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Title: A Cross-Racial Comparison of the Relationship of Personality Traits, Body Mass, and Physical Fitness Among Male Junior High School Students in Taiwan

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The purpose of the study was to compare differences among 18 personality trait scales of the California Personality Inventory (CPI), six American Association of Health, Physical Education and Recreation (AAHPER) tests of physical fitness, and Ponderal Index (PI, or body mass) measurements for a population of ethnic Chinese and aboriginal Taiwanese junior high school male athletes and nonathletes; the secondary purpose was to determine relationships among these variables. The study sample included 839 subjects, administered the tests at 18 junior high schools in Taiwan, Republic of China (ROC). Statistical analysis was prepared at the Institute of Physical Education, National Taiwan Normal University, Taiwan, ROC. The subject population included 183 subjects active in team sports (volleyball, soccer, baseball), 214 subjects active in individual sports (track and field, wrestling, swimming), and 442 nonathlete subjects between the ages 13 to 16 years.

From the results of this investigation, it was found that ethnic Chinese and aboriginal Taiwanese subjects differed significantly on several of the CPI trait scales and physical fitness tests, but that there were no significant differences between the two

racial classifications for PI measurements. Athlete subjects from both racial classifications scored significantly higher than nonathletes on all of the physical fitness tests, and upon several of the CPI trait scales. Nonathletes from both racial classifications scored significantly higher than athletes from both groups for the PI measurements. In addition, team sport athletes scored significantly higher than individual sport athletes on physical fitness tests for sit-ups, the long jump, and the 600-yard run, as well as for PI measurements and the CPI Self-Acceptance scale.

Significant interactions were found between athletes and nonathletes from both racial classifications for the sit-ups, shuttle run, and 50-yard dash physical fitness test and the CPI Communality scale, and between individual and team sport athletes from both racial classifications for the pull-ups and sit-ups physical fitness tests. For the ethnic Chinese subjects, with the exception of pull-ups, there was a significant interaction between all physical fitness tests and for 15 of the 18 CPI trait scales; for the aboriginal Taiwanese subjects, there was a significant interaction between all of the physical fitness tests and total CPI score.

No significant correlationships were found between the CPI trait scales, tests of physical fitness, and PI measurements for ethnic Chinese subjects, whereas significant correlations among the same variables were established for the aboriginal Taiwanese subjects. For the latter, as physical fitness test scores increased, there was a tendency for certain personality characteristics (Dominance, Capacity for Status, Sociability, Social Presence, Self-Acceptance, Achievement via Independence, Intellectual Efficiency, and Femininity) to become increasingly strong influences.

A Cross-Racial Comparison of the Relationship of Personality Traits, Body Mass, and Physical Fitness Among Junior High School Students in Taiwan

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A Cross-Racial Comparison of the Relationship of Personality Traits, Body Mass, and Physical Fitness Among Male Junior High School Students in Taiwan

CHAPTER 1

INTRODUCTION

As attempts are made to understand, explain, and predict the behaviors of athletes, personality has become an important area of concern to sport psychologists (Geron, Furst, & Rotstein, 1986). In spite of ambiguous results obtained from research efforts, most sport psychologists believe that personality variables have a relationship to success in athletic activities. For the most part, the focus of the sport psychologist has been upon the personality of the individual athlete, with the goal of selection or prediction of individuals with better chances to succeed in any given activity. In particular, the coaching profession has adopted this type of predictive focus since coaches do not want to take the time to work with athletes who will either "choke" or who will fail to produce in competitive situations.

In eastern Europe the study of personality traits has been combined with the examination of psychological characteristics to the end of predicting athletic success (Vanek & Cratty, 1970). Personality test data have been used on an even broader scale as a means to predict which athletes, from among the total number who try-out for given activities, will be likely to help a team. In selections made for a national-level rowing team, Morgan (1978) reported that his predictions were 90 percent suc-

cessful. It is obvious among sports participants that personality considerations have a relationship to differences in individual capabilities. Sport performers often informally assess each other when "sizing up" opponents or evaluating their own strengths and weaknesses (Gill, 1986). In interactions with each other, personality judgements also play an important role. For example, coaches and instructors do not make the same comments to players that they consider to be fragile or sensitive that they would to players who are judged to be mentally tough.

Physical educators, psychiatrists, clinical psychologists, social psychologists, educational psychologists, the practitioners of sports medicine, and others involved with a total sports program are among those professions involved in the general area of sport psychology. All of these professionals support the premise that maximal performance can be affected by the personality characteristics and degree of psychological preparation, as well as by the physical skills and the physiological conditioning of the individual athlete. Each coach, each team, and each sport is unique and any number of different approaches to these issues is required to produce a successful program. Physical trainers and psychologists must be aware of and understanding of concerns outside of their own narrow area of focus in order to be able to provide support to the athlete and to be able to minimize those influences which interfere with performance.

Coaches must be aware of the personality characteristics of each of the individual athletes they coach. For example, is the athlete an extrovert or an introvert? The extrovert will require greater degrees of variation and change in training activities. If the same drills are repeated over and over, the extrovert will begin to lose interest and look to other pursuits. On the other hand, the introvert tends to persist without the need for additional stimulation. In this sense, a high percentage of distance runners may be classified as introverts, while sprinters more frequently manifest extroverted characteristics. In general, athletes are more confident, tough-minded, emotionally

stable, and achievement-oriented than nonathletes. In sport activities, a lack of flexibility and compatibility between the coach and the athlete will prevent the development of a relationship that is essential to the maximization of athletic talent and ability (Bunker, Rotella, & Reilly, 1985).

Programs designed to assist athletes should select or develop appropriate methods for the assessment of individual cognitive styles, anxiety levels, and behavioral responses to the conditions of training and competition (Bunker et al., 1985). Athletes should be taught skills that are useful in the mastery and control of anxiety, stress management, and to anticipate the ability to cope with the experiences and problems commonly experienced in competitive situations. In addition, the opportunity should be provided to work with individuals with special problems, as well as with those who experience greater difficulty in learning required skills.

Human beings seldom desist from arriving at value judgements about each other. These speculations are usually attempts to explain why people behave as they do, or why others behave in patterns which differ from those of the observer (Cratty, 1989). For example, if an athlete performs poorly in an activity, the search for an explanation often involves reasoning which presupposes some pattern of consistency in the behavior of the athlete in question. The goal of sport personality research is to provide accurate and reliable information about individual differences in sport, including their implications with respect to sport performance and behaviors.

Statement of the Problem

During the past decade considerable research has been conducted with relation to the differing personality characteristics of both male and female athletes and nonathletes in track and field, boxing, weight lifting, swimming, and team sports, as well

as with respect to intelligence and somatotyping. However, in addition to the contradictory and uncertain nature of the findings from these studies, the issues of body mass, physical fitness, and cross-racial background have been neglected as possible causal factors in the determination of differences among these categories of subjects.

The current study was based upon the presumption that native (aboriginal) Taiwanese and people of ethnic Chinese descent would reflect differences in culture, customs, and social constructs that would in turn reflect different personality characteristics. The study of the personality traits of different races can thus be used to improve our knowledge and understanding of a particular society. A comparison was conducted among ethnic Chinese and aboriginal Taiwanese junior high school student athletes and nonathletes for each of the 18 California Psychological Inventory (CPI) scales, six tests of physical fitness, and measurements of body mass. In addition, the relationships among personality traits, physical fitness, and body mass were measured for the same subjects.

Purpose of the Study

The principal purpose of this study was to compare differences of 18 personality trait scales, six tests of physical fitness, and body mass measurements among ethnic Chinese and aboriginal Taiwanese junior high school student athletes and nonathletes. The secondary purpose of this study was to determine the relationships among measures of personality traits, physical fitness, and body mass for the same subjects.

The importance of research studies in this area of inquiry has been suggested by a number of investigators representing different sports (Gill, 1986; Morgan, 1980; Ogilvie, 1968). Each has emphasized that personality has been an indicator used by

sport coaches in the effort to understand and explain the behavior of athletes as a means to select or predict superior sport performance. Athletic coaches prefer to concentrate their efforts upon those individual performers who will perform best under difficult, competitive situations.

Research Hypotheses

For statistical purposes, the following six null hypotheses, including three principal hypotheses, two interaction hypotheses, and one secondary hypothesis, were used to compare differences between the groups of subjects and among athletes and nonathletes for each subject group.

Principal Hypotheses

Ho_1 There are no significant differences between ethnic Chinese and aboriginal Taiwanese junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_2 There are no significant differences between subjects who are athletes and those who are nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_3 There are no significant differences between subjects practicing individual sports and those practicing teams sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Interaction Hypotheses

Ho_4 There are no significant interactions between ethnic Chinese and aboriginal Taiwanese athletes and nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_5 There are no significant interactions between ethnic Chinese and aboriginal Taiwanese in individual and team sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Secondary Hypothesis

Ho_6 There are no significant relationships between the 18 CPI scale variables, six physical fitness, and body mass variables test variables for the ethnic Chinese and aboriginal Taiwanese groups.

Delimitations of the Study

The study was delimited as follows:

1) The study included 866 males from 18 junior high schools in Taiwan, Republic of China, including 376 subjects from 9 schools which were wholly aboriginal Taiwanese in population, 299 subjects from 7 schools which were wholly ethnic Chinese in population, and 191 subjects from 2 schools which reflected a mixed population.
2) The CPI was administered to junior high athlete and nonathlete subjects as a self-perceived measurement of their personality traits.

3) For the measurement of body mass and for physical fitness testing, Ponderal Index (PI) and American Association for Health, Physical Education, and Recreation (AAHPER) data for each subject were obtained for comparison with CPI test scores.
4) At each of the schools from which subjects were obtained, the CPI tests was administered by the investigator in conjunction with school counselors prior to PI measurement and AAHPER testing.

Limitations of the Study

The limitations of the study were as follows:

1) The derivation of wholly accurate and reliable statistical measurement is believed to be difficult to achieve with a personality questionnaire. It was noted that subjects may respond in a socially desirable manner, or that they may provide inaccurate responses due to limitations in individual reading skills.
2) Given the scale of test administration, the attainment of complete control of the processes of physical fitness testing by the investigator was not possible to achieve (i.e., it could not be assured that all subjects were equally motivated toward the achievement of high performance on the physical testing procedures).
3) For this study, complete randomness did not exist since the study was based upon stratified random sampling.

Definition of Terms

AAHPER Youth Fitness Test: A physical fitness test devised by Hunsicker (1958) and subsequently revised by the American Association for Health, Physical Education, Recreation and Dance (AAHPERD), a national organization which has assumed responsibility for fitness development (AAHPER, 1976). Three of the test items focus upon athletic performance-related physical fitness: the standing long jump, the 50-yard dash, and the shuttle run. The remaining three items, including sit-ups, the distance run, and pull-ups (males) or the flexed-arm hand (females), primarily measure health-related physical fitness (Safrit, 1990). The test is easily administered with little equipment. It is recommended that testing be conducted over a two-day period: pull-ups or the flexed-arm hand, sit-ups, and the shuttle run on the first day; the standing broad jump, the 50-yard dash, and the 600-yard run-walk on the second day.

Individual sport athletes: Participants in individual sports (i.e., wrestling, track and field, swimming) who have gained varsity recognition within an organized school program (Cooper, 1969).

Team sport athletes: Participants in team sports (i.e., baseball, volleyball, soccer) who have gained varsity recognition within an organized school program (Cooper, 1969).

Nonathletes: Individuals who have chosen not to participate in formal team programs at their schools.

Personality: Considered as that facet, role or aspect of the individual which is presented to the public. According to Kluckhohn and Murray (1949),

each individual is in some respect like all others, like some others, and like no others.

Personality Traits: The characteristics of an individual reflected in responses to questions about feelings, attitudes, and behaviors, and in how these responses may be grouped with respect to factor analysis. Personality traits are believed to be evidence of consistencies in the way people behave in a variety of situations (Cratty, 1989).

Physical Fitness: A multifaceted continuum extending from birth to death; a physical state ranging from the exercise of optimal abilities in all aspects of life, through high and low levels of different states of fitness, to severely limiting disease dysfunction (AAHPERD, 1980).

Ponderal Index (PI): PI is an index of body mass. Body mass is usually measured by the amount of body fat, the extent of muscular development, and the dimensions of body structure (Neilson & Jensen, 1972). For this study, PI is used as the measure of body mass, or height divided by the cube root of weight:

$$\frac{\text{height}}{\sqrt[3]{\text{weight}}}.$$

The PI is the maximal achieved mass over a given surface area and is used in the somatotyping process. The higher the PI, the thinner, or more ectomorphic, the individual (Johnson & Nelson, 1986).

Race: The first independent variable in this study was ethnic status, defined as follows as either aboriginal Taiwanese or ethnic Chinese:

Aboriginal Taiwanese: In general, those people who were an earlier population arrival in Taiwan than the ethnic Chinese (Han); a people

who emigrated from the Chinese mainland, but who at present observe only limited retention of ancient (pre-Chinese) customs. The nine tribes presently living in Taiwan include the Yame, Ami, Atayi, Saisiat, Tsuo and Sau, Bunun, Puyama, Rukai, and Paiwan. Linguistically, these tribes belong to the Malay-Polynesian group, members of which arrived in Taiwan about 600 years ago. They now live in the central mountains of Taiwan, with the exception of the Yame, who live on the island of Lanyu (Orchid Island) off Taiwan's east coast, and the Ami, who inhabit the mountains of the east coast, centered at Huailen (Boydell, 1990; China Association for Human Rights, 1987).

Ethnic Chinese: The people who have arrived in Taiwan from mainland China at a time subsequent to the arrival of the nine tribes constituting the aboriginal Taiwanese (see above).

Traits: The pattern of consistent individual interactions with an environment, as well as the patterns that best describe characteristics of individual uniqueness or how the individual differs from all others (Cratty, 1989).

CHAPTER 2

REVIEW OF LITERATURE

Only limited scientific literature is available which integrates the relationship of personality traits, body mass, and physical fitness from the viewpoint of a cross-racial comparison. Apart from this consideration, this review is presented in four sections: 1) Athletes versus nonathletes and intersport personality considerations; 2) the correlation of personality traits, athletic participation, and body mass; 3) the correlation of personality traits, athletic participation; and physical fitness; and 4) those few studies which have been concerned with cross-racial comparisons of personality traits.

Athletes Versus Nonathletes and Intersport Personality Considerations

Athletes vs. Nonathletes

Hardman (1973) found among athletes consistent evidence of higher levels of intelligence, and was able to associate sport participation with general second-level factors of anxiety and independence. In a similar survey, Cooper (1969) found that athletes were clearly more achievement-oriented, more dominant, and displayed more self-confidence and competitiveness than nonathletes.

Morgan (1978, 1980) has offered the most systematic and strongly supported study of the relationship of personality to success in sport. On the basis of a series of studies, Morgan proposed a mental health model for the effective prediction of athletic

success, demonstrating that successful athletes did indeed possess more positive mental health characteristics and fewer negative mental health characteristics than the general population. These findings have been supported by Thakur (1980), who demonstrated the existence of personality differences between athletes and nonathletes, and a subsequent study (Thakur & Ojha, 1981) which indicated that specific groups of athletes have behavioral characteristics that differentiate them from other groups of athletes. Magni, Rupolo, Simini, Leo, and Rampazzo (1985) investigated aspects of the psychology and personality of high altitude mountain climbers, finding that personalities of the type described had good functional integration. This enabled the climbers to perform particularly onerous endeavors that sometimes required them to abandon their normal activities and families for months at a time.

Edgar (1988) conducted a longitudinal comparison of the personality traits of athletes and nonathletes. Several of the statistical analyses used (i.e., comparisons of averages, ANOVA, Principal Components analysis), between sportsmen and nonsportsmen and among sportsmen, reflected the necessity to develop certain personality traits for specific sports. For example, some sports (i.e., volley ball) provided significant enhancements of emotional control, while others (i.e., rowing) placed greater significance upon energy control. In summary, the literature reviewed in this area revealed that athletes reflected higher levels of intelligence, exercised greater emotional control, expressed a greater degree of self-confidence, exercised greater energy control, were more efficient in their actions, exhibited stronger leadership tendencies, were more extroverted, and expressed more optimistic personality characteristics than nonathletes.

Individual Sport Athletes

Newman (1968), who investigated personality traits among faster and slower competitive swimmers, found that high school swimmers who were among the fastest in at least one event were less sociable and both more reflective and dominating than slower swimmers. Although no significant differences were determined between medalist and nonmedalist Olympic swimmers, the trends established indicated that the medalists were less anxious and neurotic and were more self-assertive, independent, and aggressive than nonmedalists. Morgan, O'Connor, Ellickson, and Bradley (1988) measured the personality structure, mood states, and performances among elite male distance runners. Their findings were consistent with previously published research concerning elite male and female distance runners. Ability ratings for performers in the 10,000 meter run, as reflected by previously validated performance criteria, were calculated by an expert panel, as based upon past performances. Multiple regression analysis indicated that a measure of global mood and traits anxiety accounted for 45 percent of the variance in performance, results which supported the concept that performance can be associated with positive mental health. Bushnan and Agarwal (1978) used the 16-PF questionnaire to find the characteristics that distinguished high-achieving from low-achieving players and to differentiate characteristics between male and female high-achieving athletes. The high-achievers had represented India at international table tennis and badminton events. The low-achievers were table tennis and badminton players who had only participated in district tournaments without achieving any distinction. The high-achievers were significantly higher on dominance than the low-achievers. For second order factors, the high-achievers, both male and female, were significantly more extroverted than their low-achiever counterparts. It was also found that high-achieving females scored significantly higher on the primary factors of suspiciousness, dominance, and tenseness, and lower on outgoingness, emotional

stability, and tendermindedness, than male high-achievers. At the same time the female high-achievers were rated higher for the second order factors of anxiety, alert poise, and independence.

Kodman (1982) studied the personality traits of black belt karate instructors, finding that the instructors had more in common than they had differences with subjects selected from a general college population. No unusual or bizarre features were noted in any of the three group profiles examined. Naiano (1985) studied the personality traits of adolescent tennis players, comparing them to nonathletes. In general, the tennis players scored significantly higher in extraversion and the will-to-win, while exhibiting less neuroticism (i.e., emotional instability), anxiety apprehension, obsession, and depression.

Dishman (1982, 1984) explicitly advocated consideration of both biological and psychological factors for his psychobiological exercise adherence model. Dishman proposed that biological factors, including body composition, and psychological factors, particularly self-motivation, influence an individual's adherence to an exercise program. Similarly, he believed there was a relationship between personality factors and exercise adherence. In effect, individuals who were highly self-motivated would be able to set personal goals and strive toward them with relatively little guidance, but individuals with less self-motivation would require more conducive exercise settings or systems of social support to maintain their programs.

Volp and Keil (1987) investigated the relationships between performance, intentions to drop-out, and intrapersonal conflicts among swimmers. Previous research in this area had been equivocal, with a number of researchers determining that athletes become drop-outs from competitive sports because of conflicts of interest or the failure to demonstrate high levels of ability in their chosen sports. Volp and Keil concluded that intrapersonal conflicts were important factors in both athletic performance

and in relation to dropping-out. Swimmers competing at three different levels of performance were asked to complete a conflict questionnaire. The highest performing group showed less conflict and more intensive use of cognitive conflict reduction mechanisms than did swimmers from either the medium- or low-level swimming groups. On the other hand, drop-outs reflected high conflict scores in areas directly related to athletic performance than did those who planned to continue swimming. Intrapersonal conflict was interpreted to be an important mediating variable in sport and personality research.

In summary, subjects identified as high-achievers expressed greater anxiety and a tendency toward neurosis; were more self-assertive, independent, and aggressive; expressed greater dominance and were more extroverted; exhibited a greater degree of functional integration, were less inclined toward conflict, and made more intensive use cognitive conflict reduction mechanisms than those identified as low-achievers.

Team Sport Athletes

Craighead, Privette, Vallianos, and Byrekit (1986) investigated personality characteristics among basketball players who were starters and those who were non-starters. Though the results failed to show significant discrimination between starters and nonstarters, comparisons between sexes, races, and levels of education indicated differences for some of the mood factor measures. These findings are suggestive of future research and possible modification of coaching techniques.

Scilligo, Bergerone, Cei, Ceridono, and Formica (1986), in a study of the relationship between intrapsychic and interpersonal processes and performance in teams sports, determined that athletes from teams with high standings perceived themselves to be more attentive and organized, less isolated and less inclined toward self-harm or self-neglect. Their primary orientation was directed at reciprocal attention and accep-

tance. Koslowsky and Maoz (1988) investigated commitment and personality variables as discriminators among sport referees, determining that both types of variables, individually as well as in combination, served to significantly discriminate between occupations. In combination, commmitment and personality were used to classify more than 81 percent of the referees into the correct occupational group.

In summary, team sport athletes with high standing in their sports perceived themselves as more attentive and organized, less isolated, and less inclined toward self-harm or self-neglect than athlete members from teams with low standing in their sports.

Individual Sport Athletes vs. Team Sport Athletes

O'Connor and Webb (1976) related that activities such as swimming and distance running required high levels of determination, persistence, and durability, and that these athletes were usually more introverted, emotionally stable, and possessed greater self-control. Team sport participants generally possessed average or above-average intelligence, were self-disciplined, and were able to engage in strategical thinking, while gymnasts and dancers were characterized by artistic creativity and self-control.

Colley, Roberts, and Chipos (1985) studied sex-role identity, personality, and participation in team and individual sports among males and females. Their findings stated that sports participants scored higher on extraversion and masculinity than non-participants. In addition, a comparison of a group of female noncompetitive individual sports participants with females from competitive team sports showed them to be lower on an extraversion scale, suggesting that extraverts are attracted to the competitive aspect of sports. Second, a higher proportion of female sports participants than nonparticipants were not sex-typed. The sex-role identity of the team sport partici-

pants tended to be androgynous, while that of the individual sport participants tended to be undifferentiated. This finding was attributed to the more masculine nature of team sports, thus serving to attract females who scored higher on a masculinity scale.

Geron, Furst, and Rotstein (1986), who investigated personality traits among athletes from a variety of sports, found that the athletic personality differed according to the sport. However, the differences among athletes were related not only to the type of sport, they also reflected various sociocultural milieu. The athletes of various sports also differed with respect to sociodemographic characteristics, but at the same time athletes differed according to these characteristics to a lesser extent than did nonathletes. The personality profiles of athletes are not homogeneous. They often possess "favorable" as well as "unfavorable" characteristics, both being necessary for participation in a given sport. On the other hand, the personality characteristics of the same groups of athletes often appear to be different relative to the group with which they are compared. This is why a number of directional comparisons are necessary in composing a true personality profile for athletes.

Timsit and Quevrin (1988), in a comparative study of the personality traits of fencers, distance runners, and basketball players, pointed out the significant difference between three groups as follows: 1) Long distance runners were the most elated, the less emotive, and were less inhibited than fencers; 2) basketball players were more aggressive than the other two groups, but they also reflected more controlled processes; and 3) all groups displayed a global defect in phantasmatic life and the symbolization process. More than 50 percent of these athletes failed to recognize the very popular human figures on card III of the Rorschach test.

In summary, team sport athletes were less dependent upon abstract reasoning, were more extroverted and dependent, and reflected less ego-strength, whereas individual sport athletes differed in that they were less anxious and more objective. It was

also noted that athletic personalities tended to differ according to the sport, and that the personality profiles of athletes were not homogeneous. Athletes have been found to reflect "favorable" as well as "unfavorable" personality characteristics, and it is considered that both types are necessary for participation in given sports.

Correlation of Personality Traits, Athletic Participation, and Body Mass

Stewart (1982) sought to define the population and formulate tentative treatment implications from the results of somatotyping 60 emotionally disturbed adolescent girls. Results showed that the subjects differed from a normative population, showing a predominance of endomorphic-mesomorph and mesomorphic-endomorph temperaments. Murrell and Lester (1982) administered Type A (coronary prone) personality and self-esteem measures to 36 male and 62 female undergraduates and calculated ectomorphic scores. Type A personality was unrelated to height in both sexes. Moreover, there was no evidence that shorter individuals tended to put on excessive weight to compensate for low self-esteem.

Crews, Shirreffs, Thomas, and Krahenbuhl (1986) provided an analysis that has indicated that the percent of body fat, locus of control, personality type, and relative strength could be used to predict 61 percent of the variation in average statistical scores. Cross-sectional comparisons by Robertson, Mellor, Hughes, and Sanderson (1988) have indicated that the more favorable health profiles tend to belong to a group from the country and the least favorable to sedentary types. Type A behavior, however, was most pronounced within the country group, suggesting that the personality type associated with coronary risk could be found at higher levels of play.

In summary, a relationship was established among the three primary components of body build and the three primary components of temperament. Thus, meso-

morphy-somatotonia was characterized as the love of adventure, risk-taking, and the need for violent physical activity; endomorphy-viscerotonia was characterized by affection, love of comfort, and sociability; and ectomorphy-cerebrotonia was related to tenseness, social restraint, inhibitions, and social isolation. In general, mesomorphs are popular individuals who often rise to positions of leadership, whereas ectomorphs and endomorphs, in particular, tend to be much less popular among their peers.

Correlation of Personality Traits, Athletic Participation, and Physical Fitness

Studies by Buffone (1984), Hughes (1984), Mihevic (1981), Morgan (1981, 1985), and Sachs (1984) were in agreement that participation in general sport activities did not seem to affect personality, but that vigorous exercise and programs that increased fitness levels could have a positive effect on mood, self-concept, and general mental health. Thus, the evidence suggests that improved fitness and accompanying changes in body image may positively affect self-esteem, especially for participants with low self-esteem prior to engaging in a fitness program. With the exception of self-concept, however, general personality characteristics did not seem to be affected by improvements in physical fitness.

Zarski, West, and Bubenzer (1982) tested the assumptions that running would stabilize positive aspects of personality, contribute a sense of increased confidence and self-esteem, and result in greater life adjustment. A group of 308 runners and nonrunners from ages 16 to 60 were administered the Social Interest Index and Bell Adjustment Inventory (BAI). It was hypothesized that: 1) runners would report greater life adjustment than nonrunners; 2) high social-interest subjects would report greater life adjustment than low social-interest subjects; and 3) the difference in BAI scores would be greater between high social-interest runners and low social-interest non-

runners than between either low social-interest runners or high social-interest non-runners. The data supported hypotheses 1 and 2, but the two-way social-interest running interaction on life adjustment did not support hypothesis 3. The data indicated that high social-interest runners had greater life adjustment than low social-interest runners, but both had comparable life adjustment scores. The conclusion was that physical fitness and personality are influential elements in an independent system that affects the individual's ability to adjust to life's demands.

El and Abdelwahab (1986) examined the effect of physical training upon the relationships among the physical, mental, and emotional state for adult men. Their results indicated that physical fitness was related to mental and emotional fitness and that the relationship tended to be stable and affected by physical training. Suominen, Davis, Ismail, and Salvendy (1986) investigated the impact of physical fitness upon strategy development in decision making tasks and found that increases in physical fitness was related to changes on selected personality measures.

Howard, Cunningham, and Rechnitzed (1987), in a five-year study of personality as related to the decline of physical fitness among middle-aged men, found that the second-order personality dimension, or state of introversion vs. extraversion, could be related to grip strength and predicted maximum oxygen uptake, but not to degree of body fatness. In addition, those subjects classified as introverts on the baseline showed a 12 percent decline in predicted maximum oxygen uptake, while those classified as extraverts indicated only a 2 percent decline. They concluded that there was an association between extroversion and participation in high-intensity physical activity. Pfiffner, Lanfrancon, Nil, and Buzzi (1988), in a survey of 97 healthy, middle-aged men, obtained correlations between psycho-physiological activity and Type A behavior and between psycho-physiological behavior and patterns of sociability and extroversion, physical fitness, nervosity and neuroticism, openness and sponta-

neous aggression, and a cluster of personality dimensions, including depression, irritability, reactive aggression, and self-confidence.

Hogan (1988), in a study of the personality correlates of physical fitness, indicated that fitness must be defined in multidimensional terms and is related to self-discipline. On the other hand, measures of psychopathology were unrelated to measures of health and fitness. The data suggested that those personal qualities associated with fitness were also these which served to promote and extend health. Scherman (1989) investigated physical fitness as a mode for intervention among children and found that physical fitness has a potential effect on the improvement of self-esteem in children, particularly in nonschool settings. Evidence was also presented for a positive trend in the use of physical fitness as a means of therapeutic intervention.

Snel and Gosselink (1989) studied health, personality and physiological variables as discriminators for a Type A behavior pattern among young adults. It was suggested that in anticipation of mild stressful situations, male and female Type A's coped inadequately in comparison to Type B personalities. Female Type A personalities, however, seemed to be able to compensate for inadequate coping skills, possibly by engaging in higher activity levels aimed at maintaining physical health.

In summay, it has been determined that increased levels of fitness could exercise a positive effect on mood, self-concept, and general mental health, and that running can serve to stability positive aspects of personality, contribute to a sense of increased confidence and self-esteem, and result in greater life adjustment. Thus, physical fitness and personality are influential elements in an independent system that affect the abilities of individuals to adjust to the demands of life. In addition, physical fitness was correlated with both mental and emotional fitness, and these relationships tended to be both stable and affected by physical training.

Cross Racial Comparison of Personality Traits

Hunt (1969) conducted a cross-racial comparison of personality traits among athletes and nonathletes, and found that white varsity athletes were significantly different than Negro or white nonathletes, ranking higher in ascendancy, responsibility, and emotional stability traits. Results also suggested that Negro varsity athletes were significantly different from Negro nonathletes, ranking higher in responsibility. There were no significant differences between white and Negro varsity athletes, between Negro varsity athletes and white nonathletes, or between Negro nonathletes and white nonathletes.

Fong and Peskin (1969), in an investigation of sex-role strains and personality adjustments among Chinese-Americans born in China, found that the Chinese model for the feminine role (e.g., reserve, patience, modesty) was most often rejected by a subsample of females on student visas, and was most often accepted by naturalized females (including permanent residents) as reflected on the CPI Femininity scale. Regardless of sex, naturalized and resident students clearly outranked the students with visas on important aspects of psychological health. Hammer and Scubic (1971), in a comparison of coaches and athletes from the Philippines, Canada, and the United States, found the Filipino personality to be more sober and serious than those of either Canadians or Americans.

Chelladurai, Imamura, Yamaguchi, Oinuma, and Miyauchi (1988) explored sport leadership in a cross-national setting. Comparison of Japanese and Canadian university athletes indicated that: 1) Japanese athletes preferred more autocratic behavior and social support, while Canadian athletes preferred more training and instruction; 2) Japanese athletes perceived higher levels of autocratic behavior, while Canadian athletes perceived higher levels of training and instruction, democratic behavior, and positive feedback; and 3) Canadian athletes expressed significantly more

satisfaction with both leadership and their personal outcomes than did the Japanese athletes. The results of correlational and multiple regression analyses showed similarities as well as dissimilarities in the manner in which perceived leader behaviors were associated with satisfaction measures between the two groups. Overall, the results of the study were more supportive of the cultural-influence hypothesis than of the athletic-imperative hypothesis.

MacKinnon and Keating (1989) compared Canadian and American subjects for an investigation of the structure of emotion, reporting that despite cross-national and gender differences in the affective range and intensity, the structure of emotions was relatively invariant across culture and gender. Findings indicated that American subjects seemed more in touch with their feelings and more emotionally expressive, while at the same time these cross-cultural differences were more pronounced among women.

In summary, in the U.S. there were significant differences between white varsity athletes and both Negro athletes and white nonathletes. The former ranked higher in ascendancy, responsibility, and traits of emotional stability; Filippino personality traits tended to be more sober and serious than those of either Canadians or Americans; Japanese athletes preferred more autocratic behaviors and were more dependent upon social support systems, whereas Canadian athletes placed greater value on higher levels of training and instruction, democratic behaviors, and positive feedback. In this sense, Canadian athletes expressed significantly more satisfaction with both leadership and their personal outcomes than did the Japanese athletes. American subjects seemed to be more in touch with their feelings and more emotionally expressive. In addition, such cross-cultural differences as were identified were more pronounced among female athletes than among male athletes.

General Summary

A substantial amount of the literature reviewed for the years between 1920 and 1970 was concerned with relationships between athletic performance and various personality factors. While no intellectual differences were noted, among athletes a greater motivation to achieve was generally noted. Only a few of the studies were focused upon the relation of body concerns and the vicissitudes of aggression. In general, the latter was either implicit, or was absent from the discussion (Cooper, 1969). More recently, from the 1970s to the present, personality research has shifted away from generalized concepts of personality toward "real world" personality identification as inferred from behaviors in various contexts, and even as personality as sequences of actions discernible in the moment-to-moment flow of behaviors (Fiske, 1988).

At the same time, such topic areas as the relationship of personality, body mass, and physical fitness from the perspective of cross-racial comparisons have not been fully examined. Considered separately, each of these factors has generated substantial research interest, but only a minor effort has been given to the integration of more than one of these areas of interest. Apart from concern with the relationship of personality and athletes, even nonathletic oriented research has provided useful findings from which to gain useful overviews of the factors of effective influence in the area of personality research.

Over the last decade, of 57 investigations which were reviewed, 39 studies expressed a concern with the issue of personality and aspects of physical fitness: 11 were concerned with body mass, while only two were directed at cross-racial comparisons and personality; the balance were directed at cross-cultural issues. There were a few clear tendencies in contemporary research directions in this area. Studies on personality, physical fitness, body mass, and cross-racial comparisons as an integrated

approach have been examined in connection with sport. The literature indicates that personality variables influence success in athletic activities, whereas the literature pertaining to other background factors had not offered as great an opportunity for comparison with the results of cross-racial studies.

In any review of the literature of personality traits and their relationship to athletic performance and physical fitness, as expressed by analysis of CPI measurements, it is clear that the focus of concern has been directed at western values and concepts, and primarily those that may be either induced or deduced from American society and individuals. These patterns cannot always be used with great utility for those personality traits that reflect different ethnic backgrounds, including the customs, culture, and practice of sport in the country of the present investigator, Taiwan. Thus, this study proposes to focus on a comparison of aboriginal Taiwanese and ethnic Chinese in Taiwan, and the relation of value concepts and personalty traits among athletes from these cultures. In accordance with modern sport theory, this study should prove to be of benefit to an understanding of sport as well as to issues of personality in Taiwan.

CHAPTER 3

METHODS AND PROCEDURES

The methods and procedures used for this study are described in five parts: 1) Research design, including the operational definitions of the independent and dependent variables; 2) subjects; 3) instruments; 4) administration of the tests, and 5) methods of statistical analysis.

Research Design

To measure and compare the relationships among the independent variables (race and athletes), and the dependent variables (the CPI, AAHPER physical fitness tests, and the PI measurements), the design was based on a 2 $\times$ 3 multi-way analysis of variance (ANOVA). The factors included two levels of ethnic group (ethnic Chinese and aboriginal Taiwanese) and three levels of athletic participation (individual and team sport athletes and nonathletes). A schematic representation of this design is presented in Table 3.1.

The design utilized is typical for multi-way arrangements used in ANOVA design in which each cell is an operated measurement of the dependent variables. For purposes of data analysis, it is possible to conceptualize the results schematically. Table 3.2 is a correlational model for the investigation of the relationships among the dependent variables for each ethnic group and for each athletic group.

Table 3.1 Test design, 2 × 3 factors.

Race	Athletes: Individual sport	Athletes: Team sport	Nonathletes
Ethnic Chinese	—	—	—
Aboriginal Taiwanese	—	—	—

Table 3.2 Schematic representation of correlation design for each ethnic group.

Scale or Measurement	PU	SU	SR	SLJ	50D	600	PI
Dominance (Do)	—	—	—	—	—	—	—
Capacity-for-status (Cs)	—	—	—	—	—	—	—
Sociability (Sy)	—	—	—	—	—	—	—
Social-presence (Sp)	—	—	—	—	—	—	—
Self-acceptance (Sa)	—	—	—	—	—	—	—
Tolerance (To)	—	—	—	—	—	—	—
Responsibility (Re)	—	—	—	—	—	—	—
Socialization (So)	—	—	—	—	—	—	—
Self-control (Sc)	—	—	—	—	—	—	—
Good-impression (Gi)	—	—	—	—	—	—	—
Communality (Cm)	—	—	—	—	—	—	—
Well-being (Wb)	—	—	—	—	—	—	—
Achievement via conformance (Ac)	—	—	—	—	—	—	—
Achievement via independence (Ai)	—	—	—	—	—	—	—
Intellectual efficiency (Ie)	—	—	—	—	—	—	—
Psychological-mindedness (Py)	—	—	—	—	—	—	—
Flexibility (Fx)	—	—	—	—	—	—	—
Femininity (Fe)	—	—	—	—	—	—	—
PI	—	—	—	—	—	—	—

Notes: CPI, California Psychological Inventory; PU, pull-ups; SU, sit-ups; SR, shuttle run; SLJ, standing long jump; 50D, 50-yard dash; 600, 600-yard run-walk; PI, Ponderal Index.

For this study, the dependent variables were personality traits, as measured by the 18 CPI scales (Gough, 1964), six AAHPER tests of physical fitness (AAHPER,

1976), and body mass as indicated by PI measurements (Johnson & Nelson, 1986). The independent variables included race (ethnic Chinese and aboriginal Taiwanese) and athletes (individual sport, team sport, and nonathletes). To maintain a lower experiment-wise type I error rate, the .01 level of probability was selected for each ANOVA as indicative of statistical significance.

Subjects

The subjects consisted of 866 male subjects from 18 junior high schools in Taiwan, including 299 subjects from seven schools wholly ethnic Chinese in population, 376 subjects from nine schools wholly aboriginal Taiwanese in population, and 191 subjects from two schools with mixed populations. The ages of the subjects ranged from 13 to 16 years. From the original total number, 27 subjects were excluded from consideration for reason of incomplete data. Thus, the valid number of total subjects for this study was 839 subjects. Of this final valid total, 426 subjects were of ethnic Chinese origin and 413 subjects were of aboriginal Taiwanese origin; 183 subjects were active in team sports (i.e., volleyball, soccer, and baseball), 214 subjects were active in individual sports (i.e., track and field, wrestling, and swimming), and 442 subjects were nonathletes. A summary of this sample is included as Table 3.3.

Determination of the sample size was based upon Cohen's Power Analysis (1988) and the real situation among the junior high schools in Taiwan, ROC. From Cohen's Power Analysis, results indicated that the sample size for the current study should be greater than 210 with a minimum sample size per cell of 35 (Table 3.4). In reality, a greater number of samples was collected to compensate for unreliability among the the dependent measures.

Table 3.3 Summary of sample size.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	n=253	n=173		n=426
		n=96	n=77	
Aboriginal Taiwanese	n=189	n=224		n=413
		n=118	n=106	
Totals:	n=442	n=397		n=839
		n=214	n=183	

The subjects were placed in minimum cell sizes of 35 in accordance with directions provided by Cohen (1969, 1988) for statistical power analysis for the behavioral sciences (Table 3.4). To compensate for unreliability among the dependent measures, five additional subjects were added to each cell in the design.

Table 3.4 Statistical power analysis.						
Factor	No. of levels	No. per level	N' per level	Deg. of freedom	Effect size = f	Power
Race	2	105.0	103.0	1	0.300	0.957
Athletes	3	70.0	69.0	2	0.300	0.915
Race × Athletes			69.0	2	0.300	0.915
Minimum sample size per cell = 35; minumum sample size = 210. Number of cells = 6; α = 0.01.						

The sampling technique used for this study was based upon a stratified random approach. The population was divided into ethnic Chinese, aboriginal Taiwanese, individual sport, team sport, and nonathlete groups, from which random samples were drawn. The procedures for obtaining subjects were as follows:

1. In each Taiwanese district, competitions are held in each sports event. The top three teams from individual schools in each sport for each district were identified, providing a list of 45 teams.
2. The total number of 45 teams was divided into two sublists for aboriginal Taiwanese and ethnic Chinese school populations.

3. Two school teams were randomly selected from both the sublist of the aboriginal Taiwanese schools and the sublist of ethnic Chinese schools.
4. Six to seven athletes were randomly selected from each of the selected school teams, followed by random selection of from three to four non-athlete subjects from the same schools from which athletic team members were selected. This procedure was repeated six times for each sports event, and is described in Figure 3.1.

Instruments

The instruments used for this study were the California Psychological Inventory (CPI), the American Association for Health, Physical Education, and Recreation Youth Fitness Test (AAHPER), and the Ponderal Index (PI) measurement.

California Psychological Inventory

The CPI was constructed to attain two goals in personality assessment. The first goal, largely theoretical in nature, was to develop descripitive concepts which possess broad personal and social relevance. The second goal of the CPI was to devise brief, accurate, and dependable subscales for the measurement of 18 personality factors (Gough, 1985). The psychological meanings for each scale may be summarized as follows.

1. Do (Dominance). Higher scores indicate prosocial dominance, self-assurance, task orientation, and enterprise. Lower scores indicate hesitancy to take the initiative, equivocation, and feelings of vulnerability.
2. Cs (Capacity for Status). Higher scores indicate ambition, breadth of interests, versatility, and self-confidence. Lower scores indicate dislike

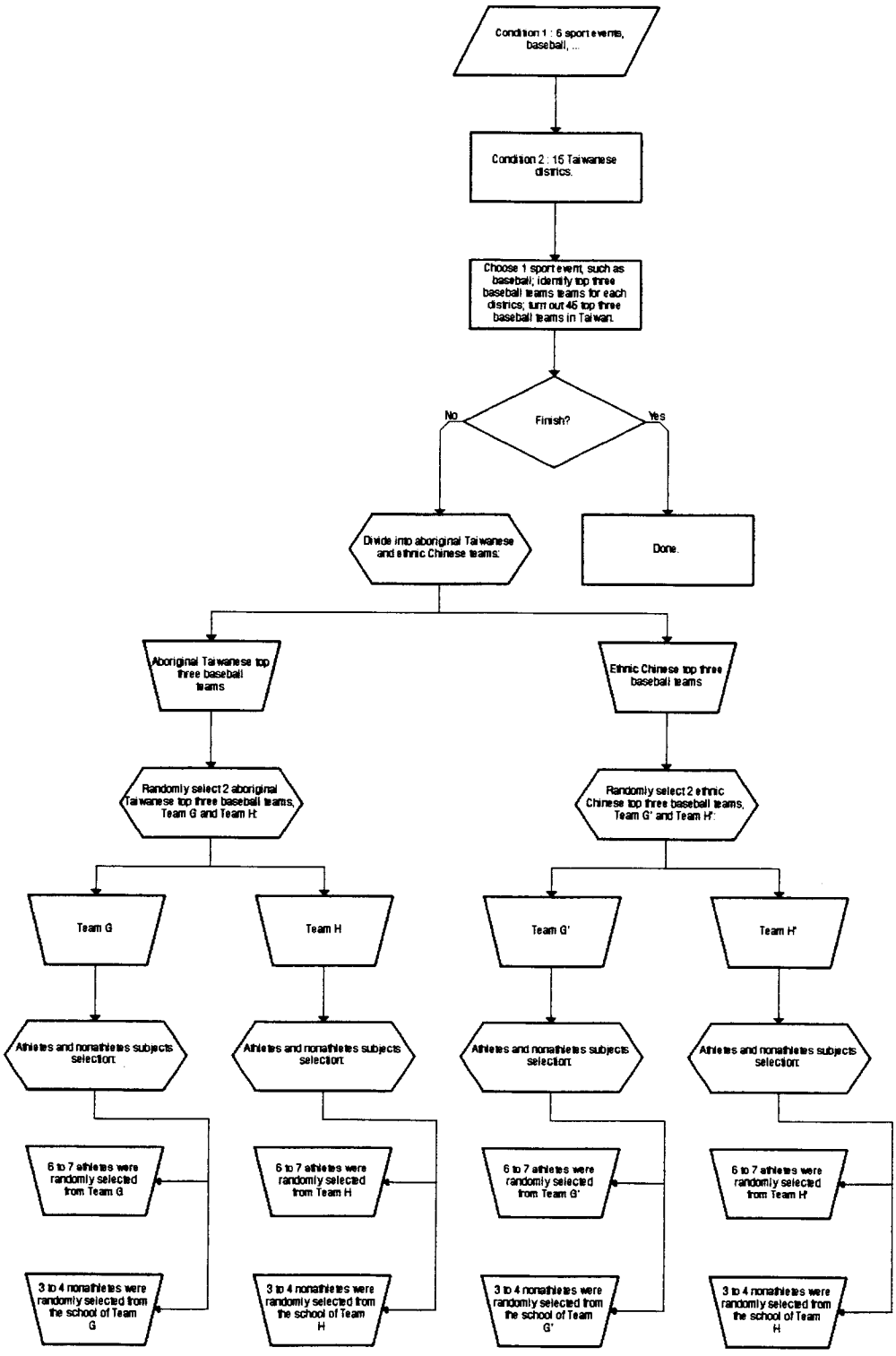


Figure 3.1 Sampling procedures, athletic and nonathletic subjects.

of competitive situations, feelings of unease in social encounters, and apathy.

3. Sy (Sociability). Higher scores suggest sociability, gregariousness, and an alert and active social manner. Lower scores suggest caution, self-denial, reticence, and a subdued or unassuming social demeanor.
4. Sp (Social Presence). Higher scores are associated with verbal fluency, wittiness, spontaneity, and a tendency to be somewhat self-centered. Lower scores are associated with narrowness of interests, inhibition, a liking for routine, and a readiness to feel guility.
5. Sa (Self-accepance). Higher scores relate to feelings of personal worth and self-esteem, talkativeness, and effective skills in self-presentation. Lower scores indicate self-doubt, withdrawal, suppressive ego defenses, and ambivalence about self.
6. To (Tolerance). Higher scores tend toward enterprising, informal, quick, tolerant, clear-thinking and resourceful personality patterns. Lower scores indicate suspicious, narrow, aloof, wary, and retiring personality characteristics.
7. Re (Responsibility). Higher scores are related to rule-awareness and ethical perceptiveness, as opposed to blind or slavish rule-following. Lower scores are related to dissatisfaction, undependability, and self-indulgence.
8. So (Socialization). Higher scores suggest conscientious, organizational ability, rule-respecting behavior, but (for very high scores) the possibility of overconformity. Lower scores suggest waywardness, undependability, moodiness, and counteractive or rebellious attitudes.

9. Sc (Self-control). Higher scores indicate strongly positive feelings about normative constraints, a tendency to suppress or even deny hostile and erotic impulses, and suppressive moral attitudes. Lower scores indicate a sort of undercontrol, with relative freedom of expression of aggressive and erotic feelings, and a pleasure-seeking approach to life.
10. Gi (Good Impression). This scale has two functions. For raw scores of about 31 and above, there is an indication of overly favorable self-description, to the point of faking good behaviors. For above-average scores which fall short of this high level, the implications are for a social style overemphasizing prosocial qualities, exaggerated but superficial conformance to convention, and shallow insight. Lower scores indicate individualistic tendencies, ease of irritability, and impatience.
11. Cm (Communality). This scale also has two functions. For raw scores of 27 or below, one must consider random answers or inattention to the content of the items. For below-average scores above this level, there is a suggestion of unconventionality, changeableness, and complexity of inner life. Higher scores suggest stability, conventionality, and a general satisfaction with things as they are.
12. Wb (Well-being). Two functions are served by this scale. For every low raw score of 20 and below, there is a possibility of undue or unwarranted emphasis on problems, or faking bad behaviors. Lower scores short of this point suggest dissatisfaction, worry, and a tendency to complain. Persons with higher scores tend to be insightful, open-minded, and rational in their judgments of self and others.
13. Ac (Achievement via Conformance). Higher scores suggest ambition, capability, and the capacity to do well in clearly defined and controlled

environments. Lower scores suggest distractibility, undependability, and resistance to rules or any kind of strict control.

14. Ai (Achievement via Independence). Higher scores tend to reflect clear-thinking, intelligence, and independence. Low scores tend to be reflect narrowness of interests, ease of discouragement from doing one's best, and poor motivation in both educational and occupational matters.
15. Ie (Intellectual Efficiency). Higher scores tend to reflect a capable, logical, and resourceful personality. Low scores tend to reflect individuals who are low in self-esteem, below average in ability, and poor in expressing their feelings and ideas.
16. Py (Psychological Mindedness). Higher scores indicate insightfulness about people (but not necessarily warmth or sympathy), foresight, critical judgment, and independence. Lower scores indicate conventionality, intellectual shallowness, and uncertainty about one's own ability.
17. Fx (Flexibility). Higher scores suggest cleverness, zest, and imagination, but also carelessness and instability in goal-seeking. Lower scores suggest conservative attitudes, conventionality, and a certain deliberateness of manner, but also self-discipline, thoroughness, and sense of duty.
18. Fe (Femininity). For males, higher scores are associated with sensitivity, worry, nervousness, and feeling of ambivalence about self, but also with a certain talent for aesthetic and imaginative thinking. Lower scores are associated with self-confidence, independence, and the ability to deal with stress and conflict, but also with obstinance and indifference to the feelings of others (Gough, 1989).

Detection of Dissimulation or Faking

The CPI is more difficult to fake than other tests because the method of scale construction produces a number of subtle items whose relationships to any particular trait or behavior will not be obvious to inspection. Nevertheless, a number of items are less subtle and two scales were developed to assist in detecting those subjects who deliberately exaggerate or otherwise distort their responses to the instrument: Good impression (Gi) and Communality (Cm). The use of these two scales for the identification of invalid test records can be summarized as follows:

1) Results on the Gi scale indicate its role in helping to identify exaggerated attempts to place oneself in a favorable light. Scores somewhat above average on Gi are indications of favorable attitudes and conscientious efforts to fit in and to adapt. Very high scores raise the possibility of test "faking" or of an undue concern with making a good impression.
2) Within the usual range of scores, the magnitude of the Cm score indicates the care and conscientiousness with which the individual has approached this test. When the score falls very low, the strong possibility is raised that the individual's answers have been given in some random or unmeaningful way.
3) For the current study, none of the subjects scored either too high on the Gi scale or too low on the Cm scale.

Translated CPI Reliability and Validity

The CPI has been administered to determine various measures of achievement in elementary, junior, and high schools, as well as colleges and medical training schools, in the military, and for police training programs (Megargee, 1972). In addition, the cross-cultural validity of the CPI has been repeatedly established (Fong & Peskin, 1969).

To examine Chinese family life, Abbott (1970) prepared a translation of the CPI into Mandarin Chinese, resulting in a 294-item translated version (Appendix A, English version of 294-item Mandarin translation). Reliability has been established as follows (Lee & Yang, 1982):

1) Test-retest reliability: a) pre-test to post-test, approximately one month; b) subjects, 65-103; c) reliability coefficient, .40-0.94.
2) Split-half reliability: .35-0.94, as revised.
3) Kuder-Richardson reliability: a) subjects, 200; b) reliability coefficient, .50-0.91.

Lee and Yang (1982) determined that use construct validity after factors analysis revealed similar personality variables among Chinese students and American students. For the Chinese translation, the means and standard deviations for the characteristics variables based upon two samples did not differ substantially from American norm scores (Gough, 1975). Results were as follows: 1) Test-retest at one-year intervals; 2) reliability coefficients for high school students ranging from .44 (Communality) to .73 (Achievement) for females and from .38 (Communality) to .75 (Self-control) among males. The validity coefficients for each of the 18 scales have been found to be significant beyond the .01 level (Berger & Littlefield, 1969). A translation table, including means and standard deviations, and a conversion table for standard scores for the 294-item test version were developed by Lee and Yang (Appendices B and C).

Summary

The American Psychologist database of the American Psychological Association), indicates that from 1983 to 1990 more than 80 papers were published which directly or indirectly used the CPI as a measurement tool. Of this number, eight were studies conducted in countries outside the U.S., including Egypt, Greece, Japan, and Kuwait. Most of the studies indicated that the CPI measures showed sufficient valid-

ity for cross-racial research (Repapi, Gough, Lanning, & Stefanis, 1983; Stitsworth, 1989; Torke, 1988).

The CPI provides several principal benefits: 1) It provides multi-factor scores; 2) it provides answers to important assessment questions asked by psychologists and counselors; 3) results can be accepted with a high degree of confidence; and 4) administration of the instrument has been empirically evaluated on a research base of more than 125,000 cases (Consulting Psychologists Press, 1990). The Mandarin Chinese translation CPI consists of 294 items (i.e., of 480 items in the original CPI), provides true-false questions easily understood by normal individuals, and measures easily understood and socially desiable behavioral tendencies rather than pathological characteristics. The reliability and validity coefficients for each of the 18 scales have been established beyond the .01 level. Thus, the 294-item Mandarin Chinese translated CPI version was used for the current investigation.

AAHPER Youth Fitness Test

The first version of the youth fitness test was published in 1958. Seven test items were included in the original battery, with each test judged to be a valid component of fitness. The youth fitness test was developed by the AAHPER, a national organizations that has assumed responsibility for fitness test development. The test manual (AAHPER, 1976) contains test instructions, national norms for each item, and information on the award system for the test.

In the AAHPER Youth Fitness Test, three of the items measure predominantly performance-related physical fitness: the standing long jump, the 50-yard dash, and the shuttle run. The remaining three items, including pull-ups (males) or the flexed-arm hand (females), sit-ups, and a distance run primarily measure health-related physical fitness (Safrit, 1990).

AAHPER Youth Fitness Test Reliability and Validity

AAHPER test items and factors that appear to be inherent in these items include the following:

Item	Factor
Pull-ups or flexed-arm hang	Dynamic strength and endurance of arms and shoulders
Sit-ups	Trunk strength and endurance
Shuttle run	Speed and change of direction
Standing long jump	Explosive strength of legs
50-yard (45.73 m) dash	Explosive strength of legs and speed of lower extremities
600-yard (548.78 m) run-walk	Cardiorespiratory endurance

The reason for utilization of the AAHPER test is that it is acceptable from an administative standpoint. The test items appear frequently in various test batteries and they are included in the AAHPER youth fitness test manual (1976), which contains up-to-date percentile norm tables that were used for this study. Safrit (1981) has summarized the range of reliability coefficients for various test items as follows:

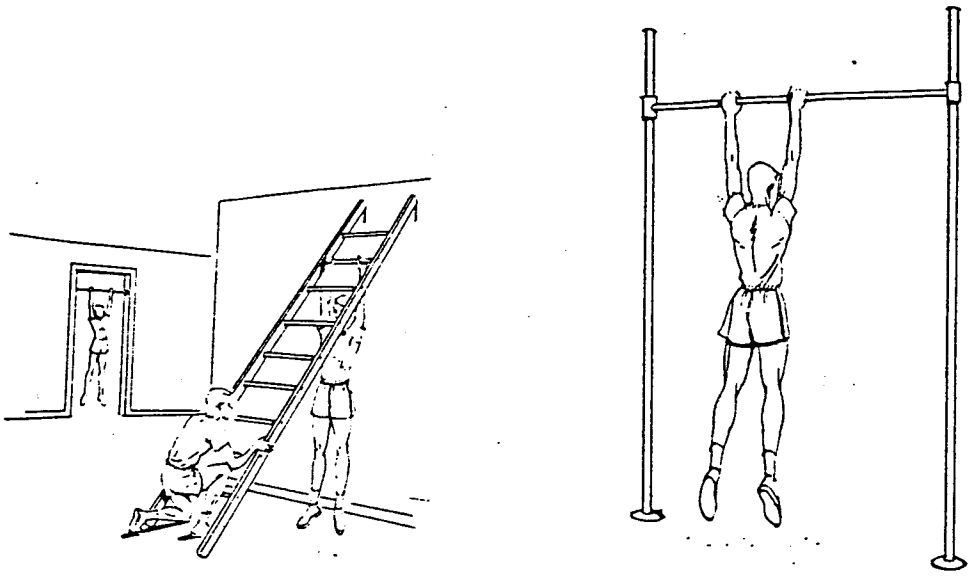
Pull-ups	.82 to .89
Flexed-arm hang	.74
Standing long jump	.83 to .98
Sit-ups	.57 to .68
Shuttle run	.68 to .75
50-yard dash	.83 to .94
600-yard run-walk	.65 to .92
12-minute run	.75 to .94

Ismail, Falls, and Macleod (1965) reported correlations ranging between .51 and .59 among the AAHPER composite scores and scores on physical fitness criterion test

batteries. From nine separate studies, Safrit (1981) reported higher validity coefficients, ranging from .65 to .90 (with most test items exceeding .80) for the 12-minute run (Appendix D).

AAHPER Youth Fitness Test Methods

1. Pull-ups (males), one trial allowed; equipment: metal or wooden bar roughly 1.5 inches in diameter (Figure 3.2):
   a. Using overhand grip (palms forward).
   b. Legs and arms fully extended, feet not in contact with the floor.
   c. From the hanging position, raise the body, chin over the bar, then lower the body to a full hang and regain the starting position.
   d. Repeated as many times as possible.
2. Sit-ups, one trial allowed; equipment: clean floor mat or dry turf, and stopwatch (Figure 3.3):
   a. Subject lies on his back with knees bent, feet on the floor or mat, heels not more than 12 inches from the buttocks.
   b. Angle at the knees should be less than 90 degrees.
   c. Subject places hands on back of neck, with fingers clasped, then places elbows squarely on the mat.
   d. Subject's feet are held by his partner to maintain contact with the floor.
   e. Subject tightens abdominal muscles or brings head and elbows forward as he curls up, finally touching the elbows to the knees.
   f. Action constitutes one sit-up.
   g. Subject returns to starting position with elbows on the floor before performing additional sit-ups.



Equipment options for Pull-Ups Test.

Starting position for Pull-Ups Test.

Figure 3.2 Equipment options and starting position for pull-ups test (Safrit, 1990).

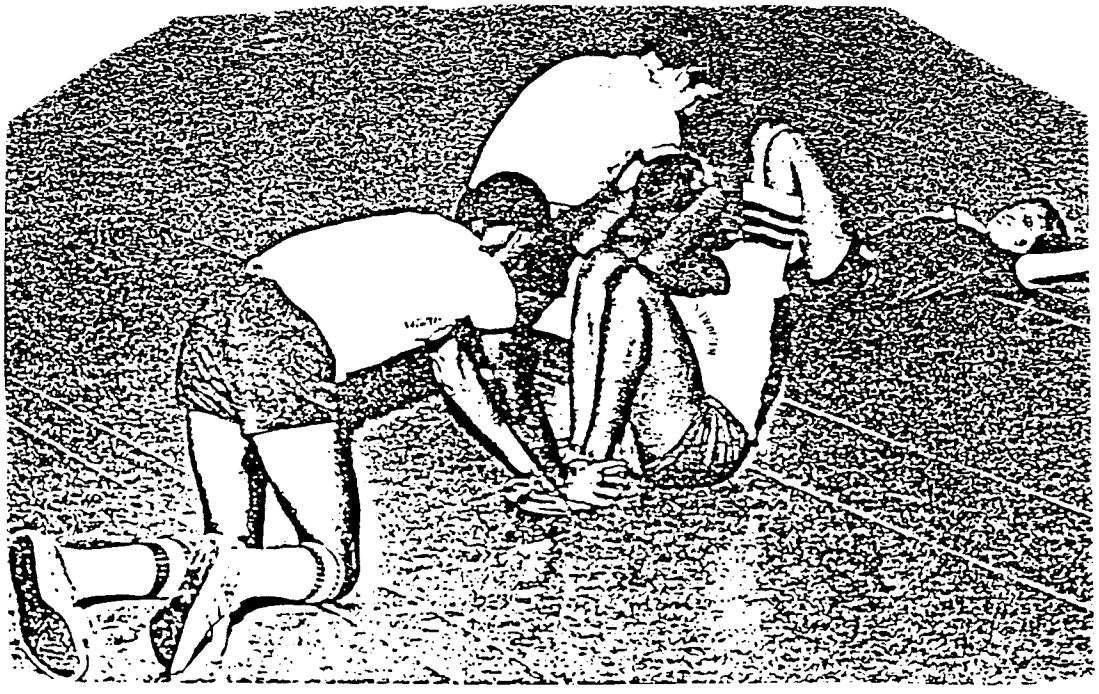


Figure 3.3 Sit-ups (flexed leg) (Safrit, 1990).

h. Timer gives the signal "ready, go!" Sit-up performance is started on the world "go!"; performance is stopped on the word "stop."

i. Score recorded as the number of correctly executed sit-ups performed in 60 seconds.

NOTE:

a. Keep fingers clasped behind the neck.

b. Do not push off the floor with the elbows.

c. Return to start position with elbows flat on the surface before performing next sit-up.

3. Shuttle-run test, two trial performed with rest between trials; equipment: two blocks of wood, 2 × 2 × 4 inches, and a stopwatch (Figure 3.4):

a. Place two parallel lines on the floor 30 feet apart.

b. Place two wooden blocks behind one of the lines.

c. Subjects starts from behind other line on the signal "go," at which time the subject runs back to start line and places the block on the floor beyond the line.

d. Subject returns to initial position, picks up other block and crosses finish line as rapidly as possible.

e. Timed exercise starting at signal "go" and ending as the subject crosses the start line.

4. Standing long jump test, three trials (Figure 3.5):

a. Subject stands behind restraining line, with feet several inches apart and toes pointed straight ahead.

b. To prepare for the jump, subject should swing arms backwark and bend the knees.

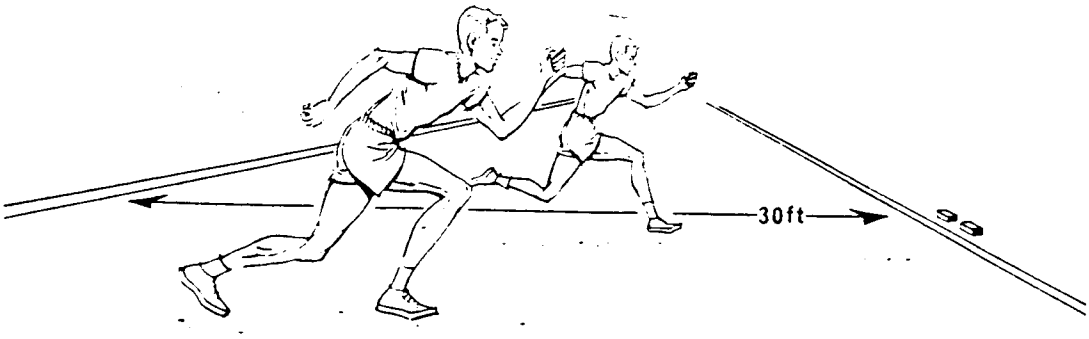


Figure 3.4 Shuttle run test (Saffrit, 1990).

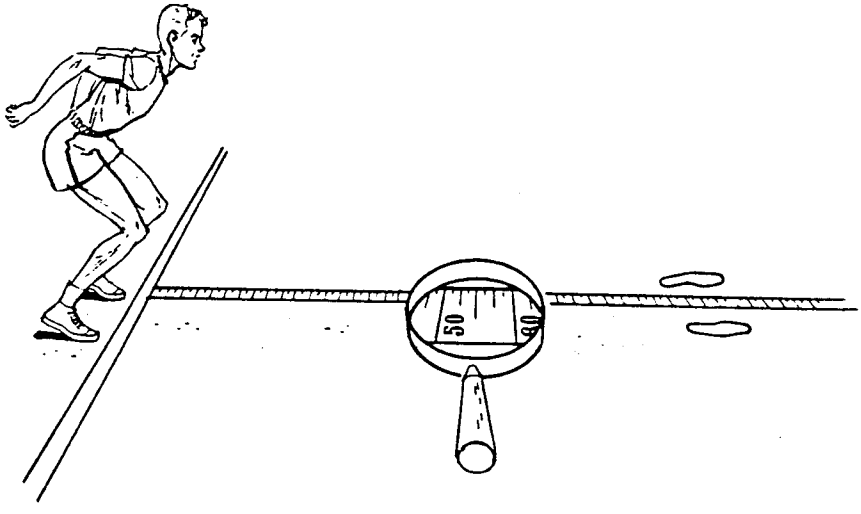


Figure 3.5 Standing long jump (Saffrit, 1990).

c. To execute jump, subject swings arms forward, extending the knees and jumping forward as far as possible.

d. Subject attempts to land on feet.

5. 50-yard dash, two trials (Figure 3.6):

a. Subject standing behind restraining line, ready at commands "are you ready," "go"!

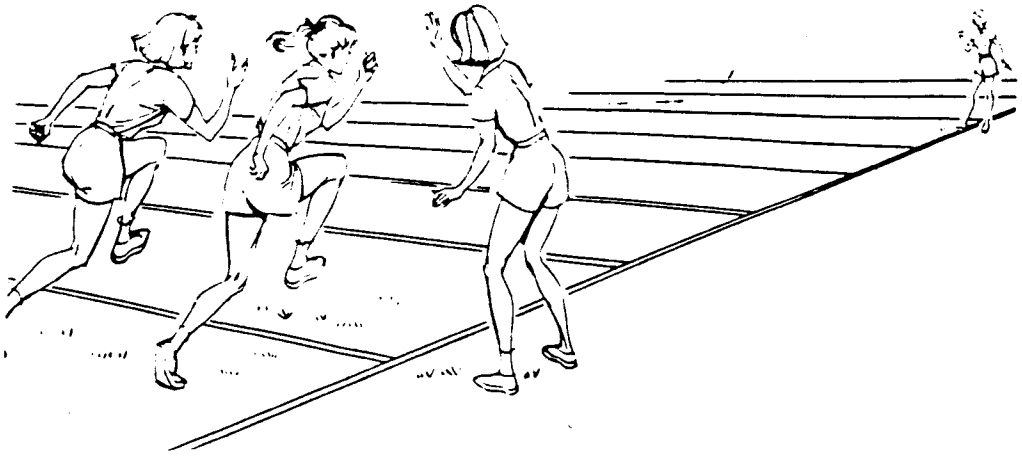


Figure 3.6 50-yard dash (Saffrit, 1990).

b. Timed event begining with last signal and downward sweep of the arm.

c. Subject runs as fast as possible without slowing until crossing the finish line.

d. Timing begins as starter's arm reaches the downward position and is stopped as finish line is crossed.

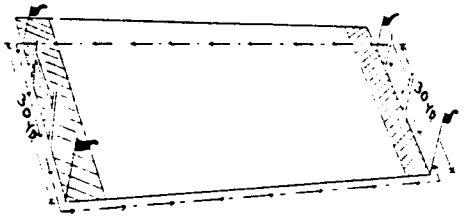
6. 600-yard run-walk test, one trial (Figure 3.7):

a. Subject to use standing start at the signals "ready" and "go"!

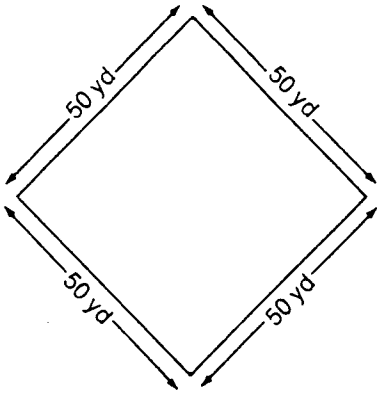
b. Timed event starting on command "go"!

c. Subjects begins to run and continues running as fast as possible until crossing the finish line.

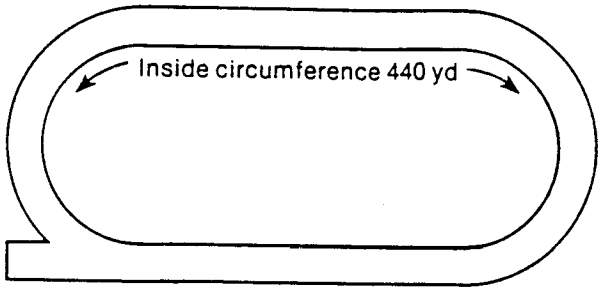
d. Subjects are not encouraged to walk.



Using football field for 600-Yard Run Test.
From Youth Fitness Test Manual.



Using any open area for 600-Yard Run Test.
From Youth Fitness Test Manual.



Using inside track for 600-Yard Run Test.
From Youth Fitness Test Manual.

Figure 3.7 Option surfaces for 600-yard run (Saffrit, 1990).

Ponderal Index Test (PI)

The PI is the product of height divided by the cube root of weight, or the maximal achieved mass over a given surface area. A nomogram, as indicated in Figure 3.8, was used to calculate the PI: the higher the PI, the thinner or more ectomorphic the individual. Procedures for the measurement of PI are described as follows:

1. For height measurement, the subject removes shoes and stands with back against the calibration on a stadiometer, heels, hips, shoulders, and head touching the backboard. The head should be erect with the chin slightly tucked in. The Frankfort plane (line from the outer, lower corner of the

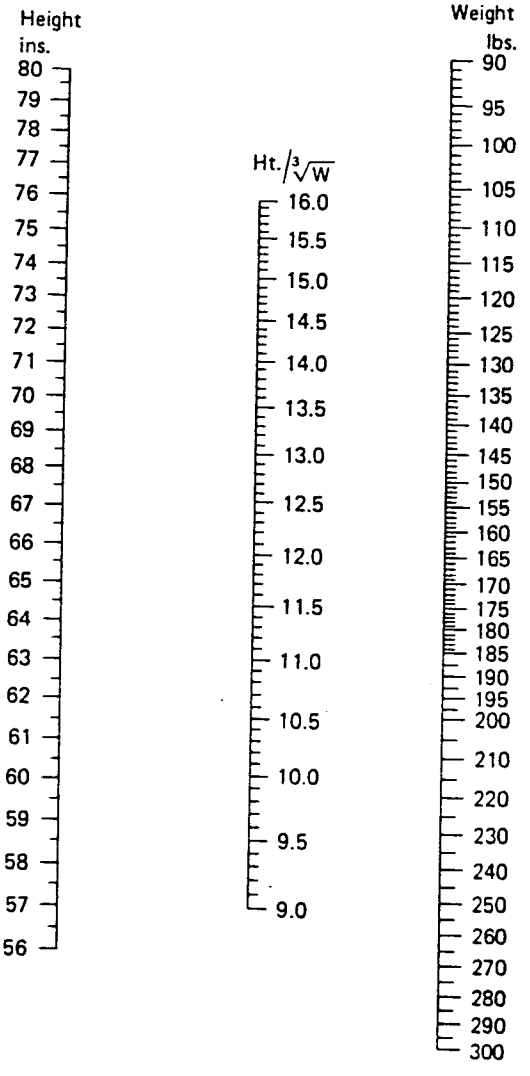


Figure 3.8 Nomogram for measurement of PI.

eye socket to the little prominence at the front of the lower earlobe) should be horizontal. Subject should stand as tall as possible.

2. A square is placed against the calibration on the backboard above the subject's head and is brought down until it fits firmly against the top of the subject's head. The square must fit both the backboard and the head and must be horizontal, not tilted. The reading is taken at the lower edge of the square. Record height to nearest 1/4 inch (Lockhart, 1959).

3. To record weight, subject should be weighed without shoes, coats, sweaters, or other heavy garments.
4. The subject stands in a steady position on the center of the weight scale. Record to the nearest half pound.

To use the nomogram, a ruler is placed between the individual's height in inches, given in the left-hand column, and the individual's weight in pounds, given in the right-hand column (Fig. 3.8). The PI is read at the point where the ruler crosses the center column (Clarke, 1976).

Administration Procedures

For this investigation, three basic procedures were followed:

1) Obtain cooperation and permission to administer testing procedures from appropriate officials of each of the selected schools;
2) Send the required consent forms to selected subjects for signatures; and
3) Administer tests in accordance with proper procedures and the application of principles of testing objectivity.

The first step was conducted in two stages. Initial contacts were established at a joint meeting with coaches and physical educators from the selected schools during the conduct of a nation-wide high school athletic competition held at Taipei, Taiwan. At this meeting the investigator explained the purpose of the test, stating that the data collected were to be used for research for a doctoral dissertation concerned with communications between coaches, physical educators, and athletes as well as nonathletes, from the perspective of the enhancement of common knowledge about the physical fitness conditions of junior high school student. Testing procedures and methods were reviewed and discussed, including a period of instruction and test demonstration. Sub-

sequently, the superintendents of the selected schools were contacted by telephone to brief them on study purposes and procedures and to obtain permission to conduct the sampling procedure. To obtain full cooperation at each school, a coodination meeting was arranged by the investigator with school superintendents and counselors, physical educators, and coaches of the appropriate sports teams. At this meeting, detailed information was provided about the purposes and procedures for the study, assuring concerned school officials that the testing procedures would reflect concern for the physical and mental health of the subjects. The times and settings for the conduct of the sampling procedures were arranged at this meeting. In turn, physical education instructors and coaches of the appropriate teams were asked to provide information on the details of the study requirements to selected student subjects.

The second step was a series of follow-up meetings with physical educators and coaches at the selected schools involved in the administration of the testing procedures. At this meeting, subject consent forms were distributed (Appendix E). Staff members were asked to obtain necessary consentual agreements to engage in further study participation from subjects as well as their parents. In addition, at each school meeting, physical education instructors and coaches were asked to introduce the investigator to school counselors. The purposes of the CPI testing procedures were reviewed and discussed, presented from the perspective of broadening comprehensive knowledge of the degree to which personality characteristics relate to human behavioral patterns in the context of selected physical activities as well as from the enhancement of subject knowledge of self as well as others. Written instructions for the conduct of the respective test procedures (i.e., the CPI and the AAHPER Youth Fitness Test) were distributed at these meetings (Appendices F and G).

The third step was to administer the testing procedures at each school, subject to the awareness that any procedure in which individuals are subject to high levels of

physical or mental performance requires appropriate consideration for the safety and health of the subjects. During the performance of the AAHPER fitness test items, neuromuscular and physiological stress, in the form of soreness, strains, or injuries, was a possibility. During the administration of the CPI, there was a similar risk of long-term psychological stress. Stress may be defined as a substantial imbalance between environmental demands and individual responses; strains may be defined as injuries to a part of the body as a result of physical effort or overexertion.

Certain concepts were recognized in order to minimize the occurrence of stresses and strains during the testing process:

1) Examiners' instructions to subjects encompassed recognition that individuals react differently to stressful situations. The examiners were encouraged to help subjects achieve a realistic approach to physical activities that would allow them to minimize the occurrence of stresses or strains.
2) Examiners were encouraged to demonstrate a genuine interest in helping subjects solve their problems, providing them with the impression that he/she was directly concerned with their health and personal welfare.
3) Examiners were instructed to tell subjects to avoid comparisons with each other, to simply do their personal best and accept the consequences of their efforts.
4) Those relaxation measures necessary for the achievement of top performances in demanding physical tests were demonstrated to the subjects. At the minimum, subjects were instructed to take deep breaths, then to expell the air from their lungs to relax prior to testing. In this manner, the reduction of tension resulted in the conservation of energy, allowing physical tasks to be completed smoothly and efficiently.

To minimize personal hazards, a three-step procedure for each subject was applied. First, prior to the initiation of testing, a short warm-up exercise period (based upon a nationwide exercise program regulated by the Ministry of Education) was conducted as a safety measure and also to enhance testing performance. Empirically-based fitness testing was accompanied by excitement and enthusiasm on the part of most students. In general, teenagers enjoy self-testing activities and the challenge presented by most physical tests and were naturally stimulated and eager to excel.

The second step was taken in the interest of safety. Test rotation stations were arranged to minimize subject fatigue, ordering them from the least to the most strenuous in the order conducted.

The final step was that a medical examination preceded administration of all testing. At each school, medical examinations of all students were conducted at the beginning of each school year, and these examinations constituted a means to screen the subjects. It is suggested that this three-step process provided adequate protection and sufficient safeguards for the hazards of pulled muscles and strains or from anxiety induced by personality testing procedures.

For administration of the CPI, school counselors at each of the selected schools were asked to administer the instrument. Prior to administration of the instrument, these counselors were given training sessions, thoroughly acquainting them with the CPI manual procedures in order to assure testing consistency and standardized procedures. In addition, a 294-item Chinese-language version of the CPI was used, a shorter test than the 480 items included in the original instrument. Thus, the possibility that the subjects would experience undue anxiety or stress was minimized.

For AAHPER fitness testing, the investigator required assistance from coaches and physical educators at each of the selected schools. Dependent upon the number of subjects from individual schools, from three to five assistants were required to help in

the testing process). Each assistant was required to attend a training session to assure standardization of procedures during the administration of the physical fitness tests. These sessions served to acquaint these assistants with testing procedures, the techniques for adminstration of each of the test items, demonstration techniques, and scoring methods.

To minimize measurement errors among different examiners in the use of the above testing procedures, two of the investigator's colleagues from the Department of Physical Education, National Taiwan Normal University, professionals in physical education instruction, were included as AAHPER pre-examiners. Each measured 30 subjects simultaneously and independently prior to the formal testing process. These pretest subjects reflected physical characteristics similar to those of the subjects used in the regular testing procedures. A Pearson product-moment coefficient of correlation was determined for the pre-examination tests for each AAHPER measure to assure overall agreement among different examiners for each of the 30 subjects.

CPI Test Procedures

1. At the direction of the investigator and counselors from the selected schools, subjects at each of the schools were administered the CPI in the classrooms in which they regularly met.
2. Prior to administration of the CPI, the examiners explained testing purposes and procedures, how long the tests would take (i.e., about 45 minutes), and instructed subjects to write their assigned numbers on their answer sheets.
3. The investigator assured subjects that their anonymity would be protected at all times, and that no names would appear in published or unpublished references to this study or in the computer files generated in the course of

the investigation. The use of Arabic numerals in place of individual names on the answer sheets assured maintenance of anonymity . For example, subjects of aboriginal Taiwanese origin were assigned numbers in a series beginning at 001, while subjects of ethnic Chinese origin were assigned numbers in a series beginning at 501.

4. To assure the accuracy of statistical analysis procedures, each subject answer sheet number was in correspondence with the AAHPER and PI individual score card numbers.
5. The examiners read the instructions aloud, set a formal tone, and provided the subjects with standardized directions. For example, questions regarding explanations of a concept or interpretation of a test item were generally dealt with by encouraging the subjects to exercise personal judgement. If an item was particularly troublesome, the subject was told to leave a blank for that specific item.
6. When the subjects had completed the questionnaires, the answer sheets were collected by the examiner as the subjects left the test area.

Youth Fitness Test and Body Mass Measurement Procedures

1. For fitness testing, the investigator prepared metal or wooden bars and two blocks of wood ($2 \times 2 \times 4$ inches), and provided an appropriate number of stopwatches and mats, measuring tapes, pencils and score-cards, and weight and height scales.
2. Each subject was administered the PI and the AAHPER over a period of two days in the school gymnasium or on the track and field court.

3. Pull-ups, sit-ups, and the shuttle run were conducted on the first day, with the standing long jump, the 50-yard dash, and the 600-yard run-walk conducted on the second day.
4. The school coaches or physical educators and the investigator administered the measurements of body mass and the six physical fitness tests.
5. Before administration of the PI and the AAHPER tests, the instructors explained each item and provided a demonstration to all subjects to stir interest and enthusiasm, then administered a short warm-up period of exercise (based upon exercises prescribed by the Ministry of Education).
6. The first day, subjects were rotated in three groups and testing included pull-ups, sit-ups, and the shuttle-run; each exercise group required 15—20 minutes for a total time of approximately one hour. For the second day, subjects were rotated in two groups, testing for the standing long jump and the 50-yard run. All subjects then performed the 600-yard run-walk; each exercise group required 15 minutes for a total of approximately one hour.
7. During testing, the examiners reminded subjects of correct techniques and safety rules.
8. During rest periods in the administration of the Youth Fitness Test, the investigator and school personnel conducted PI measurements to record subjects' heights and weights.
9. The examiners collected all individual scores cards as the subjects left the testing area.

Statistical Analysis

Following data collection, the ANOVA, canonical correlation (race and athletic status were the independent variables for the 18 CPI scales, whereas the AAHPER tests and the PI measurements were the dependent variables), and correlation (the 18 CPI scales were the first set of variables, whereas the AAHPER tests and the PI measurements constituted the second set of variables) statistical analyses were performed, using the *Statistical Package for the Social Sciences-4* (1990) for the IBM-compatible computer. The statistical analyses were completed at the Institute of Physical Education of the National Taiwan Normal University in the Republic of China. The methods for statistical analysis consisted of two steps, as indicated in the following two sections:

Primary Hypotheses

An ANOVA was performed on the test scores for race (ethnic Chinese and aboriginal Taiwanese) and athletic status (individual sport, team sport, or nonathletes), comparing standardized scores for each of the personality traits, the tests for physical fitness, and the PI measures to determine if significant differences existed.

A 2×3 (race $\times$ athletic status) ANOVA was performed for each of the 18 CPI scales, the six physical fitness measures, and the PI to test the null hypotheses Ho_1—Ho_5. In the event of significant interaction(s), the simple main effects of the interaction(s) were calculated to determine the locus of the interactive condition(s). The contrast coefficients for the independent variables for race, ethnic Chinese vs. aboriginal Taiwanese, were -1, +1, respectively; whereas the contrast coefficients for the independent variables for athletic status, including individual sport, team sport, or nonathlete, were +1, +1, -2. Comparisons for individuals who were team sport ath-

letes were +1, -1, and 0. Since the number of levels for these independent variables was 3, the df and the number of contrasts were each 2. The contrast coefficients for the interactions, athletic status by race, resulted in the matrices shown in Table 3.5.

Table 3.5 Contrast coefficients matrices.

Race	Athletic status: Individual sport	Team sport	Nonathletes	
Contrast matrix 1				
Ethnic				
Chinese	-1	-1	+2	-1
Aboriginal				
Taiwanese	+1	+1	-2	+1
	+1	+1	-2	
Contrast matrix 2				
Ethnic				
Chinese	-1	+1	0	-1
Aboriginal				
Taiwanese	+1	-1	0	+1
	+1	-1	0	

Secondary Hypotheses

The secondary purpose of this study was the determination of significant relationships among personality traits, physical fitness, and body mass. Pearson Product-Moment coefficients of correlation were calculated to provide a correlation coefficients matrix for relationships among these measures and to test for significance at $p < .05$ (from Table 3.2, the 18 CPI scales were the first set of variables, while the AAHPER test results and the PI measures constituted the second set of variables). To further investigate these relationships, canonical correlation analysis was used to determine structured correlations between personality traits and fitness parameters for race and athletic status.

The canonical correlation procedures allowed the analysis of relationships between any two sets of variables. This procedure identified the linear combinations of variables in one set that were most highly correlated with the linear combinations of the second set. In many cases, the first set represented independent variables and the second set represented dependent variables (STSC, 1989). Canonical correlation was obtained via the MANOVA subprogram of the *SPSS-4* computer program (SPSS, 1990).

CHAPTER 4

RESULTS AND DISCUSSION

Results

The purpose of the current investigation was to compare relationships among 18 CPI personality trait scales, six AAHPER tests of physical fitness, and measurements of body mass (PI) between ethnic Chinese and aboriginal Taiwanese junior high school student populations, including individual and team sport athlete and nonathlete subjects. The following statistical procedures were employed:

1) Computation of the means and standard deviations for the independent variables, race and athletic status;
2) A 2 × 3 two-way ANOVA for the test scores of each dependent measure, to determine if differences exist among the independent variables, race and athletic status;
3) A Pearson product-moment correlation to assess relationships among measures for personality traits, physical fitness, and body mass for each ethnic group; and
4) A canonical correlation analysis to assess structured relationships among measures for personality traits, physical fitness, and body mass for subjects from each ethnic group.

Results for the above analyses are presented in the following sections: a) summaries of subject scores by ethnic and athletic status; b) differences among the dependent and independent variables for the principal and interaction hypotheses;

c) correlation coefficients for dependent variables among ethnic Chinese; d) correlation coefficients for dependent variables among aboriginal Taiwanese; and e) Canonical correlation analysis for the dependent variables for subjects from each racial group.

Subject Score Summaries

Data for computation of the results was obtained for 839 subjects for the CPI, the AAHPER fitness tests, and PI (body mass) measures. The numbers of subjects by race (ethnic Chinese and aboriginal Taiwanese) and athletic status (individual and team sport athletes, nonathletes) were presented in Chapter 3 (Table 3.3). Mean scores, in the range 0 (zero) to 30, were calculated for each of the variables from raw scores tabulated for each of the 18 CPI personality trait scales, six AAHPER physical fitness tests, and PI measures of body mass. Summary comparisons of the means and standard deviations for each variable are included in Tables 4.1—4.3.

Differences Among Variables for the Principal and Interaction Hypotheses

The research hypotheses include the principal hypotheses Ho_1 through Ho_3 and the interaction hypotheses, Ho_4 and Ho_5.

Ho_1 There are no significant differences between ethnic Chinese and aboriginal Taiwanese junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_2 There are no significant differences between subjects who are athletes and those who are nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Table 4.1 Summary of means and standard deviations for personality traits, physical fitness, and body mass between ethnic Chinese and aboriginal Taiwanese by athletic status.

	Ethnic Chinese				Aboriginal Taiwanese			
	Nonathletes		Athletes		Nonathletes		Athletes	
Variables	M	SD	M	SD	M	SD	M	SD
Do	11.89	5.15	12.08	4.49	12.57	4.21	12.99	4.00
Cs	10.48	4.87	10.88	4.37	10.96	4.33	11.98	4.17
Sy	19.68	5.78	19.90	5.28	18.61	4.70	20.00	4.78
Sp	14.93	5.47	15.36	4.72	14.40	4.21	15.36	4.24
Sa	12.30	4.61	12.14	3.73	11.90	3.69	12.44	3.54
To	20.88	7.77	21.60	7.78	20.43	6.45	21.41	6.83
Re	23.95	5.17	24.10	5.32	22.35	5.04	22.99	4.91
So	18.62	4.64	18.55	4.60	16.97	4.55	17.65	4.36
Sc	28.08	9.43	29.35	8.80	28.60	7.85	29.25	7.98
Gi	22.08	8.50	23.44	8.19	23.31	7.22	24.53	7.43
Cm	20.95	3.70	19.70	3.65	18.35	3.88	18.59	3.91
Wb	25.00	7.18	25.17	6.75	23.59	6.11	24.55	6.19
Ac	21.13	6.58	21.76	6.64	20.98	6.16	21.83	6.19
Ai	11.37	3.54	11.60	3.72	10.48	3.40	11.33	3.46
Ie	18.61	5.44	18.72	5.44	16.86	4.82	18.08	4.77
Py	11.31	4.31	11.68	4.42	11.69	3.81	12.02	3.73
Fx	10.02	3.67	10.01	4.59	9.88	3.40	9.99	3.86
Fe	12.56	2.69	12.79	2.73	12.36	2.99	12.39	2.58
Pull-ups	3.08	3.60	4.92	3.49	5.45	3.59	7.46	4.76
Sit-ups	34.35	9.11	46.48	9.09	35.99	8.35	40.98	8.70
Shuttle run	10.19	0.70	9.74	0.90	10.38	0.82	9.71	0.65
Long jump	2.06	0.25	2.25	0.25	2.05	0.28	2.21	0.24
50-yard run	7.34	0.64	7.06	0.59	7.28	0.65	6.77	0.60
600-yard run	131.35	17.55	116.48	15.57	130.75	18.37	120.46	18.98
PI	13.22	0.64	13.05	0.55	13.10	0.49	13.05	0.53

Notes: Variables as defined in Chapter 3; M = mean; SD = standard deviation.

Table 4.2 Summary of means and standard deviations for personality traits, physical fitness, and body mass between ethnic Chinese and aboriginal Taiwanese for individual and team sport athletes.

	Ethnic Chinese				Aboriginal Taiwanese			
	Individual		Team		Individual		Team	
Variables	M	SD	M	SD	M	SD	M	SD
Do	11.76	4.18	12.48	4.84	12.64	4.00	13.39	3.98
Cs	10.75	4.46	11.04	4.28	11.73	4.11	12.26	4.23
Sy	19.36	5.20	20.56	5.34	19.73	4.96	20.31	4.58
Sp	15.19	4.52	15.57	4.99	15.05	4.49	15.70	3.94
Sa	11.73	3.51	12.65	3.94	12.14	3.60	12.77	3.46
To	21.69	8.11	21.49	7.40	20.77	6.62	22.11	7.01
Re	24.03	5.65	24.19	4.92	23.07	4.34	22.90	5.49
So	18.55	4.38	18.55	4.88	18.00	3.91	17.26	4.80
Sc	29.36	9.28	29.34	8.23	28.78	7.80	29.76	8.18
Gi	23.06	8.62	23.91	7.65	24.08	7.17	25.03	7.71
Cm	19.81	3.39	19.56	3.98	19.31	3.62	17.79	4.07
Wb	25.01	6.94	25.38	6.55	24.39	5.94	24.74	6.47
Ac	21.28	7.07	22.35	6.05	21.71	5.58	21.96	6.83
Ai	11.59	4.01	11.61	3.35	11.27	3.37	11.40	3.58
Ie	18.38	5.86	19.14	4.86	17.95	4.63	18.22	4.95
Py	11.33	4.47	12.12	4.35	11.71	3.94	12.37	3.47
Fx	10.27	4.85	9.69	4.26	9.56	3.88	10.46	3.80
Fe	12.57	2.82	13.05	2.60	12.26	2.63	12.53	2.53
Pull-ups	5.34	4.03	4.40	2.61	6.90	4.88	8.08	4.56
Sit-ups	42.67	8.81	51.23	6.99	39.20	9.43	42.95	7.37
Shuttle run	9.73	0.54	9.75	1.22	9.74	0.73	9.68	0.54
Long jump	2.20	0.23	2.33	0.26	2.15	0.26	2.26	0.19
50-yard run	7.14	0.68	6.97	0.45	6.75	0.65	6.80	0.53
600-yard run	118.39	18.26	114.11	11.03	123.93	20.20	116.80	16.78
PI	13.02	0.55	13.10	0.56	12.98	0.53	13.13	0.54

Notes: Variables as defined in Chapter 3; M = mean; SD = standard deviation.

Table 4.3 Summary of means and standard deviations for personality traits, physical fitness, and body mass between ethnic Chinese and aboriginal Taiwanese.

Variables	Ethnic Chinese		Aboriginal Taiwanese	
	M	SD	M	SD
Do	12.02	4.89	12.80	4.10
Cs	10.64	4.67	11.52	4.27
Sy	19.77	5.58	19.37	4.79
Sp	15.10	5.18	14.92	4.25
Sa	12.23	4.27	12.20	3.62
To	21.17	7.77	20.96	6.66
Re	24.01	5.24	22.70	4.97
So	18.59	4.62	17.34	4.45
Sc	28.60	9.19	28.95	7.92
Gi	22.63	8.39	23.97	7.35
Cm	20.44	3.73	18.48	3.89
Wb	25.07	7.00	24.11	6.16
Ac	21.38	6.60	21.44	6.19
Ai	11.46	3.61	10.94	3.54
Ie	18.65	5.43	17.52	4.83
Py	11.46	4.35	11.87	3.77
Fx	10.02	4.07	9.94	3.65
Fe	12.65	2.70	12.38	2.77
Pull-ups	3.83	3.66	6.54	4.37
Sit-ups	39.27	10.88	38.70	8.89
Shuttle run	10.01	0.82	10.02	0.80
Long jump	2.14	0.27	2.13	0.27
50-yard run	7.23	0.63	7.01	0.67
600-yard run	125.31	18.28	125.17	19.37
PI	13.15	0.61	13.07	0.51

Notes: Variables as defined in Chapter 3; M = mean; SD = standard deviation.

Ho_3 There are no significant differences between subjects practicing individual sports and those practicing teams sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_4 There are no significant interactions between ethnic Chinese and aboriginal Taiwanese athletes and nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

Ho_5 There are no significant interactions between ethnic Chinese and aboriginal Taiwanese in individual and team sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass.

CPI Dominance (Do) Scale

From Tables 4.4 and 4.5, the null hypotheses Ho_1—Ho_5 were not rejected at the .01 level of significance.

Table 4.4 Mean scores, CPI Dominance scale for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	11.98 (5.15)	12.08 (4.49)		
		11.76 (4.18)	12.48 (4.84)	12.02 (4.89)
Aboriginal Taiwanese	12.57 (4.21)	12.99 (4.00)		
		12.64 (4.00)	13.39 (3.98)	12.80 (4.10)
Totals:	12.23 (4.78)	12.59 (4.24)		
		12.24 (4.10)	13.01 (4.37)	12.40 (4.53)

Note: Standard deviations are indicated in parentheses.

Table 4.5 Significance of differences among the independent and dependent variables for the CPI Dominance scale.

Source	SS	df	MS	F	p
Race	110.85	1	110.85	5.43	.020
Nonathlete vs. athlete	14.00	1	14.00	.69	.408
Individual vs. team sport	52.40	1	52.40	2.57	.110
Race by nonathlete-athlete	4.72	1	4.72	.23	.631
Race by individual-team sport	.02	1	.02	.00	.973
Error	17004.51	833	20.41		

CPI Capacity for Status (Cs) Scale

For this personality trait scale, the F-value ($F = 7.14$, $p = .0087$) shows that the score for the aboriginal Taiwanese was significantly higher at the .01 level of confidence than for the ethnic Chinese subjects (Tables 4.6—4.7). Therefore, the null hypothesis Ho_1 was rejected, while hypotheses Ho_2—Ho_5 were not rejected at the .01 level of significance.

CPI Sociability (Sy) Scale

From Tables 4.8 and 4.9 for this personality trait scale, the null hypotheses Ho_1—Ho_5 were not rejected at the .01 level of significance.

Table 4.6 Mean scores, CPI Capacity for Status scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	10.84 (4.87)	10.88 (4.37)		
		10.75 (4.46	11.04 (4.28)	10.64 (4.67
Aboriginal Taiwanese	10.96 (4.33)	11.98 (4.17)		
		11.73 (4.11)	12.26 (4.23)	11.52 (4.27)
Totals:	10.69 (4.64)	11.50 (4.29)		
		11.29 (4.29)	11.75 (4.29)	11.07 (4.49)

Note: Standard deviations are indicated in parentheses.

Table 4.7 Significance of differences among the independent and dependent variables for the CPI Capacity for Status scale.

Source	SS	df	MS	F	p
Race	142.57	1	142.57	7.14	.008*
Nonathlete vs. athlete	102.06	1	102.06	5.111	.024
Individual vs. team sport	16.45	1	16.45	.82	.364
Race by nonathlete-athlete	19.13	1	19.13	.96	.328
Race by individual-team sport	1.47	1	1.47	.07	.786
Error	16626.72	833	19.96		

Note: * = $p < .01$.

Table 4.8 Mean scores, CPI Sociability scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	19.68 (5.78)	19.90 (5.28)		
		19.36 (5.20)	20.56 (5.34))	19.77 (5.58)
Aboriginal Taiwanese	18.61 (4.70	20.00 (4.78)		
		19.73 (4.96)	20.31 (4.58)	19.37 (4.79)
Totals:	19.22 (5.36)	19.69 (5.00)		
		19.57 (5.06)	20.42 (4.90)	19.57 (5.20)

Note: Standard deviations are indicated in parentheses.

Table 4.9. Significance of differences among the independent and dependent variables for the CPI Sociability scale.

Source	SS	df	MS	F	p
Race	17.86	1	17.86	.67	.415
Nonathlete vs. athlete	134.83	1	134.83	5.02	.025
Individual vs. team sport	76.38	1	76.38	2.85	.092
Race by nonathlete-athlete	68.08	1	68.08	2.54	.112
Race by individual-team sport	9.05	1	9.05	.34	.562
Error	22353.72	833	26.84		

CPI Social Presence (Sp) Scale

From Tables 4.10 and 4.11 for this personality trait scale, the null hypotheses Ho_1—Ho_5 were not rejected at the .01 level of significane.

Table 4.10 Mean scores, CPI Social Presence scale for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	14.93 (5.47)	15.36 (4.72)		
		15.19 (4.52)	15.57 (4.99)	15.10 (5.18)
Aboriginal Taiwanese	14.40 (4.21)	15.36 (4.24)		
		15.05 (4.49)	15.70 (3.94)	14.92 (4.25)
Totals:	14.70 (4.97)	15.36 (4.45)		
		15.11 (4.49)	15.64 (4.40)	15.01 (4.74)

Note: Standard deviations are indicated in parentheses.

Table 4.11 Significance of differences among the independent and dependent variables for the CPI Social Presence scale.

Source	SS	df	MS	F	p
Race	5.81	1	5.81	.26	.611
Nonathlete vs. athlete	98.28	1	98.28	4.38	.037
Individual vs. team sport	25.74	1	25.74	1.15	.284
Race by nonathlete-athlete	13.65	1	13.65	.61	.436
Race by individual-team sport	1.68	1	1.68	.07	.784
Error	18675.47	833	22.42		

CPI Self-Acceptance (Sa) Scale

Significant results were not obtained for this personality trait scale (Tables 4.12 and 4.13). Therefore, the principal and the interaction hypotheses were not rejected.

Table 4.12 Mean scores, CPI Self-Acceptance scale for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	12.30 (4.61)	12.14 (3.73)		
		11.73 (3.51)	12.65 (3.94)	12.23 (4.27)
Aboriginal Taiwanese	11.90 (3.69)	12.44 (3.54)		
		12.14 (3.60)	12.77 (3.46)	12.20 (3.62)
Totals:	12.13 (4.24)	12.31 (3.62)		
		11.96 (3.56)	12.72 (3.66)	12.21 (3.96)

Note: Standard deviations are indicated in parentheses.

Table 4.13 Significance of differences among the independent and dependent variables for the CPI Self-Acceptance scale.

Source	SS	df	MS	F	p
Race	.43	1	.43	.03	.868
Nonathlete vs. athlete	7.43	1	7.43	.47	.491
Individual vs. team sport	58.13	1	58.13	3.71	.054
Race by nonathlete-athlete	23.28	1	23.28	1.49	.223
Race by individual-team sport	2.05	1	2.05	.13	.718
Error	13050.66	833	15.67		

CPI Tolerance (To) Scale

Significant results were not obtained for this personality trait scale (Tables 4.14 and 4.15). Therefore, the principal and the interaction hypotheses were not rejected.

Table 4.14 Mean scores, CPI Tolerance scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	20.88 (7.77)	21.60 (7.78)		
		21.69 (8.11)	21.49 (7.40)	21.17 (7.77)
Aboriginal Taiwanese	20.43 (6.45)	21.41 (6.83)		
		20.77 (6.62)	21.11 (7.01)	20.96 (6.66)
Totals:	20.69 (7.23)	21.49 (7.25)		
		21.18 (7.32)	21.85 (7.16)	21.07 (7.25)

Note: Standard deviations are indicated in parentheses.

Table 4.15 Significance of differences among the independent and dependent variables for the CPI Tolerance scale.

Source	SS	df	MS	F	p
Race	10.95	1	10.95	.21	.648
Nonathlete vs. athlete	142.77	1	142.77	2.72	.100
Individual vs. team sport	31.90	1	31.90	.61	.436
Race by nonathlete-athlete	2.80	1	2.80	.05	.817
Race by individual-team sport	57.11	1	57.11	1.09	.297
Error	43734.20	833	52.50		

CPI Responsibility (Re) Scale

The subjects who were ethnic Chinese score significantly higher than the aboriginal Taiwanese subjects at the .001 level of significance, whereas there were no other significant differences (Tables 4.16 and 4.17). Therefore, the null hypothesis Ho_1 was rejected and Ho_2—Ho_5 were not rejected.

Table 4.16 Mean scores, CPI Responsibility scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	23.95 (5.17)	24.10 (5.32) 24.03 (5.65)	24.19 (4.92)	24.01 (5.24)
Aboriginal Taiwanese	22.35 (5.04)	22.99 (4.91) 23.07 (4.34)	22.90 (5.49)	22.70 (4.97)
Totals:	23.27 (5.18)	23.47 (5.11) 23.50 (4.98)	23.44 (5.28)	23.36 (5.15)

Note: Standard deviations are indicated in parentheses.

Table 4.17 Significance of differences among the independent and dependent variables for the CPI Responsibility scale.

Source	SS	df	MS	F	p
Race	294.13	1	294.13	11.24	.001*
Nonathlete vs. athlete	32.20	1	32.20	1.23	.268
Individual vs. team sport	.00	1	.00	.00	.994
Race by nonathlete-athlete	11.69	1	11.69	.45	.504
Race by individual-team sport	2.72	1	2.72	.10	.747
Error	21789.88	833	26.16		

Note: * = $p < .001$.

CPI Socialization (So) Scale

The subjects who were ethnic Chinese score significantly higher than the aboriginal Taiwanese subjects at the .001 level of significance, whereas there were no other significant differences at the .05 level of confidence (Tables 4.16 and 4.17). Therefore, the null hypothesis Ho_1 was rejected and Ho_2—Ho_5 were not rejected.

Table 4.18 Mean scores, CPI Socialization scale for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	18.62 (4.64)	18.55 (4.60)		
		18.55 (4.38)	18.88 (4.88)	18.59 (4.62)
Aboriginal Taiwanese	16.97 (4.55)	17.65 (4.36)		
		18.99 (3.91)	17.25 (4.80)	17.34 (4.45)
Totals:	17.92 (4.67)	18.04 (4.48)		
		18.25 (4.13)	17.80 (4.86)	17.98 (4.58)

Note: Standard deviations are indicated in parentheses.

Table 4.19 Significance of differences among the independent and dependent variables for the CPI Socialization scale.

Source	SS	df	MS	F	p
Race	240.14	1	240.14	11.65	.001*
Nonathlete vs. athlete	19.37	1	19.37	.94	.333
Individual vs. team sport	13.34	1	13.34	.65	.421
Race by nonathlete-athlete	30.05	1	30.05	1.46	.228
Race by individual-team sport	12.87	1	12.87	.62	.43
Error	17163.63	833	20.60		

Note: * = $p < .001$.

CPI Self-Control (Sc) Scale

For this personality trait scale, there were no significant differences for any source of variation (Tables 4.20 and 4.21). Therefore, the null hypotheses Ho_1—Ho_5 were not rejected.

Table 4.20 Mean scores, CPI Self-Control scale for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	28.08 (9.43)	29.35 (8.80)		
		29.36 (9.28)	29.34 (8.23)	28.60 (9.19)
Aboriginal Taiwanese	28.60 (7.85)	29.25 (7.98)		
		28.78 (7.80)	29.76 (8.18)	28.95 (7.92)
Totals:	28.30 (8.78)	29.29 (8.94)		
		29.04 (8.48)	29.58 (8.18)	28.77 (8.59)

Note: Standard deviations are indicated in parentheses.

Table 4.21 Significance of differences among the independent and dependent variables for the CPI Self-Control scale.					
Source	SS	df	MS	F	p
Race	2.57	1	2.57	.03	.852
Nonathlete vs. athlete	186.18	1	186.18	2.52	.113
Individual vs. team sport	22.20	1	22.20	.30	.584
Race by nonathlete-athlete	21.09	1	21.09	.34	.593
Race by individual-team sport	24.76	1	24.76	.34	.563
Error	61472.69	833	73.80		

CPI Good Impression (Gi) Scale

From Tables 4.22 and 4.23 for this personality trait scale, the null hypotheses Ho_1—Ho_5 were not rejected at the .01 level of significance.

Table 4.22 Mean scores, CPI Good Impression scale for ethnic Chinese and aboriginal Taiwanese subjects.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese		23.44 (8.19)		
	22.08 (8.50)	23.06 (8.62)	23.91 (7.65)	22.63 (8.39)
Aboriginal Taiwanese		24.53 (7.43)		
	23.31 (7.22)	24.08 (7.17)	25.03 (7.71)	23.97 (7.35)
		24.05 (7.78)		
Totals:	22.61 (7.99)	23.62 (7.85)	24.56 (7.68)	23.29 (7.92)
Note: Standard deviations are indicated in parentheses.				

Table 4.23 Significance of differences among the independent and dependent variables for the CPI Good Impression scale.					
Source	SS	df	MS	F	p
Race	223.60	1	223.60	3.60	.058
Nonathlete vs. athlete	337.74	1	337.74	5.44	.020
Individual vs. team sport	78.31	1	78.31	1.26	.262
Race by nonathlete-athlete	1.43	1	1.43	.02	.879
Race by individual-team sport	.27	1	.27	.00	.948
Error	51747.06	833	62.12		

CPI Communality (Cm) Scale

For this personality trait scale, ethnic Chinese scored significantly higher than aboriginal Taiwanese subjects at the .001 level of confidence (Tables 4.24 and 4.25). In addition, the F-ratio (8.33) indicated that there was a significant interaction between race and athletes at the .01 level of confidence. Subjected to further analysis, with results as indicated in Tables 4.26 and 4.27, the F-ratio (11.34) indicated that at the .001 level of confidence, ethnic Chinese nonathletes scored significantly higher than ethnic Chinese athletes and ethnic Chinese nonathletes scored significantly higher than aboriginal Taiwanese nonathletes. Therefore, the null hypotheses Ho_1 and Ho_4 were rejected, while Ho_2, Ho_3, and Ho_5 were not rejected.

Table 4.24 Mean scores, CPI Communality scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	20.95 (3.70)	19.70 (3.65)		
		19.81 (3.39)	19.56 (3.98)	20.44 (3.73)
Aboriginal Taiwanese	18.35 (3.88)	18.59 (3.91)		
		19.31 (3.62)	17.79 (4.07)	18.48 (3.89)
Totals:	19.84 (3.99)	19.08 (3.83)		
		19.54 (3.52)	18.54 (4.11)	19.48 (3.93)

Note: Standard deviations are indicated in parentheses.

Table 4.25 Significance of differences among the independent and dependent variables for the CPI Communality scale.

Source	SS	df	MS	F	p
Race	467.78	1	467.78	32.88	.000**
Nonathlete vs. athlete	50.55	1	50.55	3.55	.060
Individual vs. team sport	76.28	1	76.28	5.36	.021
Race by nonathlete-athlete	118.46	1	118.46	8.33	.004*
Race by individual-team sport	38.86	1	38.86	2.73	.099
Error	11851.12	833	14.23		

Note: * = $p < .01$; ** = $p < .001$.

Table 4.26 Mean scores, CPI Communality scale for nonathletes and athletes by race.		
	Nonathetes	Athletes
Ethnic Chinese	20.95	19.70
Aboriginal Taiwanese	18.35	18.59

Table 4.27 Significance of the interaction difference between nonathletes and athletes by race for the CPI Communality scale.					
Source	SS	df	MS	F	p
Nonathletes vs. athletes for ethnic Chinese	161.35	1	161.35	11.34	.001*
Nonathletes vs. athletes for aboriginal Taiwanese	5.87	1	5.87	.41	.521
Race for nonathletes	730.23	1	730.23	51.33	.000*
Race for athletes	76.14	1	76.14	5.35	.021
Error	1185.12	833	14.23		
Note: * = p < .001.					

CPI Well-Being (Wb) Scale

Significant results were not obtained for this personality trait scale (Tables 4.28 and 4.29). Therefore, the principal and the interaction hypotheses were not rejected.

Table 4.28 Mean scores, CPI Well-Being scale for ethnic Chinese and aboriginal Taiwanese subjects.				
	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese	25.00 (7.18)	25.17 (6.75)		
		25.01 (6.94)	25.38 (6.55)	25.07 (7.16)
Aboriginal Taiwanese	23.59 (6.11)	24.55 (6.19)		
		24.39 (5.94)	24.74 (6.47)	24.11 (6.16)
Totals:	24.39 (6.77)	24.82 (6.44)		
		24.67 (6.40)	25.01 (6.49)	24.60 (6.61)
Note: Standard deviations are indicated in parentheses.				

Table 4.29 Significance of differences among the independent and dependent variables for the CPI Well-Being scale.					
Source	SS	df	MS	F	p
Race	140.60	1	140.60	3.22	.073
Nonathlete vs. athlete	67.43	1	67.43	1.54	.214
Individual vs. team sport	12.28	1	12.28	.28	.596
Race by nonathlete-athlete	30.81	1	30.81	.71	.401
Race by individual-team sport	.01	1	.01	.00	.988
Error	3635.35	833	43.64		

CPI Achievement via Conformance (Ac) Scale

For this personality trait scale, there were no significant differences (Tables 4.30 and 4.31). Therefore, the null hypotheses Ho_1—Ho_5 were not rejected.

Table 4.30 Mean scores, CPI Achievement via Conformance scale for ethnic Chinese and aboriginal Taiwanese subjects.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	21.13 (6.58)	21.76 (6.64)		
		21.28 (7.07)	22.35 (6.05)	21.38 (6.60)
Aboriginal Taiwanese	20.98 (6.16)	21.83 (6.19)		
		21.71 (5.58)	21.96 (6.83)	21.44 (6.19)
Totals:	21.06 (6.40)	21.80 (6.38)		
		21.52 (6.28)	22.13 (6.50)	21.41 (6.40)
Note: Standard deviations are indicated in parentheses.				

Table 4.31 Significance of differences among the independent and dependent variables for the CPI Achievement via Conformance scale.					
Source	SS	df	MS	F	p
Race	.22	1	.22	.00	.942
Nonathlete vs. athlete	114.07	1	114.07	2.79	.096
Individual vs. team sport	42.16	1	42.16	1.03	.311
Race by nonathlete-athlete	2.13	1	2.13	.05	.820
Race by individual-team sport	16.24	1	16.24	.40	.529
Error	34116.86	833	40.24		

CPI Achievement via Independence (Ai) Scale

For this personality trait scale, there were no significant differences (Tables 4.32 and 4.33). Therefore, the null hypotheses Ho_1—Ho_5 were not rejected at the .01 level of significance.

Table 4.32 Mean scores, CPI Achievement via Independence scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	11.37 (3.54)	11.60 (3.72)		
		11.59 (4.01)	11.61 (3.35)	11.46 (3.61)
Aboriginal Taiwanese	10.48 (3.40)	11.33 (3.46)		
		11.27 (3.37)	11.40 (3.58)	10.94 (3.54)
Totals:	10.99 (3.50)	11.44 (3.57)		
		11.42 (3.66)	11.49 (3.48)	11.21 (3.54)

Note: Standard deviations are indicated in parentheses.

Table 4.33 Significance of differences among the independent and dependent variables for the CPI Achievement via Independence scale.

Source	SS	df	MS	F	p
Race	40.34	1	40.34	3.24	.072
Nonathlete vs. athlete	60.49	1	60.49	4.86	.028
Individual vs. team sport	.49	1	.49	.04	.843
Race by nonathlete-athlete	19.62	1	19.62	1.58	.210
Race by individual-team sport	.28	1	.28	.02	.880
Error	10372.11	833	12.45		

CPI Intellectual Efficiency (Ie) Scale

Subjects who were ethnic Chinese scored significantly higher than subjects who were aboriginal Taiwanese at the .01 level of confidence, whereas there were no other significant differences among the variables (Tables 4.34 and 4.35). Therefore, the null hypothesis Ho_1 was rejected, while Ho_2—Ho_5 were accepted.

Table 4.34 Mean scores, CPI Intellectual Efficiency scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	18.61 (5.44)	18.72 (5.44) 18.38 (5.86)	19.14 (4.86)	18.65 (5.43)
Aboriginal Taiwanese	16.86 (4.82)	18.08 (4.77) 17.95 (4.63)	18.22 (4.95)	17.52 (4.83)
Totals:	17.86 (5.25)	18.36 (5.08) 18.14 (5.21)	18.61 (4.92)	18.10 (5.17)

Note: Standard deviations are indicated in parentheses.

Table 4.35 Significance of differences among the independent and dependent variables for the CPI Intellectual Efficiency scale.

Source	SS	df	MS	F	p
Race	190.97	1	190.97	7.25	.007*
Nonathlete vs. athlete	90.45	1	90.45	3.43	.064
Individual vs. team sport	25.96	1	25.96	.99	.321
Race by nonathlete-athlete	62.18	1	62.18	2.36	.125
Race by individual-team sport	6.05	1	6.05	.23	.632
Error	21950.82	833	26.35		

Note: * = $p < .01$.

CPI Psychological Mindedness (Py) Scale

From Tables 4.36 and 4.37 for this personality trait scale, no significant differences were indicated. Thus, the primary and interaction hypotheses were not rejected.

Table 4.36 Mean scores, CPI Psychological Mindedness scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	11.31 (4.31)	11.68 (4.42) 11.33 (4.47)	12.12 (4.35)	11.46 (4.35)
Aboriginal Taiwanese	11.69 (3.81)	12.02 (3.73) 11.71 (3.94)	12.37 (3.47)	11.87 (3.77)
Totals:	11.48 (4.10)	11.87 (4.04) 11.54 (4.18)	12.26 (3.85)	11.66 (4.08)

Note: Standard deviations are indicated in parentheses.

Table 4.37 Significance of differences among the independent and dependent variables for the CPI Psychological Mindedness scale.

Source	SS	df	MS	F	p
Race	20.20	1	20.20	1.22	.270
Nonathlete vs. athlete	25.00	1	25.00	1.51	.220
Individual vs. team sport	50.17	1	50.17	3.02	.082
Race by nonathlete-athlete	.19	1	.19	.01	.915
Race by individual-team sport	.39	1	.39	.02	.878
Error	13818.67	833	16.59		

CPI Flexibility (Fx) Scale

For this personality trait scale, no significant differences were indicated (Tables 4.38 and 4.39). Therefore, the primary and interaction hypotheses were not rejected.

Table 4.38 Mean scores, CPI Flexibility scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	10.02 (3.67)	10.01 (4.59)		
		10.27 (4.85)	9.69 (4.26)	10.02 (4.07)
Aboriginal Taiwanese	9.88 (3.40)	9.99 (3.86)		
		9.56 (3.88)	10.46 (3.80)	9.94 (3.65)
Totals:	9.96 (3.56)	10.00 (4.19)		
		9.88 (4.35)	10.14 (4.01)	9.98 (3.87)

Note: Standard deviations are indicated in parentheses.

Table 4.39 Significance of differences among the independent and dependent variables for the CPI Flexibility scale.

Source	SS	df	MS	F	p
Race	.12	1	.12	.01	.928
Nonathlete vs. athlete	.32	1	.32	.02	.884
Individual vs. team sport	2.49	1	2.49	.17	.684
Race by nonathlete-athlete	.61	1	.61	.04	.840
Race by individual-team sport	53.41	1	53.41	3.57	.059
Error	12464.01	833	14.96		

CPI Femininity (Fe) Scale

For this personality trait scale, no significant differences were indicated (Tables 4.40 and 4.41). Therefore, the primary and interaction hypotheses were not rejected.

Table 4.40 Mean scores, CPI Femininity/Masculinity scale for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	12.56 (2.69)	12.79 (2.73)		
		12.57 (2.82)	13.05 (2.60)	12.65 (2.70)
Aboriginal Taiwanese	12.36 (2.99)	12.39 (2.58)		
		12.26 (2.63)	12.53 (2.53)	12.38 (2.77)
Totals:	12.48 (2.82)	12.56 (2.65)		
		12.40 (2.72)	12.75 (2.57)	12.52 (2.74)

Note: Standard deviations are indicated in parentheses.

Table 4.41 Significance of differences among the independent and dependent variables for the CPI Femininity/Masculinity scale.

Source	SS	df	MS	F	p
Race	21.20	1	21.20	2.80	.093
Nonathlete vs. athlete	3.34	1	3.34	.44	.505
Individual vs. team sport	13.42	1	13.42	1.79	.182
Race by nonathlete-athlete	2.18	1	2.18	.29	.590
Race by individual-team sport	1.10	1	1.10	.15	.702
Error	12464.01	833	14.96		

Physical Test, Pull-Ups

At the .001 level of confidence, subjects who were aboriginal Taiwanese scored significantly higher than ethnic Chinese subjects, and as indicated by the F-ratio (49.13), athletes scored significantly higher than nonathletes (Tables 4.42 and 4.43). Further analysis of significant interactions ($F = 7.19$, $p = .007$) was conducted (Tables 4.44 and 4.45). From the interaction analysis, comparison between races indicated that for individual sports, the aboriginal Taiwanese subjects scored

significantly higher than the ethnic Chinese subjects at the .01 level of confidence. Moreover, the F-ratio (39.66) indicated that among team sport athletes, the aboriginal Taiwanese scored significantly higher than the ethnic Chinese subjects at the .001 level of confidence. Thus, the null hypotheses Ho_1, Ho_2, and Ho_5 were rejected, while Ho_3 and Ho_4 were not rejected.

Table 4.42 Mean scores, pull-ups physical test for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	3.08 (3.60)	4.92 (3.49) 5.34 (4.03)	4.40 (2.61)	3.83 (3.66)
Aboriginal Taiwanese	5.45 (3.59)	7.46 (4.76) 6.90 (4.88)	8.08 (4.56)	6.54 (4.37)
Totals:	4.10 (3.78)	6.36 (4.43) 6.20 (4.57)	6.54 (4.26)	5.16 (4.25)

Note: Standard deviations are indicated in parentheses.

Table 4.43 Significance of differences among the independent and dependent variables for the pull-ups physical test.

Source	SS	df	MS	F	p
Race	1143.58	1	1143.58	75.00	.000**
Nonathlete vs. athlete	749.08	1	749.08	49.13	.000**
Individual vs. team sport	1.46	1	1.46	.10	.757
Race by nonathlete-athlete	1.33	1	1.33	.09	.768
Race by individual-team sport	109.59	1	109.59	7.19	.007*
Error	12701.22	833	15.25		

Note: * = $p < .01$; ** = $p < .001$.

Table 4.44 Mean scores, pull-ups physical test for individual and team sports by race.

	Individual	Team
Ethnic Chinese	5.34	4.40
Aboriginal Taiwanese	6.90	8.08

Table 4.45 Significance of the interaction between individual and team sports by race for the pull-ups physical test.

Source	SS	df	MS	F	p
Individual vs. team sports for ethnic Chinese	37.85	1	37.85	2.48	.116
Individual vs. team sports for aboriginal Taiwanese	78.62	1	78.62	5.16	.023
Race for individual sport	127.92	1	127.92	8.39	.004*
Race for team sport	604.76	1	604.76	39.66	.000**
Error	12701.22	833	15.25		

Note: * = $p < .01$; ** = $p < .001$.

Physical Test, Sit-Ups

At the .01 and .001 levels of confidence, the following significant differences were indicated from the results of data analysis (Tables 4.46 and 4.47):

1) Ethnic Chinese subjects scored higher than aboriginal Taiwanese subject;
2) Athletes scored higher than nonathletes; and
3) Team sport athletes scored higher than individual sport athletes.

The interactions which were significantly different were subject to further analysis, with results as indicated in Tables 4.48 —4.49 and 4.50—4.51, respectfully, for comparisons of nonathletes and athletes and individual and team sports participants. From these analyses, it was determined that:

4) Within the two racial classifications, athletes scored significantly higher than nonathletes, and team sports participants scored significantly higher than participants in individual sports;
5) Ethnic Chinese athletes scored significantly higher than aboriginal Taiwanese athletes at the .001 level of confidence; and
6) Ethnic Chinese individual and team sport participants scored significantly higher than aboriginal Taiwanesee individual and team sport participants at, respectively, the .01 and .001 levels of confidence.

Therefore, all primary and interaction hypotheses (Ho_1—Ho_5) were rejected.

Table 4.46 Mean scores, sit-ups physical test for ethnic Chinese and aboriginal Taiwanese subjects.

	Nonathletes	Athletes		Subtotals
		Individual	Team	
Ethnic Chinese		46.48 (9.09)		
	34.35 (9.11)	42.67 (8.81)	51.23 (6.99)	39.27 (10.88)
Aboriginal Taiwanese		40.98 (8.70)		
	35.99 (8.35)	39.20 (9.43)	42.95 (7.37)	38.70 (8.89)
Totals:		43.38 (9.27)		
	35.05 (8.82)	40.76 (9.30)	46.44 (8.28)	38.99 (9.94)

Note: Standard deviations are indicated in parentheses.

Table 4.47 Significance of differences among the independent and dependent variables for the sit-ups physical test.

Source	SS	df	MS	F	p
Race	2016.70	1	2016.70	27.44	.000**
Nonathlete vs. athlete	15103.06	1	15103.06	205.51	.000**
Individual vs. team sport	3671.97	1	3671.97	49.97	.000**
Race by nonathlete-athlete	2743.23	1	2743.23	37.33	.000**
Race by individual-team sport	561.82	1	561.82	7.64	.006*
Error	61217.39	833	73.49		

Note: * = $p < .01$; ** = $p < .001$.

Table 4.48 Mean scores, sit-ups physical test for nonathletes and athletes by race.

	Nonathletes	Athletes
Ethnic Chinese	34.35	46.48
Aboriginal Taiwanese	35.99	40.98

Table 4.49 Significance of the interaction between nonathletes and athletes by race for the sit-ups physical test.

Source	SS	df	MS	F	p
Nonathletes vs. athletes for ethnic Chinese	15122.30	1	15122.30	205.77	.000*
Nonathletes vs. athletes for aboriginal Taiwanese	2545.28	1	2545.28	34.63	.000*
Race for nonathletes	293.42	1	293.42	3.99	.046
Race for athletes	1846.69	1	1846.69	25.13	.000*
Error	61217.39	833	73.49		

Note: * = $p < .001$.

Table 4.50 Mean scores, sit-ups physical test for individual and team sports by race.		
	Individual	Team
Ethnic Chinese	42.67	51.23
Aboriginal Taiwanese	39.20	42.95

Table 4.51 Significance of the interaction between individual and team sports by race for the sit-ups physical test.					
Source	SS	df	MS	F	p
Individual vs. team sport athletes for ethnic Chinese	3136.05	1	3136.05	42.67	.000*
Individual vs. team sport athletes for aboriginal Taiwanese	785.01	1	785.01	10.68	.001*
Race for individual sports	634.91	1	634.91	8.64	.003*
Race for team sports	3058.47	1	3058.47	41.62	.000*
Error	61217.39	833	73.49		
Note: * = $p < .01$; * = $p < .001$.					

Physical Test, Shuttle Run

For this physical test, the F-ratio (109.59) indicated that athletes scored significantly better than nonathletes at the confidence level .001. Therefore, the null hypothesis Ho_2 and were rejected, while Ho_1, Ho_3 —Ho_5 were not rejected.

Table 4.52 Mean scores, shuttle run physical test for ethnic Chinese and aboriginal Taiwanese subjects.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	10.19 (0.70)	9.74 (0.90)		
		9.73 (0.54)	9.75 (1.22)	10.01 (0.82)
Aboriginal Taiwanese	10.38 (0.82)	9.71 (0.65)		
		9.74 (0.73)	9.68 (0.54)	10.02 (0.80)
Totals:	10.27 (0.76)	9.72 (0.77)		
		9.74 (0.65)	9.71 (0.89)	10.01 (0.81)
Note: Standard deviations are indicated in parentheses.				

Table 4.53 Significance of differences among the independent and dependent variables for the shuttle run physical test.

Source	SS	df	MS	F	p
Race	.35	1	.35	.60	.440
Nonathlete vs. athlete	63.71	1	63.71	109.59	.000*
Individual vs. team sport	.04	1	.04	.06	.806
Race by nonathlete-athlete	2.28	1	2.28	3.92	.048
Race by individual-team sport	.12	1	.12	.20	.654
Error	484.30	833	.58		

Note: * = $p < .001$.

Physical Test, Long Jump

For this physical test, tathletes scored significantly higher than nonathletes and team sport participants scored significantly higher than individual sport participants at the .001 level of confidence (Tables 4.54 and 4.55). There were no significant interactions between athletes and nonathletes or between individual and team sport participants by race. Therefore, the null hypotheses Ho_2, and Ho_3 were rejected, whereas Ho_1, Ho_4, and Ho_5 were not rejected.

Table 4.54 Mean scores, long jump physical test for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	2.06 (0.25)	2.20 (0.23)	2.33 (0.26)	2.14 (0.27)
		2.25 (0.25)		
Aboriginal Taiwanese	2.05 (0.28)	2.15 (0.26)	2.25 (0.19)	2.13 (0.27)
		2.21 (0.24)		
Totals:	2.06 (0.26)	2.17 (0.25)	2.29 (0.23)	2.14 (0.27)
		2.23 (0.25)		

Note: Standard deviations are indicated in parentheses.

Table 4.55 Significance of differences among the independent and dependent variables for the long jump physical test.

Source	SS	df	MS	F	p
Race	.26	1	.26	4.14	.042*
Nonathlete vs. athlete	6.30	1	6.30	99.70	.000***
Individual vs. team sport	1.42	1	1.42	22.45	.000***
Race by nonathlete-athlete	.11	1	.11	1.68	.196
Race by individual-team sport	.01	1	.01	.18	.669
Error	52.67	833	.06		

Note: * = $p < .05$; *** = $p < .001$.

Physical Test, 50-Yard Run

For this physical test, aboriginal Taiwanese subjects scored significantly better than ethnic Chinese subjects at the .001 level of confidence, whereas the F-ratio indicated that athletes scored significantly lower than nonathletes at the .001 level of confidence (Tables 4.56 and 4.57). A significant interaction was indicated between athletes and nonathletes by race and the results of further analysis are shown in Tables 4.58 and 4.59. From these results, athletes of both races scored significantly lower than nonathletes. Comparison within the athlete classification by race indicated that the aboriginal Taiwanese scored significantly lower than the ethnic Chinese subjects at the .001 level of confidence. Across race, there were no significant differences among nonathletes. Therefore, the null hypotheses Ho_1, Ho_2, and Ho_4 were rejected, while Ho_3 and Ho_5 were not rejected.

Table 4.56 Mean scores, 50-yard run physical test for ethnic Chinese and aboriginal Taiwanese subjects.

		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese		7.06 (0.59)		
	7.34 (0.64)	7.14 (0.68)	6.97 (0.45)	7.23 (0.63)
Aboriginal Taiwanese		6.77 (0.60)		
	7.28 (0.65)	6.75 (0.65)	6.80 (0.53)	7.01 (0.67)
Totals:		6.90 (0.61)		
	7.32 (0.64)	6.92 (0.69)	6.87 (0.51)	7.12 (0.66)

Note: Standard deviations are indicated in parentheses.

Table 4.57 Significance of differences among the independent and dependent variables for the 50-yard run physical test.

Source	SS	df	MS	F	p
Race	7.49	1	7.49	19.46	.000**
Nonathlete vs. athlete	32.64	1	32.64	84.84	.000**
Individual vs. team sport	.34	1	.34	.87	.350
Race by nonathlete-athlete	2.72	1	2.72	7.06	.008*
Race by individual-team sport	1.23	1	1.23	3.20	.074
Error	320.53	833	.38		

Note: * = $p < .01$; ** = $p < .001$.

Table 4.58 Mean scores, 50-yard run physical test for nonathletes and athletes by race.

	Nonathletes	Athletes
Ethnic Chinese	7.34	7.06
Aboriginal Taiwanese	7.28	6.77

Table 4.59 Significance of the interaction between nonathletes and athletes by race for the 50-yard run physical test.

Source	SS	df	MS	F	p
Nonathletes vs. athletes for ethnic Chinese	8.15	1	8.15	21.19	.000*
Nonathletes vs. athletes for aboriginal Taiwanese	26.99	1	26.99	70.14	.000*
Race for nonathletes	.36	1	.36	.95	.331
Race for athletes	4.67	1	4.67	12.13	.000*
Error	320.53	833	.38		

Note: * = $p < .001$.

Physical Test, 600-Yard Run

For this physical test, a significant difference was indicated between nonathletes and athletes at the .001 level of confidence (Tables 4.60 and 4.61). Nonathletes scored higher than athletes and, as indicated by the F-ratio (10.48), individual sport participants scored higher than team sport participants. Therefore, the null hypotheses Ho_2 and Ho_3 were rejected, whereas Ho_1, Ho_4, and Ho_5 were not rejected.

Table 4.60 Mean scores, 600-yard run physical test for ethnic Chinese and aboriginal Taiwanese subjects.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic		116.48 (15.57)		
Chinese	131.35 (17.55)	118.39 (18.26)	114.11 (11.03)	125.31 (18.28)
Aboriginal		120.46 (18.98)		
Taiwanese	130.75 (18.37)	123.93 (20.20)	116.60 (16.78)	125.17 (19.37)
		118.73 (17.66)		
Totals:	131.09 (17.89)	121.44 (19.50)	115.55 (14.65)	125.24 (18.81
Note: Standard deviations are indicated in parentheses.				

Table 4.61 Significance of differences among the independent and dependent variables for the 600-yard run physical test.					
Source	SS	df	MS	F	p
Race	1090.06	1	1090.06	3.50	.062
Nonathlete vs. athlete	32297.66	1	32997.66	103.78	.000*
Individual vs. team sport	3262.54	1	3262.54	10.48	.001*
Race by nonathlete-athlete	1156.55	1	1156.55	3.72	.055
Race by individual-team sport	224.85	1	224.85	.72	.396
Error	259238.33	833	311.21		
Note: * = $p < .001$.					

Body Mass (PI)

For measurements of body mass, there were no significant differences by race (Tables 4.62 and 4.63). As indicated by the F-ratio (7.78), nonathletes scored significantly higher than athletes at the .01 level of confidence. Therefore, the null hypotheses Ho_2 was rejected, whereas Ho_1, and Ho_3—Ho_5 were not rejected.

Table 4.62 Mean scores, measurements of body mass for ethnic Chinese and aboriginal Taiwanese subjects.				
		Athletes		
	Nonathletes	Individual	Team	Subtotals
Ethnic Chinese	13.22 (0.64)	13.05 (0.55)		
		13.02 (0.55)	13.10 (0.56)	13.15 (0.61)
Aboriginal Taiwanese	13.10 (0.49)	13.05 (0.53)		
		12.98 (0.50)	13.13 (0.54)	13.07 (0.51)
Totals:	13.17 (0.59)	13.05 (0.54)		
		12.99 (0.52)	13.12 (0.55)	13.11 (0.57)
Note: Standard deviations are indicated in parentheses.				

Table 4.63 Significance of differences among the independent and dependent variables for the measurements of body mass.					
Source	SS	df	MS	F	p
Race	.31	1	.31	.99	.319
Nonathlete vs. athlete	2.45	1	2.45	7.78	.005*
Individual vs. team sport	1.35	1	1.35	4.31	.038
Race by nonathlete-athlete	.66	1	.66	2.11	.147
Race by individual-team sport	.14	1	.14	.43	.510
Error	261.92	833	.31		
Note: * = $p < .01$.					

Correlation Coefficients, Ethnic Chinese Subjects

To assess the relationships among the 18 CPI trait scales and body mass measurements, for the six physical fitness tests for ethnic Chinese subjects, Pearson product-moment correlations were calculated. The tabulation of the results, as indicated in Table 4.64, included the following:

1) For the pull-ups physical test, there were no significant relationships among the CPI traits and body mass (PI).

2) For the sit-ups physical test, there were significant relationships among the CPI trait scales for Communality (Cm) and Flexibility (Fx) and for body mass (PI) .

Table 4.64 Correlation coefficients among personality traits, physical fitness, and body mass for ethnic Chinese subjects.

	PU	SU	SR	LJ	50Y	600Y	PI	M	SD
Do	.05	.01	-.09*	.09*	-.10*	-.00	-.13**	12.02	4.89
Cs	.02	-.04	-.05	.00	-.02	.05	-.12**	10.64	4.67
Sy	.07	.06	-.05	.10*	-.11*	-.06	-.07	19.77	5.50
Sp	.06	.04	-.06	.08*	-.09*	-.04	-.09*	15.10	5.10
Sa	.06	.03	-.03	.06	-.05	.01	-.10*	12.23	4.27
To	.02	-.06	-.08*	.02	-.06	-.03	.02	21.17	7.77
Re	.02	.00	-.05	.01	-.01	-.07	.06	24.01	5.24
So	-.01	.01	-.05	.00	-.04	-.11*	.03	18.59	4.62
Sc	.02	-.07	-.09*	.01	-.03	-.05	.04	28.60	9.19
Gi	.03	-.05	-.10*	.03	-.04	-.06	.01	22.63	8.39
Cm	.07	.09*	.02	.06	-.04	-.10*	.05	20.44	3.73
Wb	.04	-.01	-.11**	.05	-.08*	-.09*	.00	25.07	7.00
Ac	.05	-.02	-.12**	.08*	-.10*	-.12**	.04	21.38	6.60
Ai	.04	-.00	-.04	.04	-.03	-.04	.04	11.46	3.61
Ie	.04	.02	-.07	.09*	-.11**	-.09*	.03	18.65	5.34
Py	.08	-.04	-.13**	.10*	-.06	-.05	.02	11.46	4.35
Fx	-.02	-.09*	-.00	-.13**	.04	.11**	.06	10.02	4.07
Fe	-.07	-.02	.09*	-.09*	.09*	.04	.00	12.65	2.70
PI	.03	.08*	-.10*	.12**	-.10*	-.20**	1.00	13.15	0.61
M	3.83	39.27	10.01	2.14	7.23	125.31	13.15	-	-
SD	3.66	10.88	0.82	0.27	0.63	18.28	0.61	-	-

Notes: * = $p < .05$, ** = $p < .01$; independent/dependent variables as defined in Chapter 3; PU = pull-ups; SU = sit-ups; SR = shuttle run; LJ = long jump; 50Y = 50-yard run; 600Y = 600-yard run; M = mean; SD = standard deviation.

3) For the shuttle run physical test, there were significant relationships among the CPI trait scales for Well-Being (Wb), Achievement via Conformance (Ac), and Psychological Mindedness (Py) at the .01 level of confidence and among the CPI trait scales for Dominance (Do), Tolerance (To), Self-Control (Sc), Good Impression (Gi), and Femininity (Fe), and for body mass (PI) at the .05 level of confidence .

4) For the long jump physical test, there were significant relationships for Flexibility (Fx) and body mass (PI) at the .01 level of confidence and for Dominance (Do), Sociability (Sy), Social Presence (Sp), Achieve-

ment via Conformance (Ac), Intellectual Efficiency (Ie), Psychological Mindedness (Py), and Femininity (Fe) at the .05 level of confidence.

5) For the 50-yard run, there were significant relationships were found for Intellectual Efficiency (Ie) at the .01 level of confidence and for Dominance (Do), Sociability (Sy), Social Presence (Sp), Self-Acceptance (Sa), Well-Being (Wb), Achievement via Conformance (Ac), Femininity (Fe), and for body mass (PI) at the .05 level of confidence.

6) For the 600-yard run, there were significant relationships for Achievement via Conformance (Ac), Flexibility (Fx), and for body mass (PI) at the .01 level of confidence, and for Socialization (So), Communality (Cm), Well-Being (Wb), and Intellectual Efficiency (Ie) at the .05 level of confidence.

In addition, a correlation analysis was calculated for the relationships of the 18 CPI trait scales and the body mass measurements, with results as follows:

7) For PI measurements, there were significant relationships for Dominance (Do) and Capacity for Status (Cs) at the .01 level of confidence, and for Social Presence (Sp) and Self-Acceptance (Sa) at the .05 level of confidence.

Correlation Coefficients, Aboriginal Taiwanese Subjects

To assess the relationships among the 18 CPI trait scales, the six physical fitness tests, and body mass measurements for aboriginal Taiwanese subjects, Pearson product-moment correlations were calculated. The tabulation of the results, as indicated in Table 4.65, included the following:

Table 4.65 Correlation coefficients among personality traits, physical fitness, and body mass for aboriginal Taiwanese subjects.

	PU	SU	SR	LJ	50Y	600Y	PI	M	SD
Do	.10*	.07	-.14**	.13**	-.09*	-.06	-.11**	12.80	4.10
Cs	.11**	.09*	-.13**	.14**	-.08	-.09*	-.06	11.52	4.27
Sy	.09*	.09*	-.16**	.13**	-.09*	-.10*	-.05	19.37	4.79
Sp	.13**	.09*	-.17**	.20**	-.13**	-.14**	-.06	14.92	4.25
Sa	.06	.08	-.13**	.08	-.04	-.09*	-.10*	12.20	3.62
To	.09*	.01	-.04	.07	-.03	.04	-.08*	20.96	6.66
Re	.07	-.02	.04	-.02	.00	.08*	.00	22.70	4.97
So	.09*	.04	-.07	.04	.08*	-.01	-.05	17.34	4.45
Sc	.09*	.02	.02	.02	.01	.06	.00	28.95	7.92
Gi	.11**	.04	-.03	.07	-.01	.02	-.03	23.97	7.35
Cm	.03	.01	-.11*	.03	-.06	.02	-.03	18.48	3.89
Wb	.14**	.06	-.04	.06	-.04	-.02	-.03	24.11	6.16
Ac	.12**	.04	-.03	.03	-.01	.04	-.05	21.44	6.19
Ai	.13**	.06	-.06	.10*	-.07	-.03	-.08*	10.94	3.54
Ie	.20**	.07	-.15**	.19**	-.14**	-.10*	-.05	17.52	4.83
Py	.09*	.05	-.02	.10*	-.00	-.04	-.02	11.87	3.77
Fx	-.06	-.07	.07	-.04	.08*	.00	.01	9.94	3.65
Fe	-.12**	-.14**	.20**	-.17**	.14**	.16**	.03	12.38	2.77
PI	.02	-.05	.14**	.06	.03	-.15**	1.00	13.07	0.51
M	6.54	38.70	10.02	2.13	7.01	125.17	13.07	-	-
SD	4.37	8.89	0.80	0.27	0.67	19.37	0.51	-	-

Notes: * = $p < .05$, ** = $p < .01$; independent/dependent variables as defined in Chapter 3; PU = pull-ups; SU = sit-ups; SR = shuttle run; LJ = long jump; 50Y = 50-yard run; 600Y = 600-yard run; M = mean; SD = standard deviation.

1) For the pull-ups physical test, there were significant relationships for Capacity for Status (Cs), Social Presence (Sp), Good Impression (Gi), Well-Being (Wb), Achievement via Conformance (Ac), Achievement via Independence (Ai), Intellectual Efficiency (Ii), and Femininity (Fe) at the .01 level of confidence, and for Dominance (Do), Sociability (Sy), Tolerance (To), Socialization (So), Self-Control (Sc), and Psychological Mindedness (Py) at the .05 level of confidence.

2) For the sit-ups physical test, there were significant relationships for Capacity for Status (Cs), Sociability (Sy), and Social Presence (Sp) at the

.05 level of confidence and for Femininity (Fe) at the .01 level of confidence.

3) For the shuttle run physical test, there were significant relationships for Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Self-Acceptance (Sa), Intellectual Efficiency (Ie), and Femininity (Fe), and for body mass (PI) at the .01 level of confidence, and for Communality (Cm) at the .05 level of confidence.

4) For the long jump physical test, there were significant relationships for Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Intellectual Efficiency (Ie), and Femininity (Fe) at the .01 level of confidence, and for Achievement via Independence and Psychological Mindedness (Py) at the .05 level of confidence.

5) For the 50-yard run physical test, there were significant relationships for Social Presence (Sp), Intellectual Efficiency (Ie), and Femininity (Fe) at the .01 level of confidence, and for Dominance (Do), Sociability (Sy), Socialization (So), and Flexibility (Fx) at the .05 level of confidence.

6) For the 600-yard run, there were significant relationships for Social Presence (Sp), Intellectual Efficiency (Ie), and Femininity (Fe), and for body mass (PI) at the .01 level of confidence, and for Capacity for Status (Cs), Sociability (Sy), Self-Acceptance (Sa), Responsibility (Re), and Intellectual Efficiency (Ie) at the .05 level of confidence.

In addition, a correlation analysis was calculated for the relationships of the 18 CPI trait scales and the body mass measurements, with results as follows:

7) For PI measurements, there were significant relationships for Dominance (Do) at the .01 level of confidence, and for Self-Acceptance (Sa), Toler-

ance (To), and Achievement via Independence (Ai) at the .05 level of confidence.

Canonical Correlation Analysis

A Canonical correlation analysis was performed among the variables for personality traits, physical fitness, and body mass. Each Canonical variate was used to describe the physical fitness test or body mass measurement that could be associated with a specific personality trait. The statistical characteristics of the variates for ethnic Chinese subjects are shown in Table 4.66.

Table 4.66 Statistical characteristics of the Canonical variates for ethnic Chinese subjects.

Variate	Eigenvalue	Canonical correlation coefficient	Wilks' lambda	Chi-square significance
1	.118	.325	.694	.066^{ns}
2	.097	.297	.796	.411
3	.072	.259	.851	.859
4	.042	.200	.912	.988
5	.026	.159	.950	.997
6	.019	.136	.974	.996
7	.007	.085	.993	.996

Note: ns = no significance.

When Dimension Reduction analysis was applied to the least significant variate for the ethnic Chinese subjects, it was determined that there were no significant relationships at the .05 level of confidence. Standardized Canonical coefficients for the dependent variables and the covariates were tabulated for these subjects (Table 4.67). From this tabulation, it was determined that Canonical discriminant or correlation analysis could not be performed in conjunction with the MANOVA, thus a summarized Canonical correlation was prepared for ethnic Chinese subjects for 1) personality traits

and 2) physical fitness and body mass. (Table 4.68). Results indicated that the first set percentage of variance was 4.223, the second set percentage of variance was 17.462, and the Canonical correlation coefficient was .325. Therefore, there were no significant correlations at the .05 level of confidence and it was not necessary to further describe the Canonical discriminant or correlation analysis for ethnic Chinese subjects.

Table 4.67 Standardized Canonical coefficients for dependent variables and covariates, ethnic Chinese subjects.

First set variables	Canonical coefficients	Second set covariates	Canonical coefficients
Do	-1.021	Pull-ups	-0.159
Cs	.927	Sit-ups	.240
Sy	.756	Shuttle run	.676
Sp	.057	Long jump	.491
Sa	.521	50-yard run	.296
To	-0.518	600-yard run	-0.281
Re	-0.161	PI	.229
So	.074		
Sc	-0.781		
Gi	.431		
Cm	-0.078		
Wb	-0.023		
Ac	.612		
Ai	.394		
Ie	.436		
Py	-0.136		
Fx	-0.471		
Fe	.103		

Note: Canonical discriminant or correlation analysis unavailable for use with MANOVA.

Table 4.68 Summary of Canonical correlations for ethnic Chinese subjects.			
First set variables	Canonical variation, χ_1	Second set covariates	Canonical variation, η_1
Do	-0.2341	Pull-ups	0.0827
Cs	-0.3468	Sit-ups	0.5819
Sy	0.0669	Shuttle run	0.1895
Sp	-0.0630	Long jump	0.4619
Sa	-0.0978	50-yard run	-0.2585
To	-0.1864	600-yard run	-0.6575
Re	0.1032	PI	0.3585
So	0.1476		
Sc	-0.1045		
Gi	-0.1084		
Cm	0.4107		
Wb	-0.0407		
Ac	0.0693		
Ai	0.0047		
Ie	0.0736		
Py	-0.1204		
Fx	-0.5275		
Fe	-0.0624		
Variance (%)	4.2228		17.4621
Redundancy	0.4471		1.8489
	ρ^2		0.1059
	Canonical r (ρ)		0.3254^{ns}
Note: ns = no significance; variables as defined in Chapter 3.			

Table 4.69 provides the statistical characteristics of the Canonical variates for the aboriginal Taiwanese subjects. The first variate was significant at the .01 level of confidence. Thus, a summary of the Canonical correlations was performed between 1) personality traits and 2) physical fitness and body mass for aboriginal Taiwanese subjects (Table 4.70).

Table 4.69 Statistical characteristics of the Canonical variates for aboriginal Taiwanese subjects.

Variate	Eigenvalue	Canonical correlation coefficient	Wilks' lambda	Chi-square significance
1	.171	.382	.642	.002**
2	.102	.305	.751	.195
3	.080	.272	.828	.632
4	.052	.222	.894	.932
5	.031	.172	.941	.986
6	.020	.140	.696	.988
7	.011	.106	.989	.973

Note: ** = $p < .01$.

Table 4.70 Summary of Canonical correlations for aboriginal Taiwanese subjects.

First set variables	Canonical variation, χ_1	Second set covariates	Canonical variation, η_1
Do	0.456	Pull-ups	0.668
Cs	0.426	Sit-ups	0.357
Sy	0.413	Shuttle run	-0.731
Sp	0.571	Long jump	0.826
Sa	0.315	50-yard run	-0.729
To	0.255	600-yard run	-0.567
Re	-0.007	PI	-0.273
So	0.223		
Sc	0.059		
Gi	0.207		
Cm	0.173		
Wb	0.239		
Ac	0.179		
Ai	0.346		
Ie	0.594		
Py	0.223		
Fx	-0.166		
Fe	-0.515		
Variance (%)	11.547		39.710
Redundancy	1.683		5.789
	ρ^2		0.146
	Canonical r (ρ)		0.382**

Note: ** = $p < .01$; variables as defined in Chapter 3.

Results of the standardization of the variables and covariants for aboriginal Taiwanese subjects are shown in Figure 4.1, with the correlation between the first and second sets of variables shown in Figure 4.2. It may be noted that the correlation between the two sets of variables (η_1) was 0.382 and significant at the .01 level of confidence. The value $\rho = 0.382$ indicates that the mean χ_1 for the personality trait scales accounted for 14.6 percent of the shared variance with the tests of physical fitness and measurements of body mass ($\rho^2 = .146$). Among the first set of variables, χ_1, which account for 11.55 percent of the total variance, the highest coefficients included Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Self-Acceptance (Sa), Achievement via Independence (Ai), Intellectual Efficiency (Ie), and Femininity/Masculinity (Fe). Among the second set of variables, η_1, which account for 39.71 percent of the total variance, the six tests of physical fitness have the highest coefficients. Therefore, it may be assumed that for the aboriginal Taiwanese subjects, the six tests of physical fitness are highly correlated with the Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Self-Acceptance (Sa), Achievement via Independence (Ai), Intellectual Efficiency (Ie), and Femininity (Fe) personality trait scales.

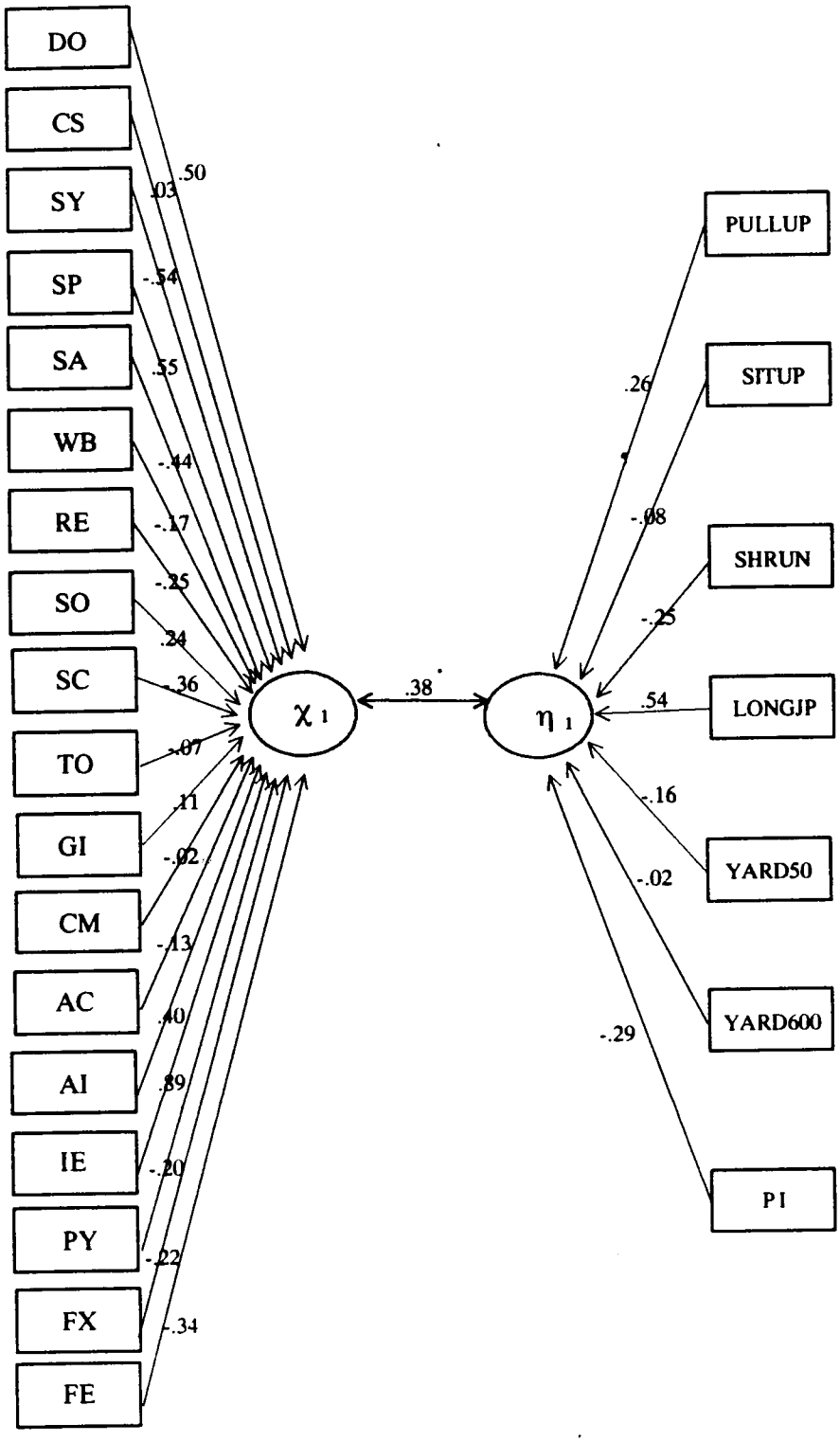


Figure 4.1 Standardization of the variables and covariants, aboriginal Taiwanese subjects.

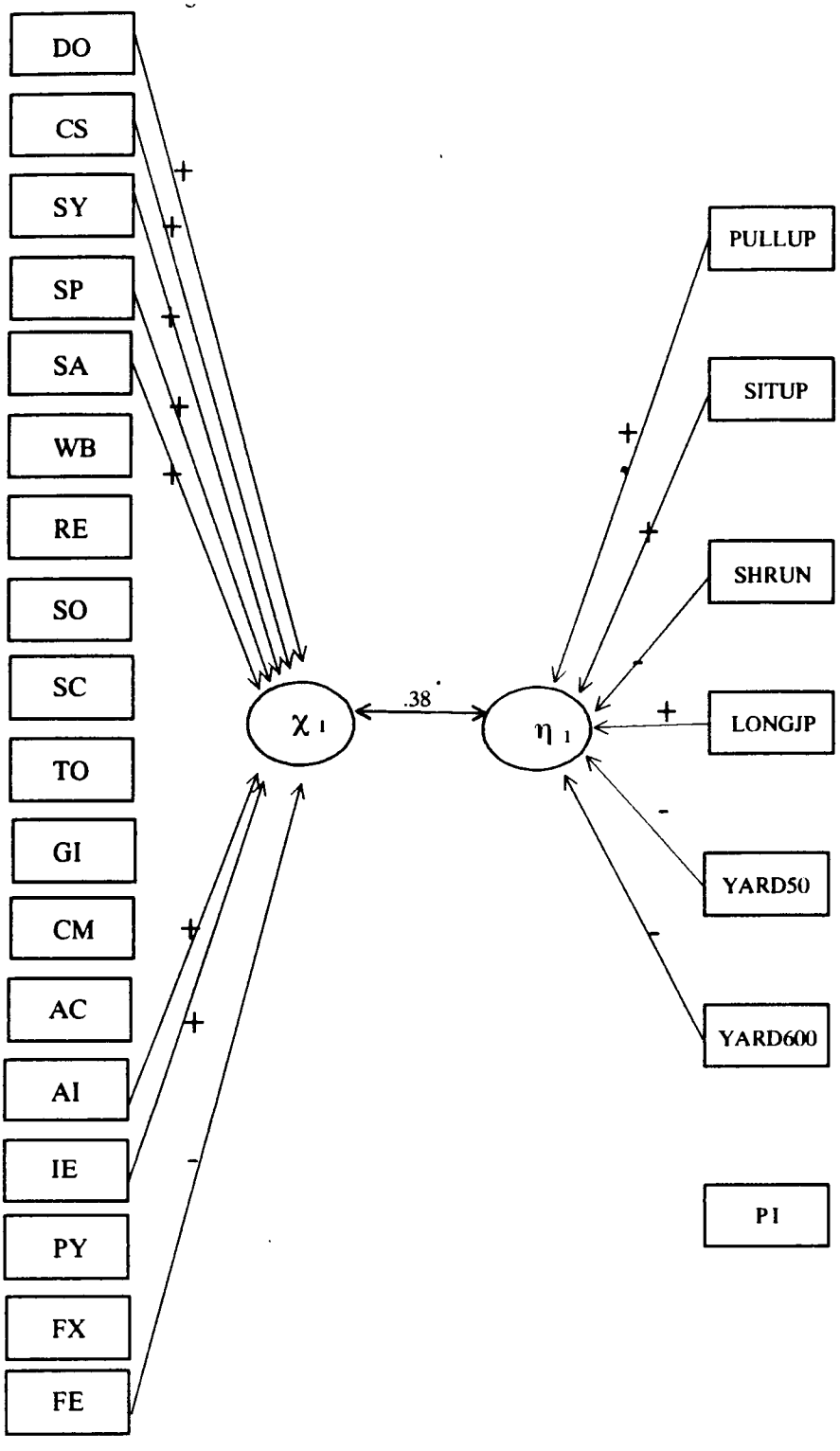


Figure 4.2 Standardized correlation between first and second set of variables, aboriginal Taiwanese subjects.

Discussion

Discussion of the results of the comparison of personality traits, physical fitness, and body mass among ethnic Chinese and aboriginal Taiwanese male junior high school student subjects is presented in the following sections: 1) Differences between ethnic Chinese and aboriginal Taiwanese subjects; 2) Differences between subjects who are athletes and those who are nonathletes; 3) Differences between subjects who are participants in individual sports and those who participate in team sports; 4) Interactions between athletes and nonathletes by race; 5) Interactions between participants in individual sports and participants in team sports by race; 6) Relationships among the 18 CPI personality trait scales, the six AAHPER tests of physical fitness, and measurements of body mass (PI) by race; and 7) Correlations between personality traits, physical fitness, and body mass by racial classification.

Differences Between Ethnic Chinese and Aboriginal Taiwanese Subjects

A review of the literature did not reveal reasonable evidence for possible differences among the variables between ethnic Chinese and aboriginal Taiwanese subjects. However, the results of the current study indicated significantly higher scores for aboriginal Taiwanese subjects for the Capacity for Status (Cs) personality trait scale. Rosenberg (1965), Cattell (1965), and Friesen (1966) were in agreement that those individuals designated as leaders would tend to reflect a better self-image than those individuals who were not considered to be leaders. Thus, it is logical that individuals who may be considered strong leaders will score high in self-esteem categories within a personality inventory. It may be assumed, for reasons inherent in the social structure of Taiwan (ROC), that individuals of aboriginal Taiwanese origin are a part of a minority group that is placed at the lower end of the social scale, and thereby may

exhibit significantly different personality traits than the general population. It may be speculated that the aboriginal Taiwanese are self-directed at breaking through older social structures in order to improve their social status, as well as to assure that others are favorably impressed with their characteristics and capabilities. As a result of their struggle to develop their leadership potential and to communicate effectively the nature of their broadened horizons of interest, it follows that aboriginal Taiwanese male junior high school students may be inclined to be personally ambitious and frequently more aggressive than average students of the same age group.

The ethnic Chinese junior high school male subjects scored significantly higher on the Responsibility (Re), Socialization (So), Communality (Cm), and Intellectual Efficiency (Ie) personality trait scales. These findings infer that these subjects are responsible and industrious, obliging, dependable, and tactful, and are efficient and intelligent and plan their futures carefully.

For the physical fitness tests, the aboriginal Taiwanese subjects scored significantly higher on the pull-ups and 50-yard run tests, whereas the ethnic Chinese subjects scored significantly higher on the sit-ups physical tests. These findings indicate that the former manifest superiority at exercises which are dependent upon strength and speed, while the latter reflect greater physical flexibility. According to the findings of this study, There were no significant differences by race for measurements of body mass.

Differences Between Athletes and Nonathletes

From the findings of the current study, there were no significant differences between athletes and nonathletes for the personality trait scales. This does not support the findings established by Cooper (1969), who found that athletes were more achievement-oriented, dominant, and displayed more self-confidence and competitive-

ness than nonathletes. On the other hand, the findings from this study were in part supportive of Morgan (1978, 1980), who determined that there was a relationship of personality to success in sports, and Tahkur and Ojha (1981), who demonstrated that there were personality differences between athletes and nonathletes. However, the findings of the current study indicated that at the .05 level of confidence, athletes scored significantly higher on the Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Good Impression (Gi), and Achievement via Independence (Ai) personality trait scales, indicating that the junior high school male athlete subjects were inclined to be somewhat more ambitious, outgoing, enthusiastic, cooperative, and dominant than were the male nonathlete subjects.

However, Geron et al. (1986) demonstrated that athletic personality traits cannot be considered in absolute terms, rather they are relative to the population to which they are being compared. Participants in certain sports differ from the nonathlete population in certain defined features, or differ equally as markedly from participants in other sports. For example, gymnasts reflect personalities which are similar to matching groups of nonathletes while differing in a number of respects from participants in other sports.

Similarly, athlete personalities cannot be considered as compositions of unidirectional characteristics (i.e., either favorable or unfavorable). Rather, athletes within the same sport often reflect both "positive" and "negative" characteristics, both being necessary to participation in the given sport. Thus, male gymnasts were considered to be independent, tolerant, and competitive, while simultaneously anxious and feminine in characteristics; soccer players were nonanxious and tolerant, while simultaneously hypochondriacal and not responsible. The differences found for the population of the current study thus cannot be generalized to apply to other populations. Other studies determining personality inventories in the athletic environment have found contrasting

results when testing separate populations (Lakie, 1962). Therefore, it is entirely possible that different populations of ethnic Chinese and aboriginal Taiwanese athletes would produce results that would differ significantly from the findings of this study.

Differences Between Individual and Team Sport Participants

Findings from the current study indicated that there were no significant differences for the personality trait scales between individual and team sport participants, whereas at the .05 level of confidence, the Communality (Cm) score for individual sport participants was somewhat higher than for team sport participants. For the physical tests, team sports participants scored higher than individual sport participants on sit-ups, the long jump, and the 600-yard run, as well as on measurements of body mass (PI). These findings indicate that the individual sports participants, in comparison to team sports participants, were more closely identified with the characteristics of dependability, moderation, steadiness, patience, sincerity, the exercise of good judgment, honesty, and conscientiousness.

In physical terms, these findings indicate that team sports participants reflected greater flexibility and leg power, as well as a higher degree of stamina and thinner body mass than individual sports participants. Overall, these findings were partially supportive of the findings from previous studies, in which team sports participants have been found to be more aggressively controlled than participants in selected individual sports, or have been found to reflect a greater degree of self-confidence and venturousness than the practitioners of individual sports (Kroll, 1967; Langer, 1966; Nelson & Langer, 1963; Ogilvie, Tutko, & Young, 1966; Timsit & Quevrin, 1988).

Interactions Between Athletes and Nonathletes by Race

Findings from the current investigation indicated a significant interaction between ethnic Chinese and aboriginal Taiwanese athletes and nonathletes for the Communality (Cm) personality trait scale. The ethnic Chinese nonathletes scored significantly higher than athletes from both racial groups, and ethnic Chinese nonathletes scored significantly higher the aboriginal Taiwanese subjects. This may indicate that the ethnic Chinese nonathletes reflected personality traits that were more dependable, moderate, tactful, reliable, patient, steady, and conscientious than the athletes of either racial group and aboriginal Taiwanese nonathletes; the findings may also indicate that the aboriginal Taiwanese athletes were impatient, changeable, complicated, nervous, restless, confused, and reflective of internal conflicts and problems to a greater degree than nonathletes from either racial group.

For the physical fitness tests, athletes from both racial groups scored higher than nonathletes from either racial group on the sit-ups test, whereas only ethnic Chinese athletes scored significantly higher than their aboriginal Taiwanese counterparts. The findings indicate greater physical flexibility on the part of athletes compared to nonathletes, and on the part of both ethnic Chinese athletes and nonathletes in comparison to equivalent groups of aboriginal Taiwanese subjects. Interactions were also indicated for the 50-yard run tests, in which athletes from both racial groups scored significantly better than nonathletes from both racial groups. This indicates a greater capacity for speed for both groups of higher scoring athletes. At the same time, ethnic Chinese nonathletes scored significantly higher on the 50-yard run than the aboriginal Taiwanese nonathletes.

Interactions Between Individual and Team Sports Participants by Race

The current investigation indicated that there were significant interaction differences between ethnic Chinese and aboriginal Taiwanese individual and team sports participants on the pull-ups and sit-ups physical fitness tests.

In the pull-ups tests, both athlete groups from the same racial classification scored significantly higher than equivalent athlete groups among the ethnic Chinese subjects. At the same time, the aboriginal Taiwanese athletes exhibited greater strength than the ethnic Chinese athlete subjects. For the sit-ups tests, team sports participants from both racial groups scored higher than their individual sports equivalents, indicating greater flexibility on the part of team sports participants regardless of racial classification. At the same time, however, ethnic Chinese athletes—both individual and team sports participants—scored higher than aboriginal Taiwanese athletes, indicating greater overall flexibility on the part of ethnic Chinese athletes.

Relationship Among Personality Traits, Physical Fitness, and Body Mass by Race

From a review of the literature, it could not be determined that significant relationships had been established between personality traits and physical fitness. Weber (1953) found no correlation between physical fitness scores and total Minnesota Multiphasic Personality Inventory (MMPI) scores. However, the findings from the current investigation indicated that there were significant but minor relationships between five of the six physical fitness tests (i.e., excluding pull-ups) and scores for 15 of the 18 CPI personality trait scales (i.e., excluding Self-Acceptance, Responsibility, and Achievement via Independence scales) for ethnic Chinese subjects, and significant relationships between all six physical fitness tests and the total CPI score for aboriginal Taiwanese subjects. Thus, the findings from this study indicate that for ethnic

Chinese subjects there was no significant relationship between personality traits and performance on pull-up physical tests.

Ethnic Chinese Subjects

For ethnic Chinese subjects, significant relationships between personality traits, physical fitness, and body mass were as follows:

1) Sit-up tests: Sit-up test scores indicated significant relationships to Communality and Flexibility. As the subjects sit-ups test scores increased, their Communality test scores tended to increase and their Flexibility test scores tended to decrease. The increase in Communality scores would indicate personality characteristics identified with tact, dependability, and patience; whereas the decrease in Flexibility scores would indicate characteristics of deliberateness, caution, and industriousness.
2) Shuttle run: As scores for the shuttle run decreased, scores for Dominance, Tolerance, Self-Control, Good Impression, Well-Being, Achievement via Independence, Psychological Mindedness, and Femininity tended to increase, indicating characteristics identified with aggressiveness, enterprise, patience, tolerance, cooperativeness, dominance, observant, and appreciativeness identified with those who performed well on the shuttle run. Shuttle run test scores also tended to decrease as body mass scores increased, indicating that the performers with thin body frames reflected superior agility.
3) Long jump: As long jump scores increased, so did the scores for Dominance, Sociability, Social Presence, Achievement via Conformance, Intellectual Efficiency, and Psychological Mindedness, indicating that performers who were aggressive, outgoing, enthusiastic, cooperative, effi-

cient, and quick-thinking reflected greater advantage when performing the long jump test. At the same time, as the long jump scores increased, the scores for Flexibility and Femininity tended to decrease, indicating that those subjects who reflected deliberateness, industry, who were outgoing, ambitious, and restless were more comfortable in performing a test in which these characteristics could be displayed. In addition, body mass scores tended to increase with long jump scores, indicating that ectomorphic (i.e., thinner) subjects reflected greater leg power than subjects with greater body mass.

4) 50-yard run: As test scores decreased, the personality scores for Dominance, Self-Acceptance, Social Presence, Well-Being, Achievement via Conformance, and Intellectual Efficiency tended to increase, indicating that aggressive, enterprising, enthusiastic, quick-thinking, energetic, capable, and efficient characteristics were of greater advantage in tests of running speed. This was also true of body mass scores, contributing to the expected observation that subjects with thinner body masses would be able to run more quickly than subjects with greater body masses. At the same time, scores for Femininity tended to decrease, thus advantaging those subjects with outgoing, ambitious, hard-headed, masculine, and restless personality traits.

5) 600-yard run: As scores on this test decreased, personality scores for Sociability, Communality, Well-Being, Achievement via Conformance, and Intellectual Efficiency tended to increase, whereas scores for Flexibility tended to decrease. Thus, long distance runners would tend to reflect characteristics which are energetic, industrious, cooperative, and efficient, while at the same time moderate, deliberate, and cautious. It

was also found that as the test scores increased, body mass scores also tended to increase, indicating the greater running ability of those subjects with thinner body masses.

Sheldon and Stevens (1942) found that the mesomorph, with a typical athletic build, displayed the stereotypical personality characteristics of aggressiveness, dominance, and risk-taking. For the current investigation, as body mass scores increased, so did the subject scores for Dominance, Capacity for Status, Social Presence, and Self-Acceptance. It is thus probable that the ethnic Chinese subjects who were more aggressive, ambitious, enthusiastic, and intelligent reflected mesomorph body frames to a greater degree than those subjects who did not reflect these characteristics.

Aboriginal Taiwanese Subjects

For aboriginal Taiwanese subjects, significant relationships between personality traits, physical fitness, and body mass were as follows:

1) Pull-ups: As pull-ups test scores increased, so did 14 of the 18 CPI scales, excluding only the Social Presence, Responsibility, Communality, and Femininity scales. It could logically be expected that those subjects who were aggressive, ambitious, outgoing, enthusiastic, energetic, serious, patient, enterprising, cooperative, capable, forceful, efficient, and observant would perform better on this test. At the same time, Femininity scores tended to decrease, adding outgoing and masculine traits to the list of characteristics identified with the better performers on this test.
2) Sit-ups: As these test scores increased, so did the personality scores for Capacity for Status, Sociability, and Social Presence, indicating the possibility that those performers with ambitious, outgoing, and enthusiastic traits would perform better on this test. At the same time, Femininity scores tended to decrease, thus adding outgoing, masculine, active, and

restless traits to those indicated above as characteristics of good performers on this test.

3) Shuttle run: As test scores decreased on this test, those for Dominance, Capacity for Status, Sociability, Social Presence, Self-Acceptance, Communality, and Intellectual Efficiency tended to increase, while those for Femininity tended to decrease. Thus, personality traits suited to this type of test could be characterized as aggressiveness, ambitious, outgoingness, enthusiasm, intelligence, dependability, and efficiency, as well as hard-headedness, masculinity, active and restlessness. At the same time, with a decrease in shuttle run scores, measurements of body mass also tended to decrease, indicating the advantage of the ectomorph subject with a thinner body mass.

4) Long jump: As test scores increased, so did personality scores for Dominance, Capacity for Status, Sociability, Social Presence, Achievement via Independence, Intellectual Efficiency, and Psychological Mindedness, where Femininity scores tended to decrease. The traits thus reflected include aggressiveness, ambition, outgoingness, enthusiasm, forcefulness, efficiency, and quickness, as well as hard-headedness, masculinity, active, robust and restlessness.

5) 50-yard run: As test scores increased, so did personality scores for Dominance, Sociability, Social Presence, Self-Acceptance, and Intellectual Efficiency, while scores for Femininity tended to decrease. Thus, good performers on this test could be expected to be aggressive, outgoing, enthusiastic, serious, and efficient, as well as hard-headed, ambitious, masculine, active, robust and restless.

6) 600-yard run: As test scores increased, so did personality scores for Capacity for Status, Sociability, Social Presence, Self-Acceptance, and Intellectual Efficiency, while scores for Responsibility and Femininity tended to decrease. Thus, the distance runner would reflect traits which were ambitious, outgoing, enthusiastic, intelligent, and efficient, but at the same time immature, moody, masculine, active, robust and restless. At the same time, with a decrease in 600-yard run scores, measurements of body mass also tended to decrease, indicating the advantage of the ectomorph subject with a thinner body mass.

For the current investigation, as body mass scores increased for aboriginal Taiwanese subjects, so did the subject scores for Dominance, Self-Acceptance, Tolerance, and Achievement via Independence. Thus, it is probable that the subjects who were more aggressive, intelligent, and enterprising with traits of maturity would reflect mesomorphic body frames. For the aboriginal Taiwanese, these results were in disagreement with those of Child (1950) and Seltzer, Wells, and Meternen (1948), who failed to corroborate a high degree of association between physical body mass and temperament.

Correlations Among Personality Traits, Physical Fitness, and Body Mass

From the results of the current investigation, no structured correlations were revealed between personality traits, physical fitness, and body mass for ethnic Chinese subjects. However, the findings did indicate a correlation among the same variables for aboriginal Taiwanese subjects.

There was a moderate correlation between performance on all of the physical fitness tests and the Dominance, Capacity for Status, Sociability, Social Presence, Self-Acceptance, Achievement via Independence, Intellectual Efficiency, and Psycho-

logical Mindedness personality trait scales, that is, higher performance scores on the physical tests could be associated with higher personality scores for these scales. These were logical results, indicating that subjects with physical strength, flexibility, agility, leg power, speed, and stamina could also be expected to reflect aggressive, ambitious, outgoing, enthusiastic, intelligent, dominant, efficient, and patient personality characteristics.

From the findings of this study, as concerns the ethnic Chinese male junior high school subjects, since there were no significant correlations among the CPI personality trait scales, the tests for physical fitness, and PI measurements, the utility of personality testing as an indicator of athletic capabilities may be questioned. It may be assumed that these subjects were exposed to a favorable quality of instruction in physical education classes that were supplied with adequate facilities and sports equipment. On the other hand, there were significant correlations among the CPI personality trait scales, the tests for physical fitness, and PI measurements for the aboriginal Taiwanese male junior high school subjects, indicating a relationship between physical fitness test scores and personality traits. This was confirmed by the findings which indicated significant differences between aboriginal Taiwanese athletes and nonathletes for the tests of physical fitness.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Following statistic analysis and consideration of the results of this investigation, the following conclusions were obtained for the primary and interaction hypotheses:

1) The null hypothesis Ho_1, there are no significant differences between ethnic Chinese and aboriginal Taiwanese junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass, was rejected.

Aboriginal Taiwanese subjects scored significantly higher than ethnic Chinese subjects on the Capacity for Status personality trait scale and the physical fitness tests for pull-ups and the 50-yard run, whereas ethnic Chinese subjects scored higher than aboriginal Taiwanese subjects on the Responsibility, Self-Acceptance, Communality, and Intellectual Efficiency personality trait scale and the physical fitness sit-ups tests. However, since there were no significant differences between ethnic Chinese and aboriginal Taiwanese subjects for measurements of body mass, the null hypothesis Ho_1 cannot be rejected with absolute certainty.

2) The null hypothesis Ho_2, there are no significant differences between subjects who are athletes and those who are nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18

CPI scales, six tests of physical fitness, and measurements of body mass, was rejected.

Athletes from both racial classification scored significantly higher than the equivalent nonathletes on all six tests of physical fitness and somewhat higher on the Capacity for Status, Sociability, Social Presence, Good Impression, and Achievement via Independence personality trait scales. In addition, nonathletes from both racial classifications scored significantly higher than athletes for measurements of body mass.

3) The null hypothesis Ho_3, there are no significant differences between subjects practicing individual sports and those practicing teams sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass, was rejected.

Team sport athletes scored significantly higher than individual sport athletes on the sit-ups, long jump, and 600-yard run physical tests, and for measurements of body mass.

4) The null hypothesis Ho_4, there are no significant interactions between ethnic Chinese and aboriginal Taiwanese athletes and nonathletes among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass, was partially rejected.

There were significant interactions between athletes and nonathletes from both racial classifications for the Communality personality trait scale. Among the ethnic Chinese, nonathletes scored significantly higher than athletes; and ethnic Chinese nonathletes scored significantly higher the aboriginal Taiwanese nonathletes.

Aboriginal Taiwanese subjects scored significantly higher than ethnic Chinese subjects on the sit-ups and 50-yard run physical fitness tests, whereas ethnic Chinese and aboriginal Taiwanese athletes scored significantly higher than nonathletes from both racial classifications for the 50-yard run physical fitness test, while aboriginal Taiwanese athletes scored significantly higher than ethnic Chinese athletes. There were no significant differences between nonathletes from both racial classifications for the same test of physical fitness. However, ethnic Chinese athletes scored significantly higher than aboriginal Taiwanese athletes on the sit-ups physical fitness test. Therefore, contradictory findings were obtained for Ho_4, and the null hypothesis was only partially rejected.

5) The null hypothesis Ho_5, there are no significant interactions between ethnic Chinese and aboriginal Taiwanese in individual and team sports among junior high school students in Taiwan, Republic of China, for each of the 18 CPI scales, six tests of physical fitness, and measurements of body mass, was partially rejected.

There were significant interactions between individual and team sport participants from both racial classifications for the pull-ups and sit-ups physical fitness tests. On the pull-ups tests, all aboriginal Taiwanese athletes scored significantly higher than their ethnic Chinese counterparts. For the sit-ups test, team sport athletes from both racial classifications scored significantly higher than their equivalent individual sport athletes.

The following conclusions were obtained for the secondary null hypothesis Ho_6, there are no significant relationships between the 18 CPI scale variables, six physical fitness, and body mass variables test variables for the ethnic Chinese and aboriginal Taiwanese groups:

1) There were no significant relationships between the 18 CPI personality trait scores, measurements of body mass, and the pull-ups physical test scores for ethnic Chinese subjects. Therefore, for ethnic Chinese subjects the hypothesis was accepted for the pull-ups physical test.
2) As the sit-ups test scores for ethnic Chinese increased, there was a tendency for an increase in the Communality personality trait scale and a tendency for a decrease in the Flexibility personality trait scale, thus indicating some degree of difference. Therefore, for ethnic Chinese subjects the hypothesis was accepted since the relationships could not be determined to be significant.
3) As the shuttle run test scores decreased, there was a tendency for the Dominance, Tolerance, Self-Control, Good Impression, Achievement via Independence, Psychological Mindedness, and Femininity personality trait scores to increase for ethnic Chinese subjects. At the same time, measurements of body mass increased for ethnic Chinese subjects. Therefore, the hypothesis was rejected for ethnic Chinese subjects.
4) As long jump test scores increased, there was a tendency for the Dominance, Sociability, Social Presence, Achievement via Conformance, Intellectual Efficiency, and Psychological Mindedness personality trait scores to increase, while the Flexibility and Femininity personality trait scores decreased for ethnic Chinese subjects. At the same time, measurements of body mass increased and the hypothesis was rejected for ethnic Chinese subjects.
5) As 50-yard run test scores decreased, there was a tendency for the Dominance, Sociability, Social Presence, Well-Being, Achievement via Conformance, and Intellectual Efficiency personality trait scores to increase,

while Femininity personality trait scores decreased for ethnic Chinese subjects. At the same time, measurements of body mass increased and the hypothesis was rejected for ethnic Chinese subjects.

6) As 600-yard run test scores decreased, there was a tendency for the Sociability, Communality, Well-Being, Achievement via Conformance, and Intellectual Efficiency personality trait scores to increase, while Flexibility personality trait scores decreased for ethnic Chinese subjects. At the same time, measurements of body mass increased and the hypothesis was rejected for ethnic Chinese subjects.

7) As pull-ups test scores increased, there was a tendency for Dominance, Capacity for Status, Sociability, Self-Acceptance, Tolerance, Self-Control, Good Impression, Achievement via Conformance, Achievement via Independence, Intellectual Efficiency, and Psychological Mindedness personality trait scores to increase for aboriginal Taiwanese subjects, while the scores for Femininity tended to decrease. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

8) As the sit-ups test scores for aboriginal Taiwanese increased, there was a tendency for an increase in the Capacity for Status, Sociability, and Social Presence personality trait scales and a tendency for a decrease in the Femininity personality trait scale. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

9) As the shuttle run test scores decreased, there was a tendency for the Dominance, Capacity for Status, Tolerance, Sociability, Social Presence, Self-Acceptance, Communality, and Intellectual Efficiency personality trait scores to increase for aboriginal Taiwanese subjects, and a tendency

for a decrease in the Femininity personality trait scores. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

10) As long jump test scores increased, there was a tendency for the Dominance, Capacity for Status, Sociability, Social Presence, Achievement via Independence, Intellectual Efficiency, and Psychological Mindedness personality trait scores to increase for aboriginal Taiwanese subjects, while Flexibility personality trait scores decreased. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

11) As 600-yard run test scores decreased, there was a tendency for the Capacity for Status, Sociability, Social Presence, Self-Acceptance, Intellectual Efficiency personality trait scores and the body mass measurements for aboriginal Taiwanese to increase, while the Responsibility and Femininity personality trait scores decreased. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

12) As measurements of body mass decreased, there was a tendency for the Dominance, Self-Acceptance, Tolerance, and Achievement via Independence personality trait scores to increase for aboriginal Taiwanese subjects. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

There were no significant structured correlationships between personality traits, physical fitness, and body mass for ethnic Chinese subjects, whereas for the aboriginal Taiwanese, there were significant correlationships between all of the physical fitness tests and the Dominance, Capacity for Status, Sociability, Social Presence, Self-Acceptance, Achievement via Conformance, Intellectual Efficiency, and Femininity/Masculinity personality trait scores, all of which tended to increase as physical test scores increased. Thus, the hypothesis was rejected for aboriginal Taiwanese subjects.

Recommendations

Based upon the results of this study and the conclusions obtained from the findings, the following recommendations are included:

1) Specific personality traits scales for athletes that would permit the closer evaluation of athletes from specific sports should be developed.
2) Application of an integration approach to the development of a model for body mass measurements is warranted in the instance of other test samples.
3) To obtain more precise findings about differences between individual and team sports participants, it would be useful to develop more comprehensive data on athlete subjects.
4) Insofar as the present study has been limited to male athletes and nonathletes, it is legitimate to expect that parallel investigations of female athletes and nonathletes from the same racial groups would reveal findings of interest that could parallel the findings from this investigation.
5) In view of the absence of significant correlations between tests for physical fitness and the CPI personality trait scales for ethnic Chinese subjects, in contrast to significant correlations for the same measures among aboriginal Taiwanese athletes and nonathletes, a study should be conducted to determine the basis for measurement differences between the two racial classifications.
6) To cultivate the promotion of elite track and field athletes in Taiwan, training emphasis should be directed toward aboriginal Taiwanese junior high school students for speed events such as the 100 and 200 meter dashes.

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APPENDICES

Appendix A

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Date: JAN 31 91

Date: 2/4/91

1. I enjoy social gatherings just to be with people.
2. A person needs to "show off" a little now and then.
3. Our thinking would be a lot better off if we would just forget about words like "probably," "approximately," and "perhaps."
4. When in a group of people I usually do what the others want rather than make suggestions.
5. People can pretty easily change me even though I thought that my mind was already made up on a subject.
6. I work under a great deal of tension.
7. I am very slow in making up my mind.
8. I always follow the rule: business before pleasure.
9. Several times a week I feel as if something dreadful is about to happen.
10. There's no use in doing things for people; you only find that you get it in the neck in the long run.
11. I would like to be a journalist.
12. A person who doesn't vote is not a good citizen.
13. I think I would like the work of a building contractor.
14. I have had very peculiar and strange experiences.
15. My daily life is full of things that keep me interested.
16. I always like to keep my things neat and tidy and in good order.
17. It makes me feel like a failure when I hear of the success of someone I know well.
18. I think I would like the work of a dress designer.
19. I am often said to be hotheaded.
20. I gossip a little at times.
21. When I was going to school I played hooky quite often.
22. It is hard for me to start a conversation with strangers.
23. I must admit that I enjoy playing practical jokes on people.
24. I get very nervous if I think that someone is watching me.
25. For most questions there is just one right answer, once a person is able to get all the facts.
26. I sometimes pretend to know more than I really do.
27. It's no use worrying my head about public affairs; I can't do anything about them anyhow.
28. Sometimes I feel like smashing things.
29. Women should not be allowed to drink in cocktail bars.
30. When someone does me a wrong I feel I should pay him back if I can, just for the principle of the thing.
31. I seem to be about as capable and smart as most others around me.
32. I usually take an active part in the entertainment at parties.
33. I think I would enjoy having authority over other people.
34. I find it hard to keep my mind on a task or job.
35. I have sometimes stayed away from another person because I feared doing or saying something that I might regret afterwards.
36. I get very tense and anxious when I think other people are disapproving of me.
37. I liked school.
38. A windstorm terrifies me.
39. Sometimes I feel like swearing.
40. I am embarrassed by dirty stories.
41. Sometimes I cross the street just to avoid meeting someone.
42. I get excited very easily.

43. I used to keep a diary.
44. Maybe some minority groups do get rough treatment, but it's no business of mine.
45. It is very hard for me to tell anyone about myself.
46. We ought to worry about our own country and let the rest of the world take care of itself.
47. I often feel as if the world was just passing me by.
48. When I get bored I like to stir up some excitement.
49. I like to boast about my achievements every now and then.
50. I am afraid of deep water.
51. I must admit I often try to get my own way regardless of what others may want.
52. I think I would like the work of a garage mechanic.
53. I usually feel nervous and ill at ease at a formal dance or party.
54. I don't like to undertake any project unless I have a pretty good idea as to how it will turn out.
55. I like adventure stories better than romantic stories.
56. People who seem unsure and uncertain about things make me feel uncomfortable.
57. Once a week or oftener I feel suddenly hot all over, without apparent cause.
58. Sometimes I think of things too bad to talk about.
59. I would do almost anything on a dare.
60. With things going as they are, it's pretty hard to keep up hope of amounting to something.
61. I take a rather serious attitude toward ethical and moral issues.
62. People today have forgotten how to feel properly ashamed of themselves.
63. I cannot keep my mind on one thing.
64. It's a good thing to know people in the right places so you can get traffic tags, and such things, taken care of.
65. I must admit that I often do as little work as I can get by with.
66. I like to be the center of attention.
67. I have no dread of going into a room by myself where other people have already gathered and are talking.
68. I get pretty discouraged sometimes.
69. The thought of being in an automobile accident is very frightening to me.
70. When in a group of people I have trouble thinking of the right things to talk about.
71. At times I feel like picking a fist fight with someone.
72. Planning one's activities in advance is very likely to take most of the fun out of life.
73. I was a slow learner in school.
74. I think I am stricter about right and wrong than most people.
75. I am likely not to speak to people until they speak to me.
76. I think I would like to drive a racing car.
77. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world."
78. One of my aims in life is to accomplish something that would make my mother proud of me.
79. I fall in and out of love rather easily.
80. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of thing.
81. Most people make friends because friends are likely to be useful to them.
82. I wish I were not bothered by thoughts about sex.
83. It is all right to get around the law if you don't actually break it.
84. Parents are much too easy on their children nowadays.
85. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.
86. I am somewhat afraid of the dark.

87. I have a tendency to give up easily when I meet difficult problems.

88. I certainly feel useless at times.

89. I consider a matter from every standpoint before I make a decision.

90. Criticism or scolding makes me very uncomfortable.

91. I have strange and peculiar thoughts.

92. If I am not feeling well I am somewhat cross and grouchy.

93. I have the wanderlust and am never happy unless I am roaming or traveling about.

94. I frequently notice my hand shakes when I try to do something.

95. I feel nervous if I have to meet a lot of people.

96. I would like to hear a great singer in an opera.

97. I am sometimes cross and grouchy without any good reason.

98. I like parties and socials.

99. My parents have often disapproved of my friends.

100. My family has objected to the kind of work I do, or plan to do.

101. I should like to belong to several clubs or lodges.

102. My home life was always happy.

103. Teachers often expect too much work from the students.

104. I often act on the spur of the moment without stopping to think.

105. I think I could do better than most of the present politicians if I were in office.

106. My way of doing things is apt to be misunderstood by others.

107. I have had blank spells in which my activities were interrupted and I did not know what was going on around me.

108. I commonly wonder what hidden reason another person may have for doing something nice for me.

109. I am certainly lacking in self-confidence.

110. Most people are secretly pleased when someone else gets into trouble.

111. When I work on a committee I like to take charge of things.

112. Sometimes I feel as if I must injure either myself or someone else.

113. I have had more than my share of things to worry about.

114. I often do whatever makes me feel cheerful here and now, even at the cost of some distant goal.

115. I usually don't like to talk much unless I am with people I know very well.

116. I am inclined to take things hard.

117. I am quite often not in on the gossip and talk of the group I belong to.

118. In school my marks in deportment were quite regularly bad.

119. I can remember "playing sick" to get out of something.

120. I like to keep people guessing what I'm going to do next.

121. The most important things to me are my duties to my job and to my fellowman.

122. In a group of people I would not be embarrassed to be called upon to start a discussion or give an opinion about something I know well.

123. If given the chance I would make a good leader of people.

124. When things go wrong I sometimes blame the other fellow.

125. I enjoy a race or game better when I bet on it.

126. I have often found people jealous of my good ideas, just because they had not thought of them first.

127. I like to go to parties and other affairs where there is lots of loud fun.

128. Most people are honest chiefly through fear of being caught.

129. I very much like hunting.

130. I have frequently found myself, when alone, pondering such abstract problems as freewill, evil, etc.

131. In school I was sometimes sent to the principal for cutting up.

132. I think I would like the work of a librarian.

133. I love to go to dances.

134. Most people inwardly dislike putting themselves out to help other people.

135. People pretend to care more about one another than they really do.

136. Most people worry too much about sex.

137. It is hard for me to find anything to talk about when I meet a new person.

138. I much prefer symmetry to asymmetry.

139. I would rather be a steady and dependable worker than a brilliant but unstable one.

140. I am apt to show off in some way if I get the chance.

141. Sometimes I feel that I am about to go to pieces.

142. A person does not need to worry about other people if only he looks after himself.

143. I can honestly say that I do not really mind paying my taxes because I feel that's one of the things I can do for what I get from the community.

144. I am so touchy on some subjects that I can't talk about them.

145. The future is too uncertain for a person to make serious plans.

146. Sometimes I just can't seem to get going.

147. I like to talk before groups of people.

148. I would like to be a nurse.

149. I am a good mixer.

150. I am often bothered by useless thoughts which keep running through my mind.

151. If I were a reporter I would like very much to report news of the theater.

152. Most of the time I feel happy.

153. I like to plan out my activities in advance.

154. When a man is with a woman he is usually thinking about things related to her sex.

155. I must admit that I have a bad temper, once I get angry.

156. I like mechanics magazines.

157. I must admit I find it very hard to work under strict rules and regulations.

158. I like large, noisy parties.

159. I sometimes feel that I am a burden to others.

160. Only a fool would try to change our American way of life.

161. I want to be an important person in the community.

162. I often feel as though I have done something wrong or wicked.

163. In school I found it very hard to talk before the class.

164. We ought to let Europe get out of its own mess; it made its bed, let it lie in it.

165. I dread the thought of an earthquake.

166. I think most people would lie to get ahead.

167. I am a better talker than a listener.

168. At times I have been very anxious to get away from my family.

169. I like science.

170. I often lose my temper.

171. I must admit I feel sort of scared when I move to a strange place.

172. I am bothered by people outside, on streetcars, in stores, etc., watching me.

173. I'm pretty sure I know how we can settle the international problems we face today.

174. Sometimes I rather enjoy going against the rules and doing things I'm not supposed to.

175. I have very few quarrels with members of my family.

176. If I get too much change in a store, I always give it back.

177. I often get disgusted with myself.

178. A large number of people are guilty of bad sexual conduct.

179. I like to read about science.

180. It is hard for me to act natural when I am with new people.

181. I refuse to play some games because I am not good at them.

182. I think I would like to belong to a singing club.

183. There have been times when I have worried a lot about something that was not really important.

184. I think I would like to belong to a motorcycle club.

185. Every now and then I get into a bad mood, and no one can do anything to please me.

186. I feel that I have often been punished without cause.

187. I would like to be an actor on the stage or in the movies.

188. At times I have a strong urge to do something harmful or shocking.

189. I often get feelings like crawling, burning, tingling, or "going to sleep" in different parts of my body.

190. I am afraid to be alone in the dark.

191. I have often gone against my parents' wishes.

192. I often wish people would be more definite about things.

193. I have nightmares every few nights.

194. If I am driving a car, I try to keep others from passing me.

195. I have a great deal of stomach trouble.

196. I have been afraid of things or people that I knew could not hurt me.

197. I cannot do anything well.

198. My parents wanted me to "make good" in the world.

199. When I was a child I didn't care to be a member of a crowd or gang.

200. In a group, I usually take the responsibility for getting people introduced.

201. I would be willing to describe myself as a pretty "strong" personality.

202. I almost never go to sleep.

203. I do not like to loan my things to people who are careless in the way they take care of them.

204. Voting is nothing but a nuisance.

205. When I am feeling very happy and active, someone who is blue or low will spoil it all.

206. I find that a well-ordered mode of life with regular hours is congenial to my temperament.

207. It is hard for me to sympathize with someone who is always doubting and unsure about things.

208. I often start things I never finish.

209. I could be perfectly happy without a single friend.

210. Education is more important than most people think.

211. I get nervous when I have to ask someone for a job.

212. There are times when I act like a coward.

213. Sometimes I used to feel that I would like to leave home.

214. Much of the time my head seems to hurt all over.

215. The idea of doing research appeals to me.

216. I have been in trouble one or more times because of my sex behavior.

217. There seems to be a lump in my throat much of the time.

218. Some people exaggerate their troubles in order to get sympathy.

219. In school most teachers treated me fairly and honestly.

220. I must admit I am a pretty fair talker.

221. I never make judgments about people until I am sure of the facts.

222. I usually try to do what is expected of me, and to avoid criticism.

223. If a person is clever enough to cheat someone out of a large sum of money, he ought to be allowed to keep it.

224. A person should not be expected to do anything for his community unless he is paid for it.

225. Some of my family have habits that bother and annoy me very much.

226. I must admit I have no great desire to learn new things.

227. No one seems to understand me.

228. A strong person will be able to make up his mind even on the most difficult questions.

229. I have strong political opinions.

230. Almost every day something happens to frighten me.

231. I dream frequently about things that are best kept to myself.

232. I think I am usually a leader in my group.

233. It is impossible for an honest man to get ahead in the world.

234. I like to have a place for everything and everything in its place.

235. I don't like to work on a problem unless there is the possibility of coming out with a clear-cut and unambiguous answer.

236. It bothers me when something unexpected interrupts my daily routine.

237. The future seems hopeless to me.

238. I seem to do things that I regret more often than other people do.

239. I have more trouble concentrating than others seem to have.

240. I have reason for feeling jealous of one or more members of my family.

241. I would never go out of my way to help another person if it meant giving up some personal pleasure.

242. Most of the arguments or quarrels I get into are over matters of principle.

243. I doubt if anyone is really happy.

244. I am known as a hard and steady worker.

245. My mouth feels dry almost all the time.

246. Success is a matter of will power.

247. I usually have to stop and think before I act even in trifling matters.

248. Most people would be better off if they never went to school at all.

249. It is pretty easy for people to win arguments with me.

250. I don't like things to be uncertain and unpredictable.

251. I have not lived the right kind of life.

252. I have used alcohol excessively.

253. Even when I have gotten into trouble I was usually trying to do the right thing.

254. A person is better off if he doesn't trust anyone.

255. Once I have my mind made up I seldom change it.

256. Life usually hands me a pretty raw deal.

257. At times I have been so entertained by the cleverness of a crook that I have hoped he would get by with it.

258. I think I am stricter about right and wrong than most people.

259. Most young people get too much education.

260. I have a natural talent for influencing people.

261. I am in favor of a very strict enforcement of all laws, no matter what the consequences.

262. People often talk about me behind my back.

263. I have one or more bad habits which are so strong that it is no use fighting against them.

264. I always see to it that my work is carefully planned and organized.

265. I regard the right to speak my mind as very important.

266. I am bothered by acid stomach several times a week.

267. I like to give orders and get things moving.

268. I have felt embarrassed over the type of work that one or more members of my family have done.

269. I don't think I'm quite as happy as others seem to be.

270. Any job is all right with me, so long as it pays well.

271. I am embarrassed with people I do not know well.

272. It often seems that my life has no meaning.

273. I used to steal sometimes when I was a youngster.

274. I feel like giving up quickly when things go wrong.

275. I have often felt guilty because I have pretended to feel more sorry about something than I really was.

276. There have been times when I have been very angry.

277. My home as a child was less peaceful and quiet than those of most other people.

278. Even the idea of giving a talk in public makes me afraid.

279. The things some of my family have done have frightened me.

280. As a youngster in school I used to give the teachers lots of trouble.

281. If the pay was right I would like to travel with a circus or carnival.

282. I never cared much for school.

283. I am troubled by attacks of nausea and vomiting.

284. The members of my family were always very close to each other.

285. There are times when I have been discouraged.

286. I have often been frightened in the middle of the night.

287. The trouble with many people is that they don't take things seriously enough.

288. I'm not the type to be a political leader.

289. My parents never really understood me.

290. I would fight if someone tried to take my rights away.

291. I must admit that people sometimes disappoint me.

292. If I saw some children hurting another child, I am sure I would try to make them stop.

293. People seem naturally to turn to me when decisions have to be made.

294. When the community makes a decision, it is up to a person to help carry it out even if he had been against it.

Appendix B

CPI Translation Table (Mandarin Chinese) for Junior High School Students, Means & Standard Deviations

變項	男生 (n = 896)		女生 (n = 898)		t 值
	平均數	標準差	平均數	標準差	
1.支配性 (Do)	11.19	5.18	9.83	5.42	5.43***
2.上進心 (Cs)	10.79	5.15	10.28	5.21	2.11
3.社交性 (Sy)	18.40	5.76	17.24	6.26	4.10***
4.自在性 (Sp)	13.56	5.25	12.95	5.60	2.37
5.自尊性 (Sa)	10.90	4.29	10.20	4.71	3.31***
6.幸福感 (Wb)	27.19	7.44	27.38	7.40	.55
7.責任心 (Re)	25.62	5.18	27.55	4.43	8.49***
8.社會化 (So)	20.32	4.92	21.07	4.52	3.34***
9.自制力 (Sc)	30.70	10.02	32.01	9.98	2.77**
10.寬容性 (To)	22.79	8.52	23.25	8.35	.38
11.好印象 (Gi)	24.15	9.46	24.11	9.45	.03
12.同家性 (Cm)	20.72	3.23	21.40	2.78	.18
13.遵循成就 (Ac)	22.91	7.25	23.04	7.38	.12
14.獨立成就 (Ai)	11.60	3.93	11.55	3.86	.26
15.精幹性 (Ie)	19.78	5.79	18.87	5.83	1.10
16.心理性 (py)	11.70	4.63	10.81	4.55	4.08***
17.伸縮性 (Fx)	8.66	3.82	8.86	3.85	1.08
18.女性化 (Fe)	12.64	2.59	16.39	2.59	10.22***

** P < .01 ，雙向檢定。

*** P < .001 ，雙向檢定。

Appendix C

CPI Conversion Table, Raw Scores to Standard Scores

粗數	Do	Cs	Sy	Sp	Sa	Wb	Re	So	Sc	To	Gi	Cm	Ac	Ai	Ie	Py	Fx	Fe	原始分數
52									71										52
51									70										51
50									69										50
49									68										49
48									67										48
47									66										47
46									65		73								46
45									64		72								45
44									63		71								44
43									62		70								43
42									61	73	69								42
41									60	71	68								41
40						67			59	70	67								40
39						66			58	69	66								39
38			84			65			57	68	65								38
37			82			63			56	67	64								37
36			81			62			55	65	63		68						36
35			79			60			54	64	61		67						35
34			77			59	66		53	63	60		65						34
33			75			58	64		52	62	59		64						33
32			74			56	62		51	61	58		63						32
31			72			55	60		50	60	57		61						31
30			70	81		54	58		49	58	56		60		68				30
29			68	79		52	57		48	57	55		58		66				29
28	82	83	67	78		51	55	66	47	56	54		57		64				28
27	81	81	65	76		50	53	64	46	55	53	69	56		62				27
26	79	80	63	74	85	48	51	62	45	54	52	66	54		61		95		26
25	77	78	61	72	83	47	49	59	44	53	51	63	53		59		93		25
24	75	76	60	70	81	46	47	57	43	51	50	60	51		57	77	90		24
23	73	74	58	68	78	44	45	55	42	50	49	57	50		56	74	87		23
22	71	72	56	66	76	43	43	53	41	49	48	54	49	76	54	72	85		22
21	69	70	55	64	74	42	41	51	40	48	47	51	47	74	52	70	82	82	21
20	67	68	53	62	71	40	39	49	39	47	46	48	46	71	50	68	80	78	20
19	65	66	51	60	69	39	37	47	38	46	45	45	45	69	49	66	77	75	19
18	63	64	49	58	67	38	35	45	37	44	43	42	43	66	47	64	74	71	18
17	61	62	48	57	64	36	33	43	36	43	42	38	42	64	45	61	72	67	17
16	59	60	46	55	62	35	31	41	35	42	41	37	40	61	43	59	69	63	16
15	57	58	44	53	60	34	29	39	34	41	40	32	39	59	42	57	67	59	15
14	55	56	42	51	57	32	28	37	33	40	39	29	38	56	40	55	64	55	14
13	53	54	41	49	55	31	26	35	32	39	38	26	36	54	38	53	61	51	13
12	52	52	39	47	53	30	24	33	31	37	37	23	35	51	37	51	59	48	12
11	50	50	37	45	50	28	22	31	30	36	36	20	34	48	35	48	56	44	11
10	48	48	35	43	48	27	20	29	29	35	35	17	32	46	33	46	53	40	10
9	46	47	34	41	46	26	18	27	28	34	34	14	31	43	31	44	51	36	9
8	44	45	32	39	43	24	16	25	27	33	33	11	29	41	30	42	48	32	8
7	42	43	30	37	41	23	14	23	26	31	32		28	39	28	40	46	28	7
6	40	41	28	36	39	22	12	21	25	30	31		27	36	26	38	43	24	6
5	38	39	27	34	36	20	10	19	24	29	30		26	33	24	36	40	20	5
4	36	37	25	32	34	19	8	17	23	28	29		24	31	23	33	38	17	4
3	34	35	23	30	32	18	6	15	22	27	28		23	28	21	31	35	13	3
2	32	33	22	28	29	16	4	13	21	26	27		21	26	19	29	33	9	2
1	30	31	20	26	27	15	2	11	20	24	26		20	23	18	27	30	5	1

Appendix D

AAHPER Youth Fitness Test
Individual Score Cards

Name _____ Date of Birth _____

School _____ Medical Clearance for Testing Date _____

Grade _____ Sex _____

TEST ITEMS	Date of Test _____ Age Yrs.__ Mos.__		Date of Test _____ Age Yrs.__ Mos.__		Date of Test _____ Age Yrs.__ Mos.__		Date of Test _____ Age Yrs.__ Mos.__	
	Raw Score	Centile Rank	Raw Score	Centile Rank	Raw Score	Centile Rank	Raw Score	Centile Rank
Height								
Weight								
Pull-up (Boys)								
Flexed-arm Hang (Girls)								
Sit-ups in 60 sec.								
Shuttle run								
Standing Broad Jump								
50-yd. dash (45.73m)								
600-yd. run (548.78m)								
9-minute run or 1-mile run (1609.76m)								
Step Test								
Percent Body Fat								
Body Density								

Appendix E

Consent Forms

STUDENT'S CONSENT FORM

This study involves taking six physical fitness tests, being weighed, and having your height measured, in addition to completion of a personality questionnaire. All information will be kept completely anonymous and your name will not be used. The physical fitness tets will be supervised by your coach/teacher and are no more dangerous than team practice or physical education classes.

I have received an oral explanation of the study procedures and understand that they entail:

A. California Psychological Inventory (CPI) Test Procedures

1. The CPI will be given to you in your regular classroom by your school counselor.

2. You will be assured that your name will not appear on your answer sheet relative to the administration of the CPI.

3. Before administration of the CPI, the examiner will explain the test purpose, testing procedures, how long the tests will take (i.e., about 45 minutes), and will instruct students to write their assigned numbers on their answer sheets.

B. AAHPER Physical Fitness Tests and Ponderal Index (PI) Procedure

1. The AAHPER tests include: pull-ups, sit-ups, shuttle run, standing long jump, the 50-yard run, and the 600-yard run-walk.

2. The PI involves the simple procedure of determining your weight and height measurements.

C. Possibile Stresses and Strains

As a result of performing the AAHPER fitness test items, muscle soreness, strains, or injuries can occur due to great effort or overexertion. Every effort will be taken to minimize such discomfort:

1. Your will participate in a brief warm-up period of exercise prior to the physical fitness testing.
2. The tests will be clearly explained and demonstrated to you.
3. You may at any time ask for assistance from the adults giving the tests.
4. Your CPI scores will be kept confidential.
5. You are free to withdraw from the study at any time.

I have read the foregoing and agree to participate in the study.

_____ _____

Student's Signature Date

_____

_____ _____

Address Phone Number

_____

Student Age

PARENT'S CONSENT FORM

Title: A Cross-Racial Comparison of the Relationship of Personality Traits, Body Mass, and Physical Fitness Among Junior High School Students

INVESTIGATOR: Ching-Ho Lin

PURPOSE: To compare differences in personality traits among aboriginal Taiwanese and ethnic Chinese junior high school student athletes and nonathletes, utilizing the California Psychological Inventory (CPI). The secondary purpose is to determine the relationship among body mass, physical fitness, and personality traits for the same groups of subjects.

Your child has been selected to be a subject in this study. Your permission is requested for his participation. He will be asked to take the California Psychological Inventory (CPI), the AAHPER Physical Fitness Test, and be weighed and have his height measured.

1. CALIFORNIA PSYCHOLOGICAL INVENTORY (CPI)

   a. The CPI measures personality. It includes 18 personality factors, including: dominance, capacity for status, sociability, social presence, self-acceptance, tolerance, responsibility, socialization, self-control, good impression, communality, well-being, achievement via conformance, achievement via independence, intellectual efficiency, psychological mindedness, flexibility, and femininity/masculinity.

   b. The CPI will be administered by school counselors using standard instructions for the test. It will be given in the school classroom.

2. AAHPER YOUTH FITNESS TEXT

   a. The AAHPER tests include pull-ups, sit-ups, shuttle-run, standing long jump, 50-yard run, and 600-yard run-walk. Participants will be asked to demonstrate their best physical performance on each test item.

   b. Testing will be conducted over a two-day period and will be conducted by the investigator and members of your school staffs.

3. PONDERAL INDEX (PI)

   Students will be weighed and have their height measured. To record these measurements, students will be asked to remove their shoes, coats, or other heavy garments.

4. POSSIBILE STRESSES AND STRAINS

   a. Any testing procedure in which individuals are requested to perform at maximal levels of effort can lead to muscle soreness, strains, or injuries. Every effort will be taken to minimize such discomforts. Such precautions include:

      1) The annual medical examination taken by each student at the beginning of the school year will serve to screen participants for the study.

      2) Prior to administration of the AAHPER tests, examiners will administer brief warm-up periods of exercise (based upon exercises prescribed by the Ministry of Education) to minimize the possibility of muscle strains.

      3) Students will be taught selected relaxation and deep breathing exercises to reduce tension and conserve energy.

   b. The examiners will advise students to avoid comparisons with one another, but to simply perform to the best of their individual abilities for each test exercise.

5. GUARANTEE OF ANONYMITY. The questionnaires completed by each subject will be identified by assigned Arabic numeral in place of the individual name. This Arabic numeral will be assigned only for testing purposes. Thus confidentiality will be maintained for all responses to the CPI questionnaire, each answer sheet for which will be identified only by number.

The benefits of participation in the study include the opportunity to contribute to the improvement of our knowledge and understanding of a particular society, as well our understanding of the needs and motivations of junior high school students participating in physical education or sports competitions.

I have been completely informed and understand the nature and purpose of this research study. The researchers have offered to answer any further questions that I may have. I understand that the participation of my child in this study is completely voluntary and that he may withdraw from the study at any time without prejudice.

I have read the foregoing and give permission for my child to participate.

_____	_____	_____
Parent's Signature	Date	Telephone

_____

_____

Address

Appendix F

CPI Test Procedures

To the School Counselor:

It would be greatly appreciated if you would observe the procedures described below:

1. The test will require approximately one hour or more.

2. Administer the questionnaire to all subjects at the same time.

3. The investigator will provide test materials, including pencils, erasers, and answer sheets.

4. Set a formal tone by reading the following directions to the subjects:

   You are being requested to help in a research study. Your individual responses are a valuable source of information for the study. You may be certain that your responses will be maintain in strict confidence, and that you will at all times remain anonymous. Answer all questions completely. Do not discuss your responses with any of your friends until all of the questionnaires have been completed and returned to me. Please do not begin the questionnaire until I give the signal to begin. Then, read the first page carefully and start the questionnaire.

5. Pass out the questionnaires and answer sheets, upon which the code number for each subject is already indicated in Arabic numerals, and explain to the subjects that they can circle or check as many or as few of the responses they believe to be appropriate, according to the individual question. Please do not rush the subjects to complete the questionnaires. This is not a timed examination and thoughtful answers are the object.

6. When the subjects have completed the answer sheets, place them in the envelope provided, seal the envelop, and return the sealed envelope with the questionnaires to the investigator.

I have read the foregoing and agree to be a CPI examiner for the study.

_____ _____

Counselor's Signature Date

Appendix G

AAHPER Youth Fitness Test Procedures

To Coaches and Physical Educators:

It would be greatly appreciated if you would observe the procedures described below:

The AAHPER Youth Fitness Test (Safrit, 1990) will be administered in two days of testing: 1) Pull-ups, the shuttle-run test, and sit-ups; and 2) the standing long jump, the 50-yard dash, and the 600-yard run.

1. Pull-ups, one trial allowed:
   a. using overhand grip (palms outward)
   b. legs and arms fully extended, feet not in contact with the floor
   c. from the hanging position, raise the body, chin over the bar, then lower the body to a full hang and regain the starting position
   d. repeated as many times as possible

2. Sit-ups, one trial allowed:
   a. subject lies on his/her back with knees bent, feet on the floor, heels not more than 12 inches from the buttocks
   b. angle at the knees should be less than 90 degrees
   c. subject places hands on back of neck, with fingers clasped, then places elbows squarely on the mat
   d. subject's feet are held by his/her partner to maintain touch with the surface
   e. subject tightens abdominal muscles or brings head and elbows forward as he/she curls up, finally touching the elbows to the knees
   f. action constitutes one sit-up
   g. subject regains starting position with elbows on the surface before performing additional sit-ups
   h. timed exercise beginning at the signal "go" and ending at the signal "stop"
   i. score recorded as the number of correctly executed sit-ups performed in 60 seconds

   NOTE:
   a. keep fingers clasped behind the neck
   b. do not push off the floor with the elbows

c. return to start position with elbows flat on the surface before performing next sit-up

3. Shuttle-run text, two trials performed with rest between trials:
   a. place two parallel lines on the floor 30 feet apart
   b. place two wooden blocks behind one of the lines
   c. subjects starts from behind other line on the signal "go," at which subject runs back to start line and places the block on the floor beyond the line
   d. subject returns to initial position, picks up other block and crosses finish line as rapidly as possible
   e. timed exercise starting at signal "go" and ending as the subject crosses the start line

4. Standing long jump test, three trials:
   a. subject stands behind restraining line, with feet several inches apart and toes pointed straight ahead
   b. to prepare for the jump, subject should swing arms backward and bend the knees
   c. to execute jump, subject swings arms forward, extending the knees and jumping forward as far as possible
   d. subject attempts to land on feet

5. 50-yard dash, two trials:
   a. subject standing behind restraining line, ready at commands "are you ready," "go"
   b. timed event beginning with last signal and downward sweep of the arm
   c. subject runs as fast as possible without slowing until crossing the finish line
   d. timing begins as starter's arm reaches the downward position and is stopped as finish line is crossed

6. 600-yard run test, one trial:
   a. subject to use standing start at the signals "ready" and "go"
   b. timed event starting on command "go"
   c. subjects begins to run and continues running as fast as possible until he/she crosses finish line
   d. subjects not encouraged to walk

_____ _____

Coach or Physical Educator Signature Date