

A COMPARISON OF THE PSYCHOLOGICAL MOOD PROFILES
OF ELITE CEREBRAL PALSIED ATHLETES AND CEREBRAL PALSIED
NON-ATHLETES

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Abstract

The objectives of this study were: (1) to compare the psychological mood profiles of elite cerebral palsied athletes with cerebral palsied individuals who were not involved in sport and (2) to compare these results with elite able-bodied athletes and able-bodied non-athletes. Twenty-eight elite Canadian cerebral palsied athletes completed a psychological mood questionnaire during a training camp just prior to departing for the Cerebral Palsy-International Sport and Recreation Association games in Belgium. A comparable group of elite able-bodied athletes were also required to answer the questionnaire while participating at a national competition. These results were compared to responses by able-bodied non-athletes and cerebral palsied non-athletes. Mood factors for athletes were analyzed as a function of the number of years in competition and sports events. In addition, mood factors were analyzed as a function of sports classification for the cerebral palsied athletes.

In order to examine group differences, two factors were considered: physical ability, cerebral palsied or able-bodied, and athletic ability, athletes or non-athletes. The results indicated a significant main effect for athletic ability. As well there were significant differences between the cerebral palsied athletes and the cerebral palsied non-athletes, while there were no significant differences

between the able-bodied athletes and the able-bodied non-athletes across the six POMS dimensions. There were also no significant differences between the cerebral palsied athletes and the able-bodied athletes. The findings were discussed in relationship to previous studies that employed the Profile of Mood States (POMS) with able-bodied and physically disabled athletes. Finally, gender, education, sport type and classification had no influence on the results of the POMS with reference to the respective groups.

In conclusion, age was considered to be a major influence in this study. Findings revealed that the able-bodied and cerebral palsied subjects were more alike than different with respect to their psychological mood profiles. In addition, the comparison made between the cerebral palsied athletes and the cerebral palsied non-athletes almost reached a significant level acceptable at $p < .05$. Thus the disabled individuals in this study were similar to the able-bodied, and the cerebral palsied athletes were different from the cerebral palsied non-athletes across the six POMS dimensions.

Résumé

Les objectifs de cette étude étaient: (1) de comparer les profils thymiques psychologiques d'athlètes élités canadiens atteints de paralysie cérébrale avec ceux d'individus non-athlètes atteints de paralysie cérébrale et (2) de comparer ces résultats avec ceux obtenus auprès d'athlètes élités valides et d'individus non-athlètes valides. Vingt-huit (28) athlètes élités canadiens atteints de paralysie cérébrale ont rempli un questionnaire sur la thymie psychologique lors d'un camp d'entraînement précédant les compétitions de Cerebral Palsy-International Sport et de Recreation Association qui se tenaient en Belgique. Un groupe identique d'athlètes élités valides ont aussi rempli ce questionnaire au moment où ils participaient à une compétition de niveau national. Les résultats obtenus ont été comparés avec les réponses recueillies auprès des individus non-athlètes valides et des individus non-athlètes invalides. Les facteurs thymiques des athlètes ont été analysés en fonction du nombre d'années de compétition et du nombre d'épreuves sportives. Ils ont également été analysés en relation avec le classement des athlètes atteints de paralysie cérébrale.

Afin d'analyser les différences entre les groupes, deux éléments ont retenu l'attention, soit la condition physique des sujets valides et invalides et la condition athlétique

des sujets-athlètes et non-athlètes. Les résultats ont une démontré importante différence significative en ce qui concerne la condition physique et la condition athlétique. En ce qui concerne les six (6) cotes du questionnaire Profile of Mood States (POMS), aucune différence significative n'a été observée entre les athlètes atteints de paralysie cérébrale et les individus non-athlètes atteints de paralysie cérébrale. De même, aucune différence significative n'a été notée entre les athlètes invalides et les athlètes valides. Les résultats des recherches ont été analysés en relation avec de précédentes études basées sur le POMS avec des athlètes valides et invalides. Enfin, le sexe, l'éducation reçue, le sport pratiqué et le classement n'influaient aucunement les résultats du POMS.

En conclusion, l'âge fut déterminé comme facteur influent dans cette étude. Les résultats ont démontré qu'il existait au niveau des profils thymiques psychologiques plus de similitudes que de dissemblances entre les sujets atteints de paralysie cérébrale et les sujets valides. De plus, la comparaison effectuée entre les athlètes atteints de paralysie / cérébrale et les individus non-athlètes atteints de paralysie cérébrale a confirmé un résultat significatif presque satisfaisant, soit $p < .05$. Ainsi, les résultats du questionnaire POMS obtenus auprès des sujets invalides de cette étude étaient similaires à ceux obtenus auprès des sujets valides et les résultats obtenus auprès

des athlètes invalides étaient différents de ceux obtenus auprès des sujets non-athlètes.

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Chapter I

INTRODUCTION

Individuals often state that they feel better following both acute (Morgan, 1968a; Byrd, 1964; Morgan, Roberts, & Feinerman, 1971) and chronic (Brunner, 1969; Mann, Garrett, Farhi, Murray, & Billings, 1969; Morgan, Roberts, Brand, & Feinerman, 1970) physical activity. Health professionals also promote physical activity to decrease illness, relieve tension, and to heighten ones' tolerance level (Byrd, 1963; Morgan, 1968a; Morgan et al., 1971; Sessoms, 1965). Morgan (1968a) indicated that the physical well being of an individual is important for the maintenance of his/her emotional and mental health. The importance of this activity is assumed equal for all, including the disabled population (Monnazzi, 1982).

Individuals with a physical disability face many social, economic, and psychological adjustments during the rehabilitation process. For example, the physique is part of the composition of one's personality (Meyerson, 1948). Thus, if a disability affects the way one looks it may also become a psychological problem which can lead to difficulties of social integration (Allport, 1937).

Vargo (1978) described the psychological stages through

which individuals with a disability might progress. The beginning stage is the denial of the disability. This is followed by mourning, and finally adjusting to the disability. Rehabilitation is thus physical, and psychological in nature.

The concept of sport as rehabilitation is not new, since therapeutic gymnastics were used by the ancient Greeks (Stewart, 1981). However, sports for persons who are physically disabled is a much newer idea and has grown during this century; prompted by the great number of disabled veterans from each of the two World Wars (Stein, 1982; Stewart, 1981). After the Second World War, sport was employed specifically as a tool in rehabilitation. More recently there has been an exponential growth of organized sports for the individual with a disability.

Sports were originally viewed as a vehicle to break the monotony of physiotherapy and to add a competitiveness to the persons' life which could be a means of psychological renewal. Furthermore, participation in sport was often associated with a positive self concept and self esteem (Brinkman & Hoskins, 1979; Harvey & Greenway, 1984; Johnson, Johnson, & Rynders, 1981; Monnazzi, 1982). In addition, participation in sports can allow the individual with a disability to regain contact with the reality of the world in which he/she lives, facilitating social reintegration (Brinkman & Hoskins, 1979; Harvey & Greenway, 1984; Johnson

et al., 1981; Monnazzi, 1982).

The values of sport for individuals with disabilities have exceeded the rehabilitation benefits and now parallel the assumed values espoused for able-bodied athletes. These values include: development of self control and self discipline, increase in social status, worthy use of leisure time, increase in physical well being, opportunity for competition, and opportunity to develop teamwork and cooperation (Kniker, 1974; Stein, 1982). With competitive opportunities for athletes with disabilities beginning to mirror those of able-bodied athletes, it is not surprising that research has begun to focus on the elite athlete who is disabled (eg. Canabal, Sherrill, & Rainbolt, 1985; Henschen, Horvat, & French, 1984).

In the past, the emphasis in training able-bodied and disabled athletes for competition has been based on physiological factors that influence successful performance. While the physiological factors of training are essential for performance and are the groundwork for the competitive athlete, it is necessary to consider the psychological factors which are also strong indicators of successful competition and improved performances (eg. Canabal et al., 1985; Fodero, 1980; Morgan & Johnson, 1978).

Sport psychologists have attempted to analyze the psychological characteristics of these elite athletes through the study of sport personology (Straub, 1980). For

example, research has focused on personality trait differences between athletes and non-athletes and successful and less successful athletes. There are several purposes of this descriptive research: (a) to allow coaches to relate to players more effectively so that individual and team performances can be improved, (b) for athletes to know more about their own personalities so that they can be more effective in their personal and professional lives (Straub, 1980), (c) to identify personality characteristics that hinder performance or indicate a psychological weakness, thus modifying the training programs or initiating them (i.e., relaxation training, biofeedback); (d) to develop assessment techniques that can be used for screening athletic potential and to match athletes accordingly to a sport in which they are highly compatible (Horsfall, Fisher, & Morris, 1977), and (e) to collect data and formulate theories that can be used by coaches as a tool for selection and maintenance of psychologically fit elite competitors (Straub, 1980).

Personality trait differences are not the only topic in sport personology. Morgan (1980b) pointed out that trait psychology has existed for many years and has represented a central issue for individuals in the field of sport psychology. However individual state differences are important as well. The change in research occurred a decade ago. It was Martens (1975) who reported that inventories

were needed to measure specific states in sport psychology in place of existing measures designed to assess broad or general traits. Distinctions were then made between 'broad' and 'narrow' trait measures, as well as state measures just prior to performance. These state measurements were even better predictors than narrow trait measures (Zuckerman, 1979).

According to the Canadian Cerebral Palsy Association (1982),

Cerebral Palsy is a general term covering non-progressive damage to the developing brain. Cerebral refers to the brain and palsy to the lack of muscle control.

Damage to the brain half way through pregnancy up until about the end of the third year of life can result in cerebral palsy, usually resulting in poor control of the muscles of the limbs and trunk.

There may also be interference with the control of the muscles of the eyes and mouth, affecting sight and speech. In addition, damage may affect a child's learning ability and may cause problems with behaviour. (p. 1)

During the 1970s, sports competitions for persons with cerebral palsy developed both nationally and

internationally. Sponsorship for cerebral palsy sports organizations initially came from the National Wheelchair Athletic Association. However a separation occurred in 1978 whereby cerebral palsy sports associations formed the National Association of Sports for Cerebral Palsy (NASCP). Since that time, there have been several local and regional competitions held as well as the National Cerebral Palsy Games.

1.1 Significance of the Study

During the past decade interest has grown in the individual with cerebral palsy. Descriptive research has begun in the biomechanical, physiological, and sociological areas (Sherrill, 1986). However there is little research on the psychological domain of the individual with cerebral palsy and cerebral palsied athletes (Canabal et al., 1985). This psychological assessment is important to understand the cerebral palsied elite athlete. Just as there is the need to understand the psychological and physiological profile of the able-bodied athlete, it is necessary to learn more about the athlete with cerebral palsy. "We need to know whether existing psychological theories and research methods can account for the experience of disabled people" (Asch, 1984, p.533). Asch (1984) explains this idea further by pointing out that all areas of research need to include people with handicaps to determine if the disability is an

overriding characteristic or under what conditions its importance diminishes. "If differences do emerge between disabled and nondisabled subjects, such research should seek to analyze the psychological, environmental, and social concomitants of disability in the situations studied and to ponder whether differences in power and status between disabled and nondisabled may explain some of the findings" (Asch, p. 533).

According to Canabal et al. (1985) "the mental health model espoused by Morgan (1980b) as predictive of success in athletics appears applicable to cerebral palsy sport" (p.3). In this model, success and positive mental health are viewed as directly proportional. The psychological measurement is the Profile of Mood States (POMS). The extent to which the POMS has been accurate in predicting success and failure in sport has been outlined in several papers (Morgan & Costill, 1972; Morgan & Johnson, 1978; Nagle, Morgan, Russel, Hellickson, Serfass & Alexander, 1975; Silva, Shultz, Haslam, & Murray, 1981). As well, the POMS has been used in comparing psychological mood profiles of able-bodied and wheelchair athletes (Henschen, Horvat, & French, 1984), and successful and unsuccessful cerebral palsied athletes (Canabal, Sherrill, & Rainbolt, 1985). "The model predicts that: high scores on vigor and low scores on tension, depression, anger, fatigue, and confusion are believed to characterize good mental health and thus contribute to

athletic success" (Morgan, 1980a, p. 97). These moods are a result of how an individual scores on the POMS. Additional research is needed to explain the psychological mood profiles of individuals having cerebral palsy, both athletic and non-athletic.

There have been very few studies that have looked at the psychological-personality domain of disabled individuals (eg. Harper, 1978; Harper & Richman, 1978; Monnazzi, 1982; Muthard, 1965), and even fewer studies have examined the psychological mood profiles of disabled versus able-bodied athletes (Canabal et al., 1985; Henschen et al., 1984). Henschen et al. (1984) compared the psychological mood profiles of able-bodied and wheelchair (amputee) athletes using the POMS test and the State-Trait Anxiety Inventory. According to Morgan (1980a) the POMS is the most highly predictive of athletic success and is sensitive to mood change and short-term changes caused by medication. In addition, it is a self report which is a direct means of assessing personality. The findings of Henschen et al. (1984) revealed that wheelchair athletes had a psychological profile that was actually closer to the 'iceberg profile' introduced by Morgan (1980a) than the able-bodied athletes. This 'iceberg profile' consists of scoring well above average on vigor and below average on tension, depression, confusion, and fatigue.

Canabal et al. (1985) compared the psychological mood

profiles, using the POMS, of international and noninternational cerebral palsied athletes. Multivariate results showed no overall significant differences between the two groups. However a significant univariate difference was revealed between international cerebral palsied athletes and noninternational cerebral palsied athletes in their scores on the mood factor vigor.

As in all areas of research there are limitations. Variables such as sport classification, sport type, and number of years in competition have not been examined thoroughly to see their relationship with psychological profiles of elite cerebral palsied athletes. Specifically there is a need to discover if cerebral palsied elite athletes exhibit the same psychological mood profile present with the able-bodied elite athlete. If this is found, particular sports may well be suited for specific personality characteristics. Sport classification may also contribute to an athletes' psychological profile. According to the Cerebral Palsy-International Sports and Recreation Association (1985) there are eight classifications for cerebral palsied athletes and thirteen sports in which to compete in at this elite level (see section 1.6). There may well be differences in mood factors depending on whether an athlete is ambulatory or nonambulatory. Consistency may be found in the psychological profiles of cerebral palsied athletes in a particular class competing in a particular

type of sport.

In sum, research must continue to identify whether existing theories and models in the psychological domain are applicable to athletes with disabilities. If they are, research will be much closer to finding the means of fully integrating the disabled population into all facets of society, including sport. By understanding and recognizing the mood profiles of disabled athletes during training and/or prior to competition, we may also begin to implement strategies and various psychological techniques to enhance their athletic performance.

1.2 Statement of the Problem

The purpose of this study was to compare the psychological mood profiles of elite cerebral palsied athletes, with that of cerebral palsied individuals who were not involved in sport. The introduction of a group of elite able-bodied athletes and non-athletes allowed further comparisons to be made with respect to the psychological mood profiles of reference groups.

1.3 Hypotheses

(1) There will be significant differences across the six POMS dimensions with respect to physical ability, cerebral palsy or able-bodied, and athletic ability, athletes or non-athletes.

(2) There will be no significant differences according to gender across the six POMS dimensions with cerebral palsied athletes, cerebral palsied non-athletes, able-bodied athletes, and able-bodied non-athletes (Canabal et al., 1985; McNair, Lorr, & Droppleman, 1971).

(3) There will be no significant differences between the cerebral palsied athletic group and the able-bodied athletic group across the six POMS dimensions. Henschen et al. (1984) found wheelchair athletes mood profile similar, if not better, than elite male and female gymnasts profile when compared visually. This profile consisted of the wheelchair athletic group scoring higher on vigor, and lower on tension, depression, anger, fatigue, and confusion.

(4) There will be significant differences between the able-bodied athletes and the able-bodied non-athletes across the six POMS dimensions (Booth, 1958; Cooper, 1969; Slusher, 1964; Tharp & Schlegelmilch, 1977).

(5) There will be significant differences between the cerebral palsied athletes and the cerebral palsied non-athletes across the six POMS dimensions.

(6) There will be significant differences among sports classifications across the six POMS dimensions with the

cerebral palsied athletes. Canabal et al. (1985) and Henschen et al. (1984) found that individuals confined to a wheelchair scored rather high on the anger mood dimension.

1.4 Delimitations

Considering the sample size chosen in the study, generalizations made to other populations should be minimized.

Specifically, the delimitations are as follows:

- (1) Elite cerebral palsied athletes training for a competitive event were used as subjects.
- (2) Elite able-bodied athletes who were involved in a national competition were used as subjects.
- (3) The POMS is a personality test measuring the mental health of an individual, specifically ones' mood profile. However there are other tests which measure different components of the psychological domain. This study was specifically interested in examining the psychological mood profiles of the subjects involved.

1.5 Limitations

The first limitation to this study was the fact that data were collected at a competition for the able-bodied athletes, while data for the cerebral palsied athletes was collected at a training camp. This could cause some differences in the psychological mood profiles of the two

groups due to greater tension and/or fatigue at an actual competition. However, the CP-ISRA games in Belgium were an extremely important competition for athletes having cerebral palsy so that the anxiety and excitement for these athletes was assumed to be as high during the training camp as the actual competition itself.

The second limitation to this study was the possible confounding of a competitive setting and athletic status. It was important to administer the POMS during a competitive setting but subsequent comparisons with non-athletes makes interpretation difficult. If there are differences between athletes and non-athletes one must question if such differences are attributed to being classified as an athlete or the actual competitive setting under which the POMS was administered.

Another limitation to this study was related to data collection procedures. Some cerebral palsy subjects required assistance during test completion. Subjects may have been apprehensive about what their results might reveal about them, either as individuals or as subjects who are expected to be representative of a given population (Cherulnik, 1983). Gergen (1973) also refers to this as the "psychology of enlightenment". In other words, the effects of the public can determine how an individual will respond to a psychological test such as the POMS. This limitation was applicable to all cerebral palsied subjects.

participating in this study.

1.6 Definitions

Ambulatory: individuals who are able to walk on their own or with assistive devices such as crutches, walkers, or canes (Class 5-8) according to CP-ISRA

Non-ambulatory: individuals who need wheelchairs to move about (Class 1-4) according to CP-ISRA

Elite Able-Bodied Athletes: those athletes who compete at a national or international level

Elite Cerebral Palsied Athletes: athletes who reach a level of competition at or near national standards (Cooper, Sherrill, & Marshall, 1986)

Sports Classifications for Cerebral Palsied Athletes:

Class (1) - functional profile is quadriplegic with individuals having poor functional range of motion and poor strength in all extremities and torso; dependent on electric chair or assistance for mobility

Class (2) - functional profile is quadriplegic-hemiplegic (one side), with individuals having fair function in non-affected side; generally have poor functional strength

in all extremities and torso; able to propel a wheelchair on flat surface; Class 2 is divided into upper and lower functional ability depending on how individual propels wheelchair

Class (3) - functional profile is moderate quadriplegic or triplegic (three extremities), moderate hemiplegic with almost full functional strength in dominant upper extremity; wheelchair can be propelled independently

Class (4) - functional profile is moderate to severe diplegic (two limbs) with good functional strength and minimal limitations in upper extremities, and lower extremities having slow, moderate to severe limitation; assistive devices needed for ambulation

Class (5) - functional profile is moderate to severe diplegic or hemiplegic; ambulation is without wheelchair but assistive devices may be required for walking long distances

Class (6) - functional profile is moderate to severe quadriplegic; where individual ambulates without aids

Class (7) - functional profile is a true ambulant hemiplegic, congenital or acquired

Class (8) - functional profile is for the minimally involved hemiplegic, monoplegic (one limb only), and the very minimally involved diplegic

The six POMS mood dimensions are:

- (1) Tension-Anxiety - Factor T is defined by adjective scales descriptive of heightened musculoskeletal tension
- (2) Depression-Dejection - Factor D appears to represent a mood of depression accompanied by a sense of personal inadequacy
- (3) Anger-Hostility - Factor A appears to represent a mood of anger and antipathy towards others
- (4) Vigor-Activity - Factor V is defined by adjectives suggesting a mood of vigorousness, ebullience, and high energy
- (5) Fatigue-Inertia - Factor F represents a mood of weariness, inertia, and low energy level
- (6) Confused-Bewilderment - Factor C appears to be characterized by bewilderment and muddleheadedness (McNair et al., 1971)

Chapter II

REVIEW OF THE LITERATURE

The following chapter is divided into four sections: (1) the state and trait controversy, (2) the elite athlete, (3) the emotional adjustment to a physical disability, (4) personality profiles of the physically disabled. The first section deals mainly with trait and state psychology and its relationship to the type of personality test which is most appropriate for measuring either state or traits. This is followed by the second section which is an examination of the psychological composition of elite athletes and attempts to explore the issue of whether the elite disabled athlete portrays a similar profile. The third section looks primarily at the physically disabled individual and the psychological adjustment period which takes place during the individuals' life. The last section investigates those studies which deal with the differences in the personality profiles of the physically disabled individual and examines the way sport enhances the individuals' psychological profile.

3.1 The state and trait controversy

One of the past concerns in the personality literature

was the question of whether one was born with a specific personality, or whether one was influenced by the many environmental factors that may cause a change in an individual's personality profile (Morgan, 1968a, 1974; Ogilvie, 1968). Ogilvie (1968) stated that there was a lack of longitudinal studies that supported the concept that personality does not change over time. Thus, it is difficult to solely attribute personality variables toward genetic variables. Instead, one's character must be accepted as an interaction of a number of variables. Johnson (1966) has reported that "the likeness of personality has been likened to measuring a cloud, because a few minutes after measurement it changes" (P. 26).

Primarily there are two rival schools of thought in sport psychology: (a) trait psychology; and (b) state psychology. The trait approach believes that the main source of behavioral variance is genetic. Sport personality researchers who tried to discover personality traits which discriminate certain types of athletes (e.g., superior versus inferior; team versus individual) usually espouse the trait psychology approach. In state psychology, personality is explained by accounting for human behavior largely in terms of the situation in which it occurs, while individual traits are not as important. (Singer, Harris, Kroll, Martens, & Sechrest, 1977).

Interactionism, a third paradigm which has come forth,

is a combination of the previous two. In the interactional paradigm, the situation, as well as the personal variables, are considered co-determinants of behavior. Thus, depending on the sample population and the situation being considered, a particular group will display a specific personality profile (Singer et al., 1977).

Trait psychology had been criticized for: (a) overlooking the influence of the environment, (b) overlooking the specific task the sample is involved in, and (c) ignoring the contribution of other group members to the personality profile of an individual (Hogan, Desoto, & Solano, 1977; Morgan 1980b). Cooper (1969) argued that simply looking at traits, undercuts the important complexity of one's body in motion and under motor stress. These criticisms challenge the basic premise of trait psychology and it is generally agreed that traditional standardized personality instruments using trait theory are no longer appropriate (Singer et al., 1977).

However, Singer et al. (1977) argued that the trait paradigm should not be abolished entirely, but individual differences should be considered in the context of specific situations. Thus, the need to totally abandon the search for common traits is not required. However, investigators might gain further understanding of athletic behavior by studying individual differences in specified events. Therefore what should be abolished is the skeptical and

credulous personology camps. Sport psychologists must identify the sport environment as well as the personality characteristics of the athlete before a thorough understanding of the athlete will emerge.

In order to understand if a personality gravitates toward certain sports, or whether certain sports actually modify the personality dynamics of the participants, research needs to shift from a descriptive mode to an experimental mode (Morgan, 1968a). This would mean that research may not depend entirely on personal interviews with athletes, or by reading an athletes' diary. However such a shift may indeed magnify the problem of causality since psychological attributes may or may not change as a result of one's participation in sports. This operational change will likely see more use of path (panel) analysis assessment techniques which attempt to identify the variables which influence activity interests and extent of participation (Martens, 1975; Singer et al., 1977).

Personality tests should include both components since states and traits play a large role in athletic performance (Morgan, 1974). States are feelings which are felt at one particular time, while traits are a more general personality characteristic. Thus, states are spontaneous and fluctuating, while traits are long term and relatively stable (Spielberger, Gorsuch, & Lushene, 1970). Hogan et al., (1977) stated that, "personality traits are best viewed

not as properties of individuals, but as value judgements placed on actors by observers. Thus, individuals characterize others subjectively and might not recognize the ability of ones changing characteristics due to different situational variables" (p. 26).

2.2 The elite athlete

For several years sports scientists have attempted to determine the unique characteristics that discriminate elite athletes from other performers (Highlen & Bennett, 1979; Morgan & Costill, 1972; Nagle, Morgan, Russell, Hellickson, Serfass, Alexander, 1975). With the rapid increase in the willingness of national level and Olympic level organizations to work with sport scientists, there is now a better understanding of athletes and how to optimize their performance. In addition, techniques are being utilized to assist in the prediction of elite athletic performance (Highlen & Bennett, 1979; Morgan, 1968a; Morgan & Johnson, 1977; Nagle et al., 1975; Williams, 1978).

Several sport scientists postulated that the validity of predicting elite athletic performance can only be verified when a repeatable pattern of psychological, physiological, and motor factors are identified for a particular sport group or for elite athletes in general (Morgan, 1974; Nagle et al., 1975; Silva et al., 1981). This psychophysiological model has been applied successfully

with elite wrestlers.

Nagle et al., (1975) studied Olympic wrestling contenders and attempted to differentiate between successful and unsuccessful candidates. Psychological assessment was conducted by the administration of the Profile of Mood States (POMS) test, and the State-Trait Anxiety Inventory (STAI) as a measure of states (transitory factors), and traits (enduring qualities). Physiological data consisted of anthropometric measurements and fitness assessment. Results demonstrated that successful contenders were less tense, confused, as well as lower in state anxiety than unsuccessful wrestlers. In addition, they exhibited more precompetitive vigor. This supported the notion that high level athletes exhibit an "iceberg" profile which purportedly represents positive mental health (Morgan, 1980; Morgan & Johnson, 1977). Anthropometric measurements did not differ greatly. However successful contenders had slightly better muscular endurance and achieved a higher maximum VO_2 . Therefore, these Olympic wrestlers and the wrestlers who challenged them for Olympic berths seemed to be more alike physiologically, then they were different. On the other hand, Nagle et al., (1975) pointed out that perhaps a slight difference of only 5 ml/kg for maximum VO_2 while far from impressive, could represent a significant advantage in high level performance.

These findings were consistent with Silva et al.

(1981) who studied elite wrestlers participating in the 1979 United States Junior World Wrestling camp. Athletic performance in the camp determined whether or not a wrestler qualified or did not qualify for the touring United States Team. Silva et al. (1981) found unsuccessful wrestlers to be more depressed and considerably more angry than successful wrestlers. Discriminant function analyses identified tension and anger, as well as physiological variables, anaerobic endurance, total grip strength, and ventilatory minute volumes as discriminators between the two groups. In conclusion, Silva et al. (1981) indicated that these two groups of elite wrestlers could be accurately discriminated from each other. Furthermore this discrimination was maximized when a psychophysiological model was utilized as compared to either a physiological or a psychological model alone. This model predicted 7 of the 8 qualifiers (87.5%), and all 7 of the nonqualifiers, for an overall prediction accuracy of 93.33%.

Although psychological assessment alone is not sufficient to predict athletic success, it indeed has beneficial qualities when sport psychologists are interested in assessing the mental health of an athlete, or a group of athletes. Many skeptics of sport psychology consider the mental health of an athlete irrelevant and some coaches are never concerned with this aspect until their athletes develop a serious emotional problem that clearly affects

their performance. However, mental health is essential not only prior to competition but following a competitive event as well (Morgan, 1980b). This does not suggest in any way that every athlete performs in the same manner. An attempt should be made to recognize individuality. Morgan (1974) indicated that the employment of a psychological model to predict success in athletics is accurate 70% of the time. Thus, it should be emphasized that this particular model is far from perfect, having a prediction error rate of 30%.

Since athletes are characterized by different psychological profiles, it is recognized that particular means must be taken to counsel and advise athletes regarding sport participation, as well as in selecting and developing national teams (Morgan, 1974). Two ways in which this can be accomplished are: (a) screening techniques to identify athletes with desired profiles; and (b) behavior modification which might be attempted where applicable. One of the most serious methodological problems associated with the screening technique, is the "potential contamination known as the self-fulfilling prophecy" (Morgan & Johnson, 1978, p. 120). Frequently there is a tendency for sport psychologists to specify the desirable psychological profile, test the athletes, and then classify them as high or low potential in their particular sport. These recommendations are then presented to the coach or selection committee. If the coach chooses to follow the

psychologists' advice, the model is looked upon as perfect and the athletes are then either successful or unsuccessful. However, this method tends to ignore the reason why athletes were "unsuccessful" and little attention may be received afterwards.

When implementing behavior modification as a tool to change behavior, coaches must recognize the importance of trained clinical psychologists or psychiatrists. Behavior modification must not be attempted by untrained individuals for there could be a chance of doing more harm than good to the athlete.

Several psychological characteristics have been identified as descriptors of elite athletes. In general:

1. The elite athlete, in relation to the less successful athlete is generally more self-confident (Highlen & Bennett, 1979; Mahoney & Avenier, 1977), feels closer to achieving maximum potential, and prior to competition exhibits a sense of focused concentration upon only those thoughts related to that particular performance (Rotella, Gansneder, Ojala, & Billing, 1980).

2. Elite level athletes experience less state anxiety during competition, and categorize pre-competition anxiety as a stimulant to better performance (Gould, Weiss, Weinberg, 1981). Highlen and Bennett (1979) studied successful and unsuccessful elite wrestlers and found that the anxiety level of qualifying wrestlers was lower prior to

competition than the non-qualifiers. It should be emphasized that testing was conducted prior to the wrestler's knowledge of his standing for a position on the Canadian World Wrestling Team. This lower anxiety level prior to competition was supported by Morgan (1974, 1977) who suggested that if anything, success is dependent upon low state anxiety. Morgan (1974) also stated that, "physical activity has a direct influence on the reduction of anxiety. Therefore successful attempts to elevate anxiety precompetitively would presumably be reversed very rapidly once exercise commenced" (p. 386). In contrast, Mahoney and Avenier (1977) examined successful and unsuccessful gymnasts and found no difference in state anxiety prior to competition. However, it should be recognized as Highlen and Bennett (1979) have, that gymnastics is a closed-loop skill, and wrestling is an open-loop skill. This might explain the difference in the athlete's anxiety level, that is, whether the environment is stable, or is continuously changing.

3. Elite athletes possess a highly positive self-concept, characterized by intense feelings of self-esteem, self-assurance, and self-assertiveness (Alderman, 1979).

4. There is a growing body of evidence that self-control and low levels of tension interact positively to contribute to successful athletic performance. Elite

performers are characterized with this lower level of tension compared to non-elite performers (Ogilvie, 1968).

5. Elite athletes tend to be more extroverted than less successful athletes. The major exceptions to this generalization are marathon and long distance runners who tend toward introversion (Morgan, 1974; 1979; Morgan & Costill, 1972).

6. Outstanding athletes possess stable personalities in terms of the neuroticism-stability dimension. It is improbable that unstable athletes could perform at a high level on a consistent basis (Morgan, 1974; Morgan & Costill, 1972; Ogilvie, 1968).

Although these characteristics are identified as qualities of the elite able-bodied athlete, research has only begun to identify if these qualities are apparent in the elite disabled athletic population. Ogilvie (1985) suggested that evidence for the benign neglect of the disabled athlete is most apparent when one attempts to review the literature on the psychological preparation of the disabled athlete prior to competition. Presently there is no reason to question whether forms of mental preparation now being provided for the elite able-bodied athlete can not be offered within disabled sports programs. The most valuable need is for studies designed to assess validity and reliability of methods and strategies now employed to enhance performances of elite athletes in all sports.

Along with this mental preparation, is the need to understand the entire psychological composite of the elite disabled athlete. As Asch (1984) claims, there is a definite need to include the handicapped in all areas of research.

2.3 The emotional adjustment to a physical disability

The psychological composite of a disabled individual can not be fully explained without looking at the emotional impact a physical disability has on an individual. In an investigation of orthopedically handicapped children, Schechter (1960) emphasized that emotional responses to disabilities were influenced by: (a) the family's neurotic structure, (b) the type and extent of the disability, (c) sex of the individual with a disability, (d) extent that the disability caused other changes in the individuals' lifestyle ie. change of school, (e) age of onset of the disability, whether acquired or congenital, and (f) subjection of pain due to physical disability and restriction of motion.

As well, Schechter (1960) pointed out that children and adults had their own misconceptions as to why they were handicapped or had a handicapped child. The idea that the handicap was a form of punishment has been emphasized by both the disabled child and the parents of the disabled child (Schechter, 1960; Vargo, 1978). Children have felt

that their physical disability was a form of punishment for something they had done wrong. Some mothers of children with disabilities felt that the conception of a disabled child was punishment for inappropriate behavior either during pregnancy or before conception.

The problem in adjusting to a physical disability is in large part, a problem in creating favorable social psychological situations. Society plays a large part in the creation of these situations (Meyerson, 1948). It has been suggested that sport and/or recreation is one way to help this psychological adjustment period through which physically disabled individuals might progress. (Canabal et al. 1985; Monnazzi, 1982; Stewart, 1981; Stein, 1982). When sports become a competitive source of activity for the physically disabled and indeed the athlete is competing at an elite level, researchers have found a psychological profile similar to that of the elite able-bodied athlete.

2.4 Personality profiles of the physically disabled

Harper (1978) studied if personality characteristics varied due to whether a handicap was acquired or congenital. The subjects in Harper's (1978) study were physically impaired adolescents with different physical disabilities such as cerebral palsy and muscular dystrophy. Results showed that the profiles of adolescents having congenital versus traumatic physical impairments were no different.

Another area of concern expressed by Harper and Richman (1978) was the influence of the type of disability on the individual's personality profile. Harper and Richman (1978) examined two groups of children, one group having cleft palate, and the other group being orthopedically impaired. It was clear that there were significant differences in their personality profiles, as measured by the Minnesota Multiphasic Personality Inventory (MMPI). Harper (1978) and Muthard (1965) on the other hand, found no significant differences in the personality profiles of individuals with different physical impairments. As well as type of disability, the extent of the disability had no effect on the individual's profile. However it should be mentioned that Harper (1978) studied different degrees of physical impairments, whereas Harper & Richman (1978) examined the orthopedically impaired, as well as individuals with cleft palate which is a disability causing facial disfigurement, as well as speech disorder. In this context, the individual with a disability which is visual to others has to adapt to the change in his/her own body image as well as the change in how others perceive him/her. The body image concept rests in the notion of an "ideology of normality" (Vargo, 1978). People with physical disabilities may feel personally inferior to others because they are different from "normal" people (Meyerson, 1948). The term ideology has been recognized as an intense and unconscious loyalty to

a status quo (Vargo, 1978). Normality is seen by the disabled as physical health, intelligence, beauty, youth, and wealth (Vargo, 1978). Our culture promotes the myth that if a person is not all of these things then he/she is "ipso facto" less worth, or less human. Some individuals even get to the point where they believe a deformed body leads to a deformed mind.

Research is beginning to identify as well as compare the psychological profiles of elite athletes, with athletes who are less successful. Canabal et al. (1985) examined the psychological mood profiles of international and noninternational cerebral palsied athletes. The POMS test was administered to a group of 39 cerebral palsied athletes who represented the United States in the 1984 International Games for the Disabled in New York, and 34 cerebral palsied athletes who competed in the 1982 National Cerebral Palsied/Les Autres Games in Fort Worth, Texas, but who were not selected to represent the United States in international competition. All 73 athletes were described as elite in that they had met qualifying standards for national competition. Subjects ranged from 16 to 45 years of age. Slight differences between the two groups existed however in distribution of gender, sports class, and schooling. As might be expected the international athletes had considerably more competitive experience than the noninternational athletes.

Multivariate analysis revealed no significant differences between genders of the two athletic groups across the six POMS mood factor scores. This finding was consistent with McNair, Lorr, & Droppleman (1971) who found no significant differences between 340 male, and 516 female undergraduate students across the six mood factors. No significant multivariate differences were found across the POMS mood dimensions between the international and the noninternational athletic groups. However, it should be emphasized that univariate differences were revealed between the two groups on the mood factor vigor which is consistent with the related literature for elite able-bodied and disabled athletes (Henschen, et al., 1984; Highlen & Bennett, 1979; Morgan, 1978; Nagle, et al., 1975). Canabal et al. (1985) found international athletes to have significantly higher vigor scores than noninternational cerebral palsied athletes. Combined group correlations were then computed for international and noninternational athletes to examine the effect of selected variables (gender, number of years in national competition, and sports classification), on the other five POMS mood dimensions: tension, depression, anger, fatigue and confusion. Significant but low correlations were found for confusion and years of national competition, and anger and sports classification. Anger was found high in the mood profiles of wheelchair athletes reported by Henschen et al. (1984).

It was pointed out that nonambulatory individuals may be readily aroused and anger is one way of revealing their day to day frustrations bound to a wheelchair. Henschen et al. (1984) pointed out that "anger is a perfectly normal reaction as long as it is in proportion to the social, emotional, and physical conditions" (p.123). Actually anger can serve as a positive purpose when the individual learns to use it as a tool to enhance performance.

Henschen et al. (1984) visually compared the psychological mood profiles of male wheelchair athletes competing in the Regional Qualifying Track Meet for national competition, and elite able-bodied gymnasts. All athletes in both groups manifested an iceberg profile from the mean test scores on the POMS. As well, the male wheelchair athletes were closest to the ideal iceberg showing higher scores on vigor, and lower scores on the other five mood factors. In addition, compared to wrestlers (Morgan, 1977), runners (Morgan and Costill, 1972), and oarsmen (Morgan and Johnson, 1978), the male wheelchair athletes exhibited a more profound iceberg profile. As mentioned, the disabled athletes did express a moderately high level of anger in their profiles, but they were average in comparison to the able-bodied athlete's mean test scores.

Monnazzi (1982) conducted a psychological survey of athletic paraplegics and non-athletic paraplegics. Some of the athletic paraplegics were involved at an international

level of competition. The Middlesex Hospital Questionnaire was administered to both groups, which measures neuroticism in six areas of the psychism: anxiety, phobia, obsession, somatization, depression, and hysteria. No consideration was given to age, sex, social class, and/or cultural level. The results obtained corresponded with the "researchers working hypothesis", namely, that non-athletic subjects should reveal higher psychoneurotic aspects of personality than the athletic subjects. This was the case for all areas of personality explored except hysteria, where the values were statistically the same for both groups. The somewhat higher score of hysteria for the athletic paraplegic group was explained by the athlete's tendency to be "actors" with traits of narcissism and exhibitionism. The hysterical character does have some theatrical aspects. It was pointed out by Monnazzi (1982) that the non-athletic paraplegics did not reach the level of extroversion typical of athletes, which was explained by the non-athlete's tendency to not resolve their problems and the fact that they take refuge in their condition. Monnazzi (1982) made further comparisons with data collected from secondary and university students and able-bodied athletes of both sexes. The findings supported Canabal et al. (1985) and Henschen et al. (1984), that the disabled athletic group had similar psychological profiles to able-bodied athletes. Therefore it was concluded by Monnazzi (1982) that "while paraplegia may

increase the psychoneurotic aspects of personality, the practice of sports attenuates them considerably, giving them an expression comparable to that of individuals without a handicap" (p.93).

It is fair to acknowledge the fact that physically disabled persons' can have a different psychological make-up from the able-bodied population due to the trauma of adapting to their disability (Vargo, 1978). However research is showing that the mood profile of the physically disabled athlete is quite similar to that of the able-bodied athlete (Canabal et al., 1985; Henschen et al., 1984). Therefore sport has been postulated as a means of socializing the disabled back into society after trauma has occurred, or even a means of helping the individual with a congenital disability to cope with his/her condition. Thus researchers in the handicapped area have come to the same question in the psychological domain, whether an individual gravitates toward certain sports, or whether certain sports actually modify the personality dynamics of the participants involved. By focusing on the cerebral palsied elite athlete as well as the cerebral palsied non-athlete, research can attempt to apply the psychological techniques which are now available for the elite able-bodied population. As well, by making comparisons one can determine if there truly is a difference in the psychological mood profiles of the cerebral palsied population, which may be a reflection of

the disability itself.

In summary, research has recognized that disabled athletes should be provided with the same psychological techniques to enhance performance. As well, personality should be explained by a combination of states and traits. Thus, provided the able-bodied and disabled individuals are at the same athletic level, and the disabled individual has found a means of emotionally adjusting to his condition, there is no reason why the psychological mood profiles of the elite disabled athlete should be any different from the elite able-bodied athlete.

Chapter III

METHODOLOGY

The purpose of this study was to compare the psychological mood profiles of elite cerebral palsied athletes with those of individuals who have cerebral palsy and were not involved in sport. It was also the purpose of the study to compare those results with those of elite able-bodied athletes and able-bodied non-athletes. The following chapter is subdivided into four sections: (1) subjects (2) instrumentation (3) translation of the instrument (4) procedure and (5) design and treatment of the data.

3.1 Subjects

A total of 112 subjects volunteered to participate in this study. Subjects were divided into four groups, with each group consisting of 28 subjects. Fifty-six subjects were cerebral palsied, and 56 subjects were able-bodied. Subjects were further classified according to their athletic ability, whether they were athletes or not; and physical ability, whether the individual had cerebral palsy or whether he/she was able bodied. This allowed analyses to look at particular interactions which are described in

Section 3.5.

Group 1 was composed of 28 elite cerebral palsied athletes representing Canada and competing in the Cerebral Palsy International Sports and Recreation Association (CP-ISRA) meet to be held in Belgium in July 1986. This group consisted of 18 males and 10 females. Twelve of the athletes were at the high school level, and 16 of these athletes were college or university students. Athletes in this group ranged in age from 15 to 43 years, with a mean age of 24.43. Data collection occurred at a training camp in Windsor, Ontario June 28 and 29, immediately prior to the Belgium meet. At the CP-ISRA meet cerebral palsied athletes from 20 countries competed in 13 sports events.

Athletes were classified according to CP-ISRA guidelines (see Section 1.6). Classification into sports is determined by joint motion, co-ordination of movements and performance of the actual skill involved in the event(s) under consideration. According to CP-ISRA (1985), 80 to 85% of cerebral palsied athletes maintain one classification grouping for all events. However, because of the varying degrees of disability in cerebral palsy an athlete may be moved up or down in classification grouping relative to a particular sport. In any Cerebral Palsy Games, sports are categorized according to track class, field class, swimming, and/or powerlifting.

The athletes in this study were almost evenly

distributed with a total of 13 athletes appearing in Classes 1-4, and 15 athletes appearing in Classes 5-8. As well, the majority of athletes competed in track and swimming events. Very few athletes competed in cross country, cycling, weight lifting, field and/or boccia events.

Group 2 consisted of able-bodied athletes, 14 swimmers who ranged in age from 16 to 21 years and competed in the Esso Cup II May 16, 17, and 18 at the Montreal Olympic pool; and 14 track and fielders who ranged in age from 16 to 23 years and competed at the Canadian Senior Championships June 20, 21, and 22 in Ottawa, Ontario. The group consisted of 14 males and 14 females. Seventeen of these athletes were high school students and 11 were college or university level students. The mean age of all elite able-bodied athletes was 18.25 years. Fifty percent of the swimmers who competed in the Esso Cup II were French speaking as well. Thus, the translated version of the POMS (see Appendix B) was distributed accordingly.

The third group consisted of 28 able-bodied adults who were not involved in sport. They ranged in age from 19 to 30 years with a mean age of 23.75 and were all university undergraduates attending either an English Literature course, or an Advanced French Translation course. This group consisted of 4 males and 24 females. The first language of half of the subjects was English, and the other half had French as their first language.

The 28 adults with cerebral palsy who were not involved in sport formed the fourth group and they ranged in age from 19 to 46 years, with a mean age of 33.00. These subjects were selected from the city of Montreal with a great majority of the subjects being French speaking and affiliated with the Canadian Cerebral Palsy Association. Ten of the subjects were involved in a workshop at Lethbridge Rehabilitation Centre in Montreal, Quebec; 10 subjects were involved in a Cerebral Palsy Wheelchair Rally organized by the Canadian Cerebral Palsy Association; and the remaining 8 subjects attended a summer camp for adults with cerebral palsy in the Laurentians during the weeks of June 30 and August 22 of 1986. Eleven of these subjects were male, and 17 were female. All subjects in this group were high school students or lower.

Since subjects in Group 4 were largely French speaking, the translated version of the POMS which will be discussed in Section 3.3, was distributed accordingly.

3.2 Instrumentation

According to Morgan (1968b, 1972) there are two means of assessing personality, direct or indirect. Direct methods consist of self-reports such as the Profile of Mood States (POMS), the Minnesota Multiphasic Personality Inventory (MMPI), or the Edwards Personal Preference Schedule (EPPS). Indirect procedures are projective in

structure such as the Rorschach Test, Figure Drawing Test, Thematic Apperception Test (TAT), and the House-Tree Person Test (H-TP).

The advantages of the direct procedure are its replicative qualities along with it being the most realistic approach to assessment of an athlete's personality (Morgan, 1968). Specifically, Morgan (1980a) has found the POMS "to be the most highly predictive of athletic success" (p. 97). The POMS consists of 65 words or phrases that describe moods or feelings which measure the athlete's emotional state. To understand the psychology of emotion, not only is physiological and behavioral data needed, but also subjective data of feeling, affect, and mood (McNair, Lorr, & Droppleman, 1971). Thus, this test allows an overall assessment of an athlete's mood profile and is purported to be predictive of success in athletics.

All subjects being tested were asked to indicate how well each word or phrase described 'how they have been feeling during the past week, including today'. Most other personality inventories (16PF, MMPI, and EPPS) do not specify a time frame. Questions may be interpreted as referring to last week, last month, last year, or even a period of a lifetime. As well, other tests look primarily at personality traits (such as extroversion/introversion) and may subsequently sacrifice a change in subjective states. State differences are important if one is

interested in maximum performance (Highlen & Bennett, 1979). The POMS is a self-report instrument that is of short duration (5-7 minutes) and is an economical method of identifying and assessing transient fluctuating affective states. Traits on the other hand may be helpful in identifying and selecting elite athletes, but not useful for training these athletes to maximize performance. The purpose of the one-week rating period was to emphasize a period long enough to distinguish an individual's typical and persistent mood reactions to his current life situations, and short enough to assess acute situational effects (McNair et al., 1971).

When answering the questions, athletes had to check one of five possible choices for each word. The choices were: 'not at all', 'a little', 'moderately', 'quite a bit', or 'extremely'. The results of a POMS test take the form of a mood profile consisting of the athlete's combined scores on six categories: tension, depression, anger, vigor, fatigue, and confusion.

The ideal profile representing a successful athlete is one referred to as an 'iceberg profile' where most of the scores bulk below the average line, while the score for vigor juts above the line. The iceberg profile has been shown in many studies comparing successful and unsuccessful athletes (Morgan, 1977; Morgan & Costill, 1972; Morgan & Johnson, 1978; Nagle et al., 1975; Silva et al., 1981).

From all studies, superior athletes possess a more positive mental and emotional health.

Internal consistency reliabilities of the six POMS mood dimensions ranged from .84 to .95. These were determined with 350 male and 650 female psychiatric outpatients who were administered the POMS when admitted to the Boston University Psychiatric Clinic from 1966 to 1969. Validity was determined by six factor analytic replications of the six mood factors during the development of the POMS. Lorr, Daston & Smith (1967) examined the individual items defining each mood scale supporting the face or content validity of the POMS.

3.3 Translation of the Instrument

According to Vallerand & Halliwell (1983) there are several steps which must be followed when considering the validation of a translated test. Since it was not the purpose of this study to fully validate the translated version of the POMS used in this study, the following procedures were used: (1) The POMS was translated from English to French by a professional translator (2) The French translated version of the POMS was translated back into English to compare this test with the original English POMS (3) A multivariate t-test was conducted on 14 English subjects and 14 French subjects to see if there were any significant differences between these two groups on the POMS

test where the six subcategories of the POMS were the multiple dependent variables. A copy of this translation is available in Appendix B.

3.4 Procedure

The study consisted of collecting data at appropriate national competitions for a group of able-bodied elite swimmers and track and fielders, and at a training camp for the group of Canadian elite cerebral palsied athletes. Able-bodied swimmers and track and fielders were asked to complete the test when they were not competing and had time to answer each question. Cerebral palsied athletes were asked to complete the test on the last day of training camp. Written permission was granted from both groups of athletes prior to the administration of the POMS test (see Appendix E). As well as the test, athletes were asked to state their sex, age, educational level, national or international events, sport(s), and number of years they had competed at an elite level (see Appendix C). Cerebral palsied athletes were also asked to state their sports classification (ambulatory or non-ambulatory). Written permission was also obtained from the cerebral palsied non-athletes attending Lethbridge Rehabilitation Centre (see Appendix E). Verbal permission was obtained from the remaining non-athletes, both able-bodied and cerebral palsied. As well as the test, non-athletes were asked to state their sex, age, educational

level, and any recreational activity in which they were to participate to prove they were not elite calibre athletes (see Appendix D).

Directions to the subjects on both instances included the stipulation that all questions were to be answered according to how they felt 'during the past week, including today'. These procedures were similar to the methods employed in previous studies using disabled and able-bodied populations (Henschen et al., 1984; Morgan & Johnson, 1978). One exception in these studies was the help provided for those who needed assistance in crossing out or circling their responses. This was accomplished by having the subject point to the response which was then circled by the experimenter. In this manner no verbal interaction influenced the results of the subjects. The same procedures were followed in the present study with those individuals having cerebral palsy who needed assistance. However, some subjects from the cerebral palsied non-athletic group could not read or speak, so that volunteers were asked to verbalize the question asked in the test and the subject nodded his/her head accordingly. For example, from each question 1-65, the volunteer asked the subject, 'in the past week, including today, have you felt friendly; not at all, a little, moderately, quite a bit, or extremely'. The subject then indicated by moving his/her head how frequently these feelings have been felt.

3.5 Design and Treatment of the Data

This investigation involved a series of multivariate analyses to determine if there were any reliable differences among the four groups and selected independent variables. The dependent variables in this study were the six mood factors measured by the Profile of Mood States: tension, depression, anger, vigor, fatigue, and confusion. The independent variables were: language, gender, education, number of years in competition, sport type, and sports classification, and the covariate was age.

To determine if there were any significant differences in how the French speaking subjects scored on the translated version of the POMS (see Appendix B) in comparison to the English speaking subjects on the original POMS (see Appendix A), a MANOVA was performed with the able-bodied non-athletic subjects across the six mood factors. These subjects were selected for the comparison due to the even number of French and English subjects. To evaluate the extent to which all four groups varied in their scores on the POMS, a 2×2 (physical ability x athletic ability) MANOVA was performed. To ensure that age did not cause variations in the initial main effects as well as determining if there was a main effect of gender across the POMS, a $2 \times 2 \times 2$ (physical ability x athletic ability x gender) MANCOVA was conducted. The covariate in this analyses was the variable age. Since the number of males and females were low and unequal when

the 2 x 2 x 2 MANCOVA was conducted, only the main effect of gender was of concern, and not the interactions with physical ability and athletic ability. Education was subdivided into High School, and/or College or University. A 2 x 2 (group x education) was performed to identify differences between how the cerebral palsied athletes and the able-bodied athletes, scored on the POMS in relation to their educational level. All four groups were to be included in this analyses, but missing data in the two non-athletic groups did not allow this to occur.

All analyses that followed compared particular groups across the six POMS dimensions. These comparisons could not be made by the initial 2 x 2 (physical ability x athletic ability) MANOVA or the 2 x 2 x 2 (physical ability x athletic ability x gender) MANCOVA findings for main effects were collapsed over all other variables within these analyses. Therefore several MANCOVAs with age as the covariate were performed to compare the two athletic groups, the two able-bodied groups, and the two cerebral palsied groups. Age was again of concern because of the differences in mean ages among the four groups which were outlined in Section 3.1.

The variable sport type was delimited to swimming and track and field, and athletes within Groups 1 and 2 were categorized into one of these sports. A MANOVA then identified whether there were differences in how swimmers

and track and fielders scored on the POMS. As well, the athletes were categorized into 0-2 years of competition, or 3-8 years of competition. Finally a MANOVA was performed to identify whether or not a greater number of years in competition influenced the athlete's results on the POMS.

The cerebral palsied athletic group was divided into Classes 1-4 (non-ambulatory) and Classes 5-8 (ambulatory). A MANOVA was performed to identify differences in POMS scores as a result of functional ability.

All multivariate and univariate analyses were accepted or rejected at the 95 percent level of confidence ($p < .05$). Although there were several multivariate tests of significance to choose from, this study was only concerned with the Pillais which showed probability limits very similar to other multivariate tests of significance.

Chapter IV

Results

The purpose of this study was to compare the psychological mood profiles of elite cerebral palsied athletes, with those of cerebral palsied individuals who were not involved in sport. With the inclusion of a group of elite able-bodied athletes and a group of able-bodied non-athletes further comparisons were made with respect to the psychological mood profiles of the four reference groups. The present chapter was divided into the following six sections: (1) assessment of the translation, (2) identification of the differences in POMS scores among the four groups involved, (3) identification of the differences between the two groups of athletes, (4) identification of the differences between the two able-bodied groups, (5) identification of the differences between the two cerebral palsied groups, and (6) analysis of the cerebral palsied athletes as a function of sport type and classification.

4.1 Assessment of the Translation

In order to assess the translation of the testing instrument and allow credibility for the results that follow, a MANOVA was conducted to compare the 14 French with

the 14 English able-bodied non-athletes across the six POMS dimensions. Mean scores on the POMS test are outlined in Table 1. The main effect for the language factor was nonsignificant with $F(6,21)=1.64$, $p > .05$.

TABLE 1

Mean Scores on the POMS Test for the
Able-Bodied Non-Athletic Group as a
Function of Language

POMS Variables	French		English	
	(n=14)		(n=14)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
1. Tension	12.00	5.76	13.57	9.83
2. Depression	8.36	8.51	15.36	15.27
3. Anger	10.50	8.36	10.93	9.10
4. Vigor	16.21	4.73	13.29	4.94
5. Fatigue	8.36	6.36	10.43	7.06
6. Confusion	5.43	3.57	10.29	6.66

4.2 Identification of the Differences in POMS Scores Among the Four Groups Involved.

The mean scores and standard deviations of the four groups are outlined in Table 2 and displayed in Figure 1. In order to examine group differences, subjects were classified according to their physical ability (Pa), cerebral palsy or able-bodied, and athletic ability (Ath), athletes, or non-athletes.

A 2 x 2 (physical ability x athletic ability) MANOVA was performed with the six POMS dimensions as dependent variables. The main effects for physical ability $F(6,103)=2.56$, $p < .05$, as well as athletic ability, $F(6,103)=3.11$, $p < .05$ were significant, but the interaction, $F(6,103)=0.736$, $p > .05$ was nonsignificant. These findings are summarized in Table 3.

Univariate analyses showed a significant difference on the variable vigor, $F(1,108)=11.26$, $p < .01$ for the factor Physical Ability (Pa). In reviewing the means for Group 1, the cerebral palsied athletes and Group 4, the cerebral palsied non-athletes; versus Group 2, the able-bodied athletes, and Group 3, the able-bodied non-athletes, it was evident that vigor was the dependent variable which caused the main effect. Group 1 and 4 combined showed a mean score of 19.93 on vigor compared to Group 2 and 3 with a mean score of 16.68. These results were presented in Table 2. Thus the significant main effect demonstrated that the

TABLE 2

Mean Scores on the POMS Test for all Four Groups

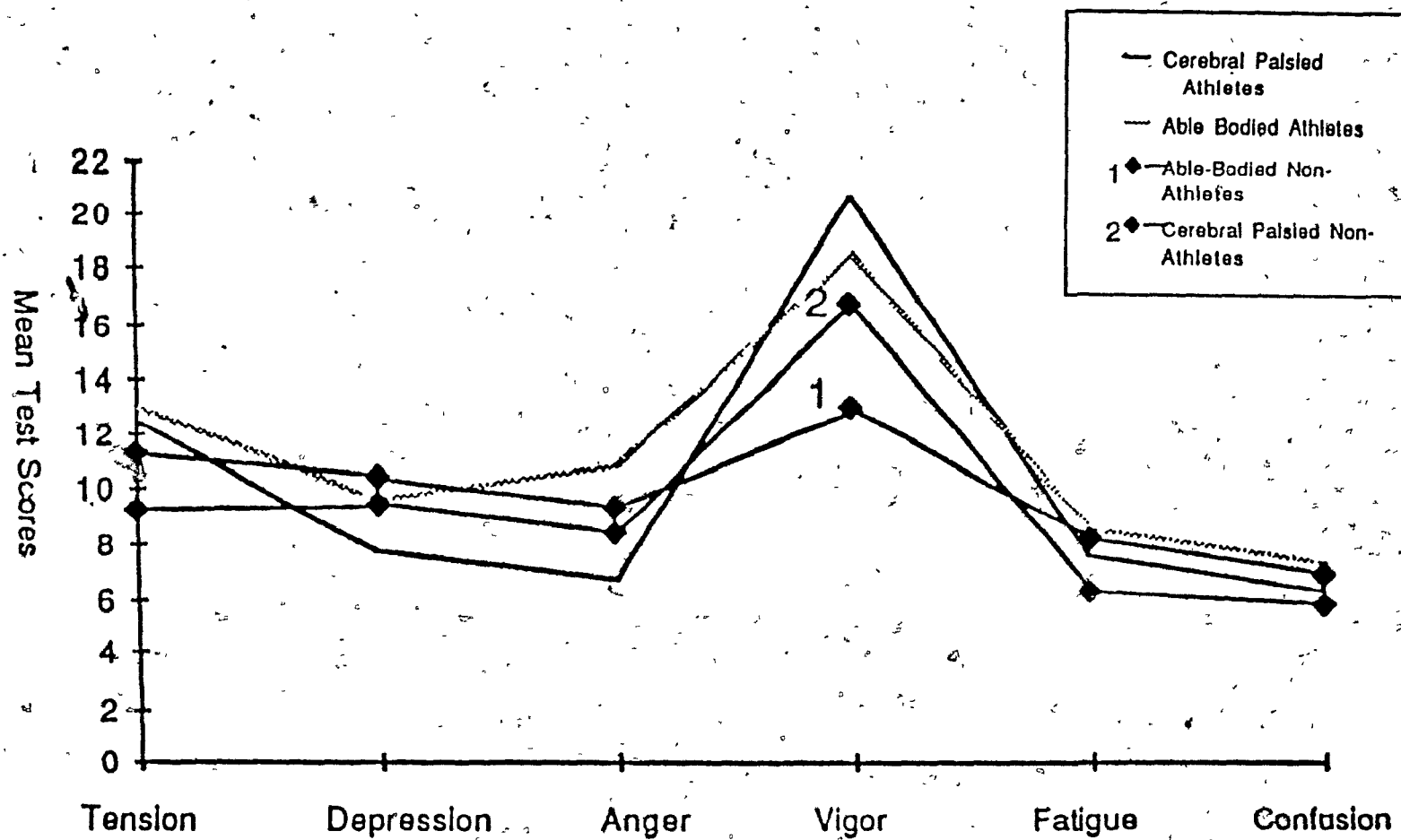
Group (n=28)								
POMS Variables	1		2		3		4	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
1. Tension	12.57	6.76	13.04	6.64	12.79	7.95	10.61	7.04
2. Depression	7.68	7.45	9.64	8.68	11.86	12.64	10.86	9.10
3. Anger	6.68	6.25	10.96	7.40	10.71	8.58	9.57	7.81
4. Vigor	20.79	4.09	18.61	4.91	14.75	4.97	19.07	6.20
5. Fatigue	7.64	4.35	8.57	6.44	9.39	6.67	7.29	5.74
6. Confusion	6.39	3.68	7.25	4.93	7.86	5.80	6.71	5.13
Age	24.43	5.72	18.25	2.13	23.75	6.19	33.00	7.83

Note. Group 1 = Cerebral Palsied Athletes

Group 2 = Able-Bodied Athletes

Group 3 = Able-Bodied Non-Athletes

Group 4 = Cerebral Palsied Non-Athletes



Profile of Mood States

Figure 1. Comparison of Profile of Mood States (POMS) Scores Among the Four Groups

TABLE 3

Summary of POMS Scores Between Physical Ability
and Athletic Ability Conditions:
Multivariate Analysis of Variance

Source	df	Multivariate F	p
Physical Ability (Pa)	6,103	2.56	0.024
Athletic Ability (Ath)	6,103	3.11	0.008
Pa x Ath	6,103	0.74	0.621

cerebral palsied subjects scored higher than the able-bodied subjects on the dependent variable vigor.

Univariate analyses on the factor Athletic Ability (Ath) also showed a significant difference on the variable vigor, $F(1,108)=8.27$, $p < .05$. It is evident from the means in Table 2 that the average vigor score of Groups 1 and 2 is higher than Groups 3 and 4, thus causing the main effect athletic ability.

Since the mean ages of Groups 1, 2, 3 and 4 were different (see Table 2), a $2 \times 2 \times 2$ MANCOVA was conducted. This allowed an assessment of the POMS scores across groups as a function of the factors Athletic Ability, Physical Ability, and Gender while adjusting for the variable age. As discussed in Section 3.5, only the main effect of gender will be presented since lack of subjects caused empty and uneven cells. Results are shown in Table 4. The main effect for physical ability, apparent in Table 3, was lost when age was covaried. The Athletic Ability (Ath) factor remained significant, $F(6,98)=3.73$, $p < .01$. Univariate analyses on the dependent variables demonstrated that vigor was the factor responsible for the significance of athletic ability, $F(1,103)=9.69$, $p < .01$.

TABLE 4

Summary of a Multivariate Analysis of Covariance between
Physical Ability, Athletic Ability,
and Gender: MANCOVA

Source	df	Multivariate F	p
Physical Ability	6,98	1.84	0.100
Athletic Ability	6,98	3.73	0.002
Gender	6,98	1.82	0.102

The main effect for the gender factor was nonsignificant, $F(6,98)=1.82$, $p > .05$.

In addition to looking at age and gender among the four groups, education was also chosen as an independent variable. Education was divided into two levels with subjects categorized into either High School, or College/University. Due to the fact that Group 3, the able-bodied non-athletes, were all university students and Group 4, the cerebral palsied non-athletes, were all high school students or lower, it was impossible to include these two groups in the MANOVA.

Therefore a 2×2 (group \times education) MANOVA was conducted to identify the relationship between the two athletic groups and the independent variable education. Table 5 outlines the means, standard deviations, and the number of athletes in each category. Results of this MANOVA are shown in Table 6. The main effects for the factors Education and Group were nonsignificant. Education revealed an $F(6,47)=1.50$, $p > .05$, and the group effect was $F(6,47)=2.08$, $p > .05$. As well, the interaction was nonsignificant with $F(6,47)=1.08$, $p > .05$.

TABLE 5

Mean Scores on the POMS Test for the Two Athletic Groups as a Function of Education

POMS Variables	Groups					
	Cerebral Palsy			Able-Bodied		
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>M</u>	<u>SD</u>	<u>n</u>
1. Tension						
High School	13.83	8.17	12	13.41	6.87	17
Coll/Univ	11.63	5.57	16	12.45	6.56	11
2. Depression						
High School	9.58	8.52	12	11.71	9.56	17
Coll/Univ	6.25	6.45	16	6.45	6.20	11
3. Anger						
High School	6.58	7.68	12	11.29	6.94	17
Coll/Univ	6.75	5.20	16	10.45	8.38	11
4. Vigor						
High School	21.58	4.76	12	18.06	5.52	17
Coll/Univ	20.19	3.56	16	19.45	3.88	11
5. Fatigue						
High School	9.50	4.96	12	8.65	5.99	17
Coll/Univ	6.25	3.34	16	8.45	7.39	11
6. Confusion						
High School	7.25	4.49	12	8.24	5.30	17
Coll/Univ	5.75	2.91	16	5.73	4.05	11

TABLE 6

Summary of the Comparisons of POMS Scores Between
the Two Athletic Groups as a Function of
the Level of Education:
Multivariate Analysis of Variance

Source	df	Multivariate F	p
Education (Ed)	6,47	1.50	0.201
Group (Gr)	6,47	2.08	0.074
Gr x Ed	6,47	1.08	0.387

4.3 Identification of the Differences Between the Two Groups of Athletes

In order to evaluate the differences between the cerebral palsied and able-bodied athletes while controlling for the variable age, a MANCOVA was conducted across the six POMS dimensions. Results of the analysis are presented in Table 7 and mean scores are displayed in Figure 1. There were no significant differences between the cerebral palsied athletes and the able-bodied athletes, $F(6,48)=1.59$, $p > .05$.

Two additional independent variables were of interest and pertinent only to the athletic groups, number of years the athletes had been in competition, and the sport they competed in. A total of 27 cerebral palsied athletes and 28 able-bodied athletes were involved in the second analysis concerning sport type. This was due to one cerebral palsied athlete who was a cyclist while all other athletes were swimmers or in track and field. However, both athletic groups consisting of 28 subjects each were used in the first comparison when the independent variable number of years in competition was included. Means, standard deviations, and the number of athletes in each sport are shown in Table 8. A 2×2 (sport \times group) MANOVA revealed no significant main effects for either sport type, $F(6,46)=1.95$, $p > .05$, group, $F(6,46)=2.20$, $p > .05$ or the interaction, $F(6,46)=1.67$, $p > .05$. These results are presented in Table 9.

Athletes were classified into either 0-2 years of competition or 3-8 years of competition. Means, standard deviations, and the number of athletes in each category are outlined in Table 10.

TABLE 7

Summary of a Multivariate Analysis of Covariance across the POMS Scores Between the Two Athletic Groups, the Two Able-Bodied Groups, and the Two Cerebral Palsied Groups: MANCOVA

Comparison	df	Multivariate F	p
Cerebral palsied athletes vs. able-bodied athletes	6,48	1.59	0.172
Able-bodied athletes vs. able-bodied non- athletes	6,48	1.65	0.155
Cerebral palsied athletes vs. cerebral palsied non- athletes	6,48	2.11	0.069

TABLE 8

Mean Scores on the POMS Test for the Two
Athletic Groups as a Function of
Sport Type

POMS Variables	Groups					
	Cerebral Palsy (n=27)			Able-Bodied (n=28)		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
1. TENSION						
Swimming	11.43	7.48	7	11.64	8.17	14
Track & Field	12.70	6.72	20	14.43	4.55	14
2. DEPRESSION						
Swimming	4.14	2.73	7	10.79	10.35	14
Track & Field	9.15	8.28	20	8.50	6.81	14
3. ANGER						
Swimming	3.71	3.95	7	9.64	6.87	14
Track & Field	7.85	6.75	20	12.29	7.93	14
4. VIGOR						
Swimming	22.43	3.95	7	16.79	5.13	14
Track & Field	20.60	3.83	20	20.43	4.07	14
5. FATIGUE						
Swimming	7.57	3.26	7	10.50	6.04	14
Track & Field	7.50	4.78	20	6.64	6.46	14
6. CONFUSION						
Swimming	5.43	3.15	7	8.00	6.19	14
Track & Field	6.60	3.91	20	6.50	3.30	14

TABLE 9

Summary of the Comparisons of POMS Scores Between
Cerebral Palsied and Able-Bodied Athletes on the
Variable Sport Type: Multivariate Analysis of Variance

Source	df	Multivariate F	p
Sport Type (Spo)	6,46	1.95	0.093
Group (Gr)	6,46	2.20	0.060
Spo x Gr	6,46	1.67	0.151

TABLE 10

Mean Scores on the POMS Test for the Two Athletic Groups as a Function of the Number of Years in Competition

POMS Variables	Groups					
	Cerebral Palsy			Able-Bodied		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
1. TENSION						
0-2 years	14.71	7.52	14	14.79	7.49	14
3-8 years	10.43	5.33	14	11.29	5.38	14
2. DEPRESSION						
0-2 years	8.64	8.49	14	11.57	10.49	14
3-8 years	6.71	6.43	14	7.71	6.19	14
3. ANGER						
0-2 years	7.50	7.44	14	12.64	8.98	14
3-8 years	5.86	4.93	14	9.29	5.20	14
4. VIGOR						
0-2 years	20.57	4.50	14	18.93	5.89	14
3-8 years	21.00	3.80	14	18.29	3.89	14
5. FATIGUE						
0-2 years	9.36	4.81	14	10.43	7.10	14
3-8 years	5.93	3.12	14	6.71	5.33	14
6. CONFUSION						
0-2 years	6.93	4.38	14	8.57	5.91	14
3-8 years	5.86	2.88	14	5.93	3.43	14

The second 2×2 (number of years in competition \times group) MANOVA was conducted with the six mood factors of the POMS serving as dependent variables. Results of this analyses are presented in Table 11. The multivariate main effect for number of years in competition, $F(6,47)=1.64$, $p > .05$, and group, $F(6,47)=1.73$, $p > .05$ were nonsignificant as well as the interaction, $F(6,47)=0.23$, $p > .05$.

4.4 Identification of the Differences Between the Two Able-Bodied Groups

In order to evaluate the differences between the able-bodied athletes and the able-bodied non-athletes while controlling for the variable age, a MANCOVA was conducted across the six POMS dimensions. Results of the analysis are presented in Table 7 and mean scores are displayed in Figure 1. There was no significant differences between the able-bodied athletes and the able-bodied non-athletes, $F(6,48)=1.65$, $p > .05$.

TABLE 11

Summary of the Comparisons of POMS Scores Between Cerebral
Palsied and Able-Bodied Athletes as a Function
of the Number of Years in Competition:
Multivariate Analysis of Variance

Source	df	Multivariate F	p
Number of Years (Num)	6,47	1.64	0.157
Group (Gr)	6,47	1.73	0.135
Num x Gr	6,47	0.23	0.965

4.5 Identification of the Differences Between the Two Cerebral Palsied Groups.

In order to evaluate the differences between the cerebral palsied athletes and the cerebral palsied non-athletes while controlling for the variable age, a MANCOVA was conducted across the six POMS dimensions. Results of the analysis are presented in Table 7 and mean scores are displayed in Figure 1. There were no significant differences between the cerebral palsied athletes and the cerebral palsied non-athletes, $F(6,48)=2.11, p > .05$. It should be remembered that when a MANOVA was conducted without controlling for the variable age, there were significant differences between the two groups across the six POMS factors, $F(6,49)=2.91, p < .05$. Again, it should be emphasized that there is still a main effect for athletic ability primariliy due to the cerebral palsied subjects.

4.6 Analysis of the Cerebral Palsied Athletes as a Function of Sport Type and Classification

In order to confirm results that were found by Canabal et al. (1985) with cerebral palsied athletes, a MANOVA was executed to compare cerebral palsied athletes who were non-ambulatory (class 1-4) to those who were ambulatory (class 5-8). Table 12 outlines the means and

TABLE 12

Mean Scores on the POMS Test for Non-Ambulatory
and Ambulatory Cerebral palsied Athletes

POMS Variables	Class 1-4		Class 5-8	
	(n=13)		(n=15)	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
1. Tension	12.69	7.16	12.47	6.64
2. Depression	7.54	7.51	7.80	7.66
3. Anger	6.08	7.63	7.20	4.97
4. Vigor	22.15	3.89	19.60	4.01
5. Fatigue	6.92	4.03	8.27	4.65
6. Confusion	6.38	3.15	6.40	4.19

standard deviations of these two classes of athletes across the six POMS factors. The results found the variable classification to be nonsignificant, $F(6,21)=0.700$, $p > .05$.

It was of interest in this study to identify whether or not cerebral palsied athletes participated in a sport event due to their sports classification. By examining the number of athletes in each sport it was found that 20 athletes participated in track and field, 7 athletes participated in swimming, and one athlete was a cyclist. Although there was an unequal distribution of athletes according to type of sport, there were no outstanding differences in the number of athletes who participated in swimming and/or track and field according to their functional ability. Three swimmers were classified as non-ambulatory in comparison to 4 swimmers who were classified as ambulatory. As well, 10 track and fielders were non-ambulatory and 10 were ambulatory.

CHAPTER V

DISCUSSION

The purpose of the present study was to compare the psychological mood profiles of elite cerebral palsied athletes, with those of cerebral palsied individuals who were not involved in sport. It was also the intent of this study to compare these results with a group of elite able-bodied athletes and able-bodied non-athletes with respect to their psychological mood profiles. The present discussion is divided into the following six main sections: (1) discussion of the translated version of the POMS, (2) an examination of all four groups-- hypotheses one and two, (3) an examination of the two athletic groups-- hypothesis three, (4) an examination of the two able-bodied groups-- hypothesis four, (5) an examination of the two cerebral palsied groups-- hypothesis five, and (6) an examination of the cerebral palsied athletic group--hypothesis six.

5.1 Discussion of the Translated Version of the POMS

Results of the MANOVA comparing the 14 French speaking students with the 14 English speaking students of Group 3 found no significant differences between the two groups across the six POMS dimensions. This analysis offered

support for the usage of the translated version of the POMS (see Appendix B). Although Vallerand & Halliwell (1983) discussed additional procedures for the validation of a testing instrument, it was not the purpose of this study to validate the French copy of the POMS, but rather to argue that the first step toward validation of the instrument was successful.

5.2 An Examination of all Four Groups--Hypotheses

One and Two

Hypothesis One stated that there will be significant differences across the six POMS dimensions with respect to physical ability and athletic ability. The results of the 2 x 2 (physical ability x athletic ability) MANOVA on the POMS scores indicated main effects for the Physical Ability factor, as well as the Athletic Ability factor on the variable vigor, suggesting that there were differences between how cerebral palsied and able-bodied subjects scored on vigor, as well as differences between how athletes and non-athletes scored on vigor.

Since the main effects of physical ability as well as athletic ability were found to be significant due to the factor vigor, several independent variables were introduced into the study to find out why these differences occurred. Age was used as a covariate in a 2 x 2 x 2 (athletic ability x physical ability x gender) MANCOVA to identify

whether or not the factors Physical Ability and Athletic Ability remained significant. Age did cause a change in the significance of the factor physical ability, which may be explained by referring to Table 2. By comparing the mean ages of Groups 1 and 4 (the cerebral palsied subjects) to the mean ages of Groups 2 and 3 (the able-bodied subjects), it is seen that the latter groups have a much higher mean age of 28.72 versus 21.50. Thus, vigor was related to age not physical ability, while vigor remained related to athletic ability. Therefore Hypothesis One is only partially accepted.

Hypothesis Two stated that there will be no significant differences according to gender across the six POMS dimensions with the four groups involved. The results of the $2 \times 2 \times 2$ (physical ability \times athletic ability \times gender) MANCOVA on the POMS scores indicated no significant main effect for gender. Therefore Hypothesis Two was not rejected.

The present findings concerning the nonsignificance of gender are in harmony with the pertinent literature (Canabal et al., 1985; McNair et al., 1971). Canabal et al. (1985) compared POMS scores for international and noninternational cerebral palsied athletes. These authors found no significant differences in mood dimensions between male and female athletes. This finding is also congruent with McNair et al. (1971) who studied 350 male and 650 female college

students and found no significant differences between gender across the six POMS dimensions.

Another variable which was introduced to identify differences among all four groups was education. Due to the fact that the non-athletic groups produced empty cells within the two categories of education, since all able-bodied non-athletes were university students and all cerebral palsied non-athletes were high school students, they were excluded from this analysis. Thus the two athletic groups were the basis for this second MANOVA. The results of the 2 x 2 (education x group) MANOVA was non significant (see Table 6).

One explanation that may account for the nonsignificant influence of education between the two athletic groups is due to the fact that the POMS has been designed for individual's who have obtained at least a Grade 7 level of education (McNair et al., 1971). All subjects within these two groups abide by these standards. In addition, there have been no further studies that have discussed the POMS in relation to educational level.

5.3 An Examination of the Two Athletic Groups

--Hypothesis Three

Hypothesis Three stated that there will be no significant differences between the cerebral palsied athletes and the able-bodied athletes across the six POMS

dimensions. The results of the MANCOVA comparing the two groups while controlling for the variable age, found no significant main effect. Therefore Hypothesis Three was not rejected. In addition when age was not controlled for and a MANOVA was conducted, there still was no main effect.

The differences in the mean ages of the two athletic groups in this study were consistent with studies by Sherrill & Rainbolt (1986); Sherrill, Pope, & Arnold (1986). They found that disabled athletes were socialized into sport at a later age than able-bodied athletes. Martens (1978) pointed out that the average age for an able-bodied individual to begin competing is between 6 and 10 years, compared to 6 and 49 years for a cerebral palsied individual (Sherrill & Rainbolt, 1986). Factors which influence this late socialization period can be understood in relation to the social learning approach introduced by Bandura (1969) & Kenyon & McPherson (1973). This theory states that there are three factors which contribute to an individuals' socialization into sport: (a) personal attributes - characteristics of the individual, (b) socializing agents - which refers to significant others which influence the individual to participate in sports, and (c) socializing situations - settings and/or opportunities in which sport role occurs.

In the case of the disabled athlete, it has been found that the family which is the most influential socializing

agent for the able-bodied athlete (Kenyon & McPherson, 1973; Spreitzer & Snyder, 1976) has little influence on the disabled athlete (Sherrill & Rainbolt, 1986; Sherrill, Pope, & Arnold, 1986). Specifically, Sherrill & Rainbolt (1986) studied 172 cerebral palsied athletes from 23 states and reported only 24.4% of the athletes identified the family as the most influential socializing agent. One agent which contributed to sports socialization for most of these athletes was interest shown by a staff member of the United Cerebral Palsy Association (UCPA) and sponsorship of a competitive event. Only when the interest was shown by the Association did the family and peers become important as socializing agents. Most athletes reported the year 1978, the founding of the National Association of Sports for Cerebral Palsy (NASCP), as their first sports instruction and first competition, regardless of their age.

Results of the 2 x 2 MANOVA (sport x group) found no significant differences across the six POMS factors between the two athletic groups as a function of the type of sport in which they participate. As well, results of another 2 x 2 MANOVA (number of years x group) designed to compare the two athletic groups across the six POMS dimensions as a function of the number of years the athletes had been in competition, found no significant differences. Thus an athlete tends to retain the same psychological mood profile even if he/she has been in national competition for longer

than two years.

5.4 An Examination of the Two Able-Bodied Groups --Hypothesis Four

Hypothesis Four stated that there are significant differences between the two able-bodied groups across the six POMS dimensions. The results of the MANOVA between the two groups indicated no main effects. Therefore Hypothesis Four was rejected.

The finding that the able-bodied athletes exhibited the same psychological profile as the able-bodied non-athletes is in contradiction to the existing literature (Booth, 1958; Cooper, 1969). Booth (1958) studied the personality traits of athletes versus non-athletes by means of the Minnesota Multiphasic Personality Inventory (MMPI). Significant differences were found between the athletes and the non-athletes on the variables interest, anxiety, and social responsibility. The mean of the scores on the interest variable was significantly higher for the non-athletes than for the athletes. The comparisons on the anxiety score found the highest level of athlete, being the varsity athlete, to score lower than all other freshmen athletes as well as non-athletes. These findings are consistent with the results from Highlen and Bennett (1979), Morgan (1968), and Morgan and Johnson (1977) who all found that the more skilled an athlete, the less anxiety exhibited both prior to and during performance.

Similarly, Cooper (1969) found differences between the athletes and non-athletes in his study. While no intellectual differences were noted, a greater motivation to achieve was noted among athletes. As well, the personality features of athletes pointed to greater social adjustment and ascendancy, and higher emotional stability. Athletes were more outgoing, confident, aggressive, dominant and leading. They were also less anxious, had higher self confidence, less compulsive and they too had lower anxiety levels.

Studies which have used the POMS as the testing instrument for comparing various athletes, have failed to introduce non-athletic groups into their studies. However when comparing high skilled athletes to low skilled athletes the former are associated with lower anxiety, depression, tension, anger and fatigue; and have much higher scores on vigor (Morgan & Johnson, 1978; Nagle et al., 1975; & Silva et al., 1981).

The nonsignificance between the two able-bodied groups can be partially explained by the way in which the data collection took place. First the able-bodied athletic data were collected at two national competitions, the Senior Track and Field Championships which was a qualifying meet for the Commonwealth Games, and the Esso II Cup Championships which was an important meet for the swimmers. However, in comparison to athletes who have been found to

exhibit the iceberg profile introduced by Morgan (1980a), these able-bodied athletes may have not been elite enough. The operational definition of elite used in this study may have been the reason for the profile that was identified. Subjects in studies that have revealed the 'iceberg profile' were conducted by Nagle et al. (1975) who examined Olympic Wrestling Contenders as well as Silva et al. (1981) who examined wrestlers participating in the 1979 United States Junior Wrestling Camp. It was not feasible to collect data from a World Championship in this study, although the track and field athletes competed in a qualifying meet for the Commonwealth Games.

5.5 An Examination of the Two Cerebral Palsied Groups --Hypothesis Five

Hypothesis Five stated that there will be significant differences between the cerebral palsied athletes and the cerebral palsied non-athletes. The results of the MANCOVA while controlling for age indicated no main effect. Therefore Hypothesis Five was rejected. However, the fact that the main effect did exist when age was ignored is of importance. Thus, although there is no supporting research comparing cerebral palsied athletes with non-athletes, the results of this study reveal a consistency with the able-bodied athletic literature. The athletes possess a more ~~positive mental~~ health (Morgan, 1968a).

5.6 An Examination of the Cerebral Palsied Athletic Group--Hypothesis Six

Hypothesis Six stated that there will be significant differences among sports classifications on the six POMS dimensions with the cerebral palsied athletes. The results of a MANOVA designed to compare non-ambulatory (class 1-4) and ambulatory (class 5-8) athletes indicated that there were no significant differences as a result of functional ability. Therefore Hypothesis Six was rejected.

This finding can be discussed in relation to previous authors who have stated that there were no differences found in the attitudes toward physical ability as a result of functional ability. Cooper, Sherrill and Marshall (1986) found no significant main effects or interaction effects between sports class (wheelchair versus ambulatory) on attitudes toward physical activity. It was pointed out in Cooper et al. (1986) that differences are assumed to be present due to different training techniques and differences in functional ability and performance. Visual comparisons were made in this study between results found with able-bodied athletes and the scores of the cerebral palsied athletes. The cerebral palsied athletes had a more positive attitude toward physical activity. In addition, Henschen et al. (1984) found that the psychological mood profiles of wheelchair athletes were closer to the iceberg introduced by Morgan (1980a) than the profiles displayed by male and

female gymnasts.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The purpose of the present study was to compare the psychological mood profiles of elite cerebral palsied athletes, with those of cerebral palsied individuals who were not involved in sport. It was also the purpose of this study to compare these results with a group of elite able-bodied athletes and able-bodied non-athletes with respect to their psychological mood profiles. This chapter contains the summary and conclusions of the investigation and is divided into the following sections: (1) summary of the methodology, (2) summary of findings, (3) conclusion, (4) implications, and (5) recommendations for further study.

6.1 Summary of the Methodology

Fifty-six cerebral palsied individuals and 56 able-bodied individuals served as subjects in this study. Of the cerebral palsied subjects, 28 individuals were elite athletes and 28 subjects were non-athletes. Similarly, 28 of the 56 able-bodied subjects were elite athletes, and 28 subjects were non-athletes.

Each of four groups completed a Profile of Mood States (POMS) questionnaire at various times. The cerebral palsied athletic data were collected at a training camp just prior to the athlete's departure to a major competition in Belgium. Seven of these athletes were competing in swimming events, and 20 athletes were involved in track and field. In comparison, the able-bodied athletic data were collected at a competition. This group of athletes were evenly distributed with 14 athletes competing at a Esso II Cup swimming competition in Montreal, Quebec, and 14 athletes competing at a Senior Track and Field Championship in Ottawa, Ontario. The able-bodied athletes were asked to complete the POMS when they were not competing and had 10-15 minutes time to answer the questions.

The cerebral palsied non-athletic data, were collected at various locations throughout the Montreal, Quebec area. Since it was difficult to locate 28 adults that had cerebral palsy in one particular area, 10 subjects were from the Lethbridge Rehabilitation Center, 10 subjects were from a camp located in the Laurentians, and 8 subjects were participating in a cerebral palsy rally one weekend in June of 1986. On the other hand, the able-bodied non-athletic data was collected from two different McGill University undergraduate summer session courses. Fourteen of these students were attending an advanced French Translation course, and 14 students were attending an English Literature

course. As well, the students attending the French course indicated that their mother tongue was French, and the students in the English Literature course were English speaking.

Instructions to all subjects were the same. They were asked to answer the POMS 'according to how they have been feeling the past week, including today'. Some of the cerebral palsied subjects required assistance to complete the POMS due to their disability. This assistance was offered by volunteers who would ask the subjects to tell them on a scale of 'not at all' to 'extremely' to either state the proper corresponding answer, or simply nod their head if they were non-verbal.

In order to identify differences between the English speaking subjects and the French speaking subjects, a MANOVA was conducted. Results showed no significant differences between the two languages across the POMS. This confirmed the translation of the testing instrument and its adequate usage for the French speaking subjects in this study.

A two-way factorial design, athletic ability by physical ability, was used to evaluate the differences between the four groups involved in this study. There were two levels of the first factor, athletic ability, and two levels of the second factor, physical ability. The athletic

ability factor included conditions of athlete and non-athlete. The physical ability factor included conditions of cerebral palsied and able-bodied. The Profile of Mood States (POMS) consisting of six mood factors served as dependent variables in this study.

The extent to which the POMS scores varied across the different groups was assessed by a $2 \times 2 \times 2$ (athletic ability \times physical ability \times gender) MANCOVA with the factor age representing the covariate in this analysis. The first two factors, athletic ability and physical ability were the same as in the two-way factorial design used to simply assess the differences in POMS scores between the four groups. The third factor, gender, involved two levels which were of course male and female. A second $2 \times 2 \times 2$ (athletic ability \times physical ability \times education) MANOVA was conducted with the POMS scores to evaluate the differences in the two athletic groups as a function of their level of education. The third factor, education, involved two levels, high school and/or college/university.

In order to detect differences between the two athletic groups, the cerebral palsied athletes and the able-bodied athletes, a MANCOVA was conducted while adjusting for the variable age. Differences were evaluated in two ways. A 2×2 (sport \times group) MANOVA as well as a 2×2 (number of

years in competition x group) MANOVA hoped to identify whether or not there were differences between the two groups as a function of the type of sport they competed in, either swimming or track and field, or the number of years they had been in competition, either 0-2 years, or 3-8 years.

To identify differences between the able-bodied athletes and the able-bodied non-athletes, as well as the cerebral palsied athletes and the cerebral palsied non-athletes, MANOVAs were conducted between the comparable groups across the POMS variables.

In order to understand the cerebral palsied athletic results on the POMS, a MANOVA was conducted to identify differences between ambulatory and non-ambulatory athletes.

6.2. Summary of Findings

Results of the analysis performed on the POMS scores between the four respected groups indicated that subjects did differ in their mood profiles. Specifically, results of the 2 x 2 (Athletic ability x Physical ability) MANOVA showed main effects for both factors involved. The interaction however, was nonsignificant. Univariate analyses revealed the differences focused on the dependent variable vigor, suggesting that there were significant differences in how the four groups scored on the mood factor.

vigor. Observation of the means presented in Table 2 suggest the differences occurred due to the able-bodied non-athletic group. Specific comparisons between the able-bodied athletic group and the able-bodied non-athletic group support this observation for significant differences were found between these two groups on the dependent variable vigor.

Results of the MANCOVA between the athletic ability condition, physical ability condition, and gender, with the variable age as the covariate, found differences in the main effects compared to the 2×2 (Athletic ability x Physical ability) MANOVA. Physical ability no longer remained as a main effect suggesting that age was related to physical ability while not being related to athletic ability. As well this analyses suggested that there were no significant differences between how the male and female subjects scored on the POMS.

In addition, the variable education was included in another MANOVA to see its influences on the two athletic groups POMS scores. All four groups were not used in this analysis due to missing data. Results of this analysis found no main effects or interactions for the factor education suggesting that the high school athletes did not score differently than the college or university athletes.

Further analyses compared the two athletic groups, the two able-bodied groups, and the two cerebral palsied groups. MANCOVAs were used for these three analyses in order to control for the variability of age in some of the comparisons. No main effects were found in each of these analyses, although the two cerebral palsied groups, and the two able-bodied groups came very close to significance. This suggested that the cerebral palsied athletes possessed a psychological mood profile similar to the existing literature on the elite able-bodied athlete. In fact when Figure 1 is considered, it is evident that the cerebral palsied athletes indeed exhibit a more positive mood profile in comparison to the able-bodied athletes in this study. In addition, by taking further steps to understand the cerebral palsied athletes, it was evident that there were no multivariate significances between how the ambulatory athletes scored on the POMS in relation to the non-ambulatory athletes. As well there were no differences in the number of cerebral palsied athletes who competed in swimming versus track and field according to the sports classification that they were in.

6.3 Conclusion

Based upon the findings and within the limitations of the present study, the following conclusions are made:

1. There were significant differences between the athletes and non-athletes regardless of physical ability.

2. There were no significant differences according to gender across the six POMS dimensions with the four groups involved.

3. There were no significant differences between the cerebral palsied athletic group and the able-bodied athletic group across the six POMS dimensions.

4. There were no significant differences with the able-bodied athletes and the able-bodied non-athletes across the six POMS dimensions although results came close to significance.

5. There were significant differences at the .07 level with the cerebral palsied athletes and cerebral palsied non-athletes across the six POMS dimensions.

6. There were no significant differences among sports classifications across the six POMS dimensions with cerebral palsied athletes.

7. Cerebral palsied athletes who were ambulatory competed in a specific sport compared to non-ambulatory.

6.4 Implications

A number of implications appear to be appropriate from the present investigation. The findings of no differences between the able-bodied athletes and the cerebral palsied athletes across the six POMS dimensions should be conveyed to coaches using psychological techniques to enhance performance. The techniques now used with able-bodied athletes should be applicable for the cerebral palsied athletes (Ogilvie, 1985). Nagle et al. (1975) found techniques such as hypnotic suggestion, autosuggestion, and relaxation to be adequate controllers of precompetitive anxiety.

Results of the present study also suggested that a cerebral palsied athlete who is wheelchair bound does not portray a significant different psychological profile than a cerebral palsied athlete who is ambulatory. Therefore being bound to a wheelchair had no effect on the group's overall score in contradiction to Canabal et al. (1985) and Henschen et al. (1984).

6.5 Recommendations for Further Study

On the basis of the results of the present study, the following areas are recommended for further research:

1. Longitudinal studies are needed whereby various stages of an athletes' career are analyzed. Therefore "one-shot" testing is not appropriate since between group comparisons can only be made, and not within group consistencies. Thus, the POMS may be used over a series of months or even years, so that a coach has a thorough representation of an athletes' mood swings, throughout preseason training and during competition.

2. The POMS or any other psychological test should never be used alone to predict elite athletic performance. Instead, a repeatable pattern of psychological, physiological, and motor factors are needed to make this prediction (Morgan & Johnson, 1977; Silva et al., 1981).

3. It has been suggested that personality differences may occur depending on whether the athlete is involved in an open or closed-loop skill (Highlen & Bennett, 1979). Athletes in this study are all involved in closed-loop skills, swimming and/or track and field. It may be important to study differences in POMS scores with cerebral palsied athletes who are competing in an open-loop skill versus a closed-loop skill.

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APPENDIX A

PROFILE OF MOOD STATES (POMS)

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

- | | |
|--------------------------|------------------------------|
| 1. Friendly | 15. Active |
| 2. Tense | 16. On edge |
| 3. Angry | 17. Grouchy |
| 4. Worn out | 18. Blue |
| 5. Unhappy | 19. Energetic |
| 6. Clear-headed | 20. Panicky |
| 7. Lively | 21. Hopeless |
| 8. Confused | 22. Relaxed |
| 9. Sorry for things done | 23. Unworthy |
| 10. Shaky | 24. Spiteful |
| 11. Listless | 25. Sympathetic |
| 12. Peeved | 26. Uneasy |
| 13. Considerate | 27. Restless |
| 14. Sad | 28. Unable to
concentrate |

- | | |
|--------------------|-------------------------------|
| 29. Fatigued | 48. Helpless |
| 30. Helpful | 49. Weary |
| 31. Annoyed | 50. Bewildered |
| 32. Discouraged | 51. Alert |
| 33. Resentful | 52. Deceived |
| 34. Nervous | 53. Furious |
| 35. Lonely | 54. Efficient |
| 36. Miserable | 55. Trusting |
| 37. Muddled | 56. Full of pep |
| 38. Cheerful | 57. Bad-tempered |
| 40. Exhausted | 58. Worthless |
| 41. Anxious | 59. Forgetful |
| 42. Ready to fight | 60. Carefree |
| 43. Good natured | 61. Terrified |
| 44. Gloomy | 62. Guilty |
| 45. Desperate | 63. Vigorous |
| 46. Sluggish | 64. Uncertain about
things |
| 47. Rebellious | 65. Bushed |

APPENDIX B

TRANSLATED VERSION OF THE PROFILE OF MOOD STATES (POMS).

Vous trouverez ci-après une liste de mots qui décrivent des états d'âme. Veuillez lire chaque terme attentivement. Encerclez ensuite une(1) des cinq(5) réponses colonne de droite qui correspond le plus exactement à VOTRE HUMEUR DE LA DERNIERE SEMAINE, Y COMPRIS AUJOURD'HUI.

Les numéros correspondent aux évaluations suivantes:

0 = pas du tout
1 = un peu
2 = modérément
3 = passablement
4 = extrêmement

- | | |
|----------------------------|--------------------------------|
| 1. Amical | 15. Actif |
| 2. Tendu | 16. Agacé |
| 3. En colère | 17. Grognon |
| 4. Las | 18. Cafardeux |
| 5. Malheureux | 19. énergique |
| 6. Lucide | 20. Affolé |
| 7. Plein d'entrain | 21. Sans espoir |
| 8. Confus | 22. Détendu |
| 9. Troublé par des remords | 23. Indigne |
| 10. Tremblant | 24. Malveillant |
| 11. Indolent | 25. Sympathique |
| 12. Irrité | 26. Troublé |
| 13. Prévenant | 27. Agité |
| 14. Triste | 28. Incapable de se concentrer |

- | | |
|----------------------|------------------------|
| 29. Fatigué | 48. Impuissant |
| 30. Serviabile | 49. Abattu |
| 31. Ennuyé | 50. Abasourdi |
| 32. Découragé | 51. Vigilant |
| 33. Rancunier | 52. Trompé |
| 34. Nerveux | 53. Furieux |
| 35. Seul | 54. Efficace |
| 36. Lamentable | 55. Confiant |
| 37. Embrouillé | 56. Plein d'énergie |
| 38. D'humeur enjouée | 57. De mauvaise humeur |
| 39. Amer | 58. Insignifiant |
| 40. Exténué | 59. Distrait |
| 41. Anxieux | 60. Insouciant |
| 42. Combatif | 61. Terrifié |
| 43. Accommodant | 62. Coupable |
| 44. Mélancolique | 63. Vigoureux |
| 45. Désespéré | 64. Mal assuré |
| 46. Paresseux | 65. Epuisé |

APPENDIX C

PERSONAL DATA QUESTIONNAIRE

- (1) Name of competition _____
- (2) Age of athlete _____
- (3) Sex of athlete _____
- (4) Sport(s) competing in _____
- (5) Number of years in competition _____
- (6) Number of years competing at
national or international level _____
- (7) Club competing for (if
applicable) _____
- (8) Sports classification (if
applicable) _____
- (9) Educational level _____
- (10) List the competitions that
you have represented Canada in _____

QUESTIONNAIRE DES DONNEES PERSONNELLES

- (1) Le titre de la compétition _____
- (2) L'âge de l'athlète _____
- (3) Le sexe de l'athlète _____
- (4) Le ou les sports pour le
ou lesquels vous avez fait
de la compétition _____
- (5) Le nombre d'années dans la
compétition _____
- (6) Le nombre d'années dans la
compétition au niveau national
ou international _____
- (7) Le club pour lequel vous
compétitionné (s'il y a
lieu) _____
- (8) Votre classement (s'il y a
lieu) _____
- (9) Niveau d'éducation _____
- (10) Inscrivez les compétitions
auxquelles vous avez représenté
le Canada _____

APPENDIX D

PERSONAL DATA QUESTIONNAIRE

- (1) Age of participant
- (2) Educational level
- (3) Sex of participant
- (4) List any participation in
recreational activities

QUESTIONNAIRE DES DONNEES PERSONNELLES

- (1) L'âge du participant
- (2) Niveau d'éducation
- (3) Le sexe du participant
- (4) Incrivez les activités
récréatives auxquelles
vous avez participé

APPENDIX E

PERMISSION FORMS

June 4, 1985

Dear participant,

I am a graduate student at McGill University interested in administering a personality test to you which is titled Profile of Mood States (POMS). The test consists of 65 words or phrases which describe moods or feelings people generally have from day to day.

The purpose of this study is to compare the psychological mood profiles of elite cerebral palsied athletes and cerebral palsied non-athletes.

Results of this study will be kept confidential and will assist me in my data collection for my masters thesis at McGill University.

I hope you will assist me in my research. If you have any questions please contact me at 843-3865 at night, or at school at 392-8891 during the day.

Sincerely,

Sara Goodbrand

I agree to participate in the following study being conducted by Miss Sara Goodbrand.

(Signature of participant)