-sufficiency (Q_2), while team athletes will score higher on sophistication (N). The purpose of this study was to examine these differences to discover how each factor contributes to the total difference in personality. The following methodology was followed in an attempt to provide a suitable answer to the problem.

Subjects

The subjects were male volunteers from the varsity teams of the University of Ottawa and Carleton University. All eligible volunteers were tested, for a total of 68 subjects (14 individual and 54 team). All had been regularly used members of their teams during the academic year 1972 - 1973.

Sports were divided into team and individual by means of a questionnaire (see Appendix A) which was given to a

number of people in the university community and to members of a sports club. The questionnaire was constructed by listing all the varsity sports offered at either the University of Ottawa or Carleton University. The sports were numbered in alphabetical order, and the numbers were randomized by computer. The sports were thus listed in random order.

A total of 29 questionnaires were returned, of 30 sent out Average ranks are shown in Appendix B. From this, three groups of sports emerged. Football, Basketball, Soccer, Volleyball, Hockey, Water-Polo, and Curling were grouped together at the "Team Sport" end of the scale. Golf, Skiing, Judo, Fencing, Gymnastics, and Swimming were grouped together at the "Individual Sport" end of the scale. Badminton, Tennis, and Table Tennis were grouped together between the other two groups. It appeared uncertain whether these three were primarily "team" or "individual". Therefore, they were dropped from the study.

It may be noted that there were many more team athletes tested than individual athletes. This was justified on the basis that this was the way they occured in the population. As noted earlier, all eligible volunteers were tested. However, there were six "team" sports, as compared to five "individual" sports. Also, most of the team sports carried more athletes (46 on Carleton's football team, for example, as compared to 5 on their golf team). The two groups ("team

athletes" and "individual athletes") were mutually exclusive.

Test Instrument

The Cattell Sixteen Personality Factor Questionnaire, form A, was used in this study. It is considered to be "the best factor-based personality inventory available" (Buros, 1970). Although it is not recommended that it be used for individual diagnosis, it appears to be reliable with groups. Reliability coefficients have been obtained for forms A and B combined ranging from .93 to .71 (Buros, 1970), and for form A alone from .61 to .83 (Cattell and Eber, 1962).

The 16 PF "purports to measure all the main dimensions of personality revealed by factor analysis" (Buros, 1970). There are sixteen scores: reserved - outgoing (A), less intelligent - more intelligent (B), affected by feelings - emotionally stable (C), humble - assertive (E), sober - happy-go-lucky (F), expedient - conscientious (G), shy - venturesome (H), tough-minded - tender-minded (I), trusting - suspicious (L), practical - imaginative (M), forthright - shrewd (N), placid - apprehensive (O), conservative - experimenting (Q_1), group-dependent - self-sufficient (Q_2), casual - controlled (Q_3), and relaxed - tense (Q_4). Norms are available for several populations, including general and college populations. There are separate norms for males and females, as well as norms for combined groups.

Certain criticisms of the 16 PF, however, should be noted. Adcock (as reported in Buros, 1970) has suggested that the factors are not completely uncorrelated. This has been supported by the work of Becker (1961). In the present study, discriminant analysis will be used to take this fact into account (see Tatsuoka, 1970).

There appears to be a consensus among sport psychologists (expressed at the Forth Canadian Psychomotor Learning and Sport Psychology Symposium, 1972) that, at least with modern college populations, the conservative - experimenting factor (Q_1) should actually be labelled "more conservative - less conservative". This problem could cause a "ceiling effect" on this factor, as even fairly conservative modern students may appear to be liberal on an out of date test.

Factor B is primarily an intelligence factor, whereas the other fifteen factors are primarily personality factors.

In view of the above comments, factors B and Q_1 were not included in the discriminant analysis.

Of the remaining fourteen factors, six were selected for use in this study on the basis of the related literature. These were factors E, H, I, M, N, and Q_2. All other factors were not included in the discriminant analysis, as there had been no indication in the literature that these might be relevant. (See Appendix C, Table C-1, for a summary of the above.)

Procedures

The test was administered to two subjects at a time. As subjects were drawn from two universities, it was necessary, for their convenience, to conduct testing at both universities. The environmental conditions were kept constant in as much as was possible. The two rooms used were similar. Both were small and windowless, and reasonably quiet. Subjects were asked to read the standardized instructions accompanying the test. Any questions were answered before the test began. Subjects were allowed to leave as soon as they finished the test. Time taken to write the test ranged from forty-five minutes to one hour and fifteen minutes.

Analysis of Data

Discriminant analysis was used with the raw scores for those factors mentioned above, namely factors E, H, I, M, N, and Q_2. This procedure provides a linear combination of the factors, which takes into account the correlations among them (Tatsuoka, 1970), to differentiate between the two groups. In addition, the raw scores of the team and individual athletes on each of the factors were compared by means of an analysis of variance, to discover if any other differences existed in this particular group. The minimum level of confidence for significance of the *F* ratios was established at 99%. Because of the large number of ratios calculated (six-

teen), it was felt that a level of confidence of 95% would increase the risk of a chance finding of significance.

CHAPTER IV

RESULTS

Sixty-eight varsity athletes, who had each been classified as either a team-sport athlete or an individual-sport athlete, were tested on the 16 PF, to determine whether any personality differences existed between team and individual athletes. On the basis of the related literature, six variables of the 16 PF were selected as most likely to show differences. These were factors E (dominance), H (adventurousness), I (sensitivity), M (imagination), N (sophistication), and Q_2 (self-sufficiency).

Mean raw scores for the two groups on all sixteen variables are presented in Figure I. These scores were used in statistical analysis. Figure II shows these scores converted to "sten", or standard, scores, based on the male, college student norms. From Figure II, we may note a difference of one sten score between the two groups on factors B, F, G, H, O, Q_2, and Q_4, and a difference of two sten scores on factor A.

To discover if any of the above differences were significant, the raw scores of each one of the factors was submitted to a one-way Analysis of Variance. The resulting F values (shown in Table I) were found to be nonsignificant for all factors except A ($F = 11.88$: degrees of freedom = 1,11; $p < 0.005$). Team athletes scored higher on this scale,

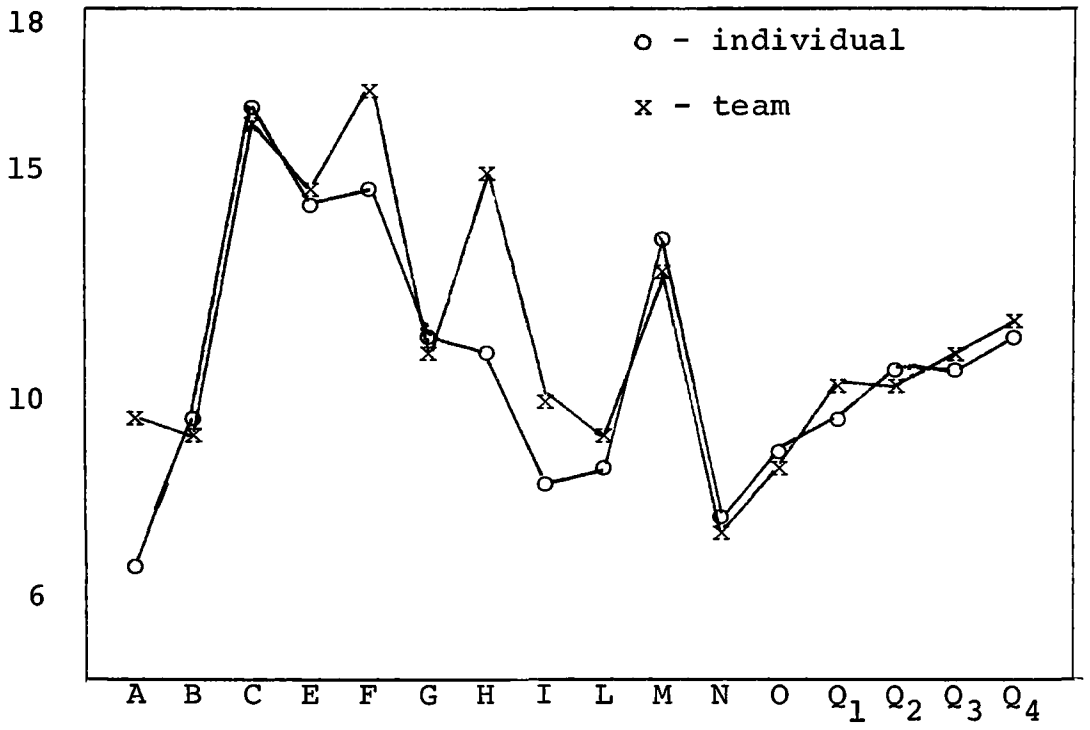

FIGURE I: 16 PF - MEAN RAW SCORES

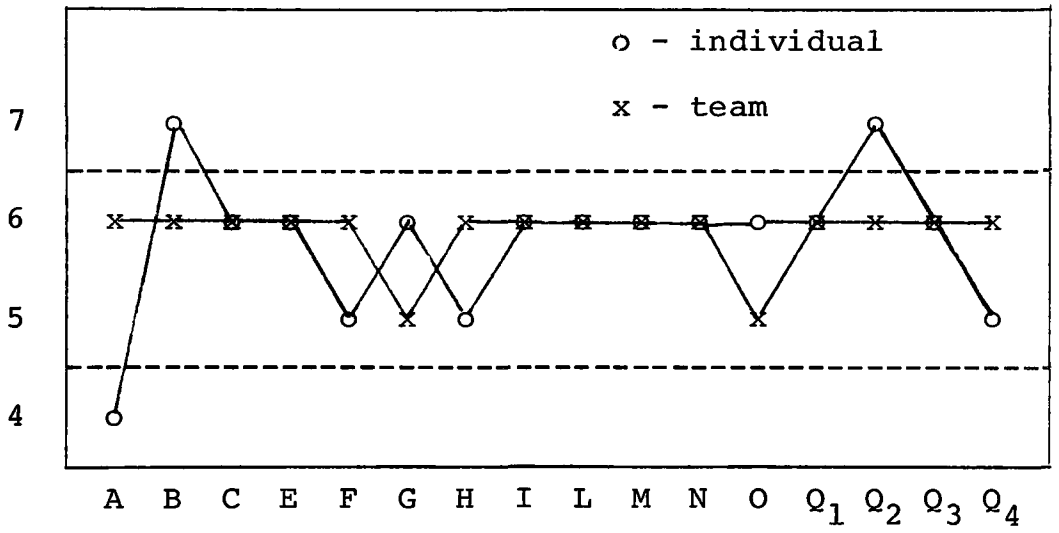

FIGURE II: 16 PF - MEAN STEN SCORES

(----] - "average" range of scores)

indicating that they are more outgoing than individual athletes.

TABLE I

RESULTS OF ANALYSIS OF THE 16 PF TEST

SOURCE OF VARIATION		DF	F RATIO	PROBABILITY
A	(reserved - outgoing)	1,66	11.87580	p <0.005
B	(less intelligent - more intelligent)	1,66	1.74251	p >0.05
C	(affected by feelings - emotionally stable)	1,66	0.22331	p >0.05
E	(humble - assertive)	1,66	0.00741	p >0.05
F	(sober - happy-go-lucky)	1,66	2.47267	p >0.05
G	(expedient - conscientious)	1,66	0.50470	p >0.05
H	(shy - venturesome)	1,66	3.62404	p >0.05
I	(tough-minded - tender-minded)	1,66	1.52071	p >0.05
L	(trusting - suspicious)	1,66	0.16138	p >0.05
M	(practical - imaginative)	1,66	0.37588	p >0.05
N	(forthright - shrewd)	1,66	0.11314	p >0.05

TABLE I
(continued)

SOURCE OF VARIATION	DF	F RATIO	PROBABILITY
O (placid - apprehensive)	1,66	0.17557	p>0.05
Q_1 (conservative - experimenting)	1,66	0.22741	p>0.05
Q_2 (group-dependent - self-sufficient)	1,66	0.20120	p>0.05
Q_3 (undisciplined - controlled)	1,66	0.01030	p>0.05
Q_4 (relaxed - tense)	1,66	0.22355	p>0.05

The raw scores of the six selected variables (E, H, I, M, N, and Q_2) were subjected to a discriminant analysis. The analysis gave the following Discriminant Function:

$$10^{-3} (1.75M + 0.33N + 0.78E + 0.26Q_2 - 1.72H - 1.80I)$$

This function was found to be non-significant. ($\underline{F}$ = 1.00486, with 6 and 61 degrees of freedom, $p>0.05$.)

CHAPTER V

DISCUSSION

An examination of the related literature has suggested that we might expect differences between individual and team athletes on several factors of the 16 PF. These factors are B (less intelligent - more intelligent), E (humble - assertive), H (shy - venturesome), I (tough-minded - tender-minded), L (trusting - suspicious), M (practical - imaginative), N (forth-right - shrewd), Q_1 (conservative - experimenting) and Q_2 (group-dependent - self-sufficient). Of these nine factors, six; E, H, I, M, N, and Q_2; were selected for study. Factor B was rejected because it was not considered to be primarily a personality factor. Factor L was rejected because the suggested differences have not been demomstrated by scientific study. Factor Q_1 was rejected because it has been suggested that we might expect a "ceiling effect" on this factor with this population.

Since earlier studies have reported significant differences on each of the above factors studied separately, it was expected that a discriminant analysis using these factors would produce a significant discriminant function, However, the discriminant function was found to be non-significant. An analysis of variance showed no significant differences on each of the six factors individually. There were also no significant differences between the groups on

the three rejected factors, i.e. factors, B, L, and Q_1, where the literature indicated that they may be differences.

There is no evidence in the literature that would lead us to expect significant differences between team and individual athletes on any of the other seven factors. The present study, however, demonstrated a highly significant difference ($F = 11.88$, with one and sixty-six degrees of freedom, $p > 0.005$) on factor A (reserved-outgoing.)

If the groups examined in the present study are drawn from the same populations as the groups in earlier studies (i.e. "team athletes" and "individual athletes"), as has been assumed, then one would expect to support the findings of these studies. However, the results of the present study have supported none of these.

This contradiction in results would lead to the observation either (1) that the present study is too conservative, due to an extremely low probability level, or (2) that the earlier studies were not conservative enough, by setting the acceptable probability level too high, or using inadequate statistical analysis.

It is unlikely that the present study is too conservative. As stated in Chapter III (p 17), the problems associated with the use of sixteen separate analysis of variance tests led to the adoption of a high minimum level of confidence (99%). At the 95% level, we could expect to show significant dif-

ferences in one test out of every twenty simply by chance, when no real difference exists. The danger of such a chance finding is greatly enhanced when one analyses sixteen factors. At the 99% level of confidence, a chance finding of significance could be expected to occur only one time in one hundred. This was considered to be more acceptable.

There is an even stronger argument against the possibility that the lack of agreement resulted from the fact that the present study was too conservative. The F values obtained from the analysis of all the factors except A had a probability of greater than 0.05. For factor A, the probability of the F value was less than 0.005. In other words, a change to a probability level of 0.05 would not have improved the results.

It appears, therefore, that the criticism that the present study is too conservative cannot be supported. We are then confronted with the second suggestion: the earlier studies were not conservative enough.

The selection of factors to be examined was based primarily on the four studies found to deal with groups comparable to those in the present study (Williams et al., 1970; Singer, 1969; Kroll, 1967; and Peterson et al., 1967). Of these, the first three reached their conclusions by examining only one group, and then comparing the results

to the norms. Although the norms provide a useful guideline, comparison alone is not highly reliable. Based on national (American) results, they do not allow for regional or other differences. A researcher in California may conclude on the basis of the norms that basketball players are outgoing, when, in actual fact, all Californians may be outgoing in comparison to the norms. Therefore, it is best to use a control or comparison group, as in the present study, when a comparison group was used. In a case where athletes are drawn from a particular school, it is best to compare them to another group of students from that school, such as nonathletes or athletes in a different sport, to allow for differences specific to that school (eg. educational, socio-economic, etc.).

Another problem associated with the use of norms, especially without statistical comparison, is demonstrated by Figures I and II in Chapter IV (P. 15). If we used only Figure II for interpretation, we would assume that differences exist on eight factors: A, B, G, H, O, Q_2, and Q_4. However, only the difference on factor A was statistically significant.

The fourth study (Peterson et al., 1967) did compare two samples. However, the minimum level of confidence accepted for significance was 95%. As stated above, this is not satisfactory when such a large number of factors is being tested.

Also, this study lacked control of testing conditions, as the tests were mailed to the subjects.

It appears, therefore, that there is a possibility that these studies were not conservative enough to be considered valid.

The problems found here may have been compounded if, in fact, each study drew samples from different populations. Most of the studies quoted in Chapter II have used university or college athletes, as did the present study. It has been assumed by many writers that these were samples from the same or highly similar populations, as differences such as age and education should be minimal. For example, Cooper (1969), in his review of the literature, grouped together all those studies using male varsity athletes. However, the results of the study by Lakie (1962) suggest that this assumption may be incorrect (see P. 8).

Lakie drew his subjects from four schools, instead of the usual one. He found differences between the various sports groups within two of the schools. However, the differences did not carry across the schools. When all the athletes were grouped by sport, irrespective of school, there were no significant differences. Lakie hypothesised that, since the majority of personality studies use varsity athletes, his results may explain the differences between these studies. Each study's findings are likely to be correct

for the particular group under study, that is for that particular school at that particular time. However, no generalizations should be made from these studies because the findings are specific to the group studied.

Lakie's study could account for the results of the present study. Because two universities were used, any differences which may have been found in each one separately could have been cancelled by combining the two populations. This is not necessarily contradicted by the fact that there was one significant difference. The two schools, being in the same city, served roughly the same geographical area. Some similarities in population may be encountered. This one difference may not have occured if two schools from different cities had been used. However, there are definite differences in the populations. One striking difference is the number of students of French-Canadian origin. Nearly one-third of the athletes from the University of Ottawa who were tested were French-Canadian. Less than seven per cent of the tested athletes from Carleton were French-Canadian. It is possible, then, that this one significant difference is a true difference between team and individual athletes.

This difference may be justified theoretically. Factor A is a part of the second order Factor II: Introversion vs. Extraversion. It is possible to argue that individual athletes should be more introverted, as they must rely on them-

selves in competition, while team athletes may also rely on teammates.

It appears then, that there were two problems in using the results of earlier studies for prediction: (1) the earlier studies may not have been conservative enough in their statistical analysis and/or methodology, and (2) the results of each study may be highly specific to the sample tested.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to determine which, if any, factors or profile of factors of Cattell's 16 PF differentiated between athletes in team sports and athletes in individual sports. On the basis of the results of earlier studies, six factors, namely factors E, H, I, M, N, and Q_2, were selected for special study. Discriminant analysis was used for this purpose. Each of the sixteen factors was studied separately using an analysis of variance to discover if there were, in fact, any significant differences between the two groups.

The discriminant function was nonsignificant. Analysis of variance produced one significant difference, namely factor A (reserved-outgoing). It was suggested that the results of the present study did not support the earlier studies because (1) they had based their results on statistical analyses and/or methodologies that were not conservative enough, and (2) each study drew samples from different populations.

Conclusions

Within the scope of this study, the following may be concluded:

1. The discriminant function was non-significant (F = 1.00486, with 6 and 61 degrees of freedom, $p > 0.05$).
2. The team athletes within the two universities were more outgoing than the individual athletes.
3. No other personality differences were found.

Recommendations

In view of the results of the present study, as well as earlier studies in this area, the following recommendations seem to be justified.

1. As the volume of contradictory evidence increases it is becoming apparent that we should take time to examine the validity of our test instruments before continuing in this field. Thus, it is recommended that a moratorium be declared on personality studies of athletes.
2. Work should be done to improve those test instruments now in existence so as to increase their validity and reliability. If such improvement appears near impossible to attain adequately, then one should seriously consider developing new instruments and testing these as to their scientific value.

Ideally, attempts should be made to find one instrument which can be agreed upon by researchers in this field. This would control some of the problems now experienced when attempting to generalize from one study to another. We can never be sure that traits similarly labelled on two different tests are actually measuring the same thing. Also, some of the tests currently used by researchers in Physical Education may not be appropriate for this use. Numerous studies have used the M.M.P.I., for example, in spite of the fact that this test is intended for diagnosis of pathological conditions. It may be possible to develop a test specifically for athletes, to measure those personality traits coaches may consider to be important in game situations.

3. In view of the implications of Lakie's (1962) study, the results of those studies using athletes from only one school should not be generalized to populations outside that school.

REFERENCES

Becker, Wesley C. "A Comparison of the Factor Structure and Other Properties of the 16 PF and the Guilford - Martin Personality Inventories." Educational and Psychological Measurement., 1961, 21, 393 - 403.

Berger, Richard A & Littlefield, Donald H. "Comparison between Football Athletes and Nonathletes on Personality." Research Quarterly, 1969, 40, 663 - 665.

Biddulph, Lowell G. "Athletic Achievement and the Personal and Social Adjustment of High School Boys." Research Quarterly, 1954, 25, 1 - 7.

Booth, E.G. Jr. "Personality Traits of Athletes as Measured by the M.M.P.I.." Research Quarterly, 1958, 29. 127 - 138.

Brunner, Burton C. "Personality and Motivating Factors Influencing Adult Participation in Vigorous Physical Activity." Research Quarterly, 1969, 40, 464 - 469.

Buros, Oscar Krisen (ed.) Personality Tests and Reviews New Jersey: The Gryphon Press, 1970.

Cattell, Raymond B. & Eber, Herbert W. Manual for Forms A and B Sixteen Personality Factor Questionnaire. Champaign, Illinois: Institute for Personality and Ability Testing, 1962.

Cooper, Lowell "Athletics, Activity and Personality: A Review of the Literature." Research Quarterly, 1969, 40, 17 - 22.

Darden, Ellington "Sixteen Personality Factor Profiles of Competitive Bodybuilders And Weightlifters." Research Quarterly, 1972, 43, 142.

Johnson, Warren H. & Hutton, Daniel C. "Effects of a Combative Sport upon Personality Dynamics as Measured by a Projective Test." Research Quarterly, 1945, 26, 49 - 53.

Johnson, Warren R.; Hutton, Daniel C., & Johnson, Granville B., Jr. "Personality Traits of some Champion Athletes as Measured by Two Projective Tests: Rorschach and H-T-P." Research Quarterly, 1954, 25, 484 - 485.

Kroll, Walter "Sixteen Personality Factor Profiles of Collegiate Wrestlers." Research Quarterly, 1967, 38, 49 - 57.

Kroll, Walter & Carlson, B. Robert "Discriminant Function and Hierarchial Grouping Analysis of Karate Participants' Personality Profiles." Research Quarterly, 1967, 38, 405 - 411.

Lakie, William L. "Personality Characteristics of Certain Groups of Intercollegiate Athletes." Research Quarterly, 1962, 33, 566 - 573.

LaPlace, John P. "Personality and its Relationship to Success in Professional Baseball." Research Quarterly, 1954, 25, 313 - 319.

Malumphy, Theresa M. "Personality of Women Athletes in Intercollegiate Competition." Research Quarterly, 1968, 39, 610 - 620.

McHugh, Mary-Margaret, Personality Traits of Varsity Lettermen of Illinois State University. Unpublished Master thesis, Illinois State University 1970.

Merriman, J. Burton "Relationship of Personality Traits to Motor Ability." Research Quarterly, 1960, 31, 163 - 173.

Newman, Carl N. "Personality Traits of Faster and Slower Competitive Swimmers." Research Quarterly, 1968, 39, 1049 - 1053.

Peterson, Sheri L.; Weber, Jerome C.; & Trousdale, William W. "Personality Traits of Women in Team Sports vs. Women in Individual Sports." Research Quarterly, 1967, 38, 686 - 690.

Singer, Robert N. "Personality Differences Between and Within Baseball and Tennis Players." Research Quarterly, 1969, 40, 582 - 588.

Slusher, Howard L. "Personality and Intelligence Characteristics of Selected High School Athletes and Nonathletes." Research Quarterly, 1964, 35, 539 - 545.

Stebbins, Clay Achievement in Sport as a Function of Personality and Social Situation. Unpublished Master thesis University of Wisconsin, 1969.

Tatsuoka, Maurice M. Discriminant Analysis. The Study of Group Differences. Champaign, Illinois: Institute for Personality and Ability Testing, 1962.

Thune, John B. "Personality of Weightlifters." Research Quarterly, 1949, 20, 296 - 306.

Williams, Jean M.; Hoepner, Barbara J.; Moody, Dorthy L.; & Ogilvie, Bruce, C. "Personality Traits of Champion Level Female Fencers." Research Quarterly, 1970, 41, 446 - 453.

APPENDIX A

TEAM SPORT - INDIVIDUAL SPORT

QUESTIONNAIRE

Please rank the following sports in order from 1 to 16, according to whether they are considered to be "team sports" or "individual sports". Team sports should be ranked at the lower end of the scale (i.e. 1, 2, 3, ...) and individual sports should be ranked at the higher end of the scale (i.e. ..., 14, 15, 16). There should be no "ties". Each sport should be given a different number.

Table Tennis ___

Gymnastics ___

Curling ___

Football ___

Soccer ___

Swimming ___

Basketball ___

Fencing ___

Water-Polo ___

Tennis ___

Judo ___

Golf ___

Skiing ___

Volleyball ___

Badminton ___

Hockey ___

APPENDIX B

RESULTS OF

TEAM SPORT - INDIVIDUAL SPORT

QUESTIONNAIRE

TABLE B - 1

RESULTS OF

TEAM SPORT - INDIVIDUAL SPORT

QUESTIONNAIRE:

AVERAGE RANK OF EACH SPORT

TEAM SPORTS		INDIVIDUAL SPORTS	
Football	2.24	Golf	13.62
Basketball	3.48	Skiing	13.24
Soccer	3.59	Judo	13.14
Volleyball	4.03	Fencing	12.34
Hockey	4.07	Gymnastics	12.00
Water-Polo	5.45	Swimming	12.00
Curling	6.93		

Badminton	8.96
Tennis	9.24
Table Tennis	10.86

APPENDIX C

FACTORS OF THE 16 PF AS RELATED TO EARLIER FINDINGS

TABLE C - 1

FACTORS PF THE 16 PF

AS RELATED TO EARLIER FINDINGS

FACTOR	DIFFERENCES FOUND	RELEVANT TO STUDY
A Reserved - Outgoing	none	no
B Less Intelligent - More Intelligent	MERRIMAN, 1960; individual athletes higher*; but this factor measures intelligence rather than personality.	no
C Affected by Feelings - Emotionally Stable	none	no
E Humble - Assertive	PETERSON etal., 1967; individual athletes higher; WILLIAMS et al., 1970; fencers high; SINGER, 1969: tennis players high on aggression on E.P.P.S.	no
F Sober - Happy-go-Lucky	none	no
G Expedient - Conscientious	none	no

* "higher" means toward the right-hand side of the scale

TABLE I
(cont.)

FACTOR	DIFFERENCES FOUND	RELEVANT TO STUDY
H Shy - Venturesome	PETERSON et al., 1967: individual athletes higher.	yes
I Tough-Minded - Tender-Minded	PETERSON et al., 1967: individual athletes higher; KROLL, 1967: wrestlers high.	yes
L Trusting - Suspicious	CATTELL & EBER, 1962: "good team members" expected to be higher; but has not been demonstrated in the literature.	no
M Practical - Imaginative	PETERSON et al., 1967: individual athletes higher; WILLIAMS et al., 1970: fencers high.	yes
N Forthright - Shrewd	PETERSON et al., 1967: team athletes higher	yes
O Placid - Apprehensive	none	no
Q_1 Conservative - Experimenting	PETERSON et al., 1967 individual athletes higher, but may expect a "ceiling effect".	NO
Q_2 Group-Dependent - Self-Sufficient	PETERSON et al., 1967: individual athletes higher; WILLIAMS et al., 1970: fencers high.	yes
Q_3 Casual - Controlled	none	no
Q_4 Relaxed - Tense	none	no

In summary of Table B-1, the factors included in the discriminant analysis were E, H, I, M, N, and Q_2.

ABSTRACT

The purpose of this investigation was 1) to examine further those differences in personality factors which had been found by earlier investigators to exist between athletes involved in team sports and those involved in individual sports and 2) to discover if these factors contribute differentially to any personality profiles. Subjects (n = 68) were male volunteers selected from the varsity teams of the University of Ottawa and Carleton University. The test instrument was Cattell's Sixteen Personality Factor Questionnaire. Six factors from the 16 PF were selected as relevant to the study. These were factors E, H, I, M, N, and Q_2. Discriminant analysis was used on these six factors, and an analysis of variance was used on all sixteen factors to discover if any other differences existed. The resulting discriminant function was nonsignificant. Of the sixteen $\underline{F}$ values obtained, only one was significant. This was the $\underline{F}$ value for factor A (reserved - outgoing). It was recommended that (1) there should be a moratorium on personality testing of athletes, (2) work should be done on improving existing personality tests or developing a new test, and (3) there should be no generalization from studies already published to larger populations.