Adolescent Exercise Motives: Comparisons Across Gender and Activity Levels

by

Robert Byron Wilson
B.A., University of Western Ontario
B.Ed., University of Windsor

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF ARTS

in the School of Physical Education

We accept this thesis as conforming
to the required standard

[redacted]

Dr. H.D. Turkington, Supervisor (School of Physical Education)

[redacted]

Dr. B.L. Howe, Departmental Member (School of Physical Education)

[redacted]

Dr. W. Muir, Outside Member (Department of Psychological Foundations)

[redacted]

Dr. D. Bachor, External Examiner (Department of Psychological Foundations)

University of Victoria

Supervisor: Dr. H. David Turkington

Abstract

The present study was designed to measure the exercise participation motives of adolescents and to determine whether their motivational orientations differed in relation to gender, sport involvement, activity preference, environmental preference, and current activity level. Two hundred and forty three adolescents (mean age = 16.4 years) completed Markland and Ingledew's (1997) Exercise Motivations Inventory - 2 (EMI - 2) which assessed the strength of 14 objectives for exercising. Results supported previous research as a MANOVA indicated females exercised more for the health, appearance, and weight-management incentives, while males placed a greater emphasis on participating to experience the competition and social recognition. A number of differences were also evident when adolescents' motives for exercising were compared based on their sport involvement, activity preference, and environmental preference. Discriminant function analysis correctly classified 75.3% of the inactive and 74.1% of the highly active adolescents based on the 14 subscales of the EMI - 2. Implications for health and fitness professionals are discussed, as well as avenues for future research.

Keywords: Exercise, Motives, Adolescence

Abstract Continued

Examiners:

[redacted]

Dr. H.D. Turkington, Supervisor (School of Physical Education)

[redacted]

Dr. B.L. Howe, Departmental Member (School of Physical Education)

[redacted]

Dr. W. Muir, Outside Member (Department of Psychological Foundations)

[redacted]

Dr. D. Bachor, External Examiner (Department of Psychological Foundations)

Table of Contents

Tables

Acknowledgments

I would like to take this opportunity to express my deepest thanks to my supervisor, Dr. David Turkington, for guiding me through this process. Not only did he take the time to field my endless concerns and questions, but he gave me sound and honest advice throughout my entire degree. For your patience and encouragement, I sincerely thank you.

I would also like to offer my thanks to the other two members of my committee, Dr. Bruce Howe and Dr. Walter Muir. I appreciated your willingness to devote both your time and expertise, which proved invaluable in helping to produce this paper.

Thanks also to the principals of Reynolds and Belmont Secondary Schools, Mr. Dave Petrie and Mr. Mike Dunne for their assistance with this project, as well as Mr. Peter Ooms who went out of his way to make this study possible.

Dedications

To my mother and father, who have provided unconditional support and love, regardless of the situation. This would not have been possible without you two.

To my soul sista', Cindy, for her endless encouragement, love, and praise, and for helping me to keep it real.

To Louisa, all of my dreams are with you.

To my closest friends, Greg, Pamela, and the homeboy in T.O., thanks for everything.

And to the other grad students, especially Makepeace and Jamie, as well as my mom-away-from-home Gladys, thank you for all of your advice, help, and friendship.

Chapter 1

Introduction

The positive effects of regular exercise on our physical and mental health have been well established. Review articles such as Dishman (1988), Gill and Overdorf (1994), and Sallis and Hovell (1990) have presented the case for the prescription of exercise as a means of preventing conditions such as heart disease, obesity, hypertension, adult onset diabetes, anxiety, and even depression. Although these established benefits of exercise are now widely accepted throughout the world, the percentage of active people remains well below the targeted national objectives of most industrialized nations (Sallis & Hovell, 1990)

In an attempt to understand this phenomenon, there has been an extensive amount of research conducted among adults to determine what factors motivate this population to be physically active. Unfortunately, similar studies among the youth and adolescent populations are limited. This is perplexing considering the adolescent segment of society accounts for one of the sharpest age-related declines in physical activity and exercise participation (Canada Fitness Survey, 1983; Dishman, 1988; Sallis & Hovell, 1990; Stephens & Craig, 1990; Stephens, Jacobs, & White, 1985). A national survey of Canadians (Canada Fitness Survey, 1983) and its longitudinal follow-up (the Campbell's Survey on Well-Being by Stephens & Craig, 1990) both revealed a dramatic decline in

activity rates as individuals moved from the structured school environment to an independent lifestyle.

As Dishman and Dunn (1988) have argued, understanding exercise motives among the younger populations should be made a priority as the exercise patterns and determinants of our youth presumably impact the prevalence of exercise during the adult years. From this perspective, health educators may be wise to adopt a preventative approach to combat the high rates of physical inactivity among the adult population (Jessor, 1984; Routh, 1988; Tappe, Duda, & Menges-Ehrnwald, 1990). Before interventions targeted at the adolescent population can be introduced, it is necessary to identify the motivating factors which may play a role in the adoption and maintenance of exercise behaviour. As Biddle (1992) explained, optimal participation in exercise and physical activity will only be realized and attained once the diverse motives of participation have been identified and are understood.

The research which has examined participation motives (or incentives) can generally be classified into two categories. The first being literature which covers adolescent motives in sport, and the second addressing adolescent motives specific to the exercise environment. Although the transferability of sport motives to the context of exercise has not been established, Schutz, Smoll, and Wood (1981) found the attitudes of young adolescents toward the construct of physical activity to be "essentially equivalent to their attitudes toward specific sports" (p. 39). Therefore, research conducted in both the sport and exercise contexts should provide valuable insights into potential determinants of exercise behaviour (See Chapter 2 for a complete overview of the

relevant literature specific to both the sporting and exercise contexts). What follows is a summary of the literature specific to the exercise environment.

Exercise Participation Motives

Although the amount of research which has focused on adolescents and their exercise behaviour is limited, the few studies which have addressed this specific population have been nationally representative. The Canada Fitness Survey (1983) not only assessed the activity levels of young Canadians (classified as either active, moderately active, or inactive), but it also identified the most frequently cited reasons for being active. Among the older adolescents aged 18-19 years (n = 948), a large percentage of both males and females rated *to feel better* and *for the pleasure* as very important reasons for being active. The reason which most discriminated between the males and females was exercising for the purposes of *weight control*. The percentage of females who rated this aspect as very important (55%) was noticeably larger than the percentage of males who felt that this was a crucial reason for being active (32%). However, more males (30%) rated the need to be *challenged* as very important, while females were less influenced by this aspect (21%).

A longitudinal follow-up of the Canada Fitness Survey (1983) was the Campbell's Survey of 1988. The data gathered in this survey was organized, interpreted, and later published by Stephens and Craig (1990). Findings of this follow-up also indicated gender differences, but like the first survey, the results of this study were not

tested to determine if these differences were statistically significant. Among the 15-19 year olds (n = 2104), females rated the following incentives as being most important in motivating them to be physically active: *feeling better mentally* (51%), for *appearance/weight control* (50%), *to feel better physically* (45%), and for the *socializing* benefits (43%). Unlike the females, the males rated *feeling better physically* (46%) as most important, *feeling better mentally* and *improving their fitness* as second and third in importance (37%), and *socializing* as fourth (33%).

Unfortunately, a steep decline in activity rates occurring in late adolescence was found in both the Canada Fitness Survey (1983) and its longitudinal follow-up by Stephens and Craig (1990). This decline in activity rates seems to be a fairly consistent finding in national surveys which have examined the prevalence of exercise.

Throughout these national studies and other review papers summarizing exercise determinant research, there is an explicitly stated need to study this apparent decrease in exercise and physical activity in late adolescence (Canada Fitness Survey, 1983; Sallis & Hovell, 1990; Stephens & Craig, 1990). It seems that this decrease occurs as young adults are making the transition to an independent lifestyle. Therefore, it would appear desirable to develop interventions aimed at preventing this steep decline in activity rates.

However, before preventative interventions are adopted in an attempt to maintain and increase the activity levels of these adolescents, it is necessary to not only identify the antecedents of physical activity specific to adolescents, but to understand how these exercise motives are related to one's gender, sport involvement, activity and environmental preferences, as well as one's activity level .

Purpose

Accordingly, the purpose of this study was to determine if any significant differences existed among exercise motives in relation to an individual's gender, sport involvement (athletes vs. nonathletes vs. former athletes), activity preference (individual vs. group activities), and environmental preference (supervised/formal vs. spontaneous/informal settings).

In addition, the present study attempted to determine which exercise motives were salient in accurately discriminating between the inactive and highly active adolescents.

Research Questions

There were five individual research questions which were addressed in this study. They were as follows:

1) Do males and females differ significantly when their exercise motives are compared?
2) Do athletes, former athletes, and nonathletes differ significantly from each other when their exercise motives are compared?
3) Do adolescents grouped according to their activity preference differ significantly with respect to their exercise motives?
4) Do adolescents grouped according to their environmental preference differ significantly with respect to their exercise motives?
5) Which exercise motives are salient in accurately discriminating between inactive and highly active adolescents?

Definitions

Activity Preference: Type of activity in which the adolescent prefers to participate (either an individual activity, group activity, or a combination of the two).

Individual Activity. Activities which are possible to carry out successfully with two or less individuals, even though the participant may still belong to a larger club or organization (e.g. gymnastics, swimming, weight-training, singles tennis, pick-up basketball, home aerobics, etc.).

Group Activity. Activities which typically require three or more individuals for the activity to be carried out in a successful manner, although the participants may not necessarily be a member of an organized team or league (e.g. ice-hockey, soccer, rugby, doubles tennis, basketball, aerobics class, etc.).

Environmental Preference*:* Type of environment in which the adolescent prefers to participate (either a formal/supervised setting, an informal/spontaneous setting, or a combination of the two).

Formal/Supervised. This type of setting hosts organized leagues/teams or structured events which are typically scheduled at specific times. A designated coach/supervisor/instructor also accompanies each team/participant (e.g. rugby, gymnastics, karate, aerobics class, etc).

Informal/Spontaneous. Defined as an environment which is non-structured, is accessible by anyone at any time, and is normally without the guidance of a coach/supervisor (e.g. rollerblading, pick-up basketball, kayaking, home aerobics, etc.)

Activity Level: Adolescents' current activity level was an estimation based on their total energy expenditure in all leisure-time activities. The three categories of activity levels were inactive, moderately active, and highly active. (See the section titled Measuring Exercise Behaviour for a complete explanation).

Inactive. Includes those adolescents whose average energy expenditure score fell

among the lower third of the sample.

Moderately Active. Includes those adolescents whose average energy expenditure score fell among the middle third of the sample.

Highly Active. Includes those adolescents whose average energy expenditure score was among the upper third of the sample.

Exercise Motives: A participant's exercise goal(s) (e.g.. stress management, improved appearance, or for the enjoyment). These motivational factors (incentives) essentially reflect *why* an individual bothers to exercise, and were measured using the Exercise Motivations Inventory-2 developed by Markland and Ingledew (1997).

Sport Involvement: An adolescent was defined as either an athlete, a non athlete, or a former athlete based upon their history of sport participation.

Athlete. An individual who is currently participating (or who is intending on participating) in an organized sport.

Non athlete. An individual who has never participated in an organized sport and is not currently participating in an organized sport.

Former Athlete. An individual who had previously participated in an organized sport but is not currently participating, and does not intend to participate in the near future.

Basic Assumption

The researcher must assume that each subject who voluntarily completes this questionnaire has answered the questions in a truthful manner.

Potential Limitations

As with any study which attempts to measure one's current activity level and their reasons for participating in exercise, there exists the possibility of the socially-desirable response bias by the subjects (Markland & Hardy, 1993). Fortunately, the original instrument (the EMI), which was later refined by Markland and Ingledew (1997) did not appear to suffer from a socially-desirable response bias, as evidenced by the low correlations between the subscales of the EMI and the Social Desirability Scale (Markland & Hardy, 1993).

In addition, the feasibility of selecting a randomized sample was not possible as the decision regarding which schools would be included in this study was based on the school's willingness to cooperate with the author.

Third, the study was retrospective in nature, so there was a possibility of inaccuracy in the recall of information. Subjects were asked to recall their exercise behaviour for the previous 7 days using a modified version of the Campbell's Survey developed by Stephens and Craig (1990). Previous research has demonstrated that similar 7-day recall questionnaires are accurate summaries of one's energy expenditure

(Montoye, Kemper, Saris, & Washburn, 1996; Wallace, McKenzie, & Nader, 1985), and are also significantly correlated ($r = 0.79$, $p < 0.01$) to the more expensive electronic motion sensors (i.e. Caltrac accelerometers) which are often utilized to assess an individual's activity level (Miller, Freedson, & Kline, 1994).

The fourth and final limitation of this study concerned the system used to classify individuals as either inactive, moderately active, or highly active. The energy cost scores obtained for each physical activity had been adopted from the established literature (Montoye et al., 1996), and as such these scores may not represent the exact energy cost score of all activities. Since these values were only averages, the energy expenditure scores may not have accurately reflected individual differences with respect to the intensity in which the activity was carried out (Ainsworth, Haskell, Leon, Jacobs, Montoye, Sallis, & Paffenbarger, 1993). In addition, individual differences in movement efficiency cannot be accounted for when establishing activity levels based upon results from a retrospective questionnaire (Ainsworth et al., 1993).

Delimitations

There are two major delimitations which were imposed upon this study. The first delimitation imposed by the author concerned the phase of the 'exercise cycle' which was studied. Sallis and Hovell (1990) suggested there are three major transition phases on which exercise determinant research could focus: Moving from being *Sedentary* to the *Adoption* of exercise; moving from the *Adoption* phase to either the *Drop-Out* or the

Maintenance phase; and lastly moving from the *Drop-Out* phase to the *Resumption* phase. The current study did not attempt to classify subjects as being involved in one of these three possible phases. The adolescents were only asked to recall information relevant to their current activity levels and motives, and consequently it was not possible to determine what causes individuals to move from one phase to the next.

The second delimitation which should be noted is the fact that exercise participation is a multidimensional process. As such, there are a number of factors which could potentially affect one's participation in exercise and physical activity. The author acknowledges that only psychosocial motives were examined. Other psychosocial factors such as one's socioeconomic status, as well as biological factors could impact a person's exercise behaviour but were not addressed in the present study.

Chapter 2

Literature Review

Introduction

This review will be limited to studies which have focused specifically on participation motives among the adolescent population. In particular, the reasons which adolescents cite as important in motivating them to participate in both the sporting and the exercise contexts will be examined. Although the transferability of sport motives to the context of exercise has not been established, Schutz, Smoll, and Wood (1981) found the attitudes of young adolescents toward the construct of physical activity to be "essentially equivalent to their attitudes toward specific sports" (p. 39). Therefore, research conducted in both the sport and exercise contexts should provide valuable insights into potential determinants of exercise behaviour, as sport is generally considered to be a subset of the exercise and physical activity domain.

The relevant studies conducted in the sport context will be reviewed in order to identify any meaningful differences among participation motives in relation to one's gender, the activities in which they participated (i.e. the sports), and the types of environments in which they participated (e.g.. recreational, competitive, etc.). Once this

has been summarized, studies that have examined participation motives in the exercise setting (as opposed to the sport setting) will be reviewed using a similar format.

Having analyzed these two major categories of participation motives, this review will then focus on the only study which has investigated the relationship between an adolescents' current activity level and the exercise incentives which they cite as being salient in motivating them towards an active lifestyle (Tappe, Duda, & Menges-Ehrnwald, 1990). This literature review will conclude by discussing the results and perceived limitations of the Tappe et al. (1990) study.

1. Sport Motives Among Adolescents

Early research.

In perhaps the earliest study of participation motives among young athletes, Alderman and Wood (1976) attempted to determine whether or not a modified version of Birch and Veroff's incentive system (as cited in Alderman & Wood, 1976) could be applied to the sport setting. In particular, Alderman and Wood (1976) set out to understand what motivates 425 male ice hockey players (aged 11-14) to participate in competitive sport in terms of seven major incentives. These major incentives were labeled: 1) *independence*, 2) *power* (i.e. influence and control), 3) *affiliation*, 4) *arousa*l, 5) *esteem* (i.e. status, recognition, and approval), 6) *excellence*, and finally 7) *aggression*.

When asked to respond to statements on how they felt about themselves as

athletes, the participants indicated that the aspects of *affiliation* were most important in motivating them to participate in competitive sports (M = 37.6 out of a possible 40). In addition, the need to be very good at something (*excellence*) and to experience the excitement involved in sports (*arousal*) were also rated very high (M = 36.2 and 34.8 respectively). The other four incentives were relatively unimportant, especially the aspects of *power* (M = 28.3) and *independence* (M = 27.4). Even though the researchers expected the ice hockey players to rate *aggression* fairly high due to their competitive nature, it was only rated as fifth in importance, with a mean score of 30.0. Unfortunately, a factor analysis was not performed on the data to determine if the seven major incentives could be further reduced to 2 or 3 major dimensions.

After reviewing the Alderman and Wood (1976) study as well as two other studies which addressed young athlete's perceived reasons for participating, Passer (1981) suggested that children's and adolescents' incentives for participating in sports could be reduced to six major categories. These were: 1) *affiliation* (reflecting team atmosphere and friendship), 2) *skill development* (to improve or maintain new skills), 3) *excitement* (action, novel activities, and the challenge), 4) *success and status* (to win, gain recognition and/or rewards), 5) *fitness* (to stay in good physical condition), and finally 6) *energy release* (to reduce tension/anxiety). Passer (1981) argued that the aspect of *energy release* did not have as much influence as the other five incentives in determining a child's/adolescents' participation in sport. Subsequent research conducted among adolescents has confirmed the importance of these six main categories of motives (Buonamano, Cei, & Mussino, 1995; Gill, Gross, & Huddleston, 1983; Klint & Weiss,

1986; Longhurst & Spink, 1987; Romar, 1994; and Ryckman & Hamel, 1991).

Like Alderman and Wood (1976), Passer (1981) determined that the importance of motivating factors such as being *independent*, *aggressive*, and having been *influenced by significant others* were of little significance for the majority of participants. It is interesting to note that although Passer (1981) recognizes the importance of *having fun* in determining participation in sports, it was felt that the incentive of *fun* did not deserve to be a general motive. Consequently, it was argued that *fun* was the resultant of other major incentives being met (i.e. affiliation, skill development, excitement, etc.). This is in direct contrast to the more recent literature which has found the dimension of *having fun* to be consistently ranked as very important, if not the most important factor in determining sport participation (Buonamano et al., 1995; Gill et al., 1983; Klint & Weiss, 1986; Romar, 1994; Wankel & Kreisel, 1985).

Gender differences.

An early study that did report *having fun* to be one of eight main incentives for both males and females was by Gill, Gross, and Huddleston (1983). These researchers examined the participation motives of boys and girls (n = 1138, aged 8-18) representing 11 different sports during a summer sports school. Using a self-developed questionnaire composed of 30 possible sport motives, the athletes cited the following 5 reasons as being most important: *to improve skills* (M = 1.07), *to have fun* (M = 1.15), *to learn new skills* (M = 1.16), *for the challenge* (M = 1.20), and *to be physically fit* (M = 1.23). These

reasons were rated on a 3-point scale with 1 indicating 'most important' and 3 meaning 'not important at all'. All responses were then subjected to a factor analysis which reduced the data to 8 main dimensions of incentives which closely resembled those of Passer (1981). These main motives were: 1) *achievement/status*, 2) *team aspects*, 3) *fitness*, 4) *energy release*, 5) *others* (i.e. parents, friends, coaches, or equipment/facilities), 6) *skill*, 7) *friends*, and finally 8) *fun*.

There were highly significant sex differences among these eight factors, most notably concerning the *achievement/status* incentive. Males tended to rate these reasons (to win, to feel important, to be popular, to gain status/rewards, and to do something I'm good at) as more important in motivating them to engage in sports. Additionally, females tended to have elevated ratings as compared to the males on both the *friendship* (to be with and make new friends) and the *fitness* (to stay in shape, get exercise, and stay physically fit) factors. Although these differences among *friendship* and *fitness* were statistically significant, the authors concluded that the gender differences found on these two factors were of little practical importance.

Like Passer (1981), Gill et al. (1983) did not attempt to examine motive patterns across different environments as all participants of the study were attending the same sports school. It was also not feasible to examine the differences among participation motives as a function of the activity type due to the small and unequal cell sizes, although Gill et al. (1983) allude to the fact that "a comparison of participation motivation factors across different activities . . . could provide valuable information . . . (but) must be left for future investigations" (p. 11).

In a small-scale comparison of sport incentives across a sample of elite male and female athletes from Finland (n = 101, M = 19 years), Romar (1994) reported some interesting gender differences. Using a self-developed questionnaire, he found that male athletes cited *being a good athlete* (60%), for the *fitness* benefits (42%), for the *challenge* (31%), and finally for the *fun* (27%) as the most salient reasons for participating in their respective sports. The female athletes also rated *being a good athlete* as most important (56%) and ranked the *fitness* aspect (51%) as second most important. However, females indicated that *having fun* (49%) was a much more important motive when compared to the males on that dimension.

Statistically significant differences ($p < .05$) occurred between male and female motives with respect to the *challenge* aspect (males were significantly higher) and having *fun* (with females rating it as more important). Similar to the study by Gill et al. (1983), Romar (1994) was not able to examine between-sport differences due to the small sample size, even though the athletes represented a variety of sports (track and field, swimming, cycling, and power-lifting).

Activity differences.

Wankel and Kreisel (1985) are among a select group of researchers who *have* examined sport motives across various activities. Utilizing a 10-item Thurstonian paired comparison inventory, 822 male sport participants representing four separate age cohorts (ages 7-8, 9-10, 11-12, and 13-14) were measured with respect to their participation

motives. These athletes were administered the "Minor Sport Enjoyment Inventory" which was developed and tested in an earlier study by Wankel and Pabich (as cited in Wankel and Kreisel, 1985). Of the four age cohorts, only the results for the 13-14 year olds will be discussed, as this age group most closely resembles the age of the participants being examined in the present study.

This study found participation motives to be extremely consistent across all three sports (soccer, baseball, and hockey) and across all four age-groups. Wankel and Kreisel (1985) reported *intrinsic* factors (i.e. the excitement of the sport, personal accomplishment, etc.) to be consistently rated as most important, and the *extrinsic or outcome-related* incentives (i.e. pleasing others, winning rewards and/or the game) as being least important. The *social* items (i.e. being on a team and being with friends) were consistently rated as moderately important. Among the 13-14 year old age-group (n = 290), the 5 leading incentives were to experience the *excitement of the game* (M = 3.65), to *compare their skills against others* (M = 3.17), for the *personal accomplishment* (M = 2.83), to *improve their skills of the game* (M = 2.64), and finally just *doing the skills of the game* (M = 2.13). These scores had been standardized (through the use of z scores) to allow for accurate comparisons across both sport activities and age levels.

As a result of the large and fairly equal sample sizes, this was the first study of participation motives which was able to examine between-sport differences. The consistency that was reported across all three sports with respect to the relative importance placed on the 10 motives was statistically significant. Unfortunately this study's sample was limited to a male-only population, so participation motive patterns

across genders could not be assessed.

A study which also examined between-sport differences among Australian youth (aged 8-18) was conducted by Longhurst and Spink (1987). The main purpose of this study was to compare the motive patterns of Australian youth to their North American counterparts. Using a modified North American questionnaire, the researchers collected data from a group of males who had participated in track and field (n = 59), swimming (n = 38), Australian rules football (n = 28), and cricket (n = 62). The female athletes represented the sports of track and field (n = 66), swimming (n = 31), and netball (n = 120).

The researchers found athletes involved in the sport of swimming to rate the motive of experiencing *action* as being significantly less important as compared to those in track and field, netball, cricket and Australian rules football ($p < .05$). Swimmers also indicated that *having fun* and *being with friends* was not as important when compared to the track and field, netball, and cricket participants ($p < .05$). The last significant difference also concerned swimmers, as they tended to consider the aspect of *excitement* to be less salient when compared to the track and field and netball athletes ($p < .05$). The authors imply that the coaching behaviour of the swimming coaches (which has been found to be less fun-orientated than coaches from other sports) may be responsible (either directly or indirectly) for these rather unusual results.

A recent study which extensively surveyed the sport incentives of 2,589 Italian youth athletes (aged 9-18) was conducted by Buonamano, Cei, and Mussino (1995). These researchers utilized both a closed questionnaire developed in North America by

Gill et al. (1983), and an open-ended questionnaire which was developed through an earlier pilot study. The responses from the open-ended questionnaire were dominated by two main incentives: for the *enjoyment* (49.2%), and for the *physical benefits* (32.0%). Factor analysis for the complete sample produced 6 major dimensions which were similar to the categories suggested by Passer (1981). These were *success/status*, *fitness/skill*, *extrinsic rewards*, *team, friendship/fun*, and *energy release*.

Although these researchers uncovered significant gender differences with respect to participation motives, only the between-sport differences among motives will be discussed. As a result of the unrotated factor analysis, Buonamano et al. (1995) determined that those athletes who wanted to achieve *success/status, fitness/energy release,* and *competition* motives rather than *affiliation* motives participated mainly in tennis, wrestling, gymnastics, weight lifting, track and field, judo, other fighting sports, and other sports classified as being 'individual' in nature. However, participants in team sports (basketball, volleyball, soccer, and other 'team' sports) tended to place a greater emphasis on the *affiliation* aspect (i.e. to be part of a group, to meet new friends, to participate with friends, and my parents want me to play).

Buonamano et al. (1995) concluded that there are five typologies of motives towards sports: *enthusiasts*, those *looking for socialization*, *competitors*, *individualists*, and *noncompetitors*. Interestingly, two of these five typologies are can be characterized based upon the type of activities in which the individual prefers to participate. The youth who are *looking for socialization* are likely to practice team sports, whereas those classified as *individualists* are those who value improving their physical condition, their

skills, and use sport as an form of energy release. These *individualists* do not care to socialize, and therefore usually engage in individually-orientated activities.

Environmental differences.

Klint and Weiss (1986) did not address gender or activity differences, but were among the first researchers to investigate the relationship between the environmental setting (i.e. the intensity level at which they participated) and one's participation motives. This study focused only on gymnasts (M = 13.4 yrs.) and compared the motives of three subgroups: (a) competitive gymnasts (n = 43), (b) recreational gymnasts (n = 26), and (c) former gymnasts (n = 37). Klint and Weiss (1986) defined the *competitive* gymnast as being involved in a program which was orientated towards developing national caliber gymnasts and consequently competed at high levels, whereas the *recreational* gymnasts had no prior competitive experience and were involved in a program which emphasized skill development. The large majority of the *former gymnasts* were classified as those who had left gymnastics but had continued to be involved in other competitive sport programs, while only two individuals had left gymnastics and had not continued to participate in sport in any way.

All subjects were administered an author-developed questionnaire which required participants to rate the relative importance of 32 individual incentives on a 5-point scale (ranging from 5 = extremely important to 0 = not at all important). Results indicated that the athletes who participated in the competitive environment listed the following five

motives as most important: *to get stronger or get into shape* (*M*=4.54), *to learn new skills* (*M*=4.54), *to improve my skills* (*M*=4.44), *to stay in shape* (*M*=4.40), and finally *to compete* (*M*=4.33) and because of the *challenge* (*M*=4.33) were equally important. Recreational gymnasts cited the motives of *having fun* (*M*=4.39), to *use the equipment* (*M*=4.39), to *learn new skills* (*M*=4.35), to *get stronger or get in shape* (*M*=4.08), and finally to *improve my skills* (*M*=3.89) as being most salient. The former gymnasts felt that the *challenge* (*M*=4.11), having *fun* (*M*=4.08), to *compete at higher levels* (*M*=4.08), for the *excitement* (*M*=3.97), and lastly to *learn new skills* (*M*=3.97) were the most important motivating incentives. Therefore it seems that the environmental setting (i.e. the intensity level at which they participated) is related to their participation motives.

Once the factor analysis reduced the 32 variables into 10 main factors, discriminant function analysis was used to determine if these three groups differed significantly on their participation motives ($p < .0001$). Not surprisingly, when the competitive athletes were compared to the recreational athletes using Scheffé *t*-tests at $p < .05$, the *competitive* gymnasts placed significantly more importance on the *competition* aspect (i.e. wanting to win, receive rewards, competing, etc.). *Competitive* gymnasts also differed from the former gymnasts as they rated the aspects of *competition*, *fitness,* and *improving skills* significantly higher ($p < .05$).

When compared to the recreational gymnasts ($p < .05$), the *former* gymnasts placed greater emphasis on *competition* and *action* (for the excitement and challenge). However, the *recreational* athletes were more motivated by the *situational* (e.g.. using the equipment) and the *fitness* factors when compared to the former gymnasts ($p < .05$).

This study established that the pattern of participation motives are related to the level at which an athlete participates (i.e. the sporting environment), but did not attempt to measure gender differences among these gymnasts.

A more recent study which did in fact compare gender and environmental differences was an examination of recreational and collegiate-level athletes (both male and female) by White (1995). One hundred and thirty three intercollegiate athletes and seventy nine recreational athletes completed the Perceived Purposes of Sport Questionnaire by Duda (as cited in White, 1995). Even though the subjects were slightly older (M = 21 yrs.) than the adolescent population which is the focus of this literature review, the results which were discovered are relevant to the issue of environmental differences.

Intercollegiate athletes who competed in a more formalized, structured environment felt that sports should make them more *competitive* ($p < .05$) and should also provide them with *more career opportunities* ($p < .01$) when compared to the recreational athletes. On the other hand, the recreational athletes who participated in a more informal environment considered sport a means for *decreasing health risks* ($p < .001$) and to *promote the proper values and ethics* among society ($p < .05$). Unfortunately, this study focused on an athlete's *perceived purpose of sport*, which is distinct from an athlete's ratings of *participation motives*.

Summary of the Sport Motive Literature

This selective review of the literature concerning adolescent participation motives for sport has indicated some significant differences when we compare across gender, activities, and environments. It seems that participating in order to gain a sense of *achievement/status* (i.e. gaining recognition, rewards, and prestige) and to experience the *challenge* are more salient for males, whereas females place a greater emphasis on *friendship*, *having fun*, and participating for the *fitness* benefits (Gill et al., 1983; Romar, 1994).

Between-sport differences among participation motives are also evident in the literature, although generalizing across activities is more difficult. Some studies have found significant differences across sports (Longhurst & Spink, 1987), while others have found the motives across sports to be extremely consistent (Wankel & Kreisel, 1985). Obviously, the nature of the sports being compared will impact the results, which is what Buonamano et al. (1995) found to be the case. Athletes participating in individual-type sports place greater importance on *success/status*, *fitness/energy release*, and *competition* aspects, while team-orientated athletes value *affiliation* to a greater extent (Buonamano et al., 1995).

Not only are between-sport differences evident, but the environment which an athlete participates in has also been found to affect the motives which an athlete will rate as important. As expected, Klint and Weiss (1986) found competitive gymnasts more likely to cite the *competitive* reasons as being more influential, while the recreational

gymnasts emphasized having *fun*. White (1995) also found competitive athletes to emphasize the *competitive* outcomes, while recreational athletes viewed sport as a means for *reducing the health risks*.

2. Exercise Motives Among Adolescents

As Biddle (1992) explains, the majority of research on exercise motives has been conducted in the sporting context. He suggests that this is natural, given that youth are more likely to engage in some form of sport, rather than other forms of physical activity outside of this competitive environment. However, there is now an emerging field of research dedicated to identifying salient exercise incentives in an attempt to increase and maintain the prevalence of exercise and physical activity among adolescents. The bulk of the research conducted among adolescents has focused on gender differences, while overlooking differences that may be related to the types of activities and environments in which they prefer to participate.

Early research.

The earliest researchers to recognize the importance of identifying and understanding adolescent motives for physical activity were Telama and Silvennoinen (1979). These Finnish authors administered 3,106 questionnaires to students from grades 5 through 12 who were selected using a stratified randomcluster design. Similar to the 6

main motives which Passer (1981) identified in his metanalysis of the sport context, Telama and Silvennoinen (1979) condensed 30 individual incentives into 8 major categories as a result of factor analysis. These were labeled *fitness related to self-image, relaxation, sociability, preference for outdoor activities, normative health* (to develop healthy habits for later in life), *competition and achievement*, *improving one's physique,* and *functional health* (maintaining one's health and improving one's endurance).

Among the 17-19 year olds, the top 6 reasons for participating in physical activity on a 5-point scale were *for the recreation and relaxation* (M = 3.5), to *maintain one's health* (M = 3.5), to engage in *outdoor activities* (M = 3.5), to *improve one's endurance* (M = 3.3), to *counterbalance school work* (M = 3.3), and to develop *healthy habits* for life (M = 3.1).

In an attempt to understand the structure and development of adolescent motives, Telama and Silvennoinen (1979) were also the first researchers to investigate gender differences. The best discriminator of the two genders was the motive variable *success in competition*, which was considerably more relevant to the males than to the females. Females indicated that they participated in physical activity *as a counterbalance to school work* and to engage in *outdoor activities and nature* to a greater degree than males. Finally, males were likely to *compete for top position*, while females participated more for the *recreation and relaxation.*

Gender differences.

In another extensive study which produced some interesting gender differences, Watkin and Youngen (1988) compared participation motives of grade 9 and 10 Australian and American adolescents towards physical activity. Both the Australian (n = 1353) and American (n = 591) samples were comprised of relatively equal numbers of males and females. A self-developed questionnaire measured the degree to which each of the 20 factors motivated them to participate in physical activity (ranging from 1 = not at all to 5 = a great deal).

The females (both Australian and American) were highly motivated to participate in physical activity to *develop or improve their physical skills* (M = 3.72), *to improve their physical appearance* (M = 3.65), *do something well* (M = 3.63), *improve their health and fitness* levels (M = 3.50), and because it provided them with a *challenge* (M = 3.42). Both samples of females rated the opportunity to achieve *prestige/social status*, gain the *responsibility of leadership*, and to engage in *graceful and beautiful movements* as least important.

For the males, there was less consistency across samples. For American males, they cited *liking to win* (M = 3.72) and the *pleasure of doing something well* (M = 3.72) as most important, whereas Australian males were highly motivated by the opportunity to *develop and improve physical skills* (M = 3.71) and because it provides them with a *challenge* (M = 3.71). As anticipated, both sets of males rated the opportunity to *engage in graceful and beautiful movements* as least important. Other motivating variables of

little significance to males were to gain the *responsibility of leadership*, for *relaxation*, and for the *opportunity to socialize*.

Watkin and Youngen (1988) found that *engaging in hard and strenuous training* was among the least important variables for both groups of males (M = 2.97). Even more interesting was the fact that both samples of males rated the *prestige/social status* reasons (M = 2.79) as relatively unimportant, which contradicts the results discussed earlier for males in the sport environment.

A nationally representative survey of Canadians reported some interesting gender differences among the older adolescents (aged 18-19; Canada Fitness Survey, 1983). The proportion of both males and females who rated *to feel better* and *for the pleasure* as very important reasons for being active were fairly equal (males = 56% and 54%, females = 57% and 50% respectively). The reason which discriminated the males and females most easily was being active in order to *control one's weight*. The percentage of females who rated this aspect as very important (55%) was noticeably larger than the percentage of males who felt that this was a crucial reason for being active (32%). The other incentive which indicated a smaller gender difference was the importance an adolescent placed on being *challenged*. Consistent with the previous work done in the sport context (Romar, 1994), more males (30%) rated the *challenge* incentive as very important while females were less influenced by this aspect (21%).

A longitudinal follow-up of the Canada Fitness Survey (1983) was the Campbell's Survey of 1988. The data gathered in this survey was organized, interpreted, and later published by Stephens and Craig (1990). The 1988 version of the survey

labeled what had earlier been termed '*reasons for being active*' as a person's '*goals for leisure time*', although the 7 individual incentives remained basically the same. Findings of this follow-up also indicated gender differences, but like the first survey, the results of this study were not tested to determine if these differences were statistically significant.

Among the 15-19 year olds (n = 2104), females rated *feeling better mentally* (51%), for *appearance/weight control* (50%), *feeling better physically* (45%), and for the *socializing* benefits (43%) as the top four goals for their leisure time. Unlike the females, the males rated *feeling better physically* (46%) as most important, *feeling better mentally* and *improving their fitness* as equally important (37%), and *socializing* as fourth important (33%).

Therefore, females considered the goals of improving their *appearance*, *controlling their weight* and *socializing* as the more valuable goals of physical activity, whereas males ranked *improving their fitness* as higher on their priority list. These gender differences have also been supported by Watkin and Younger (1988) as well as the earlier Canada Fitness Survey (1983).

A study conducted in Wales using the Exercise Motivations Inventory (EMI) also found some significant gender differences when 131 subjects aged 18-25 were compared. Markland and Hardy (1993) determined that their self-developed EMI instrument was successful in discriminating between young men and women (overall accuracy of classification was reported to be 83.9%). Of the 12 subscales of the EMI, the three dimensions which best illuminated the gender differences were the aspects of *competition, social recognition*, and *weight management*.

In accordance to the earlier research findings, Markland and Hardy (1993) found that males exercised more for the *competition* and for *social recognition*, whereas the female subjects indicated that they exercised more for the *weight management* benefits. Contrary to their original hypothesis, the *affiliation* dimension did not help discriminate between males and females.

Based only on the mean scores (1 being unimportant and 5 being very important), the females ranked *re-creation* (M = 4.01), *fitness* (M = 3.83), and *enjoyment* (M = 3.40) as most important. Males were in agreement with females as to the most important incentive (*re- creation*; M = 3.64), but they felt the *competition* aspect (M = 3.39) was second most important, with *fitness* (M = 3.37) rounding out the top three.

In a further study conducted in Great Britain by Ashford, Biddle, and Goudas (1993), exercise motives were examined among 3 separate age-groups who were participants of local community centers. The participants were grouped as follows: (a) 16-24 years, n = 165; (b) 25- 44 years, n = 148; and finally (c) 45 years and over, n = 23. Respondents represented one of 14 possible non-competitive and competitive pursuits, the most popular being swimming, weight-training, badminton, and squash. Over 50% of the subjects reported to engage in their activity once or more per week, and over 60% considered their exercise participation to be 'important' or 'very important'.

A factor analysis with oblique rotation performed on the questionnaire and interview responses condensed 15 individual incentives into four identifiable dimensions. These factors were *assertive achievement* (i.e. aggression, independence, and achievement), *physical well- being* (i.e. fitness and health), *socio-psychological*

well-being (i.e. relaxation, affiliation, eustress, etc.), and finally *sports mastery and performance* (i.e. skills, competition, learning, and excellence). Of these four factors, males scored significantly higher on the sports mastery and performance and assertive achievement than did females, although this was for all 3 age groups together and not specifically for the 16-24yrs cohort.

Among the 16-24 year olds (both male and female), the top 3 motives to exercise were: 1) for the *health* benefits ($M = 4.30$), 2) for the *fitness* aspects ($M = 4.22$), and finally 3) for the *relaxation* exercise provides ($M = 3.95$).

Even though subjects in this study had participated in 14 various activities, there was no attempt to identify between-activity differences among these adolescents. Unlike researchers interested in the sport context, the researchers concerned with exercise motives have not really addressed the issue of between-activity differences.

Activity differences.

The Canada Fitness Survey (1983) reported the most common and appealing activities for males and females aged 10-19 years. In response to the question *'What activities do you choose to do regularly?'*, it was determined that the ten most common activities (from most common to least common) were walking, jogging/running, home exercises, bicycling, ice hockey, weight training, swimming, basketball, ice skating, and soccer. According to the results, 7 out of the top 10 most common activities for this age group can be considered *individually*- oriented activities as defined by the present

proposal. Although this study did choose to focus on activities done outside of the school environment, it is not clear why the authors chose to exclude the category of 'exercise classes'.

In order to determine the most appealing activities, the participants were asked to respond to the question *'What new activities would you like to take up?'*. The youth indicated that the ten most appealing activities were jogging/running, swimming, tennis, weight training, racquetball, alpine skiing, baseball, soccer, home exercises, and finally bicycling. Six of these top 10 activities which these youth wished to partake in can be considered *individually*-oriented, as defined by the current research proposal. We should be wary of these findings, as the activities from which the participants could choose from seemed to be limited.

The previously mentioned Campbell's Survey of Canadians by Stephens and Craig (1990) also determined the most popular physical recreation activities, but failed to investigate whether or not their exercise motives were correlated to their activity preference. Of the top 10 activities in which Canadians participate, *all* 10 activities can be considered to be *individually*-oriented (i.e. walking, gardening, swimming, bicycling, dancing, home exercise, skating, alpine skiing, jogging, and golf). While 5 of the 8 least popular activities can be considered *team*-oriented activities (i.e. baseball, exercise class, tennis, hockey, and volleyball) as defined by the proposed study. Some caution should be used when interpreting these results, as they represent the entire population of this study (ages 10-65+), and are therefore not specific to the adolescent segment of society.

Among the 15-19 year olds (n = 2104), frequencies were indicated only for the 5

most popular activities for all Canadians. Among males, 74% reported participating in cycling, 58% in swimming, 51% walking, a surprising 40% for gardening, and 38% in social dancing. Females in this age group reported higher frequencies for walking (75%), for swimming (70%), slightly lower percentages for bicycling (67%), a higher score for social dancing (59%), and a lower percentage in gardening (30%).

Environmental differences.

The only study which has determined the type of environments which adolescents seem to prefer (based on participation rates) was also reported in the Campbell's Survey by Stephens and Craig (1990). Although these environments were defined slightly different by Stephens and Craig (1990) than they are in the present proposal, the results are still discussed.

Respondents were asked to indicate the nature of the activity which made the greatest contribution to the respondent's fitness, and since multiple answers were possible, the percentages exceeded 100. In the 15-19 year old category, 60% of the males reported participating in a *scheduled* activity, whereas only 39% reported engaging in a *casual, spontaneous* activity. The percentage of males who participated in an activity which was *coached or supervised* was 46%, while 44% of males also reported engaging in a *competitive* setting (i.e. with organized teams, leagues, or races). Similar to the males, results indicated 60% of females participated in a *scheduled* activity and 33% in a *casual* environment. The percentage of females participating in an activity which is

coached or supervised was similar to males (49%), but the percentage engaged in a *competitive* environment was much smaller at 28%.

Unfortunately, there was no attempt to identify differences among exercise incentives in relation to the type of environment in which the adolescent preferred to participate.

Summary of the Exercise Motive Literature

There is a considerable amount of research indicating the existence of gender differences with regards to exercise motives. The major differences between males and females tends to be on the dimensions of *competitiveness* and *social recognition* which is higher among males, whereas females consistently rate *appearance* and *weight management* incentives as extremely important (Ashford et al., 1993; Markland & Hardy, 1993; Stephens & Craig, 1990; Telama & Silvennoinen, 1979). There is less agreement concerning gender differences for *affiliation* and *socializing*, whereas the *mental and physical benefits* of exercise have been consistently rated as important by both genders (Canada Fitness Survey, 1983; Stephens & Craig, 1990).

The research addressing between-activity differences is rather limited, although several researchers have identified the need to address this area (Markland & Hardy, 1993; Stephens & Craig, 1990). Crude forms of measurement indicate that adolescents may prefer to participate in *individually*-orientated activities, although this may simply be due to a restricted list of activities on the questionnaire which may not accurately

represent their activity preference(s). Further research examining the relationship between activity preference and exercise motives is required.

Do exercise motives vary as a function of the environment in which adolescents prefer to participate? This question remains to be answered. Stephens and Craig (1990) reported that both males and females are almost twice as likely to participate in a *scheduled* activity as opposed to a *casual/spontaneous* activity. They also found high percentages of both genders participating in *coached/supervised* activities, but reported that females are less likely to engage in a *competitive* environment. As with activity preferences, environmental preferences need to be examined in greater detail to determine if they are associated with changes in exercise motives among adolescents.

3. Exercise Motives In Relation to Activity Levels

Although several authors have alluded to the need to study the relationship between activity levels and exercise motives (Dishman et al., 1985; Watkin & Youngen, 1988), there has been only one study which has examined these factors. Tappe, Duda, and Menges-Ehrnwald (1990) examined a group of adolescents to determine whether groups defined by their *activity level* could be correctly classified based upon their response to an *exercise incentive* inventory. The authors conducted an extensive study of exercise motives among 237 adolescents, 15-17 years of age (M=15.75 yrs.) who were enrolled in summer school classes. The 98 males and 139 females were deemed by the authors to be representative of a typical school-year population of the midwestern United

States.

The author-developed questionnaire attempted to measure not only their exercise incentives and level of physical activity, but also categories labeled 'sense of self' and 'perceived options'. These were necessary to measure as Tappe et al. (1990) were attempting to determine the utility of a theoretical approach (Personal Investment Theory) in studying variations among exercise behaviour. The aspects of this theoretical approach (sense of self and perceived options) are not relevant to the present study and subsequently will not be discussed. This section will only deal with the measurement and results of the adolescents' exercise incentives in relation to their activity levels.

Exercise motives were measured using an author-developed questionnaire termed the Adolescent's Personal Incentives for Exercise Questionnaire (APIEQ). This inventory contained 49 items which measured the following 11 categories of incentives: *competition, appearance, affiliation, recognition, mental benefits/coping with stress, flexibility, mastery, health, weight management, strength,* and *solitude*. They were measured on 5-point Likert-type scales ranging from 1 (not important to me at all) to 5 (extremely important). The reported range of the Cronbach's alpha reliability coefficients for the 11 subscales were .74 to .88.

The adolescents' current level of activity was defined as the sum of the products of the reported frequency, duration, and intensity for each type of exercise the individual indicated that they were involved in. The possible scores from this self-reported assessment ranged from 0 (indicating a low activity level) to 600 (being highly active).

Among the various purposes of this study, Tappe et al. (1990) attempted to: 1)

predict male and female activity levels based upon exercise incentives using a stepwise multiple regression, 2) examine exercise incentive differences related to gender using ANOVA and discriminant function analysis, and finally 3) examine exercise incentive differences among high and low activity level groupings also using discriminant function analysis. Although the first purpose of this study proved to be rather unsuccessful, the second research question did lead the authors to determine that there were significant gender differences related to exercise incentives as previous studies have also shown. However, it is the third and final research question which corresponds to the fifth research question being forwarded in the present study.

The final research question which was tested by Tappe et al. (1990) was whether exercise incentives could be used to accurately classify the adolescents as being either low or highly active. A stepwise discriminant analysis was employed to determine the accuracy in classifying groups who were defined by their activity levels, based on their exercise incentives (and the two other components of the Personal Investment Theory). One significant function resulted which correctly classified 76.3% of the total subjects (80.4% of the high-activity level adolescents and 73.3% of the low-activity level students). At $p < .001$, the groups were successfully discriminated based upon the variables of *strength improvement, affiliation, health, solitude, weight management,* and *flexibility*.

By analyzing the standardized canonical discriminant function coefficients, it was visible that the highly active adolescents exercised more as a means to *improve their strength*, for the *affiliation*, and for the *health benefits*, but were less influenced by the

incentives of *weight management* and *flexibility*.

Although this study was fairly thorough, there were two critical aspects which were not measured by Tappe et al. (1990). The first aspect which was overlooked by Tappe et al. (1990) concerns the instrument used to measure the adolescents' incentives to exercise. Although the APIEQ is a fairly comprehensive instrument, it fails to measure *one* of the most important, if not *the* most important incentives for exercising - *Enjoyment* (Biddle, 1992; Markland and Hardy, 1993; Wankel & Kreisel, 1985). The second aspect which was overlooked in this study concerns their method of assessing one's current activity level. Attaining the sum of the products of the reported frequency, duration, and intensity for each type of activity seems to be a rather crude method for arriving at an indication of one's activity level. This method of assessing one's activity level can be considered inaccurate, as it fails to consider the intensity at which the individual exercises and the large range of intensity levels that are possible while performing each specific activity (Ainsworth, Haskell, Leon, Jacobs, Montoye, Sallis, & Paffenbarger, 1993; Montoye, Kemper, Saris, & Washburn, 1996). As Stephens, Jacobs, and White (1985) state, future research which is attempting to determine an individuals's activity level should employ the use of *energy expenditure scores* if an accurate representation of one's activity level is desirable.

Chapter 3

Method

Subjects

Two hundred and forty three adolescent students (134 males, 109 females; mean age = 16.4 years) enrolled in grade 11 and 12 participated in this study. All students who were in attendance on the day the questionnaires were distributed were asked to volunteer in this study, and all but one student agreed to participate. Of the ten classes which participated in the study, six were English classes, two were Career and Personal Planning (CAPP), and two were Physical Education classes. These students represented two separate high schools located in the suburbs of a large coastal city in Western Canada. The majority of students were from a middle-class socioeconomic background.

Students were informed that the purpose of the study was to examine exercise motives among adolescents, and that there were no right or wrong answers. Questionnaires were administered and collected by the author, and anonymity was guaranteed. In addition, participants were informed that their respective teachers would not have access to their responses.

Instrumentation

There were two separate inventories used in the study. The first being the Exercise Motivations Inventory-2 (EMI-2) which was originally developed by Markland and Hardy (1993) and later refined by Markland and Ingledew (1997; See Appendix A), and the second being a questionnaire developed by the researcher (See Appendix B).

The *Exercise Motivations Inventory-2 (EMI-2)* developed by Markland and Ingledew (1997) is a multidimensional instrument designed to measure the influences of exercise goals on exercise participation (See Appendix A). The 51-item questionnaire has 14 subscales which include: Stress Management, Revitalization, Enjoyment, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Appearance, Strength & Endurance, and finally Nimbleness (flexible/agile). Each of the 51 items are measured on a 6-point scale ranging from 0 (not at all true for me) to 5 (very true for me). The EMI-2 is an extension of the previously developed Exercise Motivations Inventory (EMI) by Markland and Hardy (1993) who determined both the internal consistency and test-retest reliability of the original EMI to be acceptable (Cronbach's alpha coefficients ranged from 0.63 to 0.92, while the test-retest Pearson correlation coefficients ranged from 0.59 to 0.88 over a 4-5 week period). Although the reliability of the EMI-2 is currently being established, the internal consistency of the EMI-2 is acceptable with Cronbach's alpha reliability coefficients ranging from 0.69 to 0.92 (Markland & Ingledew, 1997).

A factor analysis (with Varimax Rotation) was conducted on the present data to

confirm the existence of the fourteen subscales of the EMI-2 when administered among an adolescent population. When the present findings were compared to the original results reported by Markland and Ingledew (1997), the EMI-2 appeared to be a useful instrument capable of measuring exercise motives among North American adolescents (See Appendix C). Of the 14 factors hypothesized to exist By Markland and Ingledew (1997), 11 factors appeared (i.e. Stress Management, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Strength & Endurance, and Nimbleness). The subscales of Appearance, Revitalization, and Ill-Health Avoidance loaded onto Weight Management, Enjoyment, and Positive Health respectively which accounted for the reduction in factors. Using a loading cutoff of .200, the majority of items loaded highly onto the appropriate subscale, basically confirming the previous results of Markland and Ingledew (1997).

Markland and Hardy (1993) had previously determined that a 'social desirability response bias' did not seem to pose a threat with respect to the original inventory, as evidenced by the low correlations between the subscales of the EMI and the Social Desirability Scale.

The *researcher-developed questionnaire* was comprised of six separate items (See Appendix B). The first item classified individuals based on their involvement in sport (either an athlete, nonathlete, or a former athlete), the second item measured an individual's activity preference (either individual, group, or a mixture), and the third item recorded their environmental preference (either formal/supervised, informal/spontaneous, or a mixture). The fourth item was designed to measure an individual's current activity

level (either inactive, moderately active, or highly active) using a seven-day recall format. This was a modified version of the questionnaire utilized in the Campbell's Survey conducted in Canada by Stephens and Craig (1990). Prompted by a comprehensive list of possible physical activities, subjects indicated whether or not they had participated in various activities over the past seven days. If they had participated in a particular activity, they were required to indicate the number of times per day they had done that activity as well as the average time they spent doing that particular activity. The fifth item asked participants to indicate whether the previous 7 days had been a 'typical' week in terms of the amount of physical activity performed. If they indicated that the previous week was atypical, the sixth item then asked participants to indicate whether a 'typical' week would have included more or less physical activity.

To determine the appropriateness of the researcher-developed instrument, it was reviewed by a panel of 3 experts. One expert in physical education, a second in the area of sport psychology, and the third an expert in the field of measurement. The panel determined this questionnaire to be appropriate for the adolescent population.

Measuring activity preferences.

Respondents indicated their preference for either *Individual*, *Group*-type activities, or a *Mixture* of these two activities (1= Prefer to participate in Individual activities; 2= Prefer to participate in a mixture of both Individual and Group-oriented activities; or 3= Prefer to participate in Group-oriented activities). For each of the three

categories, examples were provided to illustrate the differences between each category.

Measuring environmental preferences.

Regardless of the type of activity (i.e. individual or group-orientated) the adolescents preferred, they were also asked to indicate their environmental preference by selecting one of the three possible categories (1=Prefer to participate in Formal/Supervised settings, 2=Prefer to participate in a mix of both Formal/Supervised and Informal/Spontaneous settings, or 3=Prefer to participate in Informal/Spontaneous settings). For each of the three types of environments, examples were provided to illustrate the differences between each category.

Measuring activity levels.

Based upon the total energy expenditure scores calculated for each individual (during the previous 7 days), participants were assigned to either the *inactive, moderately active,* or *highly active* grouping. Individuals were classified as being a member of one of these 3 groups based upon the following criteria:

Inactive: Includes those adolescents whose reported 7-day average energy expenditure score fell within the lower third of the sample.

Moderately Active: Includes those adolescents whose reported average energy expenditure score fell within the middle third of the sample.

Highly Active: Includes those adolescents whose 7-day average energy expenditure score fell within the upper third of the sample.

These definitions of *inactive*, *moderately active*, and *highly active* were based on the individual's "total leisure-time activity in kilocalories expended per kilogram of body weight per day" over the previous 7 days (Stephens & Craig, 1990, p. 122). This method of estimating total energy expenditure incorporates the duration and the intensity of each activity in which the adolescent participated. The intensity level for each individual activity was based upon the accepted energy cost scores obtained from the literature (Montoye et al., 1996), and were expressed in terms of METs (the ratio of the work metabolic rate to the resting metabolic rate; Ainsworth et al., 1993). For example, playing touch or flag football has a MET rating of 8.0, whereas playing competitive (contact) football has a MET rating of 9.0. Using the formula outlined by Ainsworth et al. (1993), a 60-kg individual playing flag football for 40 minutes expends the following: (8 METs x 60-kg body weight) x (40 min/60 min) = 320 kcal. Dividing 320 kcal by 40 min equals 8 kcal/min. Using the same formula for an 80-kg person would produce a total energy expenditure of 427 kcal or 10.7 kcal/min.

Regular physical activity was any type of physical activity they had done either before, during, or after school. Activities outside of school time (i.e. intramural and interscholastic athletics) were considered acceptable, as were activities participated in during the Physical Education class. Physical Education is an elective course at this stage of an individual's schooling, and can therefore be considered voluntary physical activity.

Participants were prompted by an extensive list of physical activities (totaling 54) to aid in the recall of the previous week's activity.

Measuring sport involvement.

Adolescents indicated whether they considered themselves to be: (1) an *athlete* (I am currently participating/or intending on participating in an organized sport), (2) a *nonathlete* (I have never participated in an organized sport before, I am not currently participating in one, nor do I intend on participating in one in the near future), or (3) a *former athlete* (I have previously participated in an organized sport, but am not currently participating in one, nor am I intending on participating in one in the near future).

Data Analysis

Preliminary data analyses included descriptive and frequency analyses to ensure all assumptions had been satisfied (i.e. multivariate normality, outliers, linearity, multicollinearity and singularity) before proceeding with any statistical analyses. Pearson-product moment correlations were also computed to examine the existing relationships among all independent variables (The 14 subscales of the EMI-2) and dependent variables (Gender, Sport Involvement, Activity Preference, Environmental Preference, and Activity Level).

To answer the first four research questions, four separate one-way MANOVAs

(Multivariate Analyses of Variance) were run to determine whether mean differences among each independent variable (i.e. gender, sport involvement, activity preference, and environmental preference) on the dependent measures (the 14 subscales of the EMI - 2) were statistically significant. If any of the four MANOVAs produced a significant multivariate *F* value indicating significant differences do exist, the univariate *F*-tests were examined to better understand the relationships among the independent variables (IVs) and the dependant variables (DVs) in the univariate context. Post hoc analyses (using the conservative Scheffé Test) examined any significant differences that did in fact exist between groups.

To answer the final research question, Discriminant Function Analysis was used to determine which motives were salient in accurately discriminating between the inactive and highly active groups of adolescents. Discriminant Function Analysis was also used to determine the success rate of the EMI - 2 in accurately classifying both the inactive and highly active adolescents.

Chapter 4

Results and Discussion

Initial Data Screening

Prior to conducting any statistical analyses, the data was screened to identify and correct potential problems caused by out-of-range values, univariate outliers, unequal sample sizes, and missing data. In addition, the data was inspected to ensure the assumptions of multivariate normality, linearity, and homoscedasticity had been met as well as ensuring multicollinearity and singularity were not a threat. All preliminary screening as well as the statistical analyses which followed were completed using the Statistical Package for the Social Sciences (SPSS) version 7.5.

Out-of-range values.

Each of the 14 subscales of the EMI-2 were scored on a 6-point Likert-type scale. Acceptable scores ranged from 0 (not at all true for me) to 5 (very true for me). There were no incidents of out-of-range values to report, so there was no need to correct or eliminate any scores.

Univariate outliers.

Frequency histograms were used as a graphical method for determining the existence of univariate outliers. After examining the histograms of each variable involved in this study, only one score on the variable which measured one's activity level (ACTIVITY) was deemed an outlier. Although the distribution of ACTIVITY was positively skewed, the score of 135 on a distribution which had a mean of 19.9 and a standard deviation of 19.43 was clearly unattached from the rest of the distribution. However, since each subject's score on ACTIVITY served only to place that individual into either the Highly Active, Moderately Active, or Inactive group it was decided to allow the lone outlier of 135 to remain a part of the data set. This was because when the score of 135 was later used in a Discriminant Function Analysis, it was considered only as a member of group 3 (Highly Active) and therefore did not constitute an outlier.

Unequal sample sizes.

When the 243 adolescents were classified according to gender (GENDER), a fairly even split resulted as 55% (n = 134) were male and 45% (n = 109) female. Unfortunately, other categorical variables were not as evenly split. Grouping individuals based on their degree of sport involvement (ATHLETE) produced the following sample sizes: (a) Athletes (n = 139), (b) Former Athletes (n = 85), and (c) Nonathletes (n = 19). When the adolescents were categorized according to their activity preference (ACTPREF), the 243

subjects were grouped as (a) those who preferred to participate in individual activities (n = 46), (b) those who preferred group-type activities (n = 62), and finally (c) those who preferred to participate in a mixture of both individual and group-type activities (n = 135). Similar to ACTPREF, one's environmental preference (ENVPREF) also produced unequal sample sizes. When subjects were grouped according to their environmental preference the following breakdown occurred: (a) Those who preferred to participate in formal environments (n = 36), (b) those who preferred informal environments (n = 75), and (c) those who preferred a mixture of the two environments (n = 132).

With these unequal sample sizes in mind, the researcher decided to employ the Scheffé test when conducting all post hoc analyses. Not only would this procedure provide more stringent control over familywise error rates (the Scheffé test allows for an unlimited number of comparisons), but this test is also recommended when dealing with unequal sample sizes (Howell, 1995; Tabachnick & Fidell, 1996). In addition, Wilks' Lambda was used to evaluate multivariate significance which is also encouraged when unequal sample sizes are prevalent (Tabachnick & Fidell, 1996).

Missing data.

On eleven separate occasions, adolescents failed to respond to the item which required subjects to fill in their approximate weight. This information was required to calculate an individual's average energy expenditure score. Although each of these eleven individuals were female, there was no other pattern or irregularity with their questionnaire

responses which indicated the need to delete their cases. This problem was solved by inserting the mean female weight (59 kilograms) for each of these eleven females and calculating their average energy expenditure scores based on this estimated weight.

There were however three other subjects who completed the questionnaire who were excluded from the study. In the first case, the male subject had completed approximately 20% of the questionnaire and was deleted due to insufficient information. The other two cases were female exchange students who admitted frankly that they did not understand the questions which were asked of them.

Assumption of multivariate normality.

The normality of variables was assessed using both statistical and graphic methods. In addition to the chart which summarized each variable's skewness and kurtosis (See Appendix D), the SPSS program also produced frequency histograms with the normal curve overlay to provide a visual check of each variable's normality. Even though a MANOVA is generally considered robust to modest violations of normality if it is created by skewness rather than outliers (as in this study), and Discriminant Function Analysis (DFA) is considered to be robust against failures of normality, each variable was examined to ensure this assumption was met (Tabachnick & Fidell, 1996).

The majority of both DVs and IVs met the assumption of multivariate normality, with a few notable exceptions. The variable ACTIVITY was positively skewed with a skewness value of 2.11, while another continuous variable labelled health pressures

(HEALTHPR) was also positively skewed with a value of 1.02. The two exercise incentives which received the highest overall mean scores were also found to be negatively skewed. Both positive health (POSHEALT) and strength & endurance (STR_ENDU) held higher skewness values of -1.04 and -1.02 respectively.

In addition, the categorical variables in this study (i.e. ACTPREF, ATHLETE, ENVPREF, and GENDER) violated the assumption of normality which had been anticipated prior to data screening. The distributions of these categorical variables was also fairly flat which violated the assumption of normality, although the rest of the IVs and DVs in this study had relatively normal kurtosis scores.

Assumption of linearity.

As with the assumption of normality, the assumption of linearity was assessed using graphical methods. Bivariate scatter plots were run between every possible combination of pairs of variables to decide if this assumption had been met. The results indicated that the assumption of linearity had indeed been met as the images were predominantly oval-shaped. Although there were a few combinations of variables in which no pattern emerged, there was no evidence of any curvilinear relationships among these pairs of variables.

Assumption of homoscedasticity.

Bivariate scatter plots were once again used to determine whether or not the variability in scores for one variable was basically the same at all values of another continuous variable (Tabachnick & Fidell, 1996). Heteroscedasticity failed to appear on the bivariate scatter plots of the continuous variables and therefore the use of transformations was not required. When SPSS MANOVA was run for the IVs of GENDER, ATHLETE, and ACTPREF the sensitive Box's *M* test for homogeneity of dispersion matrices yielded significant *F* values for these matrices, indicating the assumption had not been met ($F = 1.76$, $p < .001$, $F = 1.35$, p .001, and $F = 1.36$, $p < .001$ respectively). Although they were significant, the low *F* values were not a concern. The only *F* value which was not significant (indicating homogeneity) was for the independent variable of ENVPREF which produced a value of $F(210, 35234) = .059$, $p > .05$.

Multicollinearity and singularity.

By examining the bivariate correlation matrix it was apparent that both multicollinearity and singularity were not a threat to this study (See Appendix E). The Pearson-Product moment correlations for each set of variables ranged from extremely low ($r = .004$) to moderately high ($r = .704$) with the majority of correlations falling between .20-.50 which is desirable when using a MANOVA (Tabachnick & Fidell, 1996). Very high correlations (i.e. above .90) did not exist indicating an absence of multicollinearity

and since none of the variables were a combination of two or more other variables, singularity was not an issue either.

As evidenced by the previous sections, the preliminary data analysis was successful in identifying and correcting potential problems caused by out-of-range values, univariate outliers, unequal sample sizes, and missing data. Despite a few exceptions, the data screening procedures also confirmed the variables involved in this study met the assumption of multivariate normality, linearity, and homoscedasticity. Once multicollinearity and singularity were ruled out, it was appropriate to run the four one-way MANOVAs (with post hoc analyses) and the Discriminant Function Analysis (DFA) in an attempt to accurately answer the research questions put forth in this study.

Question 1: Do Males and Females Differ Significantly When their Exercise Motives are Compared?

This research question was answered by employing a one-way MANOVA to determine whether mean differences among males and females on a combination of 14 variables were statistically significant. The variable GENDER served as the IV while the 14 subscales of the EMI-2 were the DVs. With the alpha level set at $p < .05$, the MANOVA revealed highly significant gender differences using the Wilks' criterion to estimate a multivariate F of 18.17 (14/228, $p < .001$). Because the MANOVA showed a significant main effect for GENDER, it was appropriate to investigate the nature of the relationships among the DVs and IVs in the univariate context. When the univariate F-

tests were examined, it was apparent that significant gender differences had occurred on 8 of the possible 14 exercise motives (See Table 1).

Females were significantly more motivated to exercise for weight management (F = 110.01, 1/242, p < .001) and for appearance (F = 12.41, 1/242, p < .001) reasons as indicated by their large F-values. Females also placed significantly more emphasis on exercising as a means to achieve a positive health (POSHEALT), to manage stress (STRESMAN), to maintain their flexibility and agility (NIMBLE), and to avoid ill-health (ILLHEALTH).

Table 1

Summary of Means, Standard Deviations (SD), and the Resultant Univariate F-tests from the One-Way MANOVA for GENDER

	GENDER			Univariate F-tests		
	Overall (n = 243) Mean (SD)	Males (n = 134) Mean (SD)	Females (n = 109) Mean (SD)	df	F	Significance
Exercise Motives						
STR_ENDU	3.79 (1.01)	3.90 (0.99)	3.67 (1.02)	1/242	3.62	.058
POSHEALT	3.63 (1.23)	3.33 (1.33)	4.00 (0.98)	1/242	19.04	.000**
ENJOYMNT	2.84 (1.25)	2.80 (1.29)	2.89 (1.21)	1/242	.28	.596
REVITALIZ	2.81 (1.16)	2.74 (1.22)	2.88 (1.08)	1/242	.84	.360
NIMBLE	2.80 (1.29)	2.62 (1.36)	3.01 (1.18)	1/242	5.44	.020*
CHALLENG	2.77 (1.25)	2.74 (1.30)	2.81 (1.17)	1/242	.23	.633
APPEARAN	2.71 (1.14)	2.48 (1.21)	2.99 (0.98)	1/242	12.41	.001**
COMPETIT	2.70 (1.60)	3.31 (1.45)	1.94 (1.46)	1/242	53.20	.000**
STRESMAN	2.59 (1.38)	2.22 (1.40)	3.05 (1.21)	1/242	23.50	.000**
AFFILIAT	2.57 (1.23)	2.65 (1.16)	2.46 (1.31)	1/242	1.39	.240
WEIGHTMG	2.56 (1.69)	1.71 (1.49)	3.61 (1.30)	1/242	110.01	.000**
ILLHEALTH	2.50 (1.41)	2.20 (1.44)	2.87 (1.27)	1/242	14.14	.000**
SOCRECOG	2.09 (1.30)	2.41 (1.30)	1.68 (1.18)	1/242	20.72	.000**
HEALTHPR	1.25 (1.20)	1.16 (1.13)	1.37 (1.28)	1/242	1.80	.181

Note. *, **, indicate significant gender differences at p < .05 and p < .001 respectively.

These results are consistent with past research which determined that females consistently place more importance on exercising as a means to improve one's appearance as well as to control their weight (Canada Fitness Survey, 1983; Markland & Hardy, 1993; Stephens & Craig, 1990; Tappe et al., 1990; Watkin & Youngen, 1988). Similarly, other studies have indicated that females may exercise more as a means to reduce stress and to avoid ill-health (Markland & Hardy, 1993; Tappe et al., 1990; Telama and Silvennoinen, 1979), although the similar gender-differences found in the previous studies were not as conclusive as the present findings. However, one gender-difference which contradicts the previous work done on participation motives occurred with respect to the positive health and flexibility incentives. Tappe et al. (1990) found males rated health incentives as being significantly more salient when compared to females, while both males and females considered the flexibility incentive as equally important.

In contrast, males were significantly more motivated to participate in physical activities due to the competitive (COMPETIT) nature of the activity and as a means to gain social recognition (SOCRECOG) from others. The gender differences found on these two exercise motives resulted in significant univariate F-values of 53.20 (1/242, $p < .001$) and 20.72 (1/242, $p < .001$) respectively.

As mentioned earlier, the gender-differences found with respect to the competition and social recognition motives confirmed previous research. Gill et al. (1983), Markland and Hardy (1993), Tappe et al. (1990), and Watkin and Youngen (1988) found males placed significantly more emphasis on the competitive aspects of physical activity, as well as the social recognition which can be gained through their involvement.

Other incentives which did not reveal significant gender differences included exercising for strength & endurance (STR_ENDU), the enjoyment (ENJOYMNT), the revitalizing aspects (REVITALIZE), the challenge (CHALLENG), affiliation reasons (AFFILIAT), or exercising due to external health pressures (HEALTHPR).

When the non-significant results concerning these last six motives (i.e. strength & endurance, enjoyment, revitalization, challenge, affiliation, and health pressures) are compared to previous research specific to the *exercise* domain, the results found in the present study are consistent. Both the Canada Fitness Study (1983) and it's follow-up by Stephens and Craig (1990) determined that males and females placed relatively equal importance on improving their strength and endurance as well as receiving the mental benefits associated with exercise (i.e. the revitalization and enjoyment). In addition, Markland and Hardy (1993) found the affiliation incentive did not help to discriminate between males and females as originally hypothesized.

However, the present findings concerning these six motives (i.e. strength & endurance, enjoyment, revitalization, challenge, affiliation, and health pressures) were not supportive of the previous literature conducted in the *sporting* environment. Gill et al. (1983) and Gould et al. (1985) found females rated the friendship (affiliation) incentive as well as the fitness benefits as significantly more important when compared to males. Romar (1994) also determined that females placed significantly more emphasis on having fun (enjoyment) versus males. While the present findings on the challenge incentive contradicted earlier work in both the exercise and sport domains. The Canada Fitness Survey (1983) and Romar (1994) both discerned noticeable differences on the challenge

incentive, as males rated this factor as being more salient in motivating them to participate in their respective activities.

This apparent discrepancy in findings suggests that the context in which the study takes place (either the exercise or sporting context) will affect the relative importance placed upon these six specific motives (i.e. strength & endurance, enjoyment, revitalization, challenge, affiliation, and health pressures). This result may indirectly oppose the earlier belief that Schutz, Smoll, and Wood (1981) put forward. These researchers determined the attitudes of young adolescents towards the construct of physical activity to be "essentially equivalent to their attitudes toward specific sports" (p. 39). However, it is not clear whether the context in which the study was administered (i.e. either sporting or exercise) is responsible for this difference, or whether these contradictions are due in part to the wording and format used in the different questionnaires. As Biddle (1995) suggests, there is a need to adopt standardized inventories to enable accurate comparisons across populations and cultures.

Although the first research question did not specifically address how the entire sample rated each of the fourteen exercise motives, the author felt it important to determine the overall rank order of motives. This was necessary to gain a comprehensive understanding of how the sample as a whole rated each of the exercise incentives, therefore enabling comparisons to be drawn to the previous work. As shown in Table 1 (the column titled Overall), both males and females rated the exercise incentives of strength & endurance (STR_ENDU) and positive health (POSHEALT) as most important with respective means of 3.79 and 3.63. The other three incentives which ranked in the top

five were exercising for the enjoyment (ENJOYMNT; $M = 2.84$), to experience it's revitalizing effects (REVITALIZ; $M = 2.81$), and to maintain one's agility and flexibility (NIMBLE; $M = 2.80$). Other subscales of the EMI-2 which received fairly high ratings included exercising for the challenge (CHALLENG; $M = 2.77$), to improve one's appearance (APPEARAN; $M = 2.71$), as well as for competitive reasons (COMPETIT; $M = 2.70$).

The exercise motives of stress management (STRESMAN), affiliation (AFFILIAT), weight management (WEIGHTMG), and social recognition (SOCRECOG) all received relatively low ratings when both males and females were considered as an entity. In addition, exercising to avoid ill-health (ILLHEALTH) or as a result of external health pressures (HEALTHPR) were not salient incentives for this population.

These results generally confirm previous research conducted in both the sport and exercise domains. Among the adolescent population the fitness and health benefits are often paramount (Ashford et al., 1993; Gould, Feltz, & Weiss, 1985; Klint & Weiss, 1986; Longhurst & Spink, 1987; Markland & Hardy, 1993; Romar, 1994; Stephens & Craig, 1990; Tappe et al., 1990), with the enjoyment and revitalization aspects also being ranked very high (Gill et al., 1983; Markland & Hardy, 1993). The only unusual finding was the importance which this population placed upon maintaining their flexibility and agility. One of the few previous studies to find a similar result was by Tappe et al. (1990) who also studied a similar age group. However, it is possible that the flexibility incentive is not often rated as important because this motive is usually not considered as a separate entity. This motive is often overlooked completely or it is measured indirectly as a component of the

fitness incentive, which may help explain its relatively unimportant role in previous participation motive studies.

Question 2: Do Athletes, Former Athletes, and Nonathletes Differ Significantly from Each Other When their Exercise Motives are Compared?

When the adolescents were required to indicate whether they considered themselves to be either an athlete, a former athlete, or a nonathlete the following split occurred: athletes comprised 57% of the sample, former athletes 35%, while nonathletes accounted for only 8% of the total. As with the first research question, this second question was also answered through the use of a one-way MANOVA with these three groups (athletes, former athletes, and nonathletes) serving as the IV and the 14 exercise motives as the DVs. With the alpha level again set at $p < .05$, it was evident that highly significant differences existed between the three groups when their exercise motives were compared. A Wilks' F value of 2.21 (28/454, $p < .001$) was the result of the MANOVA. Because a significant main effect was produced for the ATHLETE variable in the multivariate domain, it was appropriate to investigate further the relationships which existed between the IVs and DVs in the univariate domain. By referring to the results of the univariate F-tests performed by SPSS MANOVA, it was found that the means of two or more of these three groups (athletes, former athletes, and nonathletes) differed significantly on six categories of exercise motives (See Table 2). To determine where these differences occurred, post hoc analyses using the Scheffé test were utilized.

Table 2

Means, Standard Deviations (SD), and the Resultant Univariate *F*-tests from the One-Way MANOVA for ATHLETE

	ATHLETE			Univariate *F*-tests		
	Athletes (n = 139) Mean (SD)	Former Athletes (n = 85) Mean (SD)	Nonathletes (n = 19) Mean (SD)	df	*F*	Significance
Exercise Motives						
AFFILIAT	2.77 (1.16)	2.36 (1.25)	2.01 (1.33)	2/240	5.18	.006**
APPEARAN	2.64 (1.14)	2.84 (1.12)	2.63 (1.19)	2/240	.83	.439
CHALLENG	2.97 (1.20)	2.57 (1.27)	2.22 (1.21)	2/240	4.85	.009**
COMPETIT	3.22 (1.44)	2.14 (1.60)	1.34 (1.07)	2/240	22.70	.000***
ENJOYMNT	3.04 (1.17)	2.64 (1.28)	2.26 (1.45)	2/240	5.05	.007**
HEALTHPR	1.19 (1.11)	1.40 (1.35)	1.04 (1.08)	2/240	1.13	.326
ILLHEALTH	2.53 (1.41)	2.45 (1.41)	2.44 (1.44)	2/240	.10	.902
NIMBLE	2.85 (1.24)	2.71 (1.40)	2.82 (1.22)	2/240	.30	.742
POSHEALT	3.69 (1.16)	3.57 (1.30)	3.49 (1.48)	2/240	.39	.681
REVITALIZ	2.90 (1.12)	2.73 (1.15)	2.44 (1.42)	2/240	1.62	.199
SOCRECOG	2.31 (1.27)	1.86 (1.31)	1.47 (1.14)	2/240	5.72	.004**
STR_ENDU	3.96 (0.97)	3.56 (0.98)	3.59 (1.22)	2/240	4.63	.011*
STRESMAN	2.68 (1.38)	2.56 (1.36)	2.11 (1.42)	2/240	1.50	.226
WEIGHTMG	2.53 (1.63)	2.63 (1.79)	2.47 (1.81)	2/240	.13	.883

Note. *, **, *** indicate significant differences between 2 or more of the following: Athletes, Former Athletes, and Nonathletes at $p < .05$, $p < .01$, and $p < .001$ respectively.

The most significant difference existed on the competition motive (COMPETIT), as post hoc analyses indicated that athletes rated this incentive as significantly more important when compared to both the former athletes and the nonathletes ($p < .001$ and $p < .001$). Athletes also placed greater emphasis on exercising as a means to gain social recognition (SOCRECOG) when compared to both former athletes and nonathletes ($p < .05$ and $p < .05$ respectively). These findings are consistent with the results of the Klint and Weiss (1986) study, as competitive athletes rated the competitive aspects of their sport (i.e. winning and competing) as being much more salient when compared to the

former athletes.

Other significant differences which were uncovered using the Scheffé test concerned the subscales of affiliation (AFFILIAT), challenge (CHALLENG), and enjoyment (ENJOYMNT). Athletes consistently placed greater importance on the affiliation, challenge, and enjoyment aspects of exercise in comparison to nonathletes (all three differences were significant at the .05 level).

Although the statements used to describe each motive were worded differently by Klint and Weiss (1986), they also found competitive athletes (gymnasts) rated the affiliation (team atmosphere) and challenge motives higher. However, this same study also concluded that former athletes were more influenced by the enjoyment factor when compared to the competitive athletes. The former athletes ranked having fun (enjoyment) as their second most important reason for participating in gymnastics, while the enjoyment motive did not even rank among the ten most important motives for competitive athletes.

At the .05 level of significance, athletes placed more emphasis on building and maintaining strength & endurance (STR_ENDU) versus former athletes. Although worded slightly different, this result was also produced in the Klint and Weiss (1986) study. However, in the present study athletes and nonathletes did not differ significantly on the degree to which gaining strength & endurance motivated them to be physically active. It seems adolescents who are either participating in an organized sport or those who have never participated in one feel that the strength & endurance aspect is equally important. Although former athletes rated this incentive as significantly less important, we are not able to attach causality to this relationship and determine that these former athletes ceased

to participate because they did not possess the same attitudes concerning the strength & endurance incentive. Unfortunately, there are no previous studies which have examined differences among athletes and nonathletes with respect to their participation motives (only athletes vs. former athletes), so it remains to be seen whether this finding will be replicated.

Question 3: Do Adolescents Grouped According to Their Activity Preference Differ Significantly With Respect to Their Exercise Motives?

When the adolescents were asked to indicate the type of activity in which they preferred to participate, 19% reported to prefer individual-type activities, 26% preferred group-type activities, while over half of the sample (56%) preferred to participate in a combination of the two. This breakdown is somewhat surprising considering the results which Stephens and Craig (1990) found in the Campbell's Survey of Canadians. Although the finding was not specific to the adolescent population (it included individuals aged 10-65+), Canadians reported to favour participation in individually-oriented activities as all ten of the most popular activities could be considered individually-oriented as defined by the present study. In addition, five of the eight least popular activities were considered team-oriented activities (Stephens & Craig, 1990).

However, based upon the previous classification of adolescents (as preferring either individual, group, or a mixture of the two activities), a MANOVA was employed to discern whether a relationship existed between one's activity preference and the exercise

motives which they rated as important. Using these three groups (individual, group, and mixture) as the IV (ACTPREF) and the 14 exercise motives as the DVs, a one-way MANOVA determined whether mean differences among these groups were due to chance. With the alpha level again set at .05, a highly significant multivariate *F* value of 3.64 (28/454, $p < .001$) resulted which suggested the mean differences among these groups on their exercise motives were not due to chance. Having established a significant multivariate *F*, it was deemed appropriate to look to the univariate *F*-tests to fully understand the relationship between the IVs and DVs (see Table 3).

Once post hoc analyses were completed, the most significant difference occurred on the competition motive (COMPETIT), as those who preferred group-type activities placed a far greater emphasis on the competitive aspects of exercise when compared to both the individual and the mixture groups ($p < .001$ and $p < .001$ respectively). However, those who preferred a mixture of both types of activities also rated competition as significantly more important when compared to those individuals who preferred to participate in individual-type activities ($p < .01$). This finding directly opposes the results which Buonamano et al. (1995) discovered, which characterized individuals participating in individual-type sports as being highly motivated by the competitive aspects of sport.

Table 3

Means, Standard Deviations (SD), and the Resultant Univariate *F*-tests from the One-Way MANOVA for ACTPREF

	ACTIVITY PREFERENCE			Univariate *F*-tests		
	Individual (n = 46) Mean (SD)	Group (n = 62) Mean (SD)	Mixture (n = 135) Mean (SD)	df	*F*	Significance
Exercise Motives						
AFFILIAT	1.98 (1.44)	2.83 (1.11)	2.65 (1.14)	2/240	7.35	.001***
APPEARAN	3.07 (1.19)	2.25 (1.14)	2.80 (1.10)	2/240	8.15	.000***
CHALLENG	2.53 (1.24)	2.83 (1.43)	2.82 (1.15)	2/240	1.03	.359
COMPETIT	1.61 (1.55)	3.43 (1.36)	2.72 (1.52)	2/240	19.92	.000***
ENJOYMNT	2.74 (1.36)	2.80 (1.27)	2.90 (1.21)	2/240	.33	.722
HEALTHPR	0.88 (1.19)	1.23 (1.01)	1.39 (1.27)	2/240	3.07	.048*
ILLHEALTH	2.28 (1.31)	2.19 (1.48)	2.71 (1.38)	2/240	3.66	.027*
NIMBLE	2.61 (1.36)	2.52 (1.40)	2.99 (1.19)	2/240	3.54	.030*
POSHEALT	3.62 (1.35)	3.18 (1.30)	3.85 (1.10)	2/240	6.52	.002**
REVITALIZ	2.59 (1.26)	2.67 (1.15)	2.94 (1.11)	2/240	2.24	.109
SOCRECOG	1.80 (1.37)	2.12 (1.29)	2.17 (1.27)	2/240	1.42	.244
STR_ENDU	3.63 (1.26)	3.60 (1.09)	3.94 (0.85)	2/240	3.18	.043*
STRESMAN	2.57 (1.36)	2.21 (1.44)	2.78 (1.33)	2/240	3.81	.023*
WEIGHTMG	2.83 (2.00)	2.34 (1.63)	2.57 (1.62)	2/240	1.12	.327

Note. *, **, *** indicate significant differences between 2 or more of the following groups: Individual, Group, and Mixture at $p < .05$, $p < .01$, and $p < .001$ respectively.

Buonamano et al. (1995) also felt that individuals who preferred group-type sports were not motivated by the competition aspect, but by the need to experience the affiliation involved in sports (i.e. to be part of a group, to meet new friends, and to participate with friends). The present study did support this hypothesis, as those adolescents who preferred group-type activities as well as those who preferred a mixture of both types rated the affiliation incentive (AFFILIAT) significantly higher when compared to the individual group ($p < .001$ and $p < .01$ respectively). In addition to supporting the Buonamano et al. (1995) study, this finding lends some support for the result which was found in the

Longhurst and Spink (1987) study conducted in Australia. Individuals involved in an individually-orientated sport (swimming) placed significantly less emphasis on 'being with friends' when compared to their group-orientated counterparts (netball and cricket). Adolescents who preferred individual-type activities in the present study also placed significantly less emphasis on exercising due to external health pressures (HEALTHPR) compared to the group who preferred a mixture of both activities ($p < .05$).

However, the individual group did not rate every incentive low, as evidenced on the appearance (APPEARAN) incentive. Both the individual and mixture groups exercised more as a means to maintain and improve their physical image when compared to those who preferred group-orientated activities ($p < .001$ and $p < .01$ respectively). A similar result was found by Buonamano et al. (1995) when they determined that these 'individualists' tend to value improving their physical condition, which is closely linked to improving one's appearance.

These three groups also differed with respect to health-orientated incentives. At the .01 and the .05 level, exercising as a means to maintain a positive health (POSHEALT) and to reduce the impact of stress (STRESMAN) was significantly higher among those who preferred a balance of both individual and group activities versus those who preferred only group-orientated activities. In partial support of this finding, Buonamano et al. (1995) also characterized those who preferred individual sports as placing a greater emphasis on the energy release aspect (stress management) when compared to those who only preferred group-type activities.

Until further research is completed which examines the relationship between one's

activity preference and participation motives, the answers to this research question will remain inconclusive. At this stage, it seems that individuals who prefer group-orientated activities participate as a means of maintaining and expanding their friendship networks, while others who prefer individual activities seem to exercise as a means to improve their physical condition and appearance. There is also some support indicating individually-oriented adolescents may value the energy release/stress management aspects of exercise more than their group-orientated counterparts. However, what remains to be proven is which type of adolescent (i.e. either group or individually-orientated) places a greater emphasis on the competitive incentives involved in physical activity.

Question 4: Do Adolescents Grouped According to Their Environmental Preference Differ Significantly With Respect to Their Exercise Motives?

To answer this research question, a one-way MANOVA was run at the .05 level of significance to determine if there existed significant mean differences between three groups when their exercise motives were compared. The three groups were (a) those individuals who preferred to participate in a formal, structured environment (15%), (b) those who preferred an informal, spontaneous environment (31%), and finally (c) those who liked to participate in a mixture of both formal and informal environments (54%). This breakdown contradicted earlier research by Stephens and Craig (1990) that found adolescents to be almost twice as likely to engage in a scheduled activity as opposed to a casual, spontaneous activity. However, this difference may be due in part to the different

definitions utilized to classify each adolescents' preference.

Irrespective of these differences, a MANOVA was employed to discern whether an individual's environmental preference was related to their participation motives. With these three groups (formal, informal, and mixture) acting as the Independent variable (ENVPREF), the Dependant variables were the 14 exercise motives. The Multivariate Analysis of Variance produced a significant multivariate *F* value of 2.07 (28/452, $p < .001$) illustrating statistically significant differences when the exercise motives of these three groups were compared. Having established this finding, it was appropriate to further clarify the relationships which existed between the IVs and DVs in the univariate domain.

Table 4

Means, Standard Deviations (SD), and the Resultant Univariate *F*-tests from the One-Way MANOVA for ENVPREF

	ENVIRONMENTAL PREFERENCE			Univariate *F*-tests		
	Formal (n = 36) Mean (SD)	Informal (n = 75) Mean (SD)	Mixture (n = 132) Mean (SD)	df	*F*	Significance
Exercise Motives						
AFFILIAT	2.61 (1.26)	2.31 (1.29)	2.70 (1.17)	2/240	2.38	.095
APPEARAN	2.85 (0.85)	2.36 (1.25)	2.87 (1.10)	2/240	5.22	.006**
CHALLENG	3.14 (1.19)	2.46 (1.30)	2.85 (1.20)	2/240	4.31	.014*
COMPETIT	3.30 (1.63)	2.25 (1.58)	2.78 (1.55)	2/240	5.84	.003**
ENJOYMNT	3.14 (1.12)	2.55 (1.33)	2.93 (1.22)	2/240	3.49	.032*
HEALTHPR	1.23 (1.12)	1.08 (1.13)	1.36 (1.26)	2/240	1.33	.265
ILLHEALTH	2.94 (1.37)	2.24 (1.37)	2.52 (1.41)	2/240	3.11	.046*
NIMBLE	3.19 (1.18)	2.36 (1.33)	2.93 (1.24)	2/240	7.00	.001***
POSHEALT	4.10 (0.74)	3.30 (1.34)	3.69 (1.23)	2/240	5.65	.004**
REVITALIZ	3.09 (1.10)	2.61 (1.15)	2.84 (1.17)	2/240	2.20	.113
SOCRECOG	2.33 (1.11)	1.80 (1.33)	2.18 (1.31)	2/240	2.90	.057
STR_ENDU	4.15 (0.84)	3.59 (1.10)	3.81 (0.98)	2/240	3.83	.023*
STRESMAN	2.56 (1.42)	2.63 (1.42)	2.59 (1.36)	2/240	0.04	.964
WEIGHTMG	3.10 (1.63)	2.11 (1.69)	2.67 (1.67)	2/240	4.90	.008**

Note. *, **, *** indicate significant differences between 2 or more of the following groups: Formal, Informal, and Mixture at $p < .05$, $p < .01$, and $p < .001$ respectively.

By examining the univariate *F*-tests performed by SPSS MANOVA, it became apparent that these three groups differed significantly on eight of the fourteen subscales of the EMI-2. For six of these eight subscales (i.e. CHALLENG, COMPETIT, ILLHEALTH, POSHEALT, STR_ENDU, and WEIGHTMG), the adolescents who indicated a preference for participating in formal, supervised environments placed significantly more importance on these six motives when compared to the group who preferred informal, spontaneous environments (See Table 4).

Although the study by White (1995) focused on an athlete's perceived purpose of sport, it produced a similar finding. Athletes who had competed in formal, structured environments placed significantly more emphasis on the competitive aspects of sports. However, this same study produced a result which contradicted the present findings concerning the health incentives. White (1995) concluded recreational athletes who participated in relatively informal environments viewed sport more as a vehicle to reduce health risks when compared to those who participated in formal environments ($p < .001$).

The other two exercise motives which revealed significant group differences were appearance (APPEARAN) and nimbleness (NIMBLE). On both of these factors, the group who preferred a mixture of both types of environments placed significantly more emphasis on these two subscales when compared to those who preferred informal environments ($p < .01$ and $p < .001$). In addition, the group who preferred formal environments also exercised more in order to maintain their agility and flexibility (NIMBLE) when compared to the informal group ($p < .01$).

Aside from a few a studies (Stephens & Craig, 1990; White, 1995), there has been

little attention focused on the environments in which adolescents prefer to participate, as well as the relationship between these environments and one's participation motives. Additional work in this field is required before conclusive statements can be drawn.

Question 5: Which Exercise Motives are Salient in Accurately Discriminating Between Inactive and Highly Active Adolescents?

Unlike the previous four research questions, this final research question attempted to predict group membership from a set of predictors. In this design, the predictors served as the IVs while group membership (either inactive or highly active) was the DV. In this case, the predictors were the 14 exercise motives of the EMI-2 and the grouping variable was an adolescents' activity level (ACTIVITY).

A Discriminant Function Analysis (DFA) was used to answer this research question. The researcher chose to focus on interpreting the results of the DFA in terms of the pattern of differences among the predictors (motives) as a whole, thereby understanding how the two groups differed. In addition, the results of the DFA were also important in terms of how well the given instrument (i.e. the Exercise Motivations Inventory-2) could accurately classify adolescents as either inactive or highly active.

Based on the average energy expenditure score for each adolescent (during the previous seven days), they were assigned to one of three groups: (a) inactive, whose score fell within the lower third of the sample; (b) moderately active, whose score fell within the middle third; and (c) highly active, whose score fell within the upper third of the sample.

However, for classification purposes, only the inactive (n = 81) and the highly active (n = 81) groups were used. The mean energy expenditure scores for these two groups were 4.59 kcal/kg/day and 40.38 kcal/kg/day respectively. Sixty-one percent of the total sample indicated their average energy expenditure scores were representative of a typical week, while 37.9% considered their energy expenditure scores to be atypical. Of the 37.9% who felt their scores were atypical, the majority (86.8%) of these adolescents reported to be more physically active than what their energy expenditure scores had indicated.

When Discriminant Function Analysis was run with the 2 groups (inactive and highly active subjects) and the 14 predictors (the 14 subscales of the EMI-2), only one discriminant function emerged. This discriminant function produced a moderate canonical correlation between groups and predictors of .54. With $p < .001$, a large Chi-square value of 53.46 was produced indicating a reliable separation of the two groups based on the 14 exercise motive subscales of the EMI-2.

The loading matrix of correlations between the 14 predictors and the standardized discriminant function was produced which maximally separated the inactive and highly active adolescents. Loadings of less than .30 were considered to be of little importance. As evidenced in Table 5, the top six exercise incentives (i.e. COMPETIT, STR_ENDU, NIMBLE, SOCRECOG, ENJOYMNT, and REVITALIZ) were the most important variables responsible for discriminating between the inactive and highly active adolescents. An examination of each group's means indicated that highly active adolescents exercised to experience competition (M = 3.35), to improve and maintain their strength & endurance (M = 4.08), to maintain their flexibility and agility (M = 3.13), to receive the social

recognition which may accompany participation in physical activities (M = 2.44), for the pure enjoyment (M = 3.07), and because of the revitalizing benefits exercise has to offer (M = 3.00). In direct contrast, the adolescents who were relatively inactive rated almost every exercise incentive as being less salient (See Table 5).

Table 5

Results of Discriminant Function Analysis on Exercise Motives for Groups Defined By Activity Level

	Inactive	Highly Active	Correlations of predictor variables with discriminant function	Standardized canonical coefficients	Univariate tests of group means	
	Mean (SD)	Mean (SD)			F	Sig.
Exercise Motives						
COMPETIT	2.10 (1.15)	3.35 (1.30)	.69	.57	31.51	.000
STR_ENDU	3.35 (1.12)	4.08 (0.87)	.57	.34	21.64	.000
NIMBLE	2.35 (1.32)	3.13 (1.13)	.49	.54	16.18	.000
SOCRECOG	1.66 (1.13)	2.44 (1.35)	.48	.27	15.64	.000
ENJOYMNT	2.43 (1.34)	3.07 (1.15)	.40	.22	10.80	.001
REVITALIZ	2.43 (1.27)	3.00 (1.04)	.38	.31	9.82	.002
CHALLENG	2.51 (1.24)	2.97 (1.23)	.29	-.61	5.55	.020
AFFILIAT	2.33 (1.31)	2.78 (1.12)	.29	.10	5.54	.020
ILLHEALTH	2.26 (1.28)	2.66 (1.48)	.23	.21	3.50	.063
POSHEALT	3.38 (1.34)	3.75 (1.25)	.22	-.25	3.36	.068
STRESMAN	2.55 (1.46)	2.74 (1.33)	.12	-.22	0.76	.385
HEALTHPR	1.16 (1.25)	1.31 (1.17)	.10	-.10	0.68	.413
WEIGHTMG	2.56 (1.81)	2.42 (1.54)	-.06	-.10	0.28	.600
APPEARAN	2.59 (1.15)	2.61 (1.20)	.01	-.22	0.01	.911
Canonical R			.54			

However, there are two interesting exceptions to this trend. The inactive group rated the appearance incentive as being relatively equal in importance (M = 2.59) when compared to the highly active group (M = 2.61), and the inactive group actually placed a greater emphasis on weight management (M = 2.56) versus their active counterparts (M =

2.42). Although this finding is interesting, in practical terms, these two motives (APPEARAN and WEIGHTMG) did not help discriminate between the two groups defined by activity level.

These results lend partial support for the earlier work by Tappe et al. (1990) which also found highly active adolescents exercised for the improvement in strength and for the affiliation. In addition, Tappe et al. (1990) determined the health incentive to be a significant discriminator which the highly active sample rated as more important. However, the present finding indicates both the desire to achieve a positive health state (POSHEALT) and exercising as a means to avoid ill-health (ILLHEALTH) did not help in the classification of the two groups (loadings were .22 and .23 for the respective incentives).

Consistent with the Tappe et al. (1990) results, the inactive group did place a greater importance on weight management, although the loading of -.06 was of little practical importance. Although the flexibility incentive (NIMBLE) was found to be an important discriminator, it was not rated higher by the inactive group as originally determined by Tappe et al. (1990). In fact, the highly active adolescents placed considerably more emphasis on exercising as a means to maintain one's flexibility and agility (M = 3.13) versus the inactive group (M = 2.35).

In addition to interpreting the pattern of differences among the predictors as a whole, it was important to determine how successful the given instrument (i.e. the Exercise Motivations Inventory-2) was in classifying adolescents as either inactive or highly active. Using the two equal samples of 81 subjects (total n = 162), the prior

probability for classifying each group correctly was 50%. By examining Table 6, it is evident the EMI-2 correctly classified 75.3% of the inactive adolescents and 74.1% of the highly active adolescents. Overall, the EMI-2 accurately classified 74.7% of the original 162 subjects. This success rate was similar to that found in the Tappe et al. (1990) study which correctly classified 76.3% of their total subjects, although this percentage was achieved using several other instruments in addition to a comparable inventory measuring exercise incentives. Considering the overall percentage of correctly classified subjects, and in light of the previous study which employed additional measures yet produced a similar result, the Exercise Motivations Inventory-2 appears to be a valuable instrument capable of successfully discriminating between inactive and highly active adolescents.

Table 6

Classification Results for Inactive and Highly Active Adolescents

			Predicted Group Membership		
			Inactive	Highly Active	Total
Original Subjects	Count	Inactive	61	20	81
		Highly Active	21	60	81
	%	Inactive	75.3	24.7	100
		Highly Active	25.9	74.1	100

Note. Overall, 74.7% of the original grouped cases were correctly classified.

Due to the limited number of studies which have examined the relationship between the activity level and participation motives of adolescents, it is difficult to draw

general conclusions. When comparing the present findings to the previous work by Tappe et al. (1990), there are numerous variables which may have contributed to the varied results. These differences may have been a function of (a) the methods used to assess activity levels (energy expenditure levels versus more rudimentary methods), (b) the different instruments used to measure exercise motives (the EMI-2 versus the Adolescent's Personal Incentives for Exercise Questionnaire), or (c) the different geographic locations and populations (full-time students in Western Canada versus summer-school students in Midwestern United States). Further replication in this field is required before researchers will be able to draw general conclusions regarding the relationship between adolescent exercise motives and activity levels.

Chapter 5

Conclusions

The purpose of this study was to identify and understand the diverse motivating factors which may play a role in the adoption and maintenance of exercise behaviour among adolescents. Understanding the exercise patterns and determinants of our youth is critical, as the attitudes and behaviour developed during these earlier years will presumably impact the prevalence of exercise during the adult years (Dishman & Dunn, 1988). From this perspective, reasons which adolescents cite as important in motivating them to participate in physical activity could potentially form the basis of interventions aimed at maintaining and increasing the level of activity among this population. The need to adopt a preventative approach has never been more clear, as a multitude of researchers have established that the adolescent population demonstrates a sharp decline in activity rates as they move from the structured school environment to an independent lifestyle (Canada Fitness Survey, 1983; Dishman, 1988; Sallis & Hovell, 1990; Stephens & Craig, 1990; Stephens et al., 1985). More recently, the U. S. Surgeon General's Report (1996) determined that participation in all types of exercise and physical activity decreases dramatically as students get older, which further illustrates the need for interventions tailored to specific age-groups.

The findings in this particular study suggest that educators, regardless of the setting (e.g. the school, community centre, fitness club, or sport association), should not only be aware of the current differences among adolescents with respect to participation motives, but should continually tailor their respective programs in response to these individual needs. For example, not only do males and females differ in their reasons for being active, but so do adolescents classified as either athletes, nonathletes, and former athletes. Therefore, the person responsible for motivating a group of adolescents to be physically active would be wise to consider the composition of the group. Not only should educators be aware of the gender-split of their class, but they should also take into account the degree to which the adolescents have previously been involved in organized sport(s) and adjust the objectives of the program accordingly.

In addition to differences related to one's gender and previous sport involvement , adolescents who were compared based on their activity and environmental preferences also demonstrated significantly different motivational orientations. The final comparison which examined the exercise motives of the relatively inactive and highly active adolescents also produced some statistically significant differences.

Despite the statistical significance which resulted from the multiple comparisons involved in this study, it is the practical significance of these findings which are most likely of interest to those who are faced with the daunting task of trying to motivate our youth to be physically active. Although a multitude of researchers have examined motivational differences in relation to one's gender (Gill et al., 1983; Markland & Hardy, 1993; Romar, 1994; Watkin & Youngen, 1988), previous sport involvement (Klint & Weiss, 1986),

activity preference (Buonamano et al., 1995; Longhurst & Spink, 1987), and current activity level (Tappe et al., 1990), the practical recommendations which have resulted from these studies are limited. In an attempt to aid practitioners in motivating the adolescent population to be physically active, the proceeding section summarizes six logical implications which have resulted from the present study.

Implications for the Practitioner:

1) The exercise motives which adolescents cite as important in motivating them to be physically active are as varied as the students themselves. Accordingly, educators should tailor each program/course to the specific needs of that particular group of individuals. If our goal is keep this population active, we need to not only listen to what their most important reasons for being physically active are, but to incorporate these objectives into a meaningful curriculum.

2) By increasing the perceived level of autonomy among the students (i.e. allowing them to decide what goals/activities should be included in the curriculum), current research specific to both the educational (Vallerand, 1997) and leisure (Frederick and Ryan, 1995) contexts suggest that the consequent participation levels would increase as students become more intrinsically motivated. This concept, termed self-determination by Deci and Ryan (1985), is a crucial implication for practitioners, regardless of the setting (e.g. educational, community-based, private clubs/associations).

3) Individuals who are charged with the task of motivating a co-educational group of adolescents should realize that the two sexes do differ in their reasons for being physically active. Consequently, a delicate balance needs to be achieved by ensuring the males' desire to compete with and to gain social recognition from their peers is met, while the females' interest in weight and stress management as well as improving their appearance are addressed. Fortunately, activities which challenge the group, involve opportunities for social interaction, and work on maintaining and increasing their strength and endurance seem appealing to both sexes.

4) If the majority of the class is comprised of individuals who are actively involved in organized sport(s), the educator may wish to develop a teaching/coaching style which enables the participants to receive social recognition from their peers, while emphasizing the competitive aspects of the program. For example, the use of inter-squad tournaments would meet these goals while also allowing for the adolescents to interact socially, and, if matched evenly, to face personal challenges and experience the enjoyment which they have rated as significantly more important when compared to the former and non athlete groups.

5) According to the preliminary results of this study, it seems that the adolescent population as a whole would prefer to participate in a mixture of both formal, supervised settings (e.g. gymnastics and karate) as well as informal, spontaneous activities such as rollerblading and hacky sack. Consistent with this finding, students also indicated a preference for participating in a variety of activity types. This provides some initial support for programs which allow students the option of participating in a wide range of courses,

along the continuum from individual to group-oriented activities. Individually-oriented fitness-for-life classes would be wise to emphasize the physical benefits such as improving one's appearance, as well as the mental benefits which accompany exercise (e.g. stress-management), while downplaying the competitive aspects which may be associated with physical activity. The institutions which also offer group-oriented activities (e.g. traditional team-games) may want to cater to the group's affiliation needs, as well as the competitive drive which the adolescents who prefer group activities tend to possess. As Wankel (1993) explains, a variety of exercise options should be made available if we hope to respond to the needs of all participants.

6) The final implication concerns the pervasive challenge which educators are constantly faced with - trying to motivate sedentary adolescents to become physically active. The preliminary results indicate that interventions aimed at relatively inactive students may want to address the critical role regular exercise can play in successfully controlling ones' weight, as well as the appearance benefits which may accompany regular physical activity. As well, the initial results of this study indicate that both the inactive and highly active groups ranked the motives of improving ones' strength and endurance and achieving a positive health state as first and second in importance. Therefore, educators may want to offer activities which are successful at accomplishing these goals (e.g. aerobic conditioning, weight training, cross-training, etc.) and present them in a meaningful and educational manner. However, as Frederick and Ryan (1993, 1995) suggest, there are inherent dangers involved when extrinsic goals (i.e. to lose/gain weight and improving one's appearance) are the *only* focus of interventions. If individuals only strive for

extrinsic goals, they may never increase their intrinsic appreciation for physical activity (i.e. doing the activity for the sake of enjoyment, or experiencing the revitalizing effects of exercise) which may result in lower participation levels. Especially if the extrinsic goals of their program are not met, or become too difficult over time.

Implications for Future Research:

1) Additional research is needed which compares not only sedentary and highly active adolescents, but also examines the relationship between the environment in which adolescents prefer to participate and their motivational orientation. This research should be carried out utilizing standardized inventories to allow for cross-cultural as well as age-group comparisons (Biddle, 1992; Dishman et al., 1985). In this particular instance, the Exercise Motivations Inventory - 2 which was originally developed and validated in Wales among a slightly older population seems to be a useful instrument for the adolescent population in the North American context (See Appendix C). However, replication of these results are necessary.

2) If possible, future studies attempting to replicate these findings should also be linked to a theory of exercise motivation. If we hope to develop a complete understanding of why one participates in physical activity, participation motive studies which are generally considered to be atheoretical in nature should be embedded in a theory of exercise motivation (Ashford et al., 1993; Biddle, 1992).

3) In addition, research should not only be conducted among the high-school student population, but should be extended to include its graduates who are no longer physically active since leaving the formal education environment. By examining both populations using a variety of research methods and instruments, it may be possible to understand what accounts for the sharp decline in activity rates during late adolescence, thereby enabling the design of effective interventions for this population.

References

Ainsworth, B. E., Haskell, W. L., Leon, A. S., Jacobs, D. R., Montoye, H. J., Sallis, J. F., & Paffenbarger, R. S. (1993). Compendium of physical activities: Classification of energy costs of human physical activities. Medicine and Science in Sports and Exercise, 25 (1), 71-80.

Alderman, R. B., & Wood, N. L. (1976). An analysis of incentive motivation in young Canadian athletes. Canadian Journal of Applied Sport Sciences, 1 (2), 169-175.

Ashford, B., Biddle, S., & Goudas, M. (1993). Participation in community sport centers: Motives and predictors of enjoyment. Journal of Sports Sciences, 11, 249-256.

Biddle, S. (1992). Sport and exercise motivation: A brief review of antecedent factors and psychological outcomes of participation. Physical Education Review, 15 (2), 98-110.

Buonamano, R., Cei, A., & Mussino, A. (1995). Participation motivation in Italian youth sport. Sport Psychologist, 9, 265-281.

Canada Fitness Survey. (1983). Canadian Youth and Physical Activity. Ottawa, ON: Canada Fitness Survey.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York, NY: Plenum.

Dishman, R. K. (Ed.). (1988). Exercise adherence: Its impact on public health. Champaign, IL: Human Kinetics.

Dishman, R. K., & Dunn, A. L. (1988). Exercise adherence in children and youth: Implications for adulthood. In R. K. Dishman (Ed.), Exercise adherence: Its impact on public health (pp. 155-200). Champaign, IL: Human Kinetics.

Frederick, C. M., & Ryan, R. M. (1993). Differences in motivation for sport and exercise and their relations with participation and mental health. Journal of Sport Behavior, 16, 124-145.

Frederick, C. M., & Ryan, R. M. (1995). Self-determination in sport: A review using cognitive evaluation theory. International Journal of Sport Psychology, 26, 5-23.

Gill, D. L., Gross, J. B., & Huddleston, S. (1983). Participation motivation in youth sports. International Journal of Sport Psychology, 14, 1-14.

Gill, K., & Overdorf, V. (1994). Incentives for exercise in younger and older women. Journal of Sport Behavior, 17 (2), 87-97.

Gould, D., Feltz, D., & Weiss, M. (1985). Motives for participating in competitive youth swimming. International Journal of Sport Psychology, 16, 126-140.

Howell, D. C. (1995). Fundamental statistics for the behavioral sciences (3rd ed.). Belmont, CA: Duxbury.

Jessor, R. (1984). Adolescent development and behavioral health. In J. D. Matarazzo, S. M. Weiss, J. A. Miller, & S. M. Weiss (Eds.), Behavioral health: A handbook of health enhancement and disease prevention (pp. 69-90). New York, NY: John Wiley & Sons.

Klint, K. A., & Weiss, M. R. (1986). Dropping in and dropping out: Participation motives of current and former youth gymnasts. Canadian Journal of Applied Sport Sciences, 11, 106-114.

Longhurst, K., & Spink, K. S. (1987). Participation motivation of Australian children involved in organized sport. Canadian Journal of Sport Sciences, 12 (1), 24-30.

Markland, D. & Hardy, L. (1993). The Exercise Motivation Inventory: Preliminary development and validity of a measure of individuals' reasons for participating in regular physical exercise. Personality and Individual Differences, 15 (3), 289-296.

Markland, D., & Ingledew, D. K. (1997). The measurement of exercise motives: Factorial validity and invariance across gender of a revised Exercise Motivations Inventory. British Journal of Health Psychology, 2, 361-376.

Miller, D. J., Freedson, P. S., & Kline, G. M. (1994). Comparison of activity levels using the Caltrac accelerometer and five questionnaires. Medicine and Science in Sports and Exercise, 26 (3), 376-382.

Montoye, H. J., Kemper, H. C., Saris, W. H., & Washburn, R. A. (1996). Measuring physical activity and energy expenditure. Champaign, IL: Human Kinetics.

Passer, M. W. (1981). Children in sport: Participation motives and psychological stress. Quest, 33 (1), 231-243.

Romar, J. (1994). Adolescent athletes' perceived sport competence and motives for individual sports. Physical Educator, 51 (3), 114-118.

Routh, D. K. (1988). Prevention and lifestyle in child health psychology. In B. G. Melamed, K. A. Matthews, D. K. Routh, B. Stabler, & N. Schneiderman (Eds.), Child health psychology (pp. 5-15). Hillside, NJ: Lawrence Erlbaum Associates.

Ryckman, R. M., & Hamel, J. (1991). Female adolescents' motives related to involvement in organized team sports. International Journal of Sport Psychology, 18, 147-159.

Sallis, J. F., & Hovell, M. F. (1990). Determinants of exercise behaviour. Exercise and Sport Sciences Reviews, 18, 307-330.

Schutz, R. W., Smoll, F. L., & Wood, T. M. (1981). Physical activity and sport: Attitudes and perceptions of young Canadian athletes. Canadian Journal of Applied Sport Sciences, 6 (1), 32-39.

Stephens, T. & Craig, C. L. (1990). The well-being of Canadians: Highlights of the 1988 Campbell's Survey. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute.

Stephens, T., Jacobs, D. R., & White, C. C. (1985). A descriptive epidemiology of leisure-time activity. Public Health Reports, 100 (2), 147-158.

Tabachnick, B. G., & Fidell, L. S. (1996). Using multivariate statistics (3rd ed.). New York, NY: HarperCollins.

Tappe, M. K., Duda, J. L., & Menges-Ehrnwald, P. (1990). Personal investment predictors of adolescent motivational orientation toward exercise. Canadian Journal of Sport Sciences, 15 (3), 185-192.

Telama, R., & Silvennoinen, M. (1979). Structure and development of 11- to 19-year-olds' motivation for physical activity. Scandinavian Journal of Sports Sciences, 1, 23-31.

U. S. Department of Health and Human Services. (1996). Physical activity and health: A report of the Surgeon General. Atlanta, GA: U. S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. Advances in Experimental Social Psychology, 29, 271-360.

Wallace, J. P., McKenzie, T. L., & Nader, P. R. (1985). Observed vs. Recalled exercise behavior: A validation of a seven day exercise recall for boys 11 to 13 years old. Research Quarterly for Exercise and Sport, 56 (2), 161-165.

Wankel, L. M. (1993). The importance of enjoyment to adherence and psychological benefits from physical activity. International Journal of Sport Psychology, 24, 151-169.

Wankel, L. M. & Kreisel, P. S. (1985). Factors underlying enjoyment of youth sports: Sport and age group comparisons. Journal of Sport Psychology, 7, 51-64.

Watkin, B. & Youngen, L. (1988). Cross-national comparisons of motivation for participation in physical activity of Australian and American adolescents. In Broom, E. F., Clumpner, R. C., Pendleton, B., & Pooley, C. A. (Eds.), Comparative physical education and sport: Vol. 5 (pp. 267-275). Champaign, IL: Human Kinetics.

White, S. A. (1995). The perceived purposes of sport among male and female intercollegiate and recreational sport participants. International Journal of Sport Psychology, 26, 490-502.

Appendix A

Informed Consent

The purpose of this study is to examine the factors which motivate youth to participate in exercise and physical activity. Your participation in this study is completely voluntary. If you refuse to participate in this study at any time for any reason you will not suffer any consequences. Your identity will also remain anonymous. The researcher (Robert B. Wilson) fully intends to publish the results of this study but your identity will remain anonymous. The completed questionnaires will be stored in a secured filing cabinet in a locked room of the researcher's house. These questionnaires will be destroyed 5 years from their date of collection by the researcher. The findings of this study will be made available to you through your principal (Principal's Name) as copies of this study will be forwarded to his/her office. Should you wish to know any other information regarding this study you can contact the researcher by obtaining his phone number from your principal. Thank you for your time and your cooperation.

Sincerely,

Robert B. Wilson
2nd Year M.A.
University of Victoria

Completion of this questionnaire indicates consent has been given

Exercise Questionnaire

I am interested in knowing why *you* personally exercise. I would appreciate you taking the time to fill out this questionnaire whether you are currently exercising or not. Consider activities in which you have participated before, during, and after school. Remember, I would like to know why *you personally* choose to exercise or might choose to exercise, *not* whether you think the statements below are good reasons for *anybody* to exercise. Please read each statement carefully and indicate your appropriate answer. Take your time.
It would help me to know some basic personal information about those who are filling out this questionnaire. I would be grateful for the following information:

Your Age:_____ Your Gender: male / female Your Weight:_____ pds or **_____ kilos**

Please answer the following questions on the answer sheet provided

	Not at all true for me					**Very true for me**
A: Personally, I exercise (or might exercise). . .						
1. To stay slim	0	1	2	3	4	5
2. To avoid ill-health	0	1	2	3	4	5
3. Because it makes me feel good	0	1	2	3	4	5
4. To help me look younger	0	1	2	3	4	5
5. To show my worth to others	0	1	2	3	4	5
6. To give me space to think	0	1	2	3	4	5
7. To have a healthy body	0	1	2	3	4	5
8. To build up my strength	0	1	2	3	4	5
9. Because I enjoy the feeling of exerting myself	0	1	2	3	4	5
10. To spend time with friends	0	1	2	3	4	5
11. Because my doctor advised me to exercise	0	1	2	3	4	5
12. Because I like trying to win in physical activities	0	1	2	3	4	5
13. To stay/become more agile	0	1	2	3	4	5
14. To give me goals to work towards	0	1	2	3	4	5
15. To lose weight	0	1	2	3	4	5
16. To prevent health problems	0	1	2	3	4	5
17. Because I find exercise invigorating	0	1	2	3	4	5
18. To have a good body	0	1	2	3	4	5
19. To compare my abilities with other peoples'	0	1	2	3	4	5

Please turn over

	Not at all true for me					Very true for me
A: Personally, I exercise (or might exercise). . .						
20. Because it helps to reduce tension	0	1	2	3	4	5
21. Because I want to maintain good health	0	1	2	3	4	5
22. To increase my endurance	0	1	2	3	4	5
23. Because I find exercising satisfying in and of itself	0	1	2	3	4	5
24. To enjoy the social aspects of exercising	0	1	2	3	4	5
25. To help prevent an illness that runs in my family	0	1	2	3	4	5
26. Because I enjoy competing	0	1	2	3	4	5
27. To maintain flexibility	0	1	2	3	4	5
28. To give me personal challenges to face	0	1	2	3	4	5
29. To help control my weight	0	1	2	3	4	5
30. To avoid heart disease	0	1	2	3	4	5
31. To recharge my batteries	0	1	2	3	4	5
32. To improve my appearance	0	1	2	3	4	5
33. To gain recognition for my accomplishments	0	1	2	3	4	5
34. To help manage stress	0	1	2	3	4	5
35. To feel more healthy	0	1	2	3	4	5
36. To get stronger	0	1	2	3	4	5
37. For enjoyment of the experience of exercising	0	1	2	3	4	5
38. To have fun being active with other people	0	1	2	3	4	5
39. To help recover from an injury/illness	0	1	2	3	4	5
40. Because I enjoy physical competition	0	1	2	3	4	5
41. To stay/become flexible	0	1	2	3	4	5
42. To develop personal skills	0	1	2	3	4	5
43. Because exercise helps me to burn calories	0	1	2	3	4	5
44. To look more attractive	0	1	2	3	4	5
45. To accomplish things that others are incapable of	0	1	2	3	4	5
46. To release tension	0	1	2	3	4	5
47. To develop my muscles	0	1	2	3	4	5
48. Because I feel at my best when exercising	0	1	2	3	4	5
49. To make new friends	0	1	2	3	4	5
50. Because I find physical activities fun, especially when competition is involved	0	1	2	3	4	5
51. To measure myself against personal standards	0	1	2	3	4	5

Please turn over

Appendix A Continued

Scoring Key for the Exercise Motivations Inventory - 2 (EMI - 2)

By Markland and Hardy (1997)

Scale scores are obtained by calculating means of the appropriate items

Scale	Items			
Stress Management	6	20	34	46
Revitalization	3	17	31	
Enjoyment	9	23	37	48
Challenge	14	28	42	51
Social Recognition	5	19	33	45
Affiliation	10	24	38	49
Competition	12	26	40	50
Health Pressures	11	25	39	
Ill-Health Avoidance	2	16	30	
Positive Health	7	21	35	
Weight Management	1	15	29	43
Appearance	4	18	32	44
Strength & Endurance	8	22	36	47
Nimbleness (Flexibility/Agility)	13	27	41	

Appendix B

B: Please Check Off the Appropriate Box

52. Which one of the following boxes best describes your athletic background (check off only one):

☐ I am currently participating (or intending to participate) in an organized sport(s)

☐ I have previously participated in an organized sport(s), but am not currently participating in one, nor am I intending to participate in one in the near future

☐ I have never participated in an organized sport before and I am not currently participating in an organized sport (s)

53. Which one of the following boxes best describes your activity preference (check off only one):

☐ I would prefer to participate in *Individual* type activities (for example, gymnastics, biking, weight-training, singles tennis, swimming, shooting hoops, etc.)

☐ I would prefer to participate in *Group* type activities (for example, soccer, volleyball, rugby, doubles tennis, basketball games, ice-hockey, etc.)

☐ I would prefer to participate in a *Mixture* of both Individual and Group type activities

54. Which one of the following boxes best describes your preference (check off only one):

☐ I would prefer to participate in *Formal/Supervised* settings (activities which are organized, held at specific times, and have a coach or instructor. For example, rugby, gymnastics, martial arts, etc.)

☐ I would prefer to participate in *Informal /Spontaneous* settings (activities which are not structured, can be done at any time, and do not have a coach or instructor. For example, skateboarding, rollerblading, pick-up basketball, weight-training, etc.)

☐ I would prefer to participate in a *Mixture* of both Formal and Informal settings

Please turn over

C: Physical Activity in Your Spare Time

Now I would like to know about your physical activity during the past **7 days**. Consider activities in which you have participated before, during, and after school time. Activities performed during physical education classes should also be included. Remember, only include activities done during the **past 7 days**.

On the following list of activities, please indicate whether you have done that particular activity during the past 7 days. Then for those activities which you have done, please indicate how often you participated in that particular activity. In addition, indicate the average time you spent on each occasion - not counting travel time, time getting changed, time showering, etc.

For example, if you have done water aerobics 4 times in the past 7 days, and each workout lasted for 30 minutes your chart would look something like this

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
EXAMPLE	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Aerobics (water)											

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Aerobics (water)											
Aerobics (low impact)											
Aerobics (high impact)											
Archery											
Backpacking											
Badminton (singles/doubles)											
Badminton (competitive)											
Basketball (shooting baskets)											
Basketball (pickup)											
Basketball (game)											
Bicycling (mountain or BMX)											
Bicycling (slow, light effort)											
Bicycling (moderate effort)											
Bicycling (vigorous effort)											
Bicycling (stationary, light)											

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Bicycling (stationary, mod.)											
Bicycling (stationary, vigorous)											
Billiards (pool)											
Bowling											
Boxing (punching bag)											
Boxing (sparring)											
Calisthenics (pushups, situps)											
Calisthenics (home exercises, stretches, etc.)											
Canoeing (on camping trip)											
Canoeing (portaging)											
Circuit training (general)											
Curling											
Dancing (ballet or modern)											
Dancing (disco, square, folk)											
Darts											
Fencing											
Figure Skating											
Field Hockey											
Fishing (from boat)											
Fishing (from river bank)											
Fishing (in stream in waders)											
Football (playing catch)											
Football (touch, flag)											
Football (contact)											
Golf (using power cart)											
Golf (pulling clubs)											
Golf (carrying clubs)											

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Hacky sack											
Hiking (cross country)											
Horseriding (general)											
Ice Hockey											
Ice Skating (moderate effort)											
Ice Skating (vigorous effort)											
In-line skating (moderate effort)											
In-line skating (vigorous effort)											
Juggling											
Kayaking (or white water rafting)											
Lacrosse											
Martial Arts (judo, jujitsu, karate, kickboxing, etc.)											
Racquetball (general)											
Racquetball (competitive)											
Rock climbing (rappelling and/or mountain climbing)											
Rope Jumping (slow)											
Rope Jumping (general)											
Rope Jumping (fast)											
Rowing (stationary, moderate)											
Rowing (stationary, vigorous)											
Rowing (stationary, very vigorous effort)											
Rowing (outside, light effort)											
Rowing (outside, moderate)											

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Rowing (outside, vigorous)											
Rugby											
Running (jogging)											
Running (general)											
Running (7 mph, 8.5 min/mile)											
Running (8.6 mph, 7 min/mile)											
Running (cross-country)											
Running (up stairs)											
Sailing (general)											
Sailing (in competition)											
Scuba Diving											
Skateboarding											
Skiing (machine, Norditrack)											
Skiing (water)											
Soccer (general)											
Soccer (competitive)											
Softball or Baseball (playing catch)											
Softball or Baseball (game)											
Squash											
Stairmaster											
Surfing (body or board)											
Swimming (laps, moderate)											
Swimming (laps, vigorous)											
Swimming (leisurely)											
Tennis (singles)											
Tennis (doubles)											
Ultimate frisbee											

Activity	In the past 7 days, have you done this activity?		If yes, please indicate the number of times/day in the past 7 days							Average time per occasion	
	No	Yes	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Hr	Min
Volleyball (noncompetitive)											
Volleyball (competitive)											
Volleyball (beach)											
Walking (slow pace)											
Walking (moderate pace)											
Walking (very brisk pace)											
Walking (grass track/route)											
Waterpolo											
Weight lifting (general)											
Weight lifting (powerlifting or bodybuilding)											
Wrestling (per match/5 min)											
Other Activities you have done that are not listed above:											

Was this a "typical" week for you in terms of the amount of physical activity/exercise in which you participated?

Yes ☐ **No** ☐

If you answered *no* to the above question, would your "typical" week have included more or less physical activity/exercise?

More Physical Activity ☐ **Less Physical Activity** ☐

Appendix C

Results of Current Factor Analysis for EMI-2 (n = 243) Compared to the Confirmatory Factor Analysis for the EMI-2 (n = 418-423) As Reported by Markland and Ingledew (1997)

	Loadings	
Scale/Items	Current Study	Original Results By Markland & Ingledew (1997)
Stress Management		
To help manage stress	.772	.926
To release tension	.772	.954
Because it helps to reduce tension	.653	.908
To give me space to think	.573	.752
Revitalization/Enjoyment		
Because I find exercising invigorating	.686	.886
Because it makes me feel good	.636	.862
To recharge my batteries	.316	.751
Because I find exercising satisfying in and of itself	.751	.907
Because I feel at my best when exercising	.703	.804
Because I enjoy the feeling of exerting myself	.685	.806
For enjoyment of the experience of exercising	.678	.936
Challenge		
To give me goals to work towards	.467	.806
To give me personal challenges to face	.407	.929
To measure myself against personal standards	.302	.834
To develop personal skills	.000	.704
Social Recognition		
To gain recognition for my accomplishments	.620	.908
To compare my abilities with other peoples'	.559	.889
To accomplish things that others are incapable of	.545	.828
To show my worth to others	.543	.827
Affiliation		
To spend time with friends	.777	.823
To enjoy the social aspects of exercising	.773	.948
To have fun being active with other people	.739	.935
To make new friends	.627	.822
Competition		
Because I enjoy physical competition	.875	.968
Because I enjoy competing	.873	.970
Because I find physical activities fun, especially when competition is involved	.857	.937
Because I like trying to win in physical activities	.796	.917
Health Pressures		
Because my doctor advised me to exercise	.348	.736
To help prevent an illness that runs in the family	.739	.736
To help recover from an injury/illness	.639	.736

Appendix C Continued

Scale/Items	Loadings	
	Current Study	Original Results By Markland & Ingledew (1997)
Ill-Health Avoidance/Positive Health		
To avoid ill-health	.722	.958
To prevent health problems	.709	.956
To avoid heart disease	.314	.827
Because I want to maintain good health	.758	.898
To have a healthy body	.678	.873
To feel more healthy	.505	.857
Weight Management/Appearance		
To lose weight	.892	.927
To help control my weight	.876	.953
Because exercise helps me to burn calories	.836	.863
To stay slim	.773	.803
To look more attractive	.572	.878
To improve my appearance	.533	.944
To have a good body	.373	.825
To help me look younger	.231	.635
Strength & Endurance		
To develop my muscles	.833	.831
To get stronger	.793	.948
To build up my strength	.743	.851
To increase my endurance	.000	.654
Nimbleness (Flexibility & Agility)		
To maintain flexibility	.843	.889
To stay/become flexible	.817	.941
To stay/become more agile	.223	.854

Note. The Current Study used a Principal Components Analysis with Varimax Rotation. The rotation converged in 15 iterations. All analyses done using SPSS. Of the 14 original components hypothesized to exist by Markland & Ingledew (1997), only 11 emerged. However, the factors of Appearance, Revitalization, and Ill-Health Avoidance loaded onto Weight Management, Enjoyment, and Positive Health respectively which accounted for the reduction in factors. The original loadings are from "The Measurement of Exercise Motives: Factorial Validity and Invariance Across Gender of a Revised Exercise Motivations Inventory," by D. Markland and D. K. Ingledew, 1997, British Journal of Health Psychology, 2, p. 368-370. Reprinted with permission from the author.

Appendix D

Preliminary Analysis of Variables (n = 243)

	Mean	Standard Deviation	Skewness	Kurtosis	Range
Continuous (DVs)					
ACTIVITY	19.93	19.43	2.11	6.23	0.00-135.00
AFFILIAT	2.57	1.23	-.17	-.71	0.00-5.00
APPEARAN	2.71	1.14	-.51	-.34	0.00-5.00
CHALLENG	2.77	1.25	-.31	-.54	0.00-5.00
COMPETIT	2.70	1.60	-.18	-1.22	0.00-5.00
ENJOYMNT	2.84	1.25	-.37	-.69	0.00-5.00
HEALTHPR	1.25	1.20	1.02	.51	0.00-5.00
ILLHEALTH	2.50	1.41	-.00	-.80	0.00-5.00
NIMBLE	2.80	1.29	-.29	-.56	0.00-5.00
POSHEALT	3.63	1.23	-1.04	.58	0.00-5.00
REVITALIZ	2.81	1.16	-.39	-.32	0.00-5.00
SOCRECOG	2.09	1.30	.15	-.74	0.00-5.00
STR_ENDU	3.79	1.01	-1.03	1.30	0.00-5.00
STRESMAN	2.59	1.38	-.19	-.89	0.00-5.00
WEIGHTMG	2.56	1.69	-.13	-1.37	0.00-5.00
Categorical (IVs)					
ACTPREF	2.37	.78	-.75	-.97	1-3
ATHLETE	1.51	.64	.89	-.27	1-3
ENVPREF	2.40	.73	-.77	-.75	1-3
GENDER	1.45	.50	.21	-1.97	1-2

Appendix E

Pearson-Product Moment Correlation Matrix (n = 243)

Variables	1	2	3	4	5	6	7	8	9	10
Continuous (DVs)										
1. ACTIVITY	--	.025	-.058	.095	.255**	.129*	.029	.072	.203**	.125
2. AFFILIAT	.025	--	.066	.468**	.407**	.415**	.194**	.158*	.159*	.201**
3. APPEARAN	-.058	.066	--	.289**	-.039	.251**	.203**	.334**	.296**	.441**
4. CHALLENG	.095	.468**	.289**	--	.462**	.675**	.203**	.300**	.448**	.471**
5. COMPETIT	.255**	.407**	-.039	.462**	--	.399**	.055	.007	.181**	.074
6. ENJOYMNT	.129*	.415**	.251**	.675**	.399**	--	.056	.245**	.341**	.488**
7. HEALTHPR	.029	.194**	.203**	.203**	.055	.056	--	.573**	.300**	.342**
8. ILLHEALTH	.072	.158*	.334**	.300**	.007	.245**	.573**	--	.432**	.686**
9. NIMBLE	.203**	.159*	.296**	.448**	.181**	.341**	.300**	.432**	--	.485**
10. POSHEALT	.125	.201**	.441**	.471**	.074	.488**	.342**	.686**	.485**	--
11. REVITALIZ	.087	.326**	.310**	.561**	.219**	.704**	.189**	.453**	.429**	.569**
12. SOCRECOG	.142*	.436**	.319**	.565**	.585**	.413**	.174**	.155*	.284**	.244**
13. STR_ENDU	.215**	.218**	.380**	.462**	.338**	.485**	.141*	.347**	.444**	.517**
14. STRESMAN	.057	.327**	.257**	.523**	.051	.489**	.337**	.457**	.394**	.543**
15. WEIGHTMG	-.032	.037	.554**	.169**	-.157*	.092	.312**	.453**	.340**	.432**
Categorical (IVs)										
16. ACTPREF	.116	.162*	-.023	.075	.176**	.052	.154*	.146*	.142*	.125
17. ATHLETE	-.319**	-.203**	.045	-.197**	-.397**	-.201**	.023	-.028	-.032	-.056
18. ENVPREF	-.034	.072	.080	-.014	-.036	.004	.069	-.052	.017	-.041
19. GENDER	-.160*	-.076	.221**	.031	-.425**	.034	.086	.235**	.149**	.271**

Variables	11	12	13	14	15	16	17	18	19
Continuous (DVs)									
1. ACTIVITY	.087	.142*	.215**	.057	-.032	.116	-.319**	-.034	-.160*
2. AFFILIAT	.326**	.436**	.218**	.327**	.037	.162*	-.203**	.072	-.076
3. APPEARAN	.310**	.319**	.380**	.257**	.554**	-.023	.045	.080	.221**
4. CHALLENG	.561**	.565**	.462**	.523**	.169**	.075	-.197**	-.014	.031
5. COMPETIT	.219**	.585**	.338**	.051	-.157*	.176**	-.397**	-.036	-.425**
6. ENJOYMNT	.704**	.413**	.485**	.489**	.092	.052	-.201**	.004	.034
7. HEALTHPR	.189**	.174**	.141*	.337**	.312**	.154*	.023	.069	.086
8. ILLHEALTH	.453**	.155*	.347**	.457**	.453**	.146*	-.028	-.052	.235**
9. NIMBLE	.429**	.284**	.444*	.394**	.340**	.142*	-.032	.017	.149*
10. POSHEALT	.569**	.244**	.517**	.543**	.432**	.125	-.056	-.041	.271**
11. REVITALIZ	--	.343**	.455**	.579**	.188**	.131*	-.114	-.031	.059
12. SOCRECOG	.343**	--	.340**	.262**	.029	.099	-.213**	.019	-.281**
13. STR_ENDU	.455**	.340**	--	.271**	.098	.141*	-.174**	-.056	-.122
14. STRESMAN	.579**	.262**	.271**	--	.338**	.102	-.100	.002	.298**
15. WEIGHTMG	.188**	.029	.098	.338**	--	-.035	.011	-.016	.560**
Categorical (IVs)									
16. ACTPREF	.131*	.099	.141*	.102	-.035	--	-.182**	.316**	-.010
17. ATHLETE	-.114	-.213**	-.174**	-.100	.011	-.182**	--	-.023	.102
18. ENVPREF	-.031	.019	-.056	.002	-.016	.316**	-.023	--	-.012
19. GENDER	.059	-.281**	-.122	.298**	.560**	-.010	.102	-.012	--

Note. *p < .05. **p < .001.

Vita

Surname: Wilson Given Names: Robert Byron

Place of Birth: Toronto, Ontario, Canada

Educational Institutes Attended:

University of Victoria, Canada	1996 to 1998
University of Windsor , Canada	1995 to 1996
University of Western Ontario, Canada	1990 to 1994
Victoria University of Technology, Australia	1993

Degrees Awarded:

B.Ed.	University of Windsor	1996
B.A. (Honours)	University of Western Ontario	1994

Honours and Awards:

University of Victoria Fellowship	1996-98
VWC Post Secondary Scholarship	1991-94
University of Western Ontario Entrance Scholarship	1990

Partial Copyright License

I hereby grant the right to lend my thesis to users of the University of Victoria Library, and to make single copies only for such users or in response to a request from the Library of any other university, or similar institution, on its behalf or for one of its users. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by me or a member of the University designated by me. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Title of Thesis:

Adolescent Exercise Motives: Comparisons Across Gender and Activity Levels

Author [redacted]

Robert Byron Wilson
April 20, 1998