CIAU ATHLETES' USE AND INTENTIONS TO USE PERFORMANCE ENHANCING DRUGS:
A STUDY UTILIZING THE THEORY OF PLANNED BEHAVIOUR

by

MEREDITH FRANCES ALLEMEIER

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Department of Human Kinetics
The University of British Columbia
Vancouver, Canada

Date June 14, 1996
ABSTRACT

A recent investigation of CIAU athletes' drug using behaviours revealed that performance enhancing drug use is still occurring in CIAU sport (Spence & Gauvin, 1994). Although testing has its place in dissuading drug use, it may be more effective to employ drug education programs in an attempt to prevent drug use before it occurs. In order to implement an effective CIAU drug education program it is necessary to first understand the antecedents of performance enhancing drug use. Although theory has not been used in the past to predict performance enhancing drug use, specific theories may add significantly to the understanding of antecedent factors that might be associated with the use of performance enhancing drugs. In particular, a theory such as the Theory of Planned Behaviour (TPB) because it has been used successfully to predict both recreational drug use and exercise adherence, may be the most useful theory for this purpose. Additional variables that may assist in the prediction of performance enhancing drug use are habit strength and self-esteem / body image.

Male CIAU football, wrestling, ice hockey, swimming and track & field athletes (N=182) completed and returned "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances" questionnaire. Their answers were subjected to both a confirmatory factor analysis (CFA) and hierarchical regression analysis. The CFA revealed a
very poor fit between the data and the model consisting of the variables of the TPB (i.e. attitudes, subjective norms, perceived control) and the added variable of self-esteem / body image, \[ \chi^2 (98, N = 182) = 518.45, p < .05 \]. The hierarchical regression analysis, however, found the TPB variables both alone, \[ F (3, 178) = 12.50, p < .001 \] and in combination with habit strength and self-esteem / body image, \[ F (5, 176) = 11.77, p < .001 \] to significantly predict subjects' intentions to use performance enhancing drugs. Together the five variables accounted for 25% of the variance in subjects' intention scores. This was below the predicted level of 40%.

The CFA results suggest that the current questionnaire may not be measuring the variables of the TPB and the variable self-esteem / body image as accurately as would be desirable. Nevertheless, the results from the regression analysis suggest that the TPB may in future be used to better explain and predict performance enhancing drug use among male CIAU athletes, especially when the TPB is combined with measures of the variables self-esteem / body image and habit strength. Recommendations for CIAU drug education programs are also made based upon these results.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iv</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vii</td>
</tr>
<tr>
<td>Acknowledgment</td>
<td>viii</td>
</tr>
<tr>
<td>Chapter 1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Purpose</td>
<td>9</td>
</tr>
<tr>
<td>Chapter 2 Literature Review</td>
<td>11</td>
</tr>
<tr>
<td>Performance Enhancing Drug Use</td>
<td>11</td>
</tr>
<tr>
<td>Drug Education</td>
<td>14</td>
</tr>
<tr>
<td>Needs Assessment</td>
<td>17</td>
</tr>
<tr>
<td>The Theory of Planned Behaviour</td>
<td>18</td>
</tr>
<tr>
<td>Habit and Self-Esteem</td>
<td>25</td>
</tr>
<tr>
<td>Attitude and Behaviour Change via the TPB</td>
<td>31</td>
</tr>
<tr>
<td>Selecting Appropriate Drug Education Programs</td>
<td>35</td>
</tr>
<tr>
<td>Selection of a Measurement Tool</td>
<td>39</td>
</tr>
<tr>
<td>Additional Variables Associated with Drug Use</td>
<td>43</td>
</tr>
<tr>
<td>Chapter 3 Methodology</td>
<td>48</td>
</tr>
<tr>
<td>Subjects</td>
<td>48</td>
</tr>
<tr>
<td>Instrument</td>
<td>52</td>
</tr>
<tr>
<td>Procedures</td>
<td>54</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>57</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>58</td>
</tr>
<tr>
<td>Limitations</td>
<td>69</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

| Table 1 | Percentage of Self-Reported Use of Performance Enhancing Substances or Methods for Each Sport and for All Subjects. | 72 |
| Table 2 | “Yeh-sayers" and All Other Subjects' Responses to Question Eight Regarding the Performance Enhancing Effects of Various Substances and Methods. | 75 |
| Table 3 | “Yeh-sayers" and All Other Subjects' Responses to Question Ten Regarding the Health Risk of Using Various Performance Enhancing Substances and Methods. | 76 |
| Table 4 | Subjects' Estimations of Performance Enhancing Drug Use by Their Peers. | 78 |
| Table 5 | CIAU Male Athletes' Responses To Attitude Statements in Question Five. | 80 |
| Table 6 | CIAU Male Athletes' Responses To Subjective Norm Statements in Question Five. | 82 |
| Table 7 | CIAU Male Athletes' Responses To Perceived Control Statements in Question Five. | 83 |
| Table 8 | CIAU Male Athletes' Responses To Self-Esteem / Body Image Statements in Question Five. | 85 |
| Table 9 | Pearson Product-Moment Correlation's Between Subjects' Habit Strength Scores Greater Than Zero and the Four Variables Measured in Question Five. | 87 |
| Table 10 | Pearson Product-Moment Correlation's Between Subjects' Intention Scores and the Four Variables Measured in Question Five. | 88 |
| Table 11 | Results of the Confirmatory Factor Analysis and Subsequent Modifications of the CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances. | 92 |
| Table 12 | Results of the Hierarchical Regression Analysis of Variables Believed to be Associated with Intentions to Use Performance Enhancing Drugs. | 96 |
| Table 13 | Correlation Matrix Between All Variables Used in the Hierarchical Analysis. | 97 |
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Ajzen's model of the Theory of Planned Behaviour</td>
<td>22</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Ajzen's model of the Theory of Planned Behaviour and the added variables of Self-Esteem / Body Image and Habit Strength.</td>
<td>27</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Factor loadings from a confirmatory factor analysis of the Theory of Planned Behaviour and the added variable of Self-Esteem / Body Image.</td>
<td>94</td>
</tr>
</tbody>
</table>
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Chapter 1
INTRODUCTION

According to the definition used by the Canadian Interuniversity Athletic Union (CIAU), doping or performance enhancing drug use refers to the use of anabolic drugs (e.g. anabolic steroids, human growth hormone), stimulants (e.g. caffeine, amphetamines), beta blockers, diuretics, blood doping or any other substance or method banned by the International Olympic Committee, (Voy, 1991). Despite recent efforts by the CIAU to eradicate doping in Canadian university sport, evidence from drug surveys and tests suggests it is still occurring in CIAU sport, particularly among males in sports requiring power and/or strength (Allemeier, 1994; Anderson, 1991; Greenberg, 1989; Spence & Gauvin, 1994). For example, male CIAU athletes, more so than female CIAU athletes report use of anabolic steroids and amphetamines and are also more likely to believe their teammates take performance enhancing drugs (Spence & Gauvin, 1994). Likewise, random drug tests of athletes domestically and internationally have produced positive tests primarily for males in strength and power based sports (e.g. track & field, football, weightlifting) (CCDS, 1994). Based on this and other evidence, CIAU athletes that may be at greatest risk of drug use are male swimmers, football players, wrestlers, ice hockey players and track & field athletes. In an effort to better understand the extent of drug use in CIAU sport, the CIAU endorsed an investigation into the drug using habits of its athletes (Spence & Gauvin, 1994). In addition to information about drug usage,
this study found that many athletes did not recognize the CIAU's drug education program to be drug education. Unfortunately, this study did not address the content of the CIAU's drug education program, and consequently only recommended altering the marketing of the program, rather than suggesting specific changes in the program content. The manner in which the content of the CIAU's drug education program could be modified to create a program that will more effectively reduce performance enhancing drug use by male CIAU football, wrestling, swimming, ice hockey and track & field athletes, therefore, remains to be investigated.

If one wishes to change specific behaviours of male CIAU athletes in these sports, or any group for that matter, the most sensible approach is to begin with an examination of related research in the area of behaviour change. Authorities in the area of social psychology have developed numerous theories to explain the process of behaviour change (Ajzen, 1985; Bettinghaus, 1986; Fishbein & Ajzen, 1975; Shaver, 1987). These theories are used to identify psychological factors (i.e. attitudes, subjective norms, perceived control) that can be used by investigators to predict behaviour with some degree of confidence (Brawley, 1993). Of extreme importance is the identification of psychosocial factors or "socially learned' determinants of behaviour (i.e. perceptions of peer pressure, attitudes towards cheating, or perceptions of the availability of drugs) that not only predict behaviour, but also respond well to change (Brawley, 1993). Education programs are often used to create behaviour change by helping
people adopt or "learn" more socially desirable behaviours. It is expected that if education programs are properly designed they will influence attitudes, perceptions of social norms, perceptions of control, etc., and will subsequently influence or change behaviour (Brawley, 1993; Rodgers & Brawley, 1993). For example, education sessions that demonstrate the disadvantages of doping (e.g. the physical and psychological harm, the knowledge that drugs rather than personal ability may be responsibility for one's victory) as well as the advantages of competing "clean" (e.g. no fear of testing positive, taking responsibility for both winning and achieving personal bests) may lead athletes to adopt a negative attitude towards doping and a positive attitude towards competing clean. These attitudes may in turn influence athletes' decisions regarding performance enhancing drug use.

Health promoters have done much work to test the assumption that education programs based on social psychology theories will, in fact, positively change behaviour (Elder, et al., 1994; Fodor, Dalis & Gairrantano, 1995; Greenberg, J., 1989). An examination of theories used in social psychology and health promotion may, therefore, provide an answer to the question - what psychosocial factors (i.e. attitudes, perceived social norms, perceived control, etc.) should a CIAU drug education program address in order to influence male CIAU football, wrestling, swimming, ice hockey and track & field athletes' choices when deciding whether or not to use performance enhancing drugs?
A theory that is currently popular with health promoters attempting to predict health-related behaviour is "The Theory of Planned Behaviour" (Ajzen, 1985). Unlike its predecessor "The Theory of Reasoned Action" that measured only attitudes and subjective norms to predict behaviour (Ajzen & Fishbein, 1975), the TPB also measures perceived control. In most cases, studies that have compared these two theories have found that including measures of perceived control in the TPB allows researchers to more accurately predict behaviour (Blue, 1995; Brawley, 1993; Godin, 1993; Godin, Valois & Lepage, 1992; Netemeyer, Burton & Johnson, 1991; McCaul et al, 1993; Pompo, 1991; Raats, Shepard & Sparks, 1995).

It has been suggested that factors in addition to attitudes, subjective norms and perceived control should be included in the TPB. In other words, the TPB may not be as "parsimonious" a model as was first suspected (Norman & Bonnett, 1995; Raats, Shepard & Sparks, 1995). Two factors that have been added to the TPB are habit and self-esteem (Godin, Valois and Lepage, 1993; Maddux, 1993). Habit, particularly when operationally defined as addiction, may play a significant role in predicting athletic drug use (Adalf & Smart, 1992; Allnut & Chaimowitz, 1994; Brower, 1993, 1992; Ivy, 1988; Lefavi, Reeve & Newland, 1990; Rogal & Yesalis, 1992; Wang & Yesalis, 1994). Self-esteem, on the other hand, may not be as useful a predictor of athletic drug use. The variable of self-esteem has not been a consistent predictor of recreational drug use. Some studies have found a significant relationship between low self-esteem and
increased drug use (Singh & Mustapha, 1994; Taylor & del Pilar, 1992), while others have not (Zapata & Katims, 1994; Cormier & Rochon, 1988). Findings from the area of performance enhancing drug use have found a different relationship between self-esteem and anabolic steroid use. When athletes use steroids to enhance their body image, rather than to improve their performance, it is often the result of a lack of self-esteem related to their feelings of dissatisfaction with their appearance (Lefavi, Reeve & Newland, 1991; Malone, et al. 1995; Pope, Katz and Hudson 1993; Rogal & Yesalis, 1992). However, when athletes do use drugs to enhance their performance (as opposed to enhancing their appearance) it is often as a result of low self-esteem manifest as "a fear of failure" (Anshel, 1993). In conclusion, habit and self-esteem may be useful in predicting athletic drug use.

The TPB has been used to predict a wide variety of health related behaviours. The list of behaviours that have been studied includes, intentions to consume alcohol (Traeen & Nordlund, 1993), to smoke marijuana (Ellickson, Bell & Harrison, 1993; Ellickson, Bell & McGuigan, 1993; Pompo, 1991) and to smoke cigarettes (Ellickson, Bell & Harrison, 1993; Ellickson, Bell & McGuigan, 1993). Likewise, in the area of physical activity, the TPB has been found useful in predicting exercise adherence in young competitive athletes (Theodorakis, 1992) and casual exercisers (Courneya, 1995; Horne, 1994; Robinson, 1992; Rodgers & Brawley; 1993; Theodorakis, 1994, 1992; Wankle & Mummery, 1993; Wankle et al. 1994). Whether the TPB can successfully predict intention to use
performance enhancing drugs (the motives for which can be very different from the motives for recreational drug use) (Anshel, 1991, 1993; Newman, 1989), within a population of adult competitive athletes remains to be investigated.

An extensive review of the literature has not revealed any research that has investigated the utility of the TPB in predicting intentions to use performance enhancing drugs. In fact, the study of performance enhancing drug use is “theory poor”. More precisely, most of the studies that have examined the relationship between attitudes and intentions to use and actual use of performance enhancing drugs have been descriptive rather than theory-driven (Chng & Moore, 1990; Gaskins & deShazo, 1985; King, 1991; Overman & Terry, 1991; Radford, 1991; Schnieder & Morris, 1993).

As our understanding of the motives behind performance enhancing drug use increases, so should our awareness of how theories, such as those taken from the areas of attitude and attitude change, can be used to explain and predict drug use. The present study uses the TPB as a framework for understanding the drug using behaviours of those thought to be at higher risk of using performance enhancing drugs (i.e. male CIAU football, wrestling, swimming, ice hockey and track & field athletes). Three of the psychosocial variables that are examined in the present study are attitudes towards doping, perceived social norms about doping, and perceived control over one's behaviour in regard to performance enhancing drug use. The variables of habit and self-esteem have also been measured. Once it is determined which
psychosocial variables (e.g. attitudes, subjective norms, perceived control), best predict CIAU athletes' intentions to use performance enhancing drugs, the next step will be to investigate how athletes' attitudes, subjective norms, etc. can be modified to reduce the incidence of doping in CIAU sport. Countless studies and projects in the area of health promotion have attempted to manipulate people's behaviour by modifying their attitudes, their perceptions of subjective norms, and/or their feelings of perceived control. At present many studies have changed behaviour in the short-term by manipulating one or more of these variables (Ellickson, Bell & Harrison, 1993; Ellickson, Bell & McGuigan, 1993; Paisley, Lloyd & Mela, 1993; Van Ryn & Vinoker, 1993). On the other hand, there are also many studies that have examined similar behaviours within similar population groups and have failed to produce significant long term changes in the targeted behaviour (Bell & Ellickson, 1993; Bellingham & Gilles, 1993; Wiener & Pritchard, 1993).

If it is possible to change peoples' behaviour by changing their attitudes, perceptions of social norms, and feelings of perceived control, how can one change the attitudes, subjective norms and perceived control of male CIAU football, wrestling, swimming, ice hockey and track & field athletes as part of a drug education program? According to health promotion professionals the first step is to provide education that is 'compelling and meaningful' to the target audience. It is possible that different "risk-groups" (that is groups with different levels of experience with drugs and different intentions to use drugs) may find
different forms of drug education “compelling and meaningful” (Scheier, Newcomb & Skager, 1994). In the area of performance enhancing drug use, it has been found that athletes who oppose drug use may respond favourably to programs that provide information that reinforces their beliefs about drug use, whereas athletes who use or demonstrate an intention to use anabolic steroids may respond better to drug education focused on behavioural skills training (Chng & Moore, 1990; Greenberg, J., 1989; Gridley & Hanrahan, 1994).

Several recommendations are made in the preceding paragraphs regarding the study of athletic drug use. First, it is recommended that theory be used to guide research in the area of performance enhancing drug use. Second, it is suggested that the TPB is possibly the best theory with which to predict intentions to use performance enhancing drugs because the TPB predicts behavioural intentions via psychosocial factors that respond well to change; the TPB predicts behaviour more reliably than the TRA; the TPB successfully predicts recreational drug use; and the TPB is useful in predicting behaviour in exercise settings. It is also suggested that habit and self-esteem may account for variability in performance enhancing drug use, above and beyond that accounted for by the TPB. Lastly, it was suggested that altering athletes’ attitudes, subjective norms and perceived control through education that is “compelling and meaningful” is likely to alter athletes’ drug using behaviours.

Several questionnaires have been developed to assess athlete’s attitudes and knowledge of performance enhancing drugs, (Chng & Moore, 1990; Gaskins
& de Shazo, 1985; King, 1991; Marcello, Danish & Stolberg, 1989; Overman & Terry, 1991; Radford, 1992; Schnieder & Morris, 1993). However, for a variety of reasons, they were not found to be suitable for the purposes of this study. A suitable questionnaire has been developed by the Canadian Centre for Drug-Free Sport (CCDS) for use with high school students (CCDS, 1993). The preliminary results are encouraging. The questionnaire however, requires further validation and must be modified to include questions on perceived control and intentions. Since these modifications are theory-driven, it is important that theory-testing methods such as confirmatory factor analysis and hierarchical regression analysis are used to determine the validity of the questionnaire as well as the validity of the theoretical model being used to predict athletes' intentions to use performance enhancing drugs (i.e. the Theory of Planned Behaviour).

**Purpose**

The purposes of this study are threefold:

1) **To modify the CCDS's “National Survey of Youths' Attitudes Towards Performance Enhancing Drugs” in order to create a questionnaire that will effectively test the capacity of the TPB and the added variables of habit and self-esteem to predict male CIAU football, wrestling, swimming, ice hockey and track & field athletes' intentions to use performance enhancing drugs.**
2) To create profiles of male CIAU football, wrestling, swimming, ice hockey and track & field athletes who use drugs and athletes who intend to use drugs and to report the percentage of athletes surveyed that fit these profiles.

3) To establish the effectiveness of the TPB and the variables of habit and self-esteem to predict male CIAU football, wrestling, swimming, ice hockey and track & field athletes' intentions to use performance enhancing drugs. This is being done so that the "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Drugs" might be used with confidence by all CIAU institutions to answer the question: To what extent do attitudes, subjective norms, perceived control, habit and self-esteem influence the choices of male CIAU football, wrestling, swimming, ice hockey and track & field athletes, to take or avoid using performance enhancing drugs?

To better understand the characteristics of the population being surveyed, questions on demographics and drug knowledge were retained. For the purpose of validation, the original questions on drug use were likewise included.
Chapter 2

LITERATURE REVIEW

Performance Enhancing Drug Use

When referring to doping or performance enhancing drug use, the CIAU uses the International Olympic Committee's (IOC's) definition of this practice.

According to the IOC, doping is:

...the administration of or use by a competing athlete of any substance foreign to the body or any physiological substance taken in abnormal quantity or by an abnormal route of entry into the body with the sole intention of increasing in an artificial manner his or her performance in competition (Voy, 1991, p.5).

Substances that may be used in this manner, and will herein be referred to as performance enhancing drugs, or ergogenic substances include: anabolic substances (e.g. anabolic steroids, human growth hormone), beta blockers, stimulants (i.e. amphetamines, caffeine), narcotic pain killers and diuretics.

Doping, as defined here, may not be as prevalent in collegiate sport as in other sport leagues, but nevertheless continues to occur in Canadian university athletics. Football is the only sport until 1994 to be directly tested by the CIAU. Fourteen players since 1984 have tested positive for performance enhancing drugs (CIAU, 1994). Athletes in all other CIAU sports, until 1994, were subject only to announced (i.e. in-competition) testing by their National Sport Organizations (NSO's). In 1994, unannounced tests were conducted by the CIAU in the sports of football and wrestling, resulting in one positive test in football. Also in 1994, the CCDS began in-competition testing of CIAU athletes.
in ice hockey, swimming and track & field. Although no sports are “officially”
listed by either the CIAU or the CCDS as “high risk” sports, the fact that these
organizations have chosen to directly test football, wrestling, swimming, ice
hockey and track & field suggests that perhaps there is a greater likelihood that
athletes in these predominately male sports will use performance enhancing
drugs (Diane St. Denis, personal communication, July 31, 1995). Further to this
point, national and international drug tests have produced positive tests primarily
in these sports (CCDS, 1994).

It should be noted that no CIAU athletes have ever tested positive as a
result of in-competition testing (CCDS, 1995). The athletes, however, know well
in advance if they might be subjected to announced tests. Consequently it is
relatively easy for them to regulate their drug use so that they will not test
positive for drugs at the time of their competition (Anshel, 1991; Dubin, 1989).

Many athletes that compete in the CIAU also compete internationally. As a result
they are subject to unannounced testing as part of their membership in the
national pool of Canadian athletes. On several occasions these national level-
CIAU athletes have tested positive for performance enhancing drugs, but
because these infractions occurred as part of the national pool testing program,
they are recorded as infractions under the heading “International Sports”. No
mention is made of these infractions under the heading “CIAU Sports” (Lynda
Filsinger, October 26, 1994; personnel communication). Despite this omission,
other projects support the contention that drug use is a problem in CIAU sport.
A recent investigation conducted by Concordia University revealed that both recreational and performance enhancing drug use is currently a problem among Canadian university athletes (Spence & Gauvin, 1996). Interviews conducted by the author in 1994 revealed that UBC-CIAU athletes do not believe doping is a problem on their team, but are concerned about drug use on other teams at other CIAU universities. They also claim to have first-hand knowledge of doping occurring on other teams and/or in other sports (Allemeier, 1994). These findings are in keeping with similar reports recorded by Anshel (1991) in his interviews with college athletes.

As this evidence suggests, doping is occurring in Canadian university sport, although possibly on a rather minor scale. Whether or not it will continue will doubtlessly depend upon the effectiveness of the CIAU's drug testing and education programs. According to Spence & Gauvin (1994), many of the CIAU's athletes would agree that their testing program is effective. Football players and volleyball players were the most confident in the effectiveness of drug testing as only 20.7% and 26% of them respectively disagreed or strongly disagreed that drug testing deters doping. The track athletes, swimmers, hockey and basketball players they surveyed were not as confident as 40% of them disagreed or strongly disagreed that drug testing had deterred athletes from using drugs. The majority of the athletes still agreed or strongly agreed that doping can be controlled via testing. The numbers quoted above, however, do suggest there is a sizable portion of athletes that are not convinced that testing dissuades drug
use. Within this group there may be athletes who are using drugs such as human growth hormone that are not detectable by the current methods of drug testing. Others in this group may either believe they can use masking agents, etc. to confound drug tests if they are selected or believe they will never be selected for drug testing in the first place. What this suggests is that something more than testing is probably required to deter athletic drug use in the CIAU.

**Drug Education**

Education is one method that is also often used to reduce the incidence of drug use. The benefits of implementing a drug education program are numerous. First, on average it costs less to educate an individual about drug use than it does to test him or her for drugs (Tricker & Cook, 1990). Second, drug education is less costly time wise as more people can be educated at one time than could feasibility be tested in a similar amount of time. Third, drug education, unlike testing programs, is not necessarily punitive in nature. Unfortunately, the goal of many athlete drug education programs is to control doping by imparting a fear of drug-induced health problems (Marcello, Danish & Stolberg, 1989). Fear is a poor motivator of behaviour change (Goldberg et al, 1991; Job, 1988). Fortunately, drug education programs that focus on decision-making, handling peer pressure, learning drug-free alternatives to doping, and other positive and constructive methods of changing behaviour are available (Allemeier & Filsinger, 1994; Marcello, Danish & Stolberg, 1989).
The time to implement a drug education program is before drug use occurs. Regrettfully, drug education is often not deemed necessary until it is established that a large portion of the target group is currently using drugs and alcohol. (Anderson, 1991; Bachman & O' Malley, 1989; Blood, 1990; Selby, Weinstein & Bird, 1990; Smart, 1989; Winters, 1992; Woolley, 1986). The problem with measuring current rates of drug use when assessing the need for drug education is that drug use is a sensitive topic. Many individuals may not be compelled to respond honestly about their current rate of drug use. As a result, surveys of current drug use may underestimate the number of individuals using drugs and therefore underestimate the need for drug education (CCDS, 1993; Harrison, Haaga & Richards, 1993; Newman, 1988).

How does this all relate to the development and effectiveness of the CIAU's drug education program? A brief review of the history of the CIAU's mandatory drug education program shows that originally the CIAU developed its program based on the findings of an Ad Hoc committee formed by the CIAU Board of Directors. This Ad Hoc committee, created in May of 1987 was brought together "to address the practice of the CIAU testing university athletes for performance enhancing substances" (Diane St. Denis, June 7, 1995, personal communication). Based on this committee's review of the problem, a three phase program, including the development and implementation of a mandatory drug education program that would eventually be extended to all CIAU athletes by September 1989, was developed. Only recently, Spence and Gauvin (1994),
with the endorsement of the CIAU, completed a formal assessment of CIAU athletes' current use of recreational drugs (ie. tobacco, alcohol, marijuana, hashish, psychedelics, cocaine) as well as substances either banned or restricted by the CIAU. When asked to report their personal use of various banned or restricted substances, it was found that 17% of the athletes surveyed used "major pain medications" in the past year, 5.9% of the female athletes used weight loss products, 1.1% of the male athletes used anabolic steroids, 65% of all the athletes used caffeine, 1% of the male athletes used amphetamines, and 1% of all the athletes consumed barbiturates. Considering that most self-report data underestimates the actual rate of drug use, these findings would suggest that the CIAU is warranted in its efforts to provide drug education. Additional findings from this study, however, suggest that the manner in which the CIAU provides its athletes with drug education should be examined.

Spence and Gauvin (1994) found that over one third of the CIAU athletes they surveyed claimed their university does not offer athlete drug education programs. Perhaps some athletes misinterpreted the question because they call these sessions something other than drug education (ie."the video"). However, if a large proportion of CIAU athletes do not recognize the CIAU's mandatory education sessions to be drug education, it is possible that the program is not having the intended impact. At present the CIAU is working within strict limitations of time and money in order to provide its athletes with information about performance enhancing drugs and drug testing. Despite these limitations,
the CIAU is open to suggestions of alternative programs (personal communication, Diane St. Denis, Aug 14 1995).

As mentioned in the introduction, the Spence and Gauvin study (1994) provides evidence suggesting that the CIAU's drug education program should be investigated. Specifically the authors of this 1994 study suggested making changes to the marketing of the CIAU's program. No suggestions, however, were provided about what changes should be made to the content of the CIAU's drug education program to ensure that it would be recognized by CIAU athletes as drug education. Of course simply stepping in as an investigator and introducing new content into a drug education program without first finding out what type of assistance the athletes need and will accept would be a mistake. (Brannon & Feist, 1992; Elder, et al, 1994; Wilson & Olds, 1991). Therefore, the first step to take in improving the content of the CIAU's drug education program is to conduct a needs assessment.

**Needs Assessment**

The method of needs assessment that is used should not be simply a measure of current drug use as this type of measure typically underestimates the actual rate of drug use and consequently the actual need for drug education. Instead it is suggested that a measure of athletes' intentions to use performance enhancing drugs may provide a more accurate picture of CIAU athletes' need for drug education.
There are several benefits to assessing athletes' needs for drug education via their intentions to use drugs. The first is that groups who are not abusing drugs, but demonstrate an intention to try drugs in the future can be targeted for drug education before they cross the line between abstinence and abuse (Bell, 1988; Scheier, Newcomb & Skager, 1994). The second benefit is that individuals who are reluctant to accurately report their drug use may not be so reluctant to accurately report information that indirectly assesses their intentions to use drugs (Bradburn, et al, 1989; King, 1991).

The question remains: what variables should one measure in order to best predict athlete's intentions to use performance enhancing drugs? Some health educators and sport psychologists have turned to attitudinal measures to predict future drug use, rather than simply measuring current drug use when determining program need (Chng & Moore, 1990; Marcello, Danish and Stolberg, 1989; Martin & Anshel, 1991). However, it has been found that attitudes alone do not predict behaviour as well as other methods that combine attitudes with other psychological variables (Ajzen, 1985; Godin, 1993; McCaul et al, 1993; Netemeyer, Burton & Johnson, 1991; Pompo, 1991). Two such variables are subjective norms and perceived control.

The Theory of Planned Behaviour

Evidence to support the measurement of attitudes, subjective norms, and perceived control in order to more accurately predict behaviour can be found in
one of the recent attitude change theories in social psychology, Ajzen's "Theory of Planned Behaviour" (1985).

The TPB is actually an improved version of an earlier social psychology theory (ie. the Theory of Reasoned Action). Similar to the Theory of Reasoned Action, the TPB measures individuals' perceptions of social norms, or beliefs about what significant others feel they should do, as well as attitudes towards a specific behaviour. This combination of attitudes and subjective norms is referred to as one's "behavioural intention". For example, consider a CIAU football player who believes steroids will enhance his performance (ie. positive attitude); believes his coach would want him to "win at any cost"; believes in respecting his coach's wishes, and wants his coach's approval (ie. subjective norm). The combination of this player's positive attitudes towards steroids and his subjective norm that respected individuals in his environment are pro-drug use, suggests that this player will experiment with anabolic steroids.

Behavioural intentions which, as was described in the preceding example, are based on a combination of attitudes and subjective norms, can be used to predict behaviour with some degree of accuracy (Salazar, 1991; Shaver, 1987). A measure of behavioural intention that only takes into account an individual's subjective norms and attitudes, however, is limited to predicting volitional behaviour (ie. behaviour that is under one's direct control). In some instances extenuating circumstances limit personal control over actions. This in turn limits ability to act upon one's intentions.
In the process of developing a theoretical model that could account for the influence of extenuating circumstances on behaviour, Ajzen, in 1985, added a third measure, "perceived control" to a pre-existing measure of attitudes and subjective norms. His new theory, named the TPB, has since been found to be a more reliable measure of health and exercise behaviour than the theoretical model that it was based upon (Ajzen, 1985; Blue, 1995; Godin, 1993; Godin, Valois & Lepage, 1992; McCaul et al, 1993; Netemeyer, Burton & Johnson, 1991; Pompo, 1991). The success of Ajzen's TPB rests in the fact that his theory can account for more variability in individual behaviour because it measures a person's level of perceived control as well as one's attitudes and subjective norms in relation to the target behaviour. In Ajzen's own words, the concept of perceived control "refers to the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1988; p.132).

Generally, the more "favourable" an individual's attitudes and subjective norms are towards a behaviour, the more likely it is that the person will act out the intention. Furthermore, the more control individuals believe they have over their ability to perform a behaviour, the more likely it is that they will act on their intentions to carry out that behaviour. Using the example of the CIAU football player again, the TPB would predict that the more he believes the benefits of doping outweigh the consequences (ie. favourable attitude), and the more he believes that his coach, peers, family and/or friends support winning at any cost
(ie. favourable subjective norm), the stronger will be his intention to take performance enhancing drugs. Furthermore, if this same football player believes he knows how to use performance enhancing drugs (ie. has the ability), believes he has contacts who can supply him with drugs (ie. has the resources or opportunity) and likewise believes he can avoid testing positive for performance enhancing drugs (ie. can overcome anticipated impediments), the more likely it is that he will take drugs. In other words, this athlete has a high level of perceived control. If, however, this same football player believes the consequences of doping outweigh the benefits (ie. negative attitude); believes his coach, peers, family and/or friends place as much importance on achievement of personal bests as they place on winning (ie. negative social norm); believes he is not in contact with any sources of drugs (ie. has not the resources or opportunity); and believes that drug testing programs do catch athletes who break the rules (ie. cannot overcome impediments), then the TPB would predict that this athlete would not form an intention to try performance enhancing drugs. From both these examples it should be apparent that attitudes and subjective norms deal with an individual's willingness to try a behaviour, whereas perceived control deals with what type of perceived barriers must be overcome and what opportunities and resources are believed to be necessary for successfully performing the behaviour (Ajzen, 1988).

Ajzen (1988) contends that a special relationship exists between perceived control and behaviour (see Figure 1). Perceived control, as in the
Figure 1. Ajzen's model of the Theory of Planned Behaviour.
(In Ajzen, 1988; p. 133)
example mentioned above, can operate through intentions to influence behaviour. In some cases, perceived control accurately represents actual control or the realistic barriers that bar individuals from acting on their intentions. Under these circumstances, perceived control alone can predict behaviour, even if one's intentions are favourable. For example, even if the hypothetical football player possesses attitudes and social norms that are in favour of taking performance enhancing drugs (that is he intends to take drugs), the model would predict that he is not likely to take drugs if he does not believe he can obtain drugs. This prediction will of course hold true if there actually are no drugs available to him (ie. actual barrier). This relationship is represented by the lighter arrow in Figure 1. The perceived barriers, that in this case represent actual barriers, overrule the influence of intentions on behaviour (Ajzen, 1988).

In the move from descriptive research to more theory-driven investigations, researchers in the area of health promotion and exercise adherence have increasingly relied upon the TPB to guide their research. Health promoters may not have done extensive work in the area of performance enhancing drug use, but they have conducted a great deal of research in the area of recreational drug use. For example, the TPB has recently been used to predict marijuana, cigarette and alcohol use. (Ellickson, Bell & Harrison, 1993; Ellickson, Bell &McGuigan, 1993; Pompo, 1991; Traeen & Nordlund, 1993). Sport psychologists, specifically researchers in the area of exercise adherence, have likewise examined the ability of the TPB to predict behaviour. Most recently
this theory has been used to predict adherence to exercise programs (Courneya, 1995; Horne, 1994; Robinson, 1992; Rodgers & Brawley, 1993; Theodorakis, 1994; Wankle & Mummery, 1993; Wankle et al, 1994). In one particular study, the TPB was used to predict the adherence of young competitive swimmers to their training programs (Theodorakis, 1994).

The majority of researchers examining the area of performance enhancing drug use, unfortunately, have not used theory to guide their research (Chng & Moore, 1990; Gaskins & deShazo, 1985; King, 1991; Overman & Terry, 1991; Radford, 1992; Schnieder & Morris, 1993). Given the scarcity of theory-based research in the area of performance enhancing drug use, it may be necessary to look at areas outside the realm of the performance enhancing drug literature for a suitable theory to explain and predict performance enhancing drug use. One possibility is to use a social psychological theory such as the TPB that is proven to be a useful tool for predicting behaviour in both the studies of recreational drug use (Ellickson, Bell & Harrison, 1993; Ellickson, Bell & McGuigan, 1993; Pompo, 1991; Traeen & Nordlund, 1993) and exercise adherence (Horne, 1994; Robinson, 1992; Rodgers & Brawley, 1993; Theodorakis, 1992; 1994; Wankle & Mummery, 1993; Wankle et al, 1994).

The reasons given for taking recreational drugs can be quite different from the reasons given for taking performance enhancing drugs (Anshel, 1990; King, 1991; Spence & Gauvin, 1994). And even though the TPB can be used to successfully predict exercise adherence among both casual exercisers and
young competitive athletes, it still needs to be determined if this theory can be successfully used to predict performance enhancing drug use of adult competitive athletes.

Habit and Self-Esteem

In general, the TPB appears to be a reliable measure of both volitional behaviour and behaviour that is not directly under one's control. It has been suggested, however, that the TPB's predictive ability could be improved if a measure of habit strength was included (Charng, Piliavin & Callero; 1988; Dennis, 1993; Godin, Valois & Lepage, 1993; Maddux, 1993). It has also been suggested that measures of self-esteem, in addition to attitudes and subjective norms, are important to consider when predicting drug use (Canadian Centre for Drug-free Sport (CCDS), 1994; Laflin & Moore-Hirsch, 1994).

Habit, as it will be discussed here, can be defined as both "a behaviour pattern acquired by frequent repetition"and as "an addiction" (Merriam-Webster, 1994, p.320). When habit is looked at as a 'behaviour pattern", a relationship can be seen between the concepts of habit and perceived control. Perceived control reflects an individual's perception of the ease or difficulty with which a particular behaviour can be performed (Godin, Valois & Lepage, 1993; Maddux, 1993). Behaviours that have become habitual (ie. behaviours that have been performed repeatedly in the past) are likely to be considered easy to perform and hence produce a high rating of perceived control. To return to the example
of the CIAU football player, if he repeatedly used drugs in the past to enhance his performance, and he was asked to rate his perceived control over using performance enhancing drugs in the future, chances are he would rate his level of control to be very high.

This example brings up another important point about measuring habit strength. Habit strength is probably not useful in predicting behaviour unless one's subjects have prior experience with the behaviour being measured (e.g., drug use) (Courneya & McAuley, 1994; Dennis, 1993; Godin, Valois & Lepage, 1993; Maddux, 1993). For instance, one would expect that the correlation between habit strength and intentions to use drugs would be higher within a sample of experienced drug users than it would be within a sample of non-users.

Research in the area of exercise adherence has found that while habit is related to the concept of perceived control, perceived control ratings do not completely account for the effects of habit on behaviour (Godin, Valois & Lepage, 1993; Maddux, 1993; Valois & Shepard, 1986). In fact, depending on the strength of the habit, habit may have an overriding influence on behaviour in much the same way as perceived control can override the influence of attitudes and subjective norms on behaviour (see Figure 2) (Godin, Valois & Lepage, 1993; Maddux, 1993).

Consider, for example, the role of habit in recreational drug abuse, cigarette smoking and alcohol consumption in particular. Several studies have found that habit strength, unlike the other variables they looked at (i.e. self-
Figure 2. Ajzen's model of the Theory of Planned Behaviour and the added variables of Self-Esteem / Body Image and Habit Strength. (Adapted from Ajzen, 1988; p. 133)
efficacy, social support), had a direct role in predicting smoking behaviour (Barnes, Vulcano & Greaves, 1985; Borland & Owen, 1991; Forster, 1990; Dennis, 1993). In all likelihood, these studies reflect habit defined in terms of "an addiction". Habit, or addiction, is probably an important antecedent of athletic drug use as many of the performance enhancing drugs that athletes use can be addictive. Stimulants such as amphetamines and caffeine are known for being physically addictive (Adalf & Smart, 1992; Ivy, 1984; Tarnopolsky, 1994). Similarly, anecdotal reports have shown that steroid users can become "psychologically addicted" to the euphoria produced by steroids and/or the improved body image created by increases in muscle size and strength (Allnut & Chaimowitz, 1994; Brower, 1993, 1992; Lefavi, Reeve & Newland, 1991; Rogal & Yesalis, 1992; Wang & Yesalis, 1994).

Self-esteem, unlike habit, may not have as profound an influence on drug use. Recent studies examining the relationship between self-esteem and recreational drug use have produced conflicting results. Singh and Mustapha, (1994) found that low self-esteem was characteristic of drug using students in Trinidad and Tobago, whereas Zapata and Katims, (1994) found no significant relationship between drug use and self-esteem among students in Mexico. Taylor and del Pilar (1992) found increased drug use was correlated with low self-esteem in 16-43 year old males, whereas Comier and Rochon, (1988) found no relationship between self-esteem and drug use for either gender in their sample of 15-25 year olds. There have been researchers who have found a link
between low self-esteem and drug use among heroin addicts (Motti, 1993) and adolescents in drug rehabilitation programs (Colwes, 1993). While at the same time there have been researchers who have not been able to find such a relationship between self-esteem and drug use amongst older adolescents (Levinson, 1993) and adult children of alcoholics (Bailey, 1993).

After examining the inconsistencies in the literature, Schroeder and Laflin (1993) concluded that their review of the research could provide no support for the current practice of emphasizing self-esteem enhancement in drug education programs. Perhaps this is true of programs geared towards reducing recreational drug use. The question of whether or not low self-esteem is indicative of performance enhancing drug use remains to be investigated.

Research conducted in the area of self-esteem and performance enhancing drug use is primarily limited to the study of self-esteem and anabolic steroid use. Like the studies that examined recreational drug use, studies of self-esteem and steroid use have produced conflicting results. Both Evans, Weinberg and Jackson (1992) and Carr (1993) found no significant differences in the self-esteem of college athletes who use anabolic steroids and those who do not. Whereas Anshel (1993), Brower, Blow & Hill (1994) and a body image study conducted on behalf of the Canadian Centre for Drug-free Sport (CCDS) found that performance enhancing drugs are often used to make up for a lack of self-esteem exhibited as poor body image and/or a fear of failure.
Poor body image, as opposed to a desire to improve performance, might be the more common of these two reasons for using steroids. Melnick and Mookerjee (1991), found that individuals who improve their muscle size and strength via weight training are more likely to experience high levels of self-esteem and body satisfaction than similar individuals who do not weight train. For some people, the need to be “big”, to maintain a large, muscular physique can become “psychologically addicting”, eventually leading to steroid use. (Lefavi, Reeve & Newland, 1991; Rogal & Yesalis, 1992). This need, in fact, can be so strong among steroid using male body builders that they develop a psychosis called ‘reverse anorexia” or “a fear of being small” (Pope, Katz and Hudson; 1993).

In addition to poor body image, athletes with low self-esteem have also been found to exhibit “a fear of failure” (Anshel, 1993). As one would expect, winning tends to have a positive effect on self-esteem (Gould, Jackson & Finch, 1993). For athletes who lack self-esteem, winning may become one of the few sources, if not the only source from which they “derive their self-image” (Anshel, p.18, 1993). These athletes may eventually fear defeat to such an extent that they will do whatever it takes to win. Even if that means compromising their health by taking drugs (Frankle & Leffers, 1992; Radford, 1993; Van Helder, Kofman & Tremblay, 1991). This concept is what is often referred to as a “win at all cost” attitude. It is an outlook that can lead to hollow victories made possible
by performance enhancing drugs rather than the athletes' own innate abilities, thus robbing them of the boost to their self-esteem they were originally seeking.

As the preceding discussion has shown, habit, and to a lesser degree self-esteem, may be useful in predicting performance enhancing drug use. The main focus of the present investigation is still to determine the role of attitudes, subjective norms, and perceived control, in other words the role of the TPB, in predicting athletic drug use.

**Attitude and Behaviour Change via The Theory of Planned Behaviour**

An understanding of how to deal with athletic drug use will greatly improve if a set of variables that will reliably predict athletes' intentions to use performance enhancing drugs is identified. Then the intention to use drugs among male CIAU football, wrestling, swimming, ice hockey and track & field athletes, and their needs in regard to drug education can be better assessed. Before a new CIAU drug education program is developed it will be necessary to first establish whether behavioural intentions and even actual behaviour can be changed by changing attitudes, subjective norms, and perceived control. Subsequently, methods for changing attitudes, subjective norms, and perceived control within a drug education program must be found.

**Manipulation of the TPB Variables.** Although it has been shown that measures of subjective norms, attitudes, and perceived control can be used to accurately predict behavioural intentions and/or actual behaviour, few health or
psychology researchers have implemented education programs that address all three variables in order to create behaviour change. Project ALERT, a program designed to change adolescences' drug using behaviours, is one of the few recent studies that not only addresses subjective norms, attitudes and perceived control as part of its education plan, but also successfully changes behaviour (Ellickson, Bell, & Harrison, 1993; Ellickson, Bell & McGuigan, 1993). Other investigators have had more limited success trying to change subjective norms, attitudes and perceived control to change job-search intentions (Van Ryn & Vinoker, 1993) and fat intake (Paisley, Lloyd & Mela, 1993).

**Manipulation of Subjective Norms.** Many behaviour-change studies involve the manipulation of only one or two of the TPB variables (ie. norms, attitudes, control). Recent studies examining the effects of altering only subjective norms have found this variable to be useful in changing alcohol use (Donaldson, Graham & Hansen, 1994), eating habits (Kleppe & Wilhelmsen, 1993) and smoking behaviours (Bruvold, 1993) in adolescent populations. Social norms have also been found to be vital in the process of increasing condom use (Ross & McLaws, 1992), and in decreasing fat-intake (Paisley, Lloyd & Mela, 1993) in adult populations.

**Manipulation of Attitudes.** Current studies of the effects of attitude-change on behaviour have produced varied results. Some of the behaviours that have been positively changed via attitude-change programs include the use of AIDS prevention methods (Flowers & Millar, 1994; Ritchies & Getty, 1994), the
use of seat-belts (Trafimov & Fishbein, 1994), and the rate of child abuse (Huxley & Warner, 1993). Some researchers choose to determine the effectiveness of their program based upon it's effect on behavioural intentions rather than actual behaviour. Among these studies are several attitude change programs that have successfully altered subjects intentions to use alcohol and marijuana (Stacy & Bentler, 1994), to drink & drive (Wodarski, 1994), and to use cigarettes (Powell, 1993).

**Manipulation of Attitudes and Subjective Norms.** Some investigators have chosen to follow the Theory of Reasoned Action (Ajzen & Fishbein, 1975) rather than the TPB and alter only attitudes and subjective norms in order to change behavioural intentions or both intentions and actual behaviour. Some of the behavioural intentions that have been altered via education programs aimed at changing both attitudes and subjective norms include; intentions to support food irradiation (Sapp & Harrod, 1994), intentions to use alcohol (Bochner, 1994; Harmon, 1993), intentions to use sunscreen (Rothman & Salovey, 1993), and intentions to engage in “HIV risk-reducing behaviors” (Grossberg et al, 1993). Actual cigarette use in addition to intentions to use cigarettes have also been successfully altered via an education program that focused on attitudes and subjective norms (Sanders, Peveler, Mant & Fowler 1993).

So far only education programs that have successfully changed behavioural intentions or both intentions and actual behaviour via changes in attitudes and/or subjective norms have been mentioned. It is important to note
that many education programs, primarily those that examined the long term
effects rather than just the short term effects of their programs, have failed to
produce significant changes in either behavioural intentions or actual behaviour
(Bell & Ellickson, 1993; Bellingham & Gilles, 1993; Wiener & Pritchard, 1993).
According to Ajzen's TPB (1985), the downfall of these studies might lie in the
fact that the behaviours these unsuccessful researchers were trying to change
were not (at least in the long term) completely under the subjects' control.
Something other than the subjects' attitudes and subjective norms, something
that the subjects themselves could not control, was obstructing their choice to
engage in the target behaviour. In order to account for behaviours that are not
directly under one's control, Ajzen (1985) developed the TPB.

**Manipulation of Perceived Control.** As explained earlier, the TPB
accounts for not only attitudes and subjective norms, but also for perceived
control, or the perception of how easy or difficult it would be to in engage in a
particular behaviour (Ajzen, 1988). In addition to Ajzen (1988), many other
researchers, especially in the area of exercise adherence, have come to
recommend changing subject's perceptions of control, in addition to changing
their attitudes and subjective norms, in order to change behaviour (Brawley,
1993; Ellickson, Bell & McGuigan, 1993; Ellickson, Bell & Harrison, 1993; Horne,
1994; Rodgers & Brawley, 1993; Theodorakis, 1992; 1994; Wankle & Mummery,
1993; Wankle et al, 1994).
Many recent studies have found that increasing perceived control results in positive changes to behavioural intentions and even actual behaviour. For instance, researchers have manipulated perceived control to produce changes in post-operative stress (Breemhaar & Vanden Borre, 1991), asthma attacks (Tehan & Sloan, 1989), use of safe-sex methods (Terry & Galligan, 1993), drug control problems (Eggert & Thompson, 1994), recreational drug use (Jensen et al, 1993), frequency of colorectal cancer screening (Myers et al, 1994), and intentions to attend health checks (Norman & Conner, 1993).

Considering the evidence presented so far, it is assumed that changing subjects' attitudes, subjective norms and perceived control will lead to behaviour change. Furthermore, it is proposed that changing male CIAU football, wrestling, swimming, ice hockey and track & field athletes' attitudes, subjective norms and perceived control regarding performance enhancing drug use will reduce the number of CIAU athletes in these activities who intend to use drugs and perhaps the number of these athletes who will actually use drugs.

Selecting Appropriate Drug Education Programs

Before a method for changing male CIAU football, wrestling, swimming, ice hockey and track & field athletes' attitudes, subjective norms and perceived control is selected it is important to first determine if these CIAU athletes are sufficiently interested in attending drug education and if the education program that is selected is appropriate to their needs (Fodor, Dalis & Giarrantano, 1995).
Male CIAU athletes' level of interest in drug education has already been established. Spence & Gauvin (1994), found that of the male CIAU athletes who answered their survey, 61.2% agreed and 21.7% strongly agreed that the CIAU should provide drug education for its athletes.

To ensure the selection of drug education programs that are appropriate to the needs of male CIAU football, wrestling, swimming, ice hockey and track & field athletes, program selection should be made on the basis of how likely these CIAU athletes are to use performance enhancing drugs (Anshel, 1990; Chng & Moore, 1991; Greenberg, 1989; Gridley & Hanrahan, 1994). Athletes can be considered at-risk if they possess pro-drug use attitudes, believe that individuals that are close to them feel they should take drugs and are likely to comply with those individuals, and/or perceive they have little control over their choice to resist taking drugs. Athletes that fall into the high to very high risk categories will require different education programs from those in the low to moderate risk categories (Bell, 1988; Chng & Moore, 1991; Toohey, Dezelsky & Baffi, 1982). Evidence suggests that low to moderate risk groups may be convinced to remain abstinent through information about potential side-effects, as well as the reinforcement of the moral issues attached to drug use (Toohey, Dezelsky & Baffi, 1982). High to very high risk groups who are predisposed to using drugs may become more apt to use drugs following an information session on substance abuse (Chng & Moore, 1990; Hanson, 1982; Kinder, Pape & Walfish, 1980). If they are already using drugs, they typically have a great deal of
knowledge about the potential side-effects of drug use and nevertheless are willing to accept the risks (Van Raalte et al. 1993). Drug education that focuses on how to “get-off” drugs and drug-free alternatives (ie. nutrition, mental training) are therefore more appropriate for these groups than information sessions (Chng & Moore, 1990).

The selection of an appropriate drug education program may be based on more than a measure of the number of athletes that are at-risk of using drugs. An assessment of which variables (ie. male CIAU football, wrestling, swimming, ice hockey and track & field athletes' attitudes, subjective norms and perceived control) best predict self-reported drug use and/or intentions to use drugs will provide additional information about what a CIAU drug education program for these athletes should focus on changing. Examples of methods for changing each variable will be discussed individually.

**Changing Subjective Norms.** Subjective norms reflect both an individual's perception of social pressure to perform a particular behaviour as well as an individual's motivation to comply with the social norm (Ajzen & Fishbein, 1975). Several methods have been used in recreational drug education programs to combat the influence of subjective norms (Goodstat, 1989; Hansen, 1988; Powell, 1993; Stacy & Bentler, 1994; Wodarski, 1994). In the context of athletics, subjective norms could be challenged by providing evidence that drug use is not as prevalent as expected and therefore the pressure to take drugs because the competition does is not as strong as athletes
might expect (Anshel, 1994). Peer resistance skills (Walsh, et al 1994; Danish, Marcello and Stolberg, 1989) and peer teachers (Anshel, 1991; Grossman, 1994; Walsh, et al 1994) might also be used to combat performance enhancing drug use. The major source of social pressure to take performance enhancing drugs, however, may come from the coach (Anshel, 1993). In which case, it is very important that the coach be involved in any drug education program, that he or she adapts a philosophy of “zero tolerance” towards drug use, but at the same time he or she is provided with the skills to recognize and compassionately deal with doping on his or her team (Anshel, 1993; Figved, 1992; Radford, 1992).

**Changing Attitudes.** Pro-drug attitudes are often challenged by increasing the target populations’ perception of risk and perceived susceptibility to drug related harm (Bailey, Flawelling & Rachal, 1992; Frankle & Leffers, 1992; Goldberg et al, 1990; Marcello, Danish & Stolberg, 1989). As discussed earlier, athletes at low to moderate risk of using performance enhancing drugs may be persuaded to remain abstinent if presented with information about the risks and potential side effects associated with drug use (Toohey, Dezselsky & Baffi, 1982). Athletes at high to very high risk would not be so easily dissuaded. An alternative approach may be to address attitudes such as the “win-at-all-cost” attitude by encouraging coaches and teams to recognize personal bests and similar accomplishments in addition to winning (Anshel, 1993; CCDS, 1993).

**Changing Perceived Control.** Increasing perceived control via skills training generally falls into three categories: training in drug resistance skills,
training in coping-skills and training in alternatives to drug use (Anshel, 1993; Black & Smith, 1994; Carr, 1993; Colby & Rice, 1994). Drug resistance skills that have been taught in athlete drug education programs include assertiveness skills, peer refusal skills, and decision-making skills (Marcello, Danish & Stolberg, 1989). At least one drug education program has implemented coping skills training and "self-esteem strategies" in order to enable athletes to take control over stress in their competitive lives without resorting to drugs (Carr, 1993). Alternative drug-free methods of improving performance that might be taught to athletes in a drug education program include mental skills training, training in proper nutrition, and strength training (Allemeier & Filsinger, 1994).

Selection of a Measurement Tool

The previous literature review supports that (1) subjective norms, attitudes and perceived control can predict behavioural intentions and actual behaviour; (2) by altering these three variables behavioural intentions and, in some cases, actual behaviour can be changed; and (3) education methods exist for changing athletes' subjective norms, attitudes and perceived control regarding performance enhancing drugs. What is now needed is a measure of male CIAU football, wrestling, swimming, ice hockey and track & field athletes' attitudes, subjective norms, perceived control, self-esteem and habits pertaining to performance enhancing drugs. In other words a measure must be found that
can be used to test the effectiveness of using the TPB (plus other related variables) to predict athletes' intentions to use performance enhancing drugs.

Attitude measures that focus on recreational and/or performance enhancing drugs do exist for college athlete populations. Many of these, however, were tested using small sample sizes (ie n > 35) (Gaskins & de Shazo, 1985; Overman & Terry, 1991), contained only one or two questions about attitudes towards drug use (Radford, 1992; Schnieder & Morris, 1993), were created as a short form of a larger questionnaire, but were never piloted before being used (Marcello, Danish & Stolberg, 1989), or were not tested following their development (King, 1991). One survey developed by Corbin et al, (1994), contains some interesting questions about attitudes and social norms related to anabolic steroid use, perceived barriers to obtaining steroids and actual use of steroids. Since this questionnaire only contains one or two questions on each topic, and only offers subjects the opportunity to answer true or false, it unfortunately provides a limited amount of information.

The unnamed questionnaire developed by Chng and Moore (1990) does not have any of the shortcomings of the questionnaires described above. It measures knowledge, attitudes and subjective norms surrounding anabolic steroids, it was developed using university athletes, and it has been found to differentiate between steroid users and non-users. The internal reliability consistency of the questionnaire was found to be .70 for the knowledge subscale, and .88 for the attitude subscale. Unfortunately, it, unlike the next
questionnaire to be discussed, has not been translated into French and tested with French speaking athletes. This is an important consideration as the purpose of this study is to create a measure of attitudes, subjective norms and perceived control that can be used with both English and French speaking CIAU athletes across Canada. The Chng and Moore questionnaire also does not contain items related to self-esteem or habit.

The NSYA. At present there are no published inventories specifically designed to measure the attitudes of CIAU athletes towards performance enhancing drugs. There is, however, a solution to this measurement problem. Recently, the Canadian Centre for Drug-free Sport (CCDS) developed and tested “The National Survey of Youth’s Attitudes Towards Performance Enhancing Substances” (NSYA) to assess the knowledge, attitudes, subjective norms, and behaviour of Canadian high school athletes and non-athletes towards performance enhancing drugs, particularly anabolic steroids. This questionnaire has not been tested with a college athlete population and does not possess questions related to perceived control or intentions. As will be discussed next, however, “The National Survey of Youths Attitudes Towards Performance Enhancing Substances” does have several features that fit the needs of the present investigation.

The “National Survey of Youths’ Attitudes Towards Performance Enhancing Substances” (herein referred to as the NSYA) was created in consultation with numerous experts in the field of athletic drug use. Following the
pilot test, the NSYA was administered to a sample of over 16,000 Canadian male and female athlete and non-athlete, French and English speaking high school students. The questionnaire was found to distinguish between steroid users and non-users, males and females, and athletes and non-athletes.

Questions were divided into four categories: demographics, knowledge, attitudes (including subjective norms and self-esteem/body image) and behaviours (ie. frequency of drug use or habit). Students' positive and negative responses to 22 attitude questions were tabulated. Based on the number of positive responses, each student was placed in one of five “risk categories”: very high, high, moderate, low, very low. It was assumed that the more positive a student's attitudes were towards steroid use, the higher the risk that they would use steroids (Canadian Centre for Drug-free Sport (CCDS), 1993).

Attitudes and subjective norms which the experts who created the NYSA believe are related to performance enhancing drug use and which were subsequently measured by the NSYA include: a “win-at-all-cost” attitude (CCDS, 1994; Tricker & Cook, 1990, Tricker, Cook & McGuire, 1989), values surrounding cheating and punishment (CCDS, 1994; Greenberg, 1989; Radford, 1991), beliefs about the prevalence of drug use amongst peers and others (CCDS, 1994, Bell, 1988; Hansen et al, 1988; Radford, 1991; Spence & Gauvin, 1994), beliefs about the possibility of harm from drug use (Frankle & Leffers, 1992; Piniuk, 1975; Pope, Katz & Champoux, 1988) and beliefs about the effectiveness of drugs (ie. to enhance performance and looks) (Chng & Moore,
1990; Frankle & Leffers, 1992; Radford, 1991). Because the personality constructs of self-esteem and body image may also play a role in an individual’s choice to use steroids (CCDS, 1992; Pope, Katz & Hudson, 1993, Tonkin & Ronald, 1990), these constructs were measured as well.

Additional Variables Associated With Drug Use

Up until now the main focus of the present research has been on the relationship between attitudes, subjective norms, perceived control and intentions to use performance enhancing drugs. However, current research (albeit self-report data and hence subject to errors of under- and over-reporting) suggests that other variables may be associated with drug use as well (Gloria & Roth, 1993; Pope, Katz & Champoux, 1988; Pope, Katz & Hudson, 1993). These variables include gender, sport, drug type and involvement in a regular weight training or body-building program.

Gender. In the study by Spence and Gauvin (1994), CIAU athletes were asked if they took performance enhancing drugs and their reasons for taking them. Major pain medications were the most frequently reported performance enhancing drug (17.7%), the majority of users being male athletes in the “other sport” category (including wrestlers) (30%) and football players (23.1%). Males subjects also reported the most anabolic steroid use (1.1%) and amphetamine use (1%). Other studies investigating the relationship between drug use and gender have revealed that males, more often than females report
using both recreational and performance enhancing drugs (Blood, 1990; Chng & Moore, 1991; Durant, Escobedo & Heath, 1995, Perlstadt, Hembroff & Zonia 1991; Robinson, Gloria & Roth, 1993; Selby, Weinstein & Bird, 1990; Tricker, O'Neil & Cooke, 1989). Males and females have also been found to differ in their preferences for drug education. Females, more often than males, report a desire to have drug education programs made available and are more likely to make use of such programs (Jensen, 1989; Spence & Gauvin, 1994).

**Sport.** The type of sport that an athlete engages in may also have an effect on his or her choice to use performance enhancing drugs. In sports such as football, wrestling and ice hockey where strength is an asset and sports such as swimming and track & field where power and speed are advantageous, athletes may be more likely to consider using muscle building drugs like anabolic steroids and human growth hormone (Burtsztyn; 1990; Dubin, 1990, Greenberg, 1989). In wrestling, athletes are constantly striving to keep their weight low while maintaining optimal muscle mass. In the drive to make a lower weight class, wrestlers may be tempted to use diuretics to shed water weight or stimulants to suppress their appetites (Burtsztyn; 1990; Dubin, 1990). Football and track & field athletes may also come to ingest stimulants such as amphetamines or ephedrine in order to delay fatigue, increase alertness or “sharpen their reflexes” (Burtsztyn, 1990; Corrigan, 1988; Ivy 1984) Athletes in long distance track & field events may use stimulants such as caffeine or doping
methods such as blood doping to extend their endurance (Burtsztn, 1990; Clarkson; 1993; Corrigan, 1988; Ivy 1984).

At least three Canadian studies provide evidence of drug use by Canadian university-aged athletes, and particularly males. In addition to the drug use cited above, Spence and Gauvin (1996) found that caffeine (although primarily used for recreational/social reasons) was reported by 62.5% of all males. A study by Clement (1983) of Canadian national level athletes found that 10% used stimulants. Laberge and Thibault (1990) found that 2.4% used ergogenic aids to enhance their performance. And the CCDS study using the NSYA found that of subjects 18 years or older 4.7% reportedly used anabolic steroids in the past year. For these reasons and others reasons mentioned above, university athletes in sports such as football, wrestling, swimming, ice hockey and track & field, the majority of which are male dominated sports, are being directly tested by the CIAU.

**Drug Type.** Availability and acceptability of ergogenic substances may also play a role in an athletes' choice to use performance enhancing drugs. Interestingly, the one “performance enhancing” substance most used in the CCDS's study was extra protein (e.g. protein powders, shakes, amino acid supplements, etc.). An important point about extra protein is that it is readily available and its use is not penalized. In some respects the same can be said of caffeine. Caffeine use is penalized only if a concentration more than 12 micrograms are found in the urine (CCDS, 1992). An approximate concentration
of only 6 to 9mg, however, has been shown to prolong endurance and in some cases increase performance during brief intense exercise (Clarkson, 1993; Spriet, 1995; Tarnopolsky, 1994; Trice & Haymes, 1995). Although excessive protein consumption is not as well known for producing ergogenic effects, it has, however, been recommended by Lemon (1995) that strength and endurance athletes can benefit from protein consumption beyond the recommended daily allowance. The most interesting point about these two substances is that they are both readily available and both are readily used by athletes (CCDS, 1992; Spence & Gauvin, 1996). For these reasons they may also be more readily reported providing a clearer indication of the athletes' willingness or intentions to use (or rather over-use) a substance to improve their performance. Of additional interest is athlete's use of protein powders as steroid replacers as it has been suggested that these substances could serve as a "stepping stones" to more powerful anabolic substances (Sobal & Marquart, 1994).

**Weight Training.** The list of anabolic substances would include such drugs as anabolic steroids. The association between weight training and anabolic steroid use, particularly in neighbourhood gyms and fitness centres, has been examined many times. Anabolic steroids do not improve strength unless taken in combination with a regular weight training program (Frankle & Leffers, 1992; Perry, Wright & Littlepage, 1992). Body builders and weight lifters are, therefore, an obvious subject group within which to analyse the effects of steroid abuse (Durant, Escobedo & Heath, 1995; Frankle & Leffers, 1992; Perry,
Wright & Littlepage, 1992; Pope, Katz & Hudson, 1993; Tricker, O’Neil & Cook, 1989). Some studies have sought to find differences in attitudes and drug use between weight lifters and non-weight lifters. Typically it is found that those who engage in a regular weight lifting program have more positive attitudes towards steroid use than their non-weight-lifting counterparts (Chng & Moore, 1991, Finkenberg & Teper, 1991).

Chapter Summary

To summarize, the existing literature suggests that the variables of attitude, subjective norms, perceived control, habit and self-esteem might best be used to predict CIAU athletes' intentions to use performance enhancing drugs. It also appears that an athlete’s gender, sport, choice of ergogenic substance, and involvement in regular weight training might be associated with intentions to use performance enhancing drugs. In order to test these assumptions with male CIAU football, wrestling, swimming, ice hockey and track & field athletes, the “National Survey of Youths Attitudes Towards Performance Enhancing Substances” was modified to produce a suitable measure of the TPB and other variables, for use with this university athlete population.
Chapter 3

METHODOLOGY

Subjects

Subject Selection. All potential subjects were selected using a stratified random sampling procedure by the CIAU from its data base of current CIAU athletes (see Appendix B for details). Respondents were viewed as a volunteer sample (i.e. athletes who freely choose to return their completed questionnaires). All athletes remained anonymous and were informed in writing of their right to withdraw at any time without jeopardizing their eligibility to compete. In order to obtain the most truthful responses, athletes were asked only to identify themselves by their gender, sport and approximate age.

An effort was made to select only male athletes from each of the five chosen sports (i.e. football, wrestling, swimming, ice hockey and track & field), the ten provinces and the large and small CIAU universities. Male CIAU football, wrestling, swimming, ice hockey and track & field athletes were selected for this study for several reasons. The purpose of this study was to examine the utility of using The TPB and the added variables of self-esteem / body image and habit strength to predict athletes' intentions to use performance enhancing drug use with the expectation that if a means could be found to explain and predict athletic drug use then it would be possible to create drug education programs specifically targeted to the needs of the athletes being educated.
Admittedly, the use of performance enhancing drugs such as anabolic steroids may be higher amongst non-competitive groups such as adolescent recreational bodybuilders. However, this population group was not investigated for three reasons. First, the main purpose of this study was to determine how well the TPB predicts intentions to use drugs to enhance performance. The reasons adolescent bodybuilders typically give for using drugs such as anabolic steroids center around issues such as body image, not athletic issues such as winning, losing or enhancing performance. In fact, according to Anshel (1990) "Athletes have a distinct psychosocial environment which engenders different attitudes, emotions and predisposing factors to drug use, than those of their non-athletic peers" (p. 5). Although an examination of adolescent bodybuilders may provide a great deal of data on non-performance enhancing reasons for using drugs such as anabolic steroids, this data would not help to answer the question of how to best predict specific intentions to use drugs other than anabolic steroids and intentions to use drugs to increase athletic performance more generally.

Another reason for studying CIAU athletes is that CIAU athletes, unlike other Canadian university athletes, must attend a drug education session each year to be eligible to compete. Therefore, there already exists a structure in which to implement the recommendations for drug education that are stated later in this study. Moreover, the CIAU itself is open to suggestions for modifications
to the program that currently exists. (Diane St. Denis, personal communication, August 14, 1995).

And lastly, the majority of CIAU athletes surveyed by Spence and Gauvin (1994) believe, as the CIAU and CCDS believe, that CIAU athletes should be randomly tested for drug use. In other words, CIAU athletes want something done about the drug use occurring in CIAU sport.

To recap, the CIAU is open to modifications to it's existing drug education program and CIAU athletes want something done about drug use in CIAU sport. It follows then, that CIAU athletes (as opposed to other athlete groups) should serve as subjects in a study whose ultimate goal is to create an athlete drug education program that can effectively reduce drug use. The scope of this study was reduced to only male CIAU football, wrestling, swimming, ice hockey and track & field athletes. This was done in order to increase the chances that subjects would report intentions to use and actual use of performance enhancing drugs. If none of the subjects had reported intentions to use drugs it would have been impossible to determine the utility of using the TPB to predict athletes intentions to use and actual use of performance enhancing drugs.

**Response Rate.** Of the 1000 surveys sent directly to the subjects’ homes, 188 or approximately 19% of questionnaires were returned. This rate of return was lower than the anticipated rate of 30%. It was also low as compared to similar mail out studies by Clement (1983) who achieved a 33% return rate from Canadian elite athletes and by Wagman, Curry, and Cook who received
60% of their questionnaires back from U.S. elite powerlifters. It may be because of the low return rates for mailed questionnaires concerning socially undesirable behaviors that the majority of drug use questionnaires have made use of classroom settings to administer their surveys. The low return rate in the current study, however, may have been the result of more than just the athletes' suspicions about the anonymity of the survey results. Some subjects may never have received their surveys in the first place. For the sake of anonymity all questionnaires were sent directly to the subjects' homes. Since a large portion of questionnaires were returned after the Christmas break it is possible to assume that many athletes' mailing address on file with the CIAU is their family home and not their residence during the school year. Therefore many athletes would not have received their questionnaires until they went home for Christmas. Those who did not go home would not have received it. The implications of this low response rate will be further addressed in the discussion section.

For a variety of reasons (i.e. incomplete data, instances of extreme ney or yeh-saying, reports by subjects that they are female) six of the returned questionnaires were not entered into the data. The remaining sample of 182 questionnaires represented approximately 18% of the sample population, 1.7% of the active male CIAU athlete population or 4.7% of the population of actively participating male football, swimming, wrestling, ice hockey and track & field athletes in the CIAU.
Instrument:

The Questionnaire

In the early 1990s the CCDS conducted a literature review to examine the prevalence of drug use in Canada. They found that very little research had examined the rate of performance enhancing drug use amongst Canadians and even less information had been accumulated about their attitudes towards drug use. In response to this paucity of information the CCDS consulted a panel of experts in the field of performance enhancing drug use and used their input to create a questionnaire. The end result was the “National Survey of Youths' Attitudes Towards Performance Enhancing Substances” a questionnaire designed to assess the attitudes, knowledge and behaviours of eleven to eighteen year old Canadian high school students towards performance enhancing drugs.

A pilot test involving three Canadian high schools was conducted using both the French and English versions of the survey. The flow and continuity of the questions, the suitability of the questions and concepts being used, and the internal-consistency reliability of the questionnaire was examined at this time. In each case the teachers in each class that was surveyed were responsible for administering the questionnaire. The pilot was, therefore, also used as an opportunity to test the efficiency of the questionnaire administration procedures.
Appropriate changes were made to the questionnaire and then, during the winter between 1992-1993, the Price Waterhouse research company, on behalf of the Canadian Centre of Drug-free Sport (CCDS) administered the NSYA to over 16,000 students, in 31 high schools across nine provinces. The general finding was that the older the student the more likely he or she was to use performance enhancing drugs and/or possess negative attitudes which would predispose him / her to drug use.

**Construct Validity**

Construct validity is not normally determined by a single test but by a series of tests (Aiken, 1991). In addition to tests of internal consistency and factor analysis (to be addressed later in this study), construct validity can be measured based upon the judgments of a panel of experts. If a panel of experts agree that the content of the test items relate to and will measure the construct being studied, the questionnaire can be said to possess some degree of construct validity (Aiken, 1991). Questionnaire items for the “National Survey of Youths’ Attitudes Towards Performance Enhancing Substances” (NSYA) were developed based upon the experience and knowledge of a panel of experts in the field of performance enhancing drug use. After independently reviewing the items, the panel agreed upon a set of 22 items which they believed would accurately measure Canadian high school students’ attitudes towards performance enhancing drugs. This type of questionnaire development, while it does not guarantee that the NSYA measures the constructs it was designed to
measure with 100% accuracy, it does suggest a moderate degree of construct validity.

**Questionnaire Modifications**

The main purpose of this investigation was to test the ability of the TPB, and the variables self-esteem / body image and habit strength to predict CIAU athletes' intentions to use performance enhancing drugs. It has been suggested that the "National Survey of Youths' Attitudes Towards Performance Enhancing Substances" (NSYA) could be modified to suit this purpose. Specifically, in order to test the TPB questions relating to perceived control had to be added. Other changes were, of course, required to make the questionnaire suitable for a university athlete population. Appendix 1 contains the list of variables that were measured in this study as well as the list of changes that were made to the NSYA to produce "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances" used in the current research.

**Procedures:**

**Phase I**

Before the questionnaire could be administered to the university population a number of modifications had to be made. These changes have been described in Appendix 1. Once modified, "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing
"Substances" was piloted to examine the face validity of the questionnaire and to test the appropriateness and clarity of the wording.

The UBC Thunderbird Athletic Council is composed of male and female, CIAU and non-CIAU athletes, each of whom has been voted by a specific team to represent that team on the Council. Ten subjects were notified of the pilot study by mail and by the chair of the UBC Thunderbird Athletics Council. Five male CIAU athlete members of the Thunderbird Athletic Council, between the ages of 19 and 28, from a mixture of team, individual, contact and non-contact CIAU sports were used to pilot the questionnaire. Participants were selected on a volunteer basis only. Subjects remained anonymous and were informed of their right to withdraw at any time without jeopardizing their eligibility to compete. Because no subjects in phase I were to be used in phase II, subjects in phase I were informed not to fill out the questionnaire again if they received it as a result of the phase II mail out.

Athlete subjects in the pilot project were mailed the same questionnaire package used in the second phase of the study, with one addition. Subjects in the pilot project received a worksheet that asked them to indicate how long it took to complete the survey, which questions were awkward to read, which questions they thought other university athletes would have difficulty understanding and which questions they felt should be added (Oppenheimer, 1991) (see Appendix 3).
In general, the athletes were satisfied with the questionnaire's wording and content. However, the way in which the 28 items in question 5 were structured, so that some questions were worded negatively and some positively, did cause some concern. Some athletes felt this structure would confuse their peers. Since this form of wording was done to encourage subjects to read the questions and reduce the incidence of extreme responding it was decided to leave question 5 as it was written. Based on the athletes' other responses, the statement "for non-medical reasons" was added to item 25 to create the question "Using anabolic steroids for non-medical reasons should be against the law". Similarly the phrase "only a few" was replaced in the items "Only a few Olympic athletes use drugs...." and "Only a few university athletes use drugs...." with the phrase "Only a small percentage". The recommendation to change "Most people my age are better liked than me" to "Most of my peers are better liked than me" was similarly acted upon.

**Phase II**

Phase II was similar to phase I, the difference being that Phase II was conducted on a larger scale, and no participants from Phase I were subjects in Phase II. Twenty-five percent of all active male CIAU football, wrestling, swimming, ice hockey and track & field athletes between the ages of 19 and 28 from CIAU institutions across Canada were randomly selected, by computer, by the CIAU, to receive a copy of "The CIAU Modified Version of the National
Survey of Youths' Attitudes Towards Performance Enhancing Substances" (see Appendix B for the sampling procedures).

The administration procedures used were the same as those steps outlined in Phase I, but excluding those questions used to determine the clarity and appropriateness of the questionnaire. To ensure anonymity and to ensure only the investigator and co-investigator saw the completed questionnaires, all surveys were sent to the subject’s home address.

Upon completing the questionnaire, subjects were asked to seal their questionnaire in the self-addressed stamped envelope provided, to not put any identifying marks on the envelope, and to return it promptly to the co-investigator. Three weeks after mailing the questionnaire, a reminder notice was sent out to all subjects by the CIAU on behalf of the co-investigator.

**Hypotheses**

Based on the literature and procedures cited earlier, hypotheses were made.

1) It is predicted that a confirmatory factor analysis of the items in Question 5 will uphold the predicted four factor model consisting of attitudes towards drug use, subjective norms about drug use, perceived control over drug use and self-esteem/body image.
2) It is predicted that the TPB, as operationalized in “The CIAU Modified Version of the National Survey of Youths’ Attitudes Towards Performance Enhancing Substances” (i.e. attitudes, subjective norms and perceive control) will predict a significant amount of the variance in CIAU male athletes’ self-reported intentions to use performance enhancing drugs.

3) It is predicted that a measure of CIAU male athletes’ self-esteem/body image, will be found to predict a significant amount of variance in their self-reported intentions to use performance enhancing drugs.

Data Analysis

As the questionnaires were returned, the responses were collated. After 182 useable surveys were returned, the results were analyzed in the following manner.

Step 1. Descriptive statistics including frequencies, means and percentages were calculated for the following demographic information: age, sport, and participation in a regular weight training program.

Step 2. Question 9 asked subjects to report whether they used any of the following in the past year to enhance their performance and if so, how often: caffeine, narcotic pain killers, alcohol, stimulants/speed, alcohol, anabolic steroids, beta blockers, doping methods, alphabodies diuretics and extra protein. Alcohol, which is known to reduce one’s reaction time and hence performance,
and alphabodies, an imaginary, made-up drug, were included in this list to expose subjects that responded carelessly or who did not understand what was meant by “performance enhancing drugs”. It was noted which subjects answered “yes” to either of these options. Any significant differences in the scores of subjects who chose either the “alcohol” or “alphabodies” options and subjects who did not, were recorded. For each subject a total “performance enhancing drug use frequency count” was calculated. This number was used to represent the total number of times in the past year that subjects intended to use drugs to enhance their performance. This number was also used to represent each subjects’ habit strength later in the analysis. The frequency, percentage and mean habit strength score were also calculated for each of the sports studied (i.e. football, wrestling, swimming, ice hockey and track & field).

Since self-report data is very often distorted by memory and/or socially desireable responding a great deal of under-, and in some cases even over-reporting of the frequency with which people engage in punishable behaviours such as taking performance enhancing drugs occurs. The athletes’ self-reported drug use should be viewed with this in mind. It should also be kept in mind that what is reported here is the number of times subjects claim to have used ergogenic substances with the intention of enhancing their performance. In other words, in the current study the actual effectiveness of the substances subjects took to improve their athletic performance is not as important as their
perceptions of the effectiveness of the substances and their willingness to take something in order to artificially improve their performance.

**Step 3.** Subjects' responses to Questions 8 and 10, two of the knowledge questions, were added up for each item within each question. The frequency and percentage of athletes that responded “Yes”, “No”, “Don’t know effects” and “Never heard of this” for each drug were also calculated for Questions 8 and 10. Based upon the findings, the statistics calculated in step 3 were used to make recommendations for the CIAU’s drug education program.

**Step 4.** Each box in Questions 6 and 7 was assigned a value ranging from 1 to 5 (i.e., 1-20%=1.....81-100%=5 and Extremely Likely=5.....Extremely Unlikely=1). Since Questions 6 and 7 both measure athletes' intentions to use performance enhancing drugs, subjects' responses to these questions were added together to produce a single “intention” score ranging between 2 and 10. This intention score was later used in step 8 to determine the predictive validity of TPB in the context of performance enhancing drugs.

**Step 5.** Several questions regarding athletes' perceptions of drug use among non-competitive individuals, CIAU athletes, CIAU athletes in their sport and athletes on their own team were added to the questionnaire. Questions relating to both male and female groups were included to prevent subjects from becoming suspicious that only males were targeted in this study. Because this study focused on male athletes, only the results from questions 12,
13, 15, 17, and 19 that dealt with subjects' perceptions of drug use by male
groups were recorded.

The percentage of subjects that choose the same response option as well
as the percentage of football, wrestling, swimming, ice hockey and track & field
athletes that choose the same options were recorded for each of these
questions.

\textbf{Step 6.} The rationale used by the panel of experts to create the
NSYA was not well documented. This is often the case when a survey company
is used to develop a questionnaire (Dr. Conry, Oct. 19, 1994; personal
communication). Although the development of the questionnaire is unclear, the
TPB is very clear. If subjects' answers to the questions created to measure the
variables of the TPB are factor analyzed three factors should result: attitudes,
subjective norms, and perceived control. The earlier review of the literature
presents a case for including questions relating to self-esteem/body image.
Therefore, it was expected that a confirmatory factor analysis of the question
statements in Question 5 relating to attitudes, subjective norms, perceived
control and self-esteem body image would not be shown to be significantly
different from the proposed four factor model (i.e. attitudes, subjective norms,
perceived control and self-esteem/body image).

Each question statement in Question 5 was rated on a five-point Likert
scale. Approximately half the questions in each subscale were worded to be
scored positively such that the more subjects were in favour of the attitude being
studied, the more likely it was that they would agree with the positively worded question statement. For example, the more a subject was in favour of performance enhancing drug use, the more likely it was that he would respond “strongly agree = 4” to the statement “It’s okay to try anabolic steroids once”.

Approximately half of the other question statements in each subscale were worded negatively such that the more a subject agreed with performance enhancing drug use the more likely it is that he would disagree with the statement and mark “strongly disagree=1” (i.e. Using drugs to do better in sports is cheating). To obtain a score for each subscale, subjects’ responses to negatively worded questions were reversed (i.e.. 1=5, 2=4, 3=3, 4=2, 5=1) so that the scores will not cancel each other out. Items in Question 5 were coded as such:

- **Attitudes= 2, 3, 10, 11, 14, 17, 21, 25, 27.**
- **Subjective Norms = 6, 7, 13, 15, 23, 28.**
- **Perceived Control = 5, 9, 18, 20, 24, 26.**
- **Self-Esteem / Body Image = 1, 4, 8, 12, 16, 19, 22.**

(Scores reversed for items 1, 3, 6, 7, 8, 9, 12, 13, 16, 19, 20, 21, 25, 27)

Each subject’s responses to each question statement in Question 5 were entered into a confirmatory factor analysis to determine how well the proposed four factor model fit the data. This method of analysis was chosen for two reasons. First, when a theory (i.e. the TPB) and/or previous data provide reason
to specify a factor structure a priori, then a confirmatory factor analysis that tests the fit of the proposed factor structure to the observed factor structure is called for rather than an exploratory factor analysis that seeks to uncover an underlying factor structure (Chartrand, Jowdy & Danish, 1992; Schutz & Gessaroli, 1993). Second, many theory-driven sport psychology questionnaires such as the PSIS R-5, the TAIS and the GEQ were developed without the aid of confirmatory factor analysis. Recent factor analyses of some of these questionnaires have found that the data do not uphold the expected factor structure (Chartrand, Jowdy & Danish, 1992; Ford & Summers, 1992; Schutz et al., 1994). Results such as these emphasize the importance of using theory-testing methods of analysis when developing a theory-driven questionnaire. Therefore, in the present study a confirmatory factor analysis using the LISREL VIII statistical package was conducted on the data.

**Step 7** Several goodness of fit statistics were used to determine how well (or actually how badly) the theoretical model fit the observed data. If chi-square statistic does not reach significance, then the null hypothesis, that the observed factor structure and the derived factor structure come from the same sample distribution, cannot be rejected. Therefore, it is possible that the observed factor structure and the derived factor structure are statistically similar (Pedhazur & Pedhazur, 1991). Unfortunately, there are problems with interpreting model fit using the chi-square statistic. The chi-square statistic is sensitive to sample size in that the larger the sample the more likely one is to get
a significant result that suggests the observed data and the model are dissimilar when the fit is actually quite good. Conversely, smaller samples are more likely to produce a good fit when the model fit is actually quite poor (Joreskog & Sorbom, 1993; Pedhazur & Pedhazur, 1991).

Keeping this limitation in mind, Q (i.e. chi-squared / degrees of freedom) was only used in part to evaluate the model's fit to the observed data. If the fit was good Q would have been less than 2.0. If the fit was "adequate" or "reasonable" it would have been less than 5.0. Q's over 5.0 would have been taken to indicate an extreme lack of fit between the model and the data.

The Root Mean Square Residual (RMSR) is another fit statistic that was used to evaluate the fit of the model to the data. Part of confirmatory factor analysis involves calculating the difference between the covariance matrix estimated using the theoretical model and the matrix calculated using the observed data. Discrepancies between the two are reported as fitted residuals. The RMSR is in a sense the square root of the fitted residuals (Chi & Duda, 1995; Pedhazur & Pedhazur, 1991). It follows then that the smaller the RMSR, the smaller the difference between the model and the data and hence the better the fit.

The Root Mean Square Error of Approximation (RMSEA) was also used to evaluate the fit of the model to the data. The RMSEA measures the error of approximation per degree of freedom (Joreskog & Sorbom, 1993), thus showing how well the sample data fits the population (Smith et al., 1995). It should be
noted that the RMSEA, unlike some other fit indices are not as sensitive to “changes in model complexity” and therefore may be useful in evaluating the fit of different models (Steiger, 1994). Values of .05 or less suggest a close fit while values up to .08 suggest a reasonable fit (Joreskog & Sorbom, 1993; Steiger, 1994).

Other fit indices that are used to compare between models include the Comparitive Fit Index (CFI) and the Parsimonious Goodness of Fit Index (PGFI). The CFI compares the restricted model (i.e. the model obtained by fitting the data into the theoretically expected factor structure) with the null model (i.e. the model that holds that all correlations will be zero) (Bryne, 1990). The CFI is a "normed comparative fit index" in that it compensates for variability in sample size by adjusting for degrees of freedom (Bentler, 1990; Bryne, 1994). It has a 1 to 0 range, with values of .90 or higher indicating an adequate fit.

The parsimony of a model, though in conflict with goodness of fit, is just as important. For example, goodness of fit can be improved by freeing up parameters to be estimated thus reducing the degrees of freedom and increasing the fit between the data and the model (Muliak, et al, 1989). Conversely, a model is completely parsimonious when no parameters need be used to estimate values in the hypothesised structure to which the data are compared. Consequently, there is no loss in degrees of freedom as all of the data points are completely free to be tested against the hypothesised structure (Muliak, et al, 1989). The PGFI, designed to accomodate both concerns for
goodness of fit and parsimony, penalizes reductions in degrees of freedom for
improved goodness of fit. PGFI values may range from 1-0, with larger PGFI's
indicating a better fit, although a PGFI of .50 when the CFI is above .90 is still

The closeness of the Q, RMSR, RMSEA, CFI and PGFI values of the
current data to the acceptable limits of these fit indices was used in part to judge
the utility of using the “CIAU Modified Version of the National Survey of Youths’
Attitudes Toward Performance Enhancing Substances” to predict CIAU athlete’s
intentions to use performance enhancing drugs.

**Step 8.** A “model generating” approach was taken in order to
derive the best fitting model for the data. The original number of factors was
always maintained. Poor fitting items (i.e. items with the lowest correlation)
however, were removed one at a time from each factor, resulting in the loss of
four items on each round of analyses. Lisrel analyses were subsequently
conducted until it was evident from the fit indices that further removal of items
only worsened the fit.

Once a best fitting model was found the items in the reduced model were
used to test the ability of the TPB to predict subjects’ intentions to use
performance enhancing drugs.

**Step 9.** The next step was to correlate the subjects’ factor scores,
as well as their habit strength scores, with their intention scores. This was done
using a hierarchical regression analysis. This type of analysis was chosen
because it was recommended by Ajzen, the creator of the TPB (Ajzen & Madden (1988), and because it allows investigators to determine how much variance a set of variables accounts for when entered into a regression analysis in the order of importance predetermined by theory or past research.

Factor scores were calculated for each subject for each of the four factors as represented in Modification C of the "CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances". For example, subjects' responses to items 13, 15 and 28 were retained as the best representatives of the factor "subjective norms". Subjects scores on these items were subsequently added together to produce a single "subjective norm" score for each subject.

As recommended by Theodorakis' 1994 investigation using both the TPB and two additional variables to measure intentions to exercise, only attitudes and subjective norms were entered into Step 1 of the hierarchical regression analysis. In Step 2 perceived control alone was entered. Following this, in Step 3 subjects' self-esteem/body image and habit strength scores were entered into the factor analysis.

Several statistics were used to evaluate the contributions of the variables to the prediction of intentions both individually and in sets. The individual contributions of the variables were assessed using the F-test of the regression coefficients (i.e. R), although, regression coefficients do not indicate the "absolute"
importance of individual variables as their value is dependant on the other variables in the equation (SPSS, 1994).

"R" is the multiple regression coefficient which, on a scale from 1 to 0 indicates how much a criterion variable (eg. intentions) and set of predictors (eg. attitudes & subjective norms) are linearly related (Licht, 1995). The F-ratio, obtained by dividing the mean square regression by the mean square residual, is a test of significance for R. F-change, that was also used to assess the data, indicates both how R has changed as a result of adding variables (thus causing a change in the F-ratio), and the significance of this change.

**Step 10.** It was intended that a set of score profiles for subjects who report using drugs and subjects who report an intention to use drugs would be developed by calculating the Pearson product -moment correlation between these subject’s subscale scores from Step 5 and their habit and intention scores. Likewise, the percentage of athletes surveyed that match the profiles described above (regardless of their reported drug use or intentions) was to be subsequently reported. The low correlations however, pre-empted this attempt to build profiles.

**Step 11.** The utility of using the TPB was estimated based upon the hierarchical regression portion of the study. The validity of the “CIAU Modified Version of the National Survey of Youths Attitudes” was determined based upon the results from the CFA and the hierarchical regression analysis.
In keeping with the findings from studies in the areas of exercise adherence and drug use, the factors of attitude, subjective norms and perceived control should have accounted for approximately 40% of the variability in subjects' intention scores if the TPB was an effective predictor of their intentions to use performance enhancing drugs. (Blue, 1995; Godin, 1993; Rodgers & Brawley, 1993; Theodorakis, 1994).

Limitations

In terms of the findings, comments have been made regarding each of the hypotheses listed earlier. Because of the type of questions that were asked and the type of population that was used, these findings were subject to the following limitations.

1. Under-reporting. When subjects are asked to answer self-report questions there is a tendency for socially desirable responding to occur (i.e. answering in a way that reflects favourably on oneself, rather than responding honestly about one's behaviour). When subjects are asked to answer questions about a sensitive matter such as drug use, the frequency of socially desirable responding tends to increase (e.g. subjects tend to under-report the extent to which they use drugs). Therefore, the effects of under-reporting may have skewed the results of the present study.
2. Causality. The present study was designed to examine the correlations between performance enhancing drug use and the several variables that were believed to be associated with athletic drug use (i.e. attitudes, subjective norms, perceived control, habit strength and self-esteem/body image). Because only correlations were calculated it was not possible to make any assumptions about causality. For example, even if a positive relationship had been found between favourable attitudes towards drug use and frequency of drug use, it would have been impossible to say whether the favourable attitudes lead to the drug use, or the drug use lead to the favourable attitudes, or if some other intervening factor was influencing both the subjects' attitudes and behaviours.

3. Population. The current study was intended to survey male CIAU football, wrestling, swimming, ice hockey and track & field athletes between the ages of 19 and 28, from all ten provinces. The results of this study, therefore, may only be generalized to this population.
Chapter 4

RESULTS

Demographics. Most subjects were between 22-24 years of age (47.3%). The 19-21 year old group made up 41.8% of the sample while only 11% of the subjects were 25-28 years of age. Most of the subjects participated in CIAU football (32%) followed by track and field (24.2 %), hockey (18.7)%, swimming (17%) and wrestling (7.7%). Four athletes identified themselves in their questionnaire as participants in both CIAU football and track & field. Two of these subjects were arbitrarily assigned to the football category while the other two were assigned to the track and field category. In regard to weight training, the majority of subjects (89.6%), as anticipated, reported that they regularly participate in some sort of weight training program.

Self-reported Drug Use. Not surprisingly the two substances subjects most frequently reported using were the two most socially acceptable and readily available performance enhancing substances: caffeine and extra protein. Specifically, 17.5% of subjects reported using caffeine and 17% reported using extra protein in order to improve their performances. The next most popular performance enhancing substance was narcotic pain killers (6%) followed by stimulants/speed (1.6%), doping methods (1%) and anabolic steroids(1%). No subjects reported using either diuretics or beta blockers (See Table 1 for details).
Table 1

Percentage of Self-Reported Use of Performance Enhancing Substances or Methods for Each Sport and for All Subjects

<table>
<thead>
<tr>
<th>Substance or Method</th>
<th>Football N = 59</th>
<th>Track N = 44</th>
<th>Hockey N = 34</th>
<th>Swimming N = 31</th>
<th>Wrestling N = 14</th>
<th>All Subjects N = 182</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>5.1</td>
<td>2.3</td>
<td>0.0</td>
<td>3.2</td>
<td>0.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Alphabodies</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Caffeine</td>
<td>17.0</td>
<td>13.6</td>
<td>14.7</td>
<td>12.9</td>
<td>7.1</td>
<td>17.5</td>
</tr>
<tr>
<td>Diuretics</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Doping</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Narcotics</td>
<td>15.3</td>
<td>2.3</td>
<td>0.0</td>
<td>3.2</td>
<td>0.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Protein</td>
<td>28.8</td>
<td>18.2</td>
<td>11.7</td>
<td>0.0</td>
<td>14.3</td>
<td>17.0</td>
</tr>
<tr>
<td>Speed</td>
<td>3.4</td>
<td>2.3</td>
<td>2.9</td>
<td>0.0</td>
<td>0.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Steroids</td>
<td>0.0</td>
<td>2.3</td>
<td>2.9</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total Use</strong></td>
<td><strong>45.8</strong></td>
<td><strong>29.5</strong></td>
<td><strong>23.4</strong></td>
<td><strong>19.3</strong></td>
<td><strong>14.2</strong></td>
<td><strong>30.8</strong></td>
</tr>
</tbody>
</table>

Doping = Doping Methods, Narcotics = Narcotic Pain Killers, Protein = Extra Protein (i.e. Powders), Speed = Stimulants, Steroids = Anabolic Steroids
Although alcohol is believed to impair performance 2.7% of subjects reportedly used alcohol as an ergogenic aid. No subjects, however, mistakenly reported using "alphabodies", a fictitious drug name included in the list of ergogenic substances to catch subjects who respond carelessly.

Total drug frequency, or the total number of times athletes report using substances to enhance their performance, was recorded for each athlete. Total drug use scores were arbitrarily used to represent the strength of an athlete's willingness to use performance enhancing substances. Athletes could score 0 (never used), 1 (1-2 times), 2 (3-5 times), 3 (6-10 times), or 4 (more than 10 times). Total scores for the ten items potentially ranged from 0 to 40. The spread of actual scores obtained from this sample ranged from 0 to 12. A large proportion (69.2%) of the athletes reported no drug use at all. Of those subjects who reported drug use, most (11%) scored 4, with the second largest group (7.7%) scoring 1.

The largest percentage of drug use per sport was reported by football players (45.8%), followed by track and field athletes (29.5%), hockey players (23.4%), swimmers (19.3%) and wrestlers (14.2%) (See Table 1). In fact for every drug that subjects reported using, football players as a group reported the largest percentage of use for that drug. Specifically, they reported the most use by sport of extra protein (28.8%), caffeine (17%), narcotics (15.3%), alcohol
(5.1%), stimulants/speed (3.4%), and doping methods (1.7%). Anabolic steroid use was reported by only one hockey player and one track & field athlete.

**Intentions.** Athletes intentions were scored using two scales. One asked athletes what the percent chance (i.e. 1 to 100%) would be that they would use performance enhancing drugs in the next six months. A second question asked what the likelihood (i.e. Extremely unlikely to Extremely likely) was of them using such substances in the next six months. Whereas 92.3% of subjects responded that there was a 1-20% chance they would use drugs in the next six months, only 87.9 % reported it was extremely unlikely that they would use performance enhancing drugs. The subjects' scores on the two intention questions were added together to produce a single intention score. Scores ranged from 2 to 10 with the majority of subjects (86.8%) scoring two.

**Knowledge.** Subjects were asked to respond to several items in Questions 8 and 10 to test their knowledge of the effects of performance enhancing drugs both on performance and health. Two items in question 8 and one item in question 10 were designed to detect subjects who responded carelessly or who lacked the necessary knowledge to provide informed responses to these questions. As a result, 22 subjects were removed from the analysis of question 8 (see Table 2) and 48 subjects were removed from the analysis of question 10 (see Table 3).

The remaining 160 subjects' responses to question 8, "Do you think that any of the following will help an athlete perform better?", were analysed. Of this
Table 2

"Yeh-sayers" and All Other Subjects' Responses to Question Eight Regarding the Performance Enhancing Effects of Various Substances and Methods.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Response Types</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Don't Know</td>
<td>Never Heard Of</td>
<td>Yes</td>
<td>No</td>
<td>Don't Know</td>
<td>Never Heard Of</td>
<td></td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>60.9</td>
<td>4.3</td>
<td>21.7</td>
<td>8.7</td>
<td>31.4</td>
<td>13.5</td>
<td>37.8</td>
<td>16.7</td>
<td></td>
</tr>
<tr>
<td>Caffeine</td>
<td>82.2</td>
<td>8.7</td>
<td>8.7</td>
<td>0.0</td>
<td>65.4</td>
<td>30.8</td>
<td>3.2</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td>39.1</td>
<td>21.7</td>
<td>30.4</td>
<td>8.7</td>
<td>14.1</td>
<td>43.6</td>
<td>28.8</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>Doping</td>
<td>82.6</td>
<td>13.0</td>
<td>4.3</td>
<td>1.3</td>
<td>76.3</td>
<td>9.0</td>
<td>13.5</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Narcotics</td>
<td>73.9</td>
<td>8.7</td>
<td>17.4</td>
<td>0.0</td>
<td>50.0</td>
<td>35.3</td>
<td>14.7</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>34.8</td>
<td>52.2</td>
<td>13.0</td>
<td>0.6</td>
<td>36.5</td>
<td>46.2</td>
<td>16.7</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>91.3</td>
<td>4.3</td>
<td>4.3</td>
<td>0.0</td>
<td>71.2</td>
<td>17.3</td>
<td>11.5</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>91.0</td>
<td>7.7</td>
<td>1.3</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

A = Subjects who answered "yes" alphabodies and/or alcohol will improve sport performance. N = 22
B = Subjects who did not answer "yes" alphabodies or alcohol will improve performance. N = 160

Doping = Doping Methods, Narcotics = Narcotic Pain Killers, Protein = Extra Protein (i.e. Powders), Speed = Stimulants, Steroids = Anabolic Steroids
Table 3

"Yeh-sayers" and All Other Subjects' Responses to Question Ten Regarding the Health Risk of Using Various Performance Enhancing Substances and Methods.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Response Types</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Don't Know</td>
<td>Never Heard Of</td>
<td>Yes</td>
<td>No</td>
<td>Don't Know</td>
<td>Never Heard Of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>91.7</td>
<td>6.3</td>
<td>2.1</td>
<td>0.0</td>
<td>29.1</td>
<td>7.5</td>
<td>52.2</td>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caffeine</td>
<td>45.8</td>
<td>50.0</td>
<td>4.2</td>
<td>0.0</td>
<td>23.9</td>
<td>69.4</td>
<td>6.0</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td>89.6</td>
<td>6.3</td>
<td>4.2</td>
<td>0.0</td>
<td>40.3</td>
<td>16.4</td>
<td>29.9</td>
<td>13.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doping</td>
<td>93.8</td>
<td>4.2</td>
<td>2.1</td>
<td>0.0</td>
<td>51.5</td>
<td>23.1</td>
<td>23.1</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotics</td>
<td>70.8</td>
<td>27.1</td>
<td>2.1</td>
<td>0.0</td>
<td>50.0</td>
<td>39.6</td>
<td>9.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>29.2</td>
<td>64.6</td>
<td>6.3</td>
<td>0.0</td>
<td>10.4</td>
<td>67.9</td>
<td>20.1</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>97.9</td>
<td>0.0</td>
<td>2.1</td>
<td>0.0</td>
<td>81.3</td>
<td>11.9</td>
<td>6.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
<td>97.9</td>
<td>0.0</td>
<td>2.1</td>
<td>0.0</td>
<td>96.3</td>
<td>3.0</td>
<td>0.7</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A = Subjects who answered "yes" alphabodies can be harmful to your health. N = 48
B = Subjects who did not answer "yes" alphabodies can be harmful to your health. N = 134

Doping = Doping Methods, Narcotics = Narcotic Pain Killers, Protein = Extra Protein (i.e. Powders), Speed = Stimulants, Steroids = Anabolic Steroids
group 91% of subjects answered "yes", anabolic steroids will improve performance. Other ergogenic aids considered to be relatively effective were doping methods (76.3%), stimulants/speed (71.2%), caffeine (65.4%) and narcotic pain killers (50%). Substances considered to be less effective were extra protein (36.5%), beta blockers (31.4%), and diuretics (14.1%).

In addition to answering "yes" or "no", subjects had the option of responding with either "don't know effects" or "never heard of this". The drug most subjects did not know the effects of was beta blockers (37.8%) followed by diuretics (28.8%), protein (16.7%), narcotic pain killers (14.7%), doping methods (13.5%), stimulants/speed (11.5%), caffeine (3.2%) and anabolic steroids (1.3%). Drugs which subjects had never heard of included beta blockers (16.7%), diuretics (13.5%), doping methods (1.3%) and extra protein (0.6%).

One hundred and thirty-four subjects' responses were retained for the analysis of question 10, "Do you think any of the following will be harmful to your health if you use them?". The largest majority of these subjects (96.3%) answered "yes", anabolic steroids are harmful to your health. Reportedly, the second most harmful ergogenic aids were stimulants/speed (81.3%) followed by doping methods (51.5%), narcotic pain killers (50%) and diuretics (40.3%). Substances that the majority of subjects were not as willing to label as harmful were beta blockers (29.1%), caffeine (23.1%) and protein (10.4%).

**Estimations of drug use by others.** In addition to asking subjects to report on their own drug use, it was considered useful for comparison to ask
Table 4

Subjects' Estimations of Performance Enhancing Drug Use by Their Peers.

<table>
<thead>
<tr>
<th>Peer Group</th>
<th>N</th>
<th>Estimated Percentage of Drug Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-athletic males (Question 13)</td>
<td>182</td>
<td>0%</td>
</tr>
<tr>
<td>Male CIAU athletes (Question 15)</td>
<td>182</td>
<td>1.1%</td>
</tr>
<tr>
<td>Male CIAU athletes in their sport (Question 17)</td>
<td>182</td>
<td>8.2%</td>
</tr>
<tr>
<td>Male CIAU athletes on their team (Question 19)</td>
<td>180</td>
<td>51.1%</td>
</tr>
</tbody>
</table>
them to also report their perceptions of the rate of drug use amongst their peers (See Table 4). Subjects were first asked to report if they personally knew someone who uses performance enhancing drugs. Over half (52.2%) of the subjects claimed to be personally familiar with someone who uses ergogenic substances. Subjects were also asked to report what percentage of males who do not compete in organized sport use performance enhancing drugs. In this instance, most subjects (57%) believed that only 1-10% of these individuals take ergogenic drugs. When asked about drug use by all CIAU male athletes and by all CIAU male athletes in their sport, the majority of subjects (54.4% and 57.1% respectively) again reported that only 1-10% of these groups used ergogenic aids. The perceived occurrence of drug use dropped when subjects were asked to report how much drug use occurs on their own team, the majority of subjects (51.1%) reporting 0% drug use by their team-mates.

Psychosocial variables associated with drug use:

Attitudes. Questions 2,3,10,11,14,17,21,25 and 27 were designed to measure attitudes related to an athletes' choice to take or not take performance enhancing drugs. See Table 5 for a detailed listing of responses. Of particular interest are subjects' responses to Questions 2 and 3. A little over 60% of athletes somewhat agreed or strongly agreed that winning was the most important thing to them. Paradoxically, 79.1% somewhat agreed or strongly agreed that doing their best was more important than winning. It is also interesting to note that at least 8.2% of subjects somewhat agree or strongly
Table 5

CIAU Male Athletes Responses To Attitude Statements in Question Five. | N=182

<table>
<thead>
<tr>
<th>Attitude Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In sports, winning is the most important thing to me.</td>
<td>7.1%</td>
<td>25.8%</td>
<td>6.6%</td>
<td>48.9%</td>
<td>11.5%</td>
</tr>
<tr>
<td>To me, doing my best at sports is more important than winning.</td>
<td>0.5%</td>
<td>6.6%</td>
<td>13.7%</td>
<td>37.9%</td>
<td>41.2%</td>
</tr>
<tr>
<td>Olympic athletes using drugs such as AS should be allowed to compete. **</td>
<td>72.5%</td>
<td>13.2%</td>
<td>7.7%</td>
<td>2.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Athletes using drugs such as AS should be allowed to compete on a University team. **</td>
<td>81.3%</td>
<td>10.4%</td>
<td>3.3%</td>
<td>1.6%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Its okay to try anabolic steroids once. **</td>
<td>68.7%</td>
<td>14.3%</td>
<td>8.8%</td>
<td>3.8%</td>
<td>4.4%</td>
</tr>
<tr>
<td>There are substances that will improve my athletic performance.</td>
<td>7.1%</td>
<td>4.4%</td>
<td>6.6%</td>
<td>25.8%</td>
<td>56.0%</td>
</tr>
<tr>
<td>Using drugs to do better in sports is cheating **</td>
<td>4.9%</td>
<td>5.5%</td>
<td>2.7%</td>
<td>13.2%</td>
<td>73.6%</td>
</tr>
<tr>
<td>The use of AS for non-medical reasons should be against the law **</td>
<td>9.9%</td>
<td>13.7%</td>
<td>14.8%</td>
<td>23.1%</td>
<td>38.5%</td>
</tr>
<tr>
<td>People who sell anabolic steroids should go to jail **</td>
<td>8.8%</td>
<td>15.4%</td>
<td>25.3%</td>
<td>23.6%</td>
<td>26.9%</td>
</tr>
</tbody>
</table>

AS = Anabolic steroids

** = Items selected by the Confirmatory Factor Analysis to be used in the Hierarchical Analysis.
agree that it is acceptable to try anabolic steroids once and that 8.8% of subjects are undecided on the matter.

**Subjective Norms.** Questions 6, 7, 13, 15, 23 and 28 were believed to measure subject’s perception of subjective norms surrounding performance enhancing drug use. See Table 6 for the results. Most notably, 6% of subjects are unclear whether or not their coach believes athletes should not use performance enhancing drugs and a further 6.6% of subjects somewhat disagree or strongly disagree that their coach is opposed to performance enhancing drug use. Also worth noting, 17% of subjects are undecided as to whether or not they would take performance enhancing drugs if a they were offered to them by a friend, and a full 6% somewhat agree or strongly agree that they would take drugs if such an offer was made.

**Perceived Control.** Questions 5, 9, 18, 20, 24 and 26 were written to reflect athletes’ perception of control over their choice to take or not take performance enhancing drugs. See to Table 7 for the results. In question 9, 90.1% of subjects somewhat agreed or strongly agreed that it is easy to resist the temptation to use performance enhancing drugs demonstrating how perceived control is not a problem for this group of subjects. Similarly 57% of the sample somewhat agreed or strongly agreed that they could get ergogenic drugs if they wanted. And in regards to drug testing, over 20% of subjects are undecided about the effectiveness of drug testing and 34% of subjects
Table 6

CIAU Male Athletes' Responses To Subjective Norm Statements in Question Five.
N = 182

<table>
<thead>
<tr>
<th>Subjective Norm Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only a small percentage of Olympic athletes use drugs to perform better.</td>
<td>18.1%</td>
<td>37.9%</td>
<td>25.8%</td>
<td>14.8%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Only a small percentage of university athletes use drugs to perform better.</td>
<td>3.8%</td>
<td>23.1%</td>
<td>23.1%</td>
<td>30.2%</td>
<td>19.8%</td>
</tr>
<tr>
<td>My coach believes athletes should not use drugs to improve their performance.**</td>
<td>2.2%</td>
<td>4.4%</td>
<td>6.0%</td>
<td>15.4%</td>
<td>72.0%</td>
</tr>
<tr>
<td>If a close friend offered me a drug that would make me do better in sports I would take it.**</td>
<td>64.8%</td>
<td>12.1%</td>
<td>17.0%</td>
<td>2.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td>It is important to me to do everything my coach wants me to do.</td>
<td>13.2%</td>
<td>24.7%</td>
<td>11.5%</td>
<td>37.4%</td>
<td>13.2%</td>
</tr>
<tr>
<td>It is nobody's business but my own if I choose to take anabolic steroids.**</td>
<td>29.7%</td>
<td>29.7%</td>
<td>15.9%</td>
<td>12.1%</td>
<td>12.6%</td>
</tr>
</tbody>
</table>

** = Items selected by the Confirmatory Factor Analysis to be used in the Hierarchical Analysis.
Table 7

CIAU Male Athletes Responses To Perceived Control Statements in Question Five
N = 182

<table>
<thead>
<tr>
<th>Perceived Control Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have little control over my choice to use performance enhancing drugs such as anabolic steroids.</td>
<td>94.0%</td>
<td>2.2%</td>
<td>0.5%</td>
<td>1.1%</td>
<td>2.2%</td>
</tr>
<tr>
<td>For me, it is easy to resist the temptation to use performance enhancing drugs such as anabolic steroids.**</td>
<td>3.3%</td>
<td>4.9%</td>
<td>1.6%</td>
<td>16.5%</td>
<td>73.6%</td>
</tr>
<tr>
<td>If I wanted to, I could easily obtain performance enhancing drugs such as anabolic steroids.**</td>
<td>8.2%</td>
<td>13.7%</td>
<td>20.9%</td>
<td>26.4%</td>
<td>30.8%</td>
</tr>
<tr>
<td>It would be difficult for me to avoid testing positive if I used performance enhancing drugs.</td>
<td>22.5%</td>
<td>12.1%</td>
<td>20.9%</td>
<td>20.9%</td>
<td>23.6%</td>
</tr>
<tr>
<td>It is hard to tell if someone is taking anabolic steroids.</td>
<td>15.9%</td>
<td>42.9%</td>
<td>19.2%</td>
<td>19.2%</td>
<td>2.7%</td>
</tr>
<tr>
<td>If I wanted to I could show someone how to correctly administer anabolic steroids.**</td>
<td>66.5%</td>
<td>14.3%</td>
<td>6.6%</td>
<td>8.2%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

** = Items selected by the Confirmatory Factor Analysis to be used in the Hierarchical Analysis.
somewhat disagree or strongly disagree that drug testing could catch them if they took drugs.

**Self-Esteem / Body Image.** Questions 1, 4, 8, 12, 16, 19 and 22 were believed to measure athletes' perceptions of their self-esteem and body image. See Table 8 for the results. In regards to anabolic steroid use, at least 34% of subjects believe that steroids will improve their physical appearance while only a few more subjects (46.1%) somewhat disagree or strongly disagree that taking steroids will make them look better. Just over 19% of subjects (19.8%) were undecided on the matter.

**Profiles of drug users and individuals intending to use drugs.**

Problems of over- and under-reporting on direct measures of drug use make it difficult to accurately determine the number of individuals who use performance enhancing drugs. If an indirect less threatening measure was developed to identify drug users (such as a list of characteristics that correlate highly with performance enhancing drug use), it may improve the understanding of the extent of performance enhancing drug use in the CIAU and other groups.

Frequency of drug use scores (i.e. the number of times subjects reported using substances to enhance their performance) for subjects who actually reported drug use (N = 56) was correlated with their total scores on the attitude, subjective norm, perceived control and self-esteem body image subscales developed by means of a confirmatory factor analysis of the subjects' responses to items in question 5. Overall the correlations were positive and very low. The
Table 8
CIAU Male Athletes Responses To Self-Esteem / Body Image Statements in Question Five.
N = 182

<table>
<thead>
<tr>
<th>Self-Esteem / Body Image Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I usually like the way I look.**</td>
<td>0%</td>
<td>4.9%</td>
<td>6.0%</td>
<td>50.0%</td>
<td>39.0%</td>
</tr>
<tr>
<td>Most of my peers are better liked than me.</td>
<td>33.0%</td>
<td>40.1%</td>
<td>20.3%</td>
<td>6.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>I think that I do well at school.**</td>
<td>1.1%</td>
<td>4.9%</td>
<td>6.0%</td>
<td>55.5%</td>
<td>32.4%</td>
</tr>
<tr>
<td>People rarely judge me on my appearance.</td>
<td>13.2%</td>
<td>36.8%</td>
<td>25.3%</td>
<td>19.8%</td>
<td>4.9%</td>
</tr>
<tr>
<td>I am content being who I am.**</td>
<td>0.5%</td>
<td>4.4%</td>
<td>1.6%</td>
<td>33.0%</td>
<td>60.4%</td>
</tr>
<tr>
<td>Usually, if I have something to say, I say it.</td>
<td>0.5%</td>
<td>6.0%</td>
<td>7.7%</td>
<td>46.2%</td>
<td>39.6%</td>
</tr>
<tr>
<td>Anabolic steroids will help me look better.**</td>
<td>28.0%</td>
<td>18.1%</td>
<td>19.8%</td>
<td>28.6%</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

** = Indicates items selected in the Confirmatory Factor Analysis for use in the Hierarchical Analysis.
individual correlations, between habit strength and attitudes, perceived control, and self-esteem were all found to be statistically significant. But, even if a correlation is statistically significant it does not imply that it is important as a relationship. For example, on Table 9 the largest correlation, between attitudes and drug use frequency, would only allow one to predict 12% (i.e. $r = .34$, $r^2 = .12$) of the variance in subjects' reported use of performance enhancing substances. Given these results alone it would be of very limited use to outline a profile of subjects who use performance enhancing substances based upon their subscale scores from question 5.

On Table 10 the correlations between intentions and attitudes ($r = .24$, $p < .001$), subjective norms ($r = .38$, $p < .001$), perceived control ($r = .26$, $p < .001$), self-esteem / body image and habit strength ($r = .33$, $p < .001$) were only slightly stronger. All correlations proved to be statistically significant. The largest correlation, found for subjective norms ($r = .38$, $p < .001$) was still well below the recommended lower limit of .50 for meaningful correlations. Again, it would be of limited predictive value to develop profiles of athletes who intend to use performance enhancing drugs based upon these results alone. It is still possible, however, that a multiple regression of these values will reveal significant and meaningful correlations among these variables.
Table 9

Pearson Product-Moment Correlation's Between Subjects' Habit Strength Scores Greater Than Zero and the Four Variables Measured in Question 5.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>R</th>
<th>R-Squared</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>56</td>
<td>0.34</td>
<td>0.12</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>56</td>
<td>0.24</td>
<td>0.05</td>
<td>n.s.</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>56</td>
<td>0.33</td>
<td>0.11</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Self-Esteem / Body Image</td>
<td>56</td>
<td>0.21</td>
<td>0.04</td>
<td>n.s.</td>
</tr>
</tbody>
</table>
Table 10

Pearson Product-Moment Correlations Between Subjects' Intention Scores and the Four Variables Measured in Question 5.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>R</th>
<th>R-Squared</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>182</td>
<td>0.24</td>
<td>0.06</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>182</td>
<td>0.38</td>
<td>0.14</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>182</td>
<td>0.20</td>
<td>0.04</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Self-Esteem / Body Image</td>
<td>182</td>
<td>0.33</td>
<td>0.11</td>
<td>p &lt; .001</td>
</tr>
</tbody>
</table>
Confirmatory Factor Analysis

A confirmatory factor analysis was performed on the items from question 5 of the "CIAU Modified Version of the National Survey of Youths Attitudes Towards Performance Enhancing Drugs" to test the structural validity of the four scales contained within (i.e. attitudes, subjective norms, perceived control, self-esteem / body image).

Prelis Analysis. Prior to entering the data into the Lisrel 8 program, the data was put through the Prelis program. This program not only allows researchers to examine the data for violations of multivariate normality, but can also be used to calculate a covariance matrix from the raw data file.

Results from the Prelis analysis of the 28 variables suggests that the data is rather skewed. Skewness scores from the "test of univariate normality for continuous variables" ranged from 4.83 to -1.57. Only four variables did not differ significantly from the pattern of a normal distribution (p.'s >.05). The kurtosis scores ranged from 22.54 to -1.35. This time only two variables had scores over p = .05, suggesting an even greater deviation from the expected values for a normal distribution. Furthermore, the score on Mardia's test of kurtosis was 12.79 (p >.000) implying that the data as a whole deviates radically from "the assumed distribution of multivariate normality" (Schutz, et al.,1994).

It is one of the basic assumptions of confirmatory factor analysis that the multivariate normality, "the joint distribution of more than two variables" not be violated (Pedhazur & Pedhazur, 1991). Since most variables in this data
set are not normally distributed and maximum-likelihood tests are sensitive to violations of multivariate normality (Bentler, 1985; Bollen & Stine, 1993), this may explain, in part, the final result of the confirmatory factor analysis to follow. However, recent evidence suggests that maximum likelihood procedures still yield valid results in the presence of quite severe non-normality (Chou & Bentler, 1995).

**Confirmatory Factor Analysis.** The covariance matrix generated in the Prelis 2 program was entered into a Maximum Likelihood Confirmatory Factor Analysis using Lisrel 8. Instructions were written to test for a four factor model (i.e. four latent variables) consisting of attitudes, subjective norms, perceived control and self-esteem/body image. According to the Theory of Planned Behaviour (the model being tested), three of the four factors are known to be correlated. Therefore all factors were free to correlate in the model. The unit of measurement for the factors was defined by fixing the loading of one of the observed variables for each factor (i.e. question items) to 1.0.

A data-driven "model generating" approach was taken to the analysis, resulting in four separate modifications of the data. The first analysis was conducted using the full data set. In each subsequent analysis four items, one from each factor, was removed. Items chosen for removal were always items with the lowest loading in the "Completely Standardized Solution" for that particular analysis. Removal of items one at a time was chosen because the order of removal can affect the loading of other variables (Hofmann, 1995).
Table 11 displays the chi-square ($X^2$), the degrees of freedom (df), the Q ratio ($X^2$/df ratio), the Parsimony Goodness of Fit Index (PGFI), the Comparative Fit Index, the Root Mean Square Residual (RMSR) and the Root Mean Square Error of Approximation (RMSEA) and its significance level for each modification. Optimally the chi-square value should be small in relation to the degrees of freedom. Consequently the Q-ratio should be between 2.0 to 5.0, 2.0 or less indicating a good fit and 5.0 or more indicating an poor fit. Conversely, the larger the PGFI the more parsimonious the model (i.e. the better it explains the phenomena being studied with the minimum number of variables). Larger CFI values are also desired, with a CFI of .90 or greater indicating an adequate fit between the model and the data. The RMSEA should be small. Approximately .05 or less indicates a good fit, whereas .08 to .05 indicates an adequate fit (Joreskog & Sorbom, 1993). The RMSR should also be small. In fact, the closer it is to zero the better the model fits the data (Grimm & Yarnold, 1995).

As can be seen in Table 11 the four factor model proved to have a very poor fit with the original 28 item data set. Consequently, steps were taken to modify the data and improve the fit between it and the intended model. It can be seen that while the first four modifications indicate improvements in the fit of the data to the model in at least one or more of the fit indices, the last modification with only 12 items indicates no improvement or a deteriorating fit. This actually is a mute point as all the results appear to indicate a rather poor fit between the data and the model. The Q-ratios range from 4.59 to 5.29, either very close to or above
<table>
<thead>
<tr>
<th>Data Entered</th>
<th>Chi-square</th>
<th>df</th>
<th>Q</th>
<th>RMSEA</th>
<th>CFI</th>
<th>PGFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Data (28 items)</td>
<td>1669.24</td>
<td>344</td>
<td>4.85</td>
<td>0.52</td>
<td>0.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Modification A (24 items)</td>
<td>1129.93</td>
<td>246</td>
<td>4.59</td>
<td>0.58</td>
<td>0.14</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Modification B (20 items)</td>
<td>788.65</td>
<td>164</td>
<td>4.81</td>
<td>0.55</td>
<td>0.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Modification C (16 items)</td>
<td>518.45</td>
<td>98</td>
<td>5.29</td>
<td>0.50</td>
<td>0.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Modification D (12 items)</td>
<td>283.50</td>
<td>48</td>
<td>5.91</td>
<td>0.50</td>
<td>0.16</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 11: Results of the Confirmatory Factor Analysis and Subsequent Modifications of the CIAU Modified Version of the National Survey of Youths Attitudes Towards Performance Enhancing Drugs.
5.0, the outer limit for an adequate fit. The PGFI values ranging from .59 to .50 are all progressively smaller indicating that the reduction in variable numbers is affecting the conciseness with which the model can explain attitudes subjective norms, perceived control and self-esteem / body image. The CFI's, on the whole, do appear to improve in the first three modifications (.60, .69, .78 respectively). The values, however, do not reach the minimum of .90 set as the "rule of thumb" level for an adequate fit between the model and the data (Bryant & Yarnold, 1995). The RMSR values ranging from .097 to .10 are also unacceptably large, and the RMSEA values ranging from .14 to .15 are not close to .08, the upper limit of acceptability for this fit indices.

If a single modification of the original model was selected for a follow-up hierarchical analysis, perhaps the best model to select would be Modification C containing 16 items (see Figure 2). Although its Q-ratio is slightly above the upper level of acceptability (Q = 5.29), its PGFI value (.50) is slightly lower than Modification B (.55), and its RMSR (.10) is marginally higher than Modification B (.097), it does possesses the same RMSEA (.15) as Modification B and it has a higher CFI (.78 vs. .69). Modification C also has a higher average factor loading than Modification B for each of the four factors (.74, .48, .47, .60 vs. .67, .42, .38, .55 respectively) (Marsh et al, 1994). Looking at the Lisrel Estimates, all of the correlation z-scores for Modification C are above 2.00 and significant, whereas at least one variable in Modification B is below 2.00.
Figure 2.

Factor loadings from a confirmatory factor analysis of the Theory of Planned Behaviour and the added variable self-esteem / body image: Four-factor theoretical structure.

(ATT=attitudes, SJN=subjective norms, PCD=perceived control, SEB=self-esteem / body image).
Hierarchical Regression Analysis

As illustrated in Table 12, attitudes and subjective norms were entered in the first step, followed by perceived control in the second step and self-esteem/body image and habit strength in the third step. In the first step, subjective norms contributed significantly to the prediction of intention ($B = .33; p < .001$), whereas attitudes did not ($B = .11, p = n.s.$). Together, however, the amount of variance accounted for by the model was significant $R = .39$, $F (2, 179) = 16.44, p < .001$. Controlling for the influence of attitudes and subjective norms it was found that perceived control ($B = .15, p < .05$) significantly increased the proportion of variance accounted for by the model $R = .42$, $F (3, 178) = 12.50, p < .001$; $F$-change = 4.06, $p = .05$.

The addition of both self-esteem/body image and habit strength scores in Step 3 accounted for variance beyond that accounted for by the Theory of Planned Behaviour (i.e. attitudes, subjective norms and perceived control) $R = .50$, $F (5, 176) = 11.77, p < .001$; $F$ change = 8.99, $p < .001$. Individually, habit strength ($B = .22, p < .001$) and self-esteem/body image ($B = .20, p < .01$) also contributed to prediction of intention. In regards to the relationship between the variables, it can be seen on Table 13 that all the correlations, while almost all significant were also all quite small. All of the variables also appear to have correlated to about the same degree with intentions and with each other. The one notable exception being the correlation between Habit Strength and Self-Esteem/Body Image ($r = .13, p = n.s.$).
Table 12

Results of the Hierarchical Regression Analysis of Variables Believed to be Associated with Intentions to Use Performance Enhancing Drugs.
N=182

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Beta*</th>
<th>p</th>
<th>R</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>10.92</td>
<td>4.86</td>
<td>0.11</td>
<td>n.s.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>5.65</td>
<td>2.29</td>
<td>0.33</td>
<td>p &lt; .001</td>
<td>0.39</td>
<td>(F=16.44, p &lt; .001)</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>10.92</td>
<td>4.86</td>
<td>0.06</td>
<td>n.s.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>5.65</td>
<td>2.29</td>
<td>0.31</td>
<td>p &lt; .001</td>
<td>0.42</td>
<td>(F=12.50, p &lt; .001)</td>
<td></td>
</tr>
<tr>
<td>Perceived Control</td>
<td>6.75</td>
<td>2.26</td>
<td>0.15</td>
<td>p &lt; .05</td>
<td>0.42</td>
<td>(F change=4.06, p &lt; .05)</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>10.92</td>
<td>4.86</td>
<td>0.04</td>
<td>n.s.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>5.65</td>
<td>2.29</td>
<td>0.21</td>
<td>p &lt; .001</td>
<td>0.50</td>
<td>(F=11.77, p &lt; .001)</td>
<td></td>
</tr>
<tr>
<td>Perceived Control</td>
<td>6.75</td>
<td>2.26</td>
<td>0.06</td>
<td>n.s.</td>
<td></td>
<td>(F change=8.99, p &lt; .001)</td>
<td></td>
</tr>
<tr>
<td>Self-Esteem / Body Image</td>
<td>7.81</td>
<td>4.46</td>
<td>0.20</td>
<td>p &lt; .01</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Habit Strength</td>
<td>1.12</td>
<td>2.14</td>
<td>0.22</td>
<td>p &lt; .001</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Beta = Standardized Regression Co-efficient
Table 13

Correlation Matrix Between All Variables Used in the Hierarchical Analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attitudes</td>
<td>.28**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Subjective Norms</td>
<td>.38**</td>
<td>.51**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Perceived Control</td>
<td>.26**</td>
<td>.38**</td>
<td>.27**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Self-Esteem / Body Image</td>
<td>.33**</td>
<td>.28**</td>
<td>.34**</td>
<td>.28**</td>
<td></td>
</tr>
<tr>
<td>6. Habit Strength</td>
<td>.34**</td>
<td>.21**</td>
<td>.30**</td>
<td>.31**</td>
<td>.13</td>
</tr>
</tbody>
</table>

**p < .001
Chapter 5

DISCUSSION

As stated in the introduction, this study was designed to serve several purposes: (1) to create a questionnaire that will effectively measure the constructs of attitudes, subjective norms, perceived control, self-esteem / body image and habit strength, (2) to confirm a set of variables that could be used to predict athletes' present use of ergogenic substances or their intentions to use such substances, and (3) to establish the effectiveness of the Theory of Planned Behaviour and two additional variables of self-esteem / body image and habit strength to predict athletes' intentions to use performance enhancing drugs. A fourth purpose, although not formally stated, was to collect descriptive data that may be useful for improving the CIAU's current drug education program. Unfortunately, it would appear that the results of the current study may have fallen short of fulfilling all of these purposes.

Confirmatory Factor Analysis

Originally it was hypothesized that a confirmatory factor analysis, using maximum likelihood methods, on the data in Question 5 would reproduce the expected four factor model consisting of attitudes, subjective norms, perceived control and self-esteem / body image. After repeated modifications, it was found that the best fitting model, \( \chi^2 (98, n=182) = 518.45, p < .05 \), provided only a
rather poor fit to the data and consequently could provide only very weak support for the predicted four factor structure.

The sample, its size and characteristics, would at first appear to have some influence on the CFA results. Of the 1000 surveys mailed out, only 182 or 18% of them were returned. Given this small return rate, it is possible that the sample that was obtained does not adequately represent the attitudes, etc. of all male CIAU football, swimming, hockey, wrestling and track and field athletes. In fact the high degree of skewness and kurtosis (i.e. leptocurtic) observed in the Prelis analysis indicates that this sample was very homogeneous. As a result, the data may be biased. While the responses themselves may have been biased towards athletes who are responsible about returning surveys or who have no reason to fear detection (i.e. do not use drugs), or live at the mailing address given by them to the CIAU, etc. it is unlikely that the high degree of skewness and kurtosis observed would have any influence on the validity of the results. More to the point, it has been shown that maximum likelihood methods of analysis are relatively robust and will produce valid results even when data is extremely skewed (Chou & Bentler, 1995).

It has been suggested, however, that "what one gets out of CFA depends on what one puts in" (Smith, et al., 1995; p.393). If the skewness of the data is not likely a major influence on the results then perhaps it is the instrument itself that is at fault. It is possible that the scales used in the "CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing
Substances were "poor operationalizations" of the Theory of Planned Behaviour and the variable self-esteem/body image. In other words, the questionnaire may not have been measuring the simple four factor model that it was intended to measure, thus bringing the validity of this instrument into question. An examination of the fitted matrix loadings or the KSI matrix shows that many of the variables loaded almost equally as well on another factor even while their loading on the intended factor was retained. Specifically, in Modification C, 13 of the 16 variables had potential loadings on another factor with a magnitude within +.10 of their loading on their intended factor. These results suggest that the questionnaire may not be an adequate measure for testing the Theory of Planned Behaviour and the added variable self-esteem/body image. It is also possible that the Theory of Planned Behaviour is not an appropriate model with which to predict athlete's intentions to use performance enhancing drugs. To test these possibilities further, the questionnaire subscales, as will be discussed in later sections, were subjected to a hierarchical regression analysis.

**Correlations and Comparisons**

It was believed that the present investigation might uncover a set of variables that could accurately predict performance enhancing drug use rather than rely on measures of actual drug use that are usually very inaccurate. It would then be possible to more accurately determine the rate of drug use in the
CIAU and hence the need for and type of drug education required by CIAU athletes.

The ability of the "CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances" to solicit accurate information about subjects' drug using habits was established in two ways. Comparisons were drawn between the percentage of self-reported drug use obtained from the sample and the percentage of drug use subjects reported for their peers. Comparisons were also drawn between the percentage of self-reported drug use in this study versus the percentages quoted in similar studies.

Table 1 shows the percentage of subjects as a whole and by sport who reportedly used substances to improve their performance. Table 4, on the other hand, shows subjects' estimations of the percentage of their peers who use ergogenic substances. According to Table 1, 30.8% of all subjects reported using performance enhancing substances. This amount well exceeds the 1-10% rate of drug use predicted by the majority of subjects for all male CIAU athletes and all male CIAU athletes in their sport. It also, obviously, exceeds the 0% rate of drug use that the majority of subjects predicted for their team-mates.

From the results seen in Table 4 it would appear that at least 37.5% of subjects were more accurate in their predictions of the current rate of drug use as this group predicted that 11-30% of all male CIAU athletes take drugs. Only 26.4% of subjects believe that 11-30% of male CIAU athletes in their sport use
drugs and even less subjects (6.7%) believe 11-30% of their team-mates use drugs.

Whereas it was expected that subjects would be more willing to report drug use by others than themselves, it would appear that for this sample the converse is true. It must be considered, however, that the reported rate of drug use presented in Table 1 includes subjects' reports of both banned and legal substance use. This was done as it was deemed more important for the purposes of the study to access subjects' intentions to use substances to improve their performance (regardless of the actual effectiveness of the substances they reported using) than it was to focus strictly on their use of banned substances.

Although subjects were asked to report what percentage of their peers used performance enhancing drugs in questions 13, 15, 17 and 19, it may be possible that subjects were thinking only of banned substances when they responded to these questions. When only substances banned by the CIAU are considered (i.e. narcotic pain killers, doping methods, stimulants / speed & steroids), the rate of subjects' reported drug use falls to 10.8%. Under these circumstances, the subjects own reported rate of drug use is more similar to the rate of drug use most subjects reported for their peers (i.e. 1-10%).

Many similarities are also found when the subjects' reported rates of drug use are compared to reports of drug use uncovered by similar studies of Canadian athletes. In Table 1 subjects' reports of drug use are listed for each
sport. In the current study narcotic pain killers were reported by 6.0% of subjects, particularly football players (15.3%). Major pain medications, while not necessarily as potent as narcotic pain killers, were reported by 17.7% of male subjects in Spence and Gauvins' (1996) study of CIAU athletes. The current study also found that 1.0% of subjects reported using anabolic steroids and 1.6% of subjects used stimulants / speed. Similarly, Spence and Gauvin (1996) found that 1.1% of their male subjects reported steroid use and 1.0% reported amphetamine use. Clement (1983) in his study of elite Canadian athletes found that 2% of all subjects reported using speed while 6% took stimulants and 2% used Benzedrine.

In terms of overall reported drug use, 30.8% of subjects in the current study reported using substances to improve their performance. Similarly Spence and Gauvin (1996) found that 22.1% their subjects reported ergogenic drug use, whereas Labarge and Thibault (1990) who studied athletes at the Quebec Games found that only 2.4% reported such use.

Having established that the subjects' responses about their own drug use is consistent with both with their own reports of drug use by their peers and with reports of drug use made in similar studies, the next step in the current research was to test the relationship between self-reported drug use and self-reported attitudes, subjective norms, perceived control and self-esteem body image. The purpose was to determine if there was a link between these concepts and if so to draw up profiles of drug users based upon their subscale scores.
Pearson-product moment correlations were calculated between subjects' attitude, subjective norm, perceived control and self-esteem/body image subscale scores and both their habit strength and intention scores. In general it was found that the linear relationship between these subscales and both drug use and intentions to use drugs was very poor. As can be seen on Tables 9 and 10, several of the correlations were significant. The highest correlation, between intentions and subjective norms, however, was only \( r = .38, p<.001 \). Typically correlations of less than .50 are not considered to have much predictive power. For example, an \( r = .50 \) would allow one to predict 25% of the variance in subjects' scores. An \( r = .38 \), on the other hand, would only allow one to predict 14% of the variability in subjects' drug use habits by knowing their attitude subscale score.

One cause of these low correlations may be something called a "restricted range". The data, as was mentioned in the section on CFA, is based on a comparatively small sample of CIAU male athletes. Specifically, the current sample represents only 1.7% of all active male CIAU athletes. As a result it is very likely that this sample is biased towards athletes who do not use or do not intend to use performance enhancing drugs and hence are more likely to return their questionnaire as they have little reason to fear detection. This, as the Prelis analysis showed, produced a very homogenous sample. It may also have had the effect of restricting the range of possible scores in the sample. A strong linear relationship may have been found if all male CIAU athletes, those with
both strong and weak intentions to use drugs, had answered the survey. When only a small portion of the total number of subjects, most of whom come from the low end of the scale, respond the result is a decrease both in the variance of the results as well as the correlation coefficient (Cohen & Cohen, 1983).

Profiles built on this linear correlation data alone, with no knowledge of the rest of the range, would not be of much use if one wanted to predict which athletes currently use drugs or intend to use drugs in the future. A hierarchical regression analysis of the results, however, may still provide useful information about the relationship between athletes' attitudes, subjective norms, perceived control, self-esteem / body image and habit strength and their intentions to use performance enhancing drugs.

Hierarchical Regression

Earlier it was hypothesized that the variables in the Theory of Planned Behaviour would predict a significant proportion of the variance in subjects' intentions to use performance enhancing drugs. The results suggest that a significant amount of variance was accounted for by the model. In absolute terms, however, the amount of variance accounted for by the model is well below that suggested by exercise adherence studies to be necessary for effective prediction of intentions.

Using the subscales identified via confirmatory factor analysis, subject's attitude, subjective norm, perceived control and self-esteem / body image, as
well as their habit strength subscale scores were entered into a hierarchical regression analysis. It was found that the first three variables (i.e. the antecedents of intentions in the Theory of Planned Behaviour) were able to predict a significant amount of variance in subjects' intentions scores $R = .41$, $F(3,178) = 12.50, p < .001$. The R-squared, or the percentage of variance in intention scores that could be predicted using subjects' attitude, subjective norm and perceived control scores, of 17% was well below 40%, the percentage that is suggested by a review of the exercise adherence literature using the Theory of Planned Behaviour as necessary for the accurate prediction of intentions (Godin, 1993).

Individually, subjective norms were found to contribute significantly to the prediction of intentions ($B = .33, p < .001$), attitudes, however, did not ($B = .11, p = \text{n.s.}$). The Theory of Planned Behaviour would predict, that when the variables of the Theory of Reasoned Action (i.e. attitudes and subjective norms) are controlled for, the addition of perceived control would add significantly to the prediction of intentions. As expected perceived control did add to this prediction ($F$-change $= 4.06, p = .05$).

It would appear, that of the variables that make up the Theory of Planned Behaviour, the variable "subjective norms", or what significant others think one should do and one's willingness to conform with others' wishes, is the best predictor of athletes' intentions to use performance enhancing drugs. To the best of the authors' knowledge, the current study is the first attempt to apply not only
the Theory of Planned Behaviour to the study of performance enhancing drug use, but also the first attempt to use any theory to explain this form of drug use. Therefore, it was necessary to look at research outside the area of performance enhancing drug use in order to draw comparisons to this study. Perhaps the closest comparisons might be drawn between this study and other studies that have examined recreational drug use. It has been mentioned earlier that the motivations behind recreational drug use and performance enhancing drug use may be quite different. But if subjective norms and perceived control do play a significant role in predicting athletes' choices regarding ergogenic drug use, then the similarities between the two forms of drug use may be closer than was first suspected.

In support of the role of subjective norms, there are several studies of recreational drug use that have found that subjective norms, in terms of peer pressure, can act as a mechanism to encourage or discourage subjects from using drugs. For example, Ellickson, Bell & Harrison (1993) and Ellickson, Bell & McGuigan (1993), although they did not mention using the theory of planned behaviour they did find that by changing high school students' attitudes, subjective norms and perceived control they were able to change their use of marijuana and cigarettes. Social norms were found to be especially effective in changing drug use behaviours in that the classes taught by peer teachers were the most successful. Likewise, a study of longitudinal data by Sclegel & D'Avernas (1992) on adolescent alcohol use found that while all three variables
(i.e. attitudes, social norms and perceived control) played a role in predicting intentions, peer pressure was especially predictive of drug use.

Just as perceived control was found to predict performance enhancing drug use in the current study, Traeen & Sturla (1993) found that perceived control was the most predictive of adults intentions to visit public drinking places (presumably to consume alcohol). Only Pompo’s 1991 dissertation on marijuana use and the Theory of Planned Behaviour discovered that attitudes, not subjective norms or perceived control played the greatest role in predicting drug use.

In Table 6 items that were used in the hierarchical regression analysis of subjective norms were marked for identification. In this table it can be seen that, 59.4% of subjects do not believe that it is their business alone if they choose to take anabolic steroids. Also, almost 6% of subjects were willing to take a drug if a close friend offered it to them. More than 6% do not believe their coach is against performance enhancing drug use and a further 6% are unsure of their coach’s opinion on the matter. Although the item was not included in the hierarchical analysis, it can also be seen in Table 6 that over 50% of subjects believe that it is important to do everything their coach wants them to do. What these results suggest is that subjects' coaches and friends have the potential to influence subjects to take performance enhancing drugs and that a reasonable number of subjects are inclined to submit to their influence.
If subjective norms do play a role in predicting athletes' intentions to use performance enhancing drugs then the most obvious mechanism for this would be team building, the process of bringing athletes together as a cohesive group. As a group, teams tend to form their own set of social norms which may be either for or against ergogenic drug use. On Questions 15, 17 and 19 (see Table 4) subjects were asked to speculate how many of their male peers in the CIAU use performance enhancing drugs. Over half of the subjects (50.5%) claimed that none of their team-mates use drugs. From this it would appear that most athletes perceive that the social norm on their team is not to use drugs. However, on question 12 over half the subjects (52.2%) admitted to personally knowing someone who uses performance enhancing drugs. Perhaps subjects were being protective of their team-mates, or perhaps it is friends outside of their team or sport that use drugs. Either way, over half of subjects are exposed to a possible social influence to use performance enhancing substances.

Another large source of social influence on athletes is their coach. Presumably, this is because it is common practice for athletes to do what their coach asks of them. As mentioned earlier approximately 6% of the sample felt their coach does not oppose drug use and 6% were unsure of their coaches' opinion on the matter. Although this means that most subjects are at least somewhat sure their coach opposes drug use, it also means that the coaches of at least 12% of the sample may either be purposely or inadvertently influencing their athletes to use performance enhancing drugs. As will be discussed later, an
understanding of the influence of peers and coaches is very useful information if one wishes to design a program to influence athletes' choices regarding performance enhancing drugs.

Perceived control was also found to influence athletes' choices regarding performance enhancing drug use. Looking at the items entered into the hierarchical analysis on Table 7, 57.2% of subjects believe they could obtain performance enhancing drugs if they wanted them, 90.1% believe it is easy for them to resist the temptation to use drugs, and 12.6% believe they could show someone how to administer anabolic steroids. Referring back to the example of the CIAU football player given earlier, it was stated that if he had a high degree of perceived control he would know how to use performance enhancing drugs (e.g. administer steroids), and he would have contacts to supply him with drugs (e.g. can obtain drugs if he wants them). The results above would suggest that while most subjects could resist the temptation to use ergogenic drugs, a notable proportion of these subjects have access to the resources and skills necessary to use them should they choose to give in to temptation. Considering that 30% of subjects reported using substances to improve their performance and 90% of subjects believe they are resistant to the temptation to use ergogenic drugs, it would appear that many subjects are not as resistant as they reported. In terms of drug education it may mean that even the more "resistant" athletes may benefit from drug resistance training.
Attitudes were not found to be as predictive of performance enhancing drug use as were the variables of subjective norms and perceived control. It might be possible to assume, when reviewing the item scores in Tables 5, 6 and 7, that there is less variability in their attitude scores than their subjective norm and perceived control scores. Looking at the items entered into the hierarchical analysis (as indicated in Table 5), it would appear that subjects claim to strongly oppose drug use. In other words, their attitudes are relatively homogeneous. It would be difficult then to distinguish between subjects on these points. Consequently, little could be predicted about their intentions by understanding their attitudes as measured by the "CIAU Modified Version of the National Survey of Athletes Attitudes Towards Performance Enhancing Substances".

According to a recent unpublished study by Spence and Gauvin (1995), attitudes may better be measured in terms of their relationship to positive and negative evaluations of the outcomes of performance enhancing drug use. It was found that ergogenic drug users tended to have higher success expectancies (e.g. winning, becoming a professional athlete or coach, making an Olympic team) and could be significantly predicted based upon their expectancies of success.

Although the variables in the Theory of Planned Behaviour alone were found to be predictive of intentions, the variables of self-esteem / body image and habit strength were found to add significantly to the prediction of intentions (F change = 8.99, p < .001). Based on the literature review presented in Chapter
3, it was assumed that self-esteem / body image would not be a significant predictor of subjects' intentions to use performance enhancing drugs. Specifically, just as many studies in the recreational drug literature could be found to support a relationship between self-esteem and intentions to use drugs as there were studies proving a lack of relationship (Schroder & Laflin, 1993). In regards to performance enhancing drug use, Evans, Weinberg & Jackson (1992) and Carr (1993) did not find self-esteem to predict anabolic steroid use. But when self-esteem is measured in terms of body image, a connection between how one feels about one's appearance and anabolic steroid use was found (Brower, Blow & Hill, 1994).

Of the self-esteem / body image items retained for the hierarchical analysis (see items indicated in Table 8) two related to self-esteem and two to body image. Unlike previous studies of ergogenic drug use, lower self-esteem in terms of subjects' discontentment with themselves and their academic performance were important in predicting their intentions to use performance enhancing drugs. On the other hand, similar to previous studies of ergogenic drug use, the greater the subjects' dissatisfaction with their appearance and the greater their confidence in the ability of anabolic steroids to improve their body image, the greater were their intentions to use ergogenic drugs.

It might be possible that for some athletes, discontentment with themselves may mean discontentment with their athletic performance. Consequently, they may try to use drugs as a means to improve their
performance and as a result improve their self-esteem. Low self-esteem may also be the cause or the result of doing poorly in school for these athletes. When data is correlational, as it is with hierarchical regression analysis, the causality of that relationship is unknown. Therefore, in terms of drug education, it may be impossible to say that improving self-esteem will reduce drug use. But, it may still be useful for coaches and educators to identify athletes who suffer from low self-esteem as chances would seem greater that these athletes use performance enhancing drugs.

Similarly, coaches and educators of male athletes may also wish to identify players who have poor body images. Whereas female athletes have been known to take diet aids and diuretics to lose weight, a trend of "reverse anorexia" appears to be developing among young males (Pope, Katz & Hudson, 1993). Males with this disorder have developed a "fear of being small". This fear most likely arises from muscle magazines and other media that promote an image of the "muscle-ripped" male as the physique that all other males should strive to achieve. Athletes, whose focus is primarily on their physique, may be especially susceptible to this kind of influence especially if it is accompanied by size requirements imposed by their sport, such as occurs in football.

In the current sample, approximately 30% of subjects reported using one or more performance enhancing substances. As was originally proposed, habit proved to be a useful for predicting intentions in a sample with previous experience in using drugs. It was also proposed that habit and perceived control
may be related in that they both measure past experience. Specifically, past experience can lead to habit formation as well as increased self-efficacy or control. In addition to measuring past experience, habit also measures the influence of addiction. If perceived control had not been found to significantly predict intentions it might have been possible to discount the role of past experience and conclude that habit, only in terms of an addiction, had influenced athletes intentions to use performance enhancing drugs. As it stands, this conclusion is not possible. All that can be concluded is that athletes who used ergogenic substances in the past are more likely to try using them again in the future.

It should be noted as well that habit proved to be the most significant predictor of performance enhancing drug use. In terms of drug education this means that it is vitally important to get anti-drug messages through to athletes before athletes have tried using drugs because once they start using performance enhancing substances they will likely continue using them. According to CCDS's 1993 study of drug use amongst Canadian high school athletes this drug use can begin as early as 11 years of age. This might suggest that drug education for CIAU athletes is too late to be preventative. But, as will be pointed out later, methods are available for dealing with current drug users.
Conclusion

Earlier a Confirmatory Factor Analysis was conducted to find the best fitting model for the data. As hypothesised, a model was found to predict (although rather weakly) the intended four factor model. Specifically, this best fitting model, consisting of 16 attitude, subjective norm, perceived control and self-esteem / body image items, proved to be a very poor fit for the data. It was suggested that either the questionnaire that was used to obtain the data was not measuring the model's variables as it was intended to do, or the model was inappropriate for the phenomena being studied.

A hierarchical regression analysis was used to test how well the variables of attitude, subjective norm and perceived control could predict intentions according to the Theory of Planned Behaviour. Based on previous research the variables of self-esteem / body image and habit strength were later added as it was believed that they would improve the model's prediction of intentions.

As hypothesised the variables associated with the Theory of Planned Behaviour did significantly predict subjects' intentions to use performance enhancing drugs. Nevertheless, it fell short of the pre-set goal of predicting 40% of the variance in intention scores. Also as hypothesised, self-esteem / body image significantly predicted subjects' intentions to use performance enhancing drugs. But regardless of the addition of this variable and the variable habit strength to the model again still fell short of the expected level of 40%.
Despite the poor fit between the model and the data, the variables of the Theory of Planned Behaviour (i.e. attitude, subjective norm, perceived control) and the added variables of self-esteem / body image and habit strength, as they were operationalized in the "CIAU Modified Version of the National Survey of Youths Attitudes Towards Performance Enhancing Drugs" were able to predict 25% of the variance in subjects' intention scores. This implies that the Theory of Planned Behaviour together with self-esteem / body image and habit strength may yet be useful in predicting athletes' intentions to use drugs to develop drug education programs rather than relying simply on measures of self-reported drug use alone.

These results also imply that further modifications must to be made to the "CIAU Modified Version of the National Survey of Youths Attitudes Towards Performance Enhancing Drugs" to improve its ability to measure the variables of the Theory of Planned Behaviour, and self-esteem / body image and habit strength. Since the "National Survey of Youths Attitudes Towards Performance Enhancing Drugs" had been developed via the input of experts in the field of performance enhancing drug use and had been proven to have a high level of internal consistency it was originally assumed that with minor modifications it would prove to be a valid instrument for measuring intentions to use performance enhancing drugs. An alternative to this would have been to return to the drug experts, ask them to generate long list of questions for each of the four variables, submit their questions to an exploratory factor analysis to reduce
the number of items and enter the remaining items into a confirmatory factor analysis to test the factor structure. Using this method it may have been possible to develop a more psychometrically sound instrument with which to accurately measure athletes' intentions to use performance enhancing drugs.

An additional recommendation to future researchers is to administer the questionnaire in person rather than rely on subjects to return the surveys in the mail. Whereas this study only achieved an 18% return rate, Spence and Gauvin (1996) were able to obtain an 87% return rate by presenting the questionnaires to subjects in a classroom setting. On the other hand, the incidence of drug use in the CIAU may be so small that statistical methods other than those that require large samples be obtained may be more suited to the study of CIAU athletes' drug using behaviours.

Recommendations For CIAU Drug Education Programs

Throughout the discussion of the hierarchical regression results comments were made regarding implications for drug education programs. To summarize:

1) It was concluded that peers and coaches can potentially influence athletes to take performance enhancing drugs and therefore should be involved in setting social norms against drug use.

2) It was concluded that although the majority of subjects perceive themselves to be in control of their drug using habits many of these subjects nevertheless reported using substances to improve their
performance. Therefore it still may be useful to incorporate drug resistance skills into CIAU drug education classes.

3) It was shown that low self-esteem and poor body image can be linked to intentions to use performance enhancing drugs. Consequently, coaches and educators may wish to identify athletes who suffer from either of these problems as they may be more likely to use drugs.

4) It was concluded that although it may be too late to prevent CIAU athletes from starting to use substances to improve their performance, there are methods available for educating drug users against further drug use.

Earlier it was emphasised that habit, of all the variables measured, was the most predictive of subjects' intentions to use ergogenic substances. It should be noted that of all the drugs subjects reported using, the two most frequently reported were the two most easily obtained and least restricted substances; caffeine and extra protein. While overuse of nutritional aids to improve performance may result in only minor health problems, it has been suggested that substances such as protein powders, amino acids, etc., could have serious consequences in that they may be used as steroid replacers and consequently serve as a "stepping stone" to more powerful anabolic substances (Sobal & Marquart, 1994). This does not suggest that the use of caffeine or protein powders will automatically lead to the use of banned substances, just as cigarette smoking does not automatically lead to illegal drug use. But it has been found that many illegal drug users began their experimentation with drugs by
smoking cigarettes (Stark & Campbell, 1993; Kandel & Yamaguchi, 1992; Yu & Williford, 1992). The current study has shown that performance enhancing drug use is similar to recreational drug use in that both are motivated to a large extent by social norms. Whether or not recreational and performance enhancing drug use are also similar in terms of the "stepping stone" effect found between socially acceptable drugs and illegal drugs (i.e. users of unrestricted substances tend to go on to use banned substances to enhance their performance) remains to be investigated.

Although some subjects reported using substances more dangerous than caffeine and protein powders to improve their performance, the majority of subjects reported only using these nutritional supplements, or using no substances at all. If this is the case, then perhaps it would be more advisable if the CIAU addressed drug education first in terms of nutritional ergogenic aids that CIAU athletes are more likely to use and perhaps are more willing to discuss and second in terms of the more dangerous substances that they are less likely to take. Also, discussing nutritional aids with athletes could provide a good format for discussing their nutritional needs with them, thus providing the athlete with information that they can use regardless of their intentions to use or not use performance enhancing drugs.

The final recommendation concerns the subjects' reported knowledge of the effects of performance enhancing drugs. As illustrated on Table 2, many athletes claimed to have no knowledge of the performance enhancing effects of
beta blockers (54.5 %), diuretics (42.3), extra protien (16.7%), narcotics (14.7%) and doping methods (13.5%). Similarly, many athletes claimed to have no knowledge of the health risks of taking beta blockers (63.4%), diuretics (43.3%), doping methods (24.6%) and extra protien (21.6%) (See Table 3).

Currently, all first year CIAU athletes must attend a drug education seminar in which the ergogenic effects and health risks of performance enhancing drug use are discussed. The results presented above would suggest that perhaps these drug education sessions are not having the intended impact on male CIAU football, swimming, ice hockey, wrestling and track & field athletes. It may not be of great concern that athletes are unaware of beta blockers and doping methods as few athletes would be expected to use these ergogenic aids. But an athletes' lack of knowledge about narcotics and diuretics could result in a situation similar to that which Silken Lauman found herself in when she inadvertently tested positive at the Pan American Games. So, although it may be preferrable to emphasize nutrition in future CIAU drug education sessions, it is still important to discuss with athletes the effects of banned ergogenic aids they may come in contact with. It may also be advisable for the CIAU to supply individuals who conduct the first year drug education sessions with a standardized session format (see Allemeier & Filsinger, 1994) and knowledge tests to evaluate the effectiveness of each session.
Recent studies of the drug using habits of CIAU athletes suggest that performance enhancing drug use is a problem, particularly among males in sports requiring power and/or strength (Allemeier, 1994; Greenberg, 1989; Spence & Gauvin, 1994). Although the current research details the extent of this problem it provides no suggestions as to how to modify the content of the CIAU's current drug education program to more effectively reduce drug use in CIAU sport.

Expert work in the area of social psychology suggests that the best way to change behaviour is to identify psychosocial factors (e.g. attitudes, subjective norms, perceived control) associated with a target behaviour as these factors tend to respond well to change (Brawley, 1993, Elder, et al, 1994; Fodor, Dalis & Gairrantano, 1995; Greenberg, J., 1989). Apparently few if any models or theories containing psychosocial variables have been used to predict performance enhancing drug use, in particular drug use by CIAU athletes. Of the psychosocial models of behaviour that are available, the Theory of Planned Behaviour (TPB) that uses attitudes, subjective norms and perceived control to predict intentions and actual behaviour, appears to be the most suited to the study of athlete drug use. The TPB, unlike other models, has been used to successfully predict both recreational drug use and exercise adherence. Recent
research also suggests that the variables of self-esteem (including body image) and habit strength might aid in the prediction of intentions to use performance enhancing drugs.

In order to test the ability of the Theory of Planned Behaviour and the added variables of self-esteem / body image and habit strength to predict performance enhancing drug use it was necessary to create, or in this case modify, a questionnaire to measure all of these variables.

Therefore the purposes of the current study were threefold:

1) To modify the CCDS’s “National Survey of Youths’ Attitudes Towards Performance Enhancing Drugs” in order to create a questionnaire that will effectively test the capacity of the Theory of Planned Behaviour and the added variables of habit and self-esteem to predict male CIAU football, wrestling, swimming, ice hockey and track & field athletes’ intentions to use performance enhancing drugs.

2) To create profiles of male CIAU football, wrestling, swimming, ice hockey and track & field athletes who use drugs and athletes who intend to use drugs and report the percentage of athletes surveyed that fit these profiles.

3) To establish the effectiveness of the Theory of Planned Behaviour and the variables of habit and self-esteem to predict male CIAU football, wrestling, swimming, ice hockey and track & field athletes’ intentions to use performance enhancing drugs.
A total sample of 1000 male CIAU football, wrestling, swimming, ice hockey and track & field athletes from CIAU institutions across Canada were randomly selected by computer, by the CIAU to receive a copy of "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances". Male athletes from these sports were selected as it was anticipated that they would be most at risk for performance enhancing drug use and hence would be more likely than other CIAU athletes to report drug use. It was further believed that measurement of these athletes' attitudes, subjective norms, perceived control, self-esteem/body image and habit strength would accurately predict these athletes' intentions to use drugs and hence would make it possible to determine which of these variables CIAU drug education should focus on changing to effectively reduce drug use. It was further believed that predictions based upon measurement of these psychosocial factors would provide a more accurate picture of the extent of drug use in the CIAU than that to be obtained by using self-report measures of drug use.

Data from 182 surveys was analyzed. This sample represented approximately 18% of the sample population, 1.7 % of the active male CIAU athlete population or 4.7 % of the population of actively participating male football, swimming, wrestling, ice hockey and track & field athletes in the CIAU.

A confirmatory factor analysis of the data using Lisrel 8 found that the best fitting model, \( \chi^2 (98, n = 182) = 518.45, p < .05 \), only provided a rather poor fit to the data and consequently could provide only very weak support for
the predicted four factor structure (i.e. attitudes, subjective norms, perceived control, and self-esteem / body image). An examination of the KSI matrix shows that 13 of the 16 variables measured had potential loadings on another factor that was within +.10 of their loading on the intended factor. This suggests that the questions in the "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances" may have been "poor operationalizations" of the Theory of Planned Behaviour and the added variable of self-esteem / body image, thus bringing the validity of this survey's scales into question.

Comparisons between the results obtained from the current questionnaire and results from similar surveys found that subjects' self-reported drug use and their reports of drug use by their peers were in keeping with the rates of drug use reported elsewhere. Interestingly, the percentage of subjects that reported using drugs themselves (30%) was higher than the percentage of drug use that most subjects picked to be the current rate of drug use for male CIAU athletes (1-10%). When the subjects' self-reported use of only "banned substances" (as opposed to unrestricted substances) was considered, the rate of self-reported drug use (10.8 %) was more in keeping with subjects' reported rate for their male CIAU peers (1-10%). Also of interest, over 50% of the sample claimed to personally know someone who uses performance enhancing substances.

Pearson product-moment correlations between subjects' attitude, subjective norm, perceived control and self-esteem / body image scores and
their intentions, while all significant, at most could predict only 14% of the variance in subjects' intention scores.

A hierarchical regression analysis was somewhat more successful. Together the variables of the Theory of Planned Behaviour (i.e. attitudes, subjective norms, and perceived control) were found to account for a significant amount of variance in subjects' intention scores, \( R = .41, F(3, 178) = 12.50, p < .001 \). Individually, subjective norms \( B = .33, p < .001 \) and perceived control \( B = .08, p = .05 \) significantly predicted intentions while attitudes did not.

The addition of perceived control significantly increased the proportion of variance accounted for above that accounted for by the Theory of Reasoned Action (i.e. attitudes and subjective norms) \( R = .41, F(3, 178) = 12.50, p < .001 \; F\text{-change} = 4.06, p = .05 \). The addition of both self-esteem / body image and habit strength similarly accounted for variance beyond that accounted for by the Theory of Planned Behaviour (i.e. attitudes, subjective norms and perceived control) \( R = .50, F(5.176) = 11.77, p < .001 \; F\text{-change} = 8.99, p < .001 \). Individually, habit strength \( B = .22, p < .001 \) and self-esteem / body image \( B = .20, p < .01 \) also contributed to prediction of intention.

In conclusion, the confirmatory factor analysis found only a poor fit between the data and the model and the hierarchical regression analysis found that the TPB and the added variables of self-esteem / body image and habit strength predicted much less variance than was expected (40%) based upon previous research. But, given that the Theory of Planned Behaviour, with the
added variables of self-esteem / body image and habit strength predicted 25% of
the variance in subject's intentions scores, it may still be a useful model for
predicting performance enhancing drug use intentions amongst CIAU male
athletes. The effectiveness of this model may be improved by reworking the
questions on the survey via exploratory factor analysis to improve the autonomy
of the scales.

The results of the survey nevertheless have produced several
recommendations for CIAU drug education programs. It is suggested that
coaches and peers may be adversely influencing athletes to use performance
enhancing drugs and therefore coaches and athletes must be involved in setting
social norms against drug use on their team. Drug resistance skills may also
need to be taught as athletes do not control their drug use as much as they
perceive they do. It also may be necessary to target athletes with low self-
esteeem as low self-esteem may be linked to performance enhancing drug use.
But, most importantly, it is suggested that CIAU drug education be geared firstly
towards "nutrition education" as most athletes reported use of dietary
supplements (i.e. caffeine and extra protein) to enhance their performance and
secondly towards the more dangerous banned substances. It is believed that
this type of program would better retain the athletes' interest in the sessions and
thus encourage more participation on the part of the athletes.
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Appendix A

Questionnaire Modifications
Variables Measured

Demographic Variables. Changes were made to Question 1 "How old are you" to correspond to the ages of the university population (i.e. 19-28 years) under study. Because the subjects were, by selection, all athletes, questions four, five, six, seven and eight on the NSYA that were designed to determine the subjects' level of athletic participation were removed. A single question asking “What CIAU sport(s) do you compete in?” was substituted in their place.

Several studies have found that individuals who take part in regular weight lifting programs are more likely to use anabolic steroids than those who do not participate (Chng & Moore, 1991; Finkenberg & Teper, 1991). It is assumed that most if not all CIAU athletes were involved in some type of weight lifting program. However, rather than rely on assumptions, Question 4 “Are you involved in a weight training program, for example, do you lift weights or work out on machines?” remained in the survey.

Behavioural Intention. According to Ajzen (1988, 1991), attitudes, subjective norms, and perceived control influence behaviour indirectly through behavioural intentions (See figure 1, p.15). Previous studies suggested that both habit strength (Godin, Valois and Lepage, 1993), and self-esteem (Laflin & Moore-Hirschl, 1994) also influence behaviour through behavioural intentions. It was, therefore, assumed that measures of attitudes, subjective
norms, and perceived control could be used to predict behavioural intentions and that measures of habit strength and self-esteem might add significantly to this prediction. It is further assumed that measures of behavioural intentions could be used to predict future behaviour.

For the purposes of this study only the relationship between the variables mentioned above (i.e. attitudes, subjective norms, perceived control, habit strength and self-esteem) and CIAU athletes' intentions to use performance enhancing drugs were examined. To examine the relationship between CIAU athletes' intentions to use performance enhancing drugs and their future drug use, some time must be left between collecting the baseline data on their intentions and the outcome measures of their behaviour. This usually requires that a follow-up study, some weeks or months later, is conducted to collect this behavioural data. Such a follow-up study was beyond the scope of the current research.

According to Blue’s (1995) review of the literature on the Theory of Planned Behaviour in exercise research, measuring the subjects' intentions in terms of a “likeliness” or “probability” better takes into account subjects' perceptions of barriers to performing a behaviour. Measures of subjects' behavioural intentions to use performance enhancing drugs, therefore, were based upon Godin, Valois and Lepage’s 1993 study of perceived control and exercise that measures intentions in these terms. The first question asked “What is the probability out of 100% that in the next six months you will use a
performance enhancing drug to improve your sport performance?” (i.e. 0-20%, 21-40%, 41-60%, 61-80%, 81%-100%). The second question asked “Presently, do you think that you will use performance enhancing drugs over the next six months?” (i.e. Extremely likely, Very likely, Somewhat Likely, Somewhat Unlikely, Very Unlikely, Extremely Unlikely).

**Attitude.** All of the current question statements from item 12 on the original questionnaire (i.e. the NSYA), now Question 5, were assigned to one of the following three categories; attitudes, subjective norms and self-esteem/body image. Questions were arbitrarily assigned to these categories on the basis of their similarity to the definitions of attitude, subjective norms and self-esteem/body image that will be presented in the upcoming sections. Similarly, the newly created questions designed to tap the construct of perceived control were written in keeping with the definitions that are presented in the following sections.

Subjects had the option of reporting on a five point Likert-type scale either (1) Strongly disagree, (2) Somewhat disagree, (3) Undecided (4) Somewhat agree, or (5) Strongly agree. This response format was somewhat modified from the original response format used in the NSYA (i.e. (1) Strongly agree, (2) Somewhat disagree, (3) Somewhat agree, (4) Strongly agree and (0) Don’t know).

Increasing the number of scored responses from four to five points by removing the “Don’t know” response option that is scored “0” in the original
format with the response option "Undecided" that is scored "3", may have increased the variance in responses and hence increased the reliability of the questionnaire (Mueller, 1987). The change to a five-point Likert-type scale also aided in the statistical analysis and interpretation of the results.

The questions designed to measure CIAU athletes' attitudes towards performance enhancing drugs as well as their attitudes towards issues related to drug use (i.e. attitudes towards winning, cheating, effectiveness of drugs, use of drugs) were based on the following definition of attitude.

According to Ajzen (1991), and the expectancy-value model of attitudes (Fishbein and Ajzen, 1975), an attitude forms from the positive or negative expectations that we link to particular behavioural outcomes. "In this fashion we learn to favour behaviours we believe have largely desirable consequences and we form unfavourable attitudes toward behaviours we associate with mostly undesirable consequences" (Ajzen, 1991; p. 191). Therefore, the "attitude toward the behaviour refers to the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Ajzen, 1991; p. 188).

The attitude questions were as follows:

"In sports, winning is the most important thing to me"

"Doing my best at sports is more important than winning"

"Olympic athletes using drugs such as anabolic steroids should be allowed to compete"

"Athletes using drugs such as anabolic steroids should be allowed to compete on a university team"
"It is okay to try anabolic steroids once"

"There are substances that will improve my athletic performance"

"Using drugs to do better in sports is cheating"

"Using anabolic steroids should be against the law"

"People who sell anabolic steroids should go to jail"

**Subjective Norms.** Ajzen's definition of subjective norm is made up of two components. The first is the normative belief or "the likelihood that important referent individuals or groups approve or disapprove of performing a given behavior" (Ajzen, 1991; p.195). The second component refers to "the person's motivation to comply with the referent in question" (Ajzen, 1991; p.195). The strength of the normative belief is determined by multiplying the person's belief that significant others will approve or disapprove of a behaviour by the person's desire to conform with preferences of referent others.

The following questions, taken from the original questionnaire, the NSYA, were used to assess CIAU athletes' perceptions of the subjective norms surrounding performance enhancing drug use. This set of questions is divided into two categories: questions that relate to the athletes' expectations surrounding performance enhancing drug use and questions that relate to the athletes' level of compliance with those expectations. The first three questions assessed expectations, the last three assessed compliance. In each case athletes were given the option to respond, (1) Strongly disagree, (2) Somewhat
disagree, (3) Undecided, (4) Somewhat agree, or (5) Strongly agree, to these questions.

"Only a few Olympic athletes use drugs to perform better"

"Only a few university athletes use drugs to perform better"

"My coach believes athletes should not use drugs to improve performance"

"If a close friend offered me a drug that would make me do better in sports I would try it"

"It is important to me to do everything my coach wants me to do"

"It is nobody's business but my own if I choose to take anabolic steroids"

**Perceived Control.** Perceived control, as was discussed earlier, refers to "the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1991; p. 188). These impediments and obstacles can include such things as a lack of knowledge, a lack of opportunities or a lack of resources necessary to perform a particular behaviour.

Five questions related to perceived control were added to the NSYA to create "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances". This addition was one of the major changes made to produce a questionnaire capable of testing Ajzen's Theory of Planned Behaviour. Each of the questions listed below were written in keeping with Ajzen's (1988, 1991) instructions for questionnaire design. This is with one exception, the first question listed below was taken from the NSYA as it
was deemed to measure “detection”, one of the impediments to using drugs. Once again, subjects were given the option to respond (1) Strongly disagree, (2) Somewhat disagree, (3) Undecided, (4) Somewhat agree, or (5) Strongly agree, to these questions.

“It is hard to tell if someone is taking anabolic steroids”

“I have little control over my choice to use performance enhancing drugs such as anabolic steroids”

“For me, it is easy to resist the temptation to use performance enhancing drugs such as anabolic steroids”

“If I wanted to, I could easily obtain performance enhancing drugs such as anabolic steroids”

“It would be difficult for me to avoid testing positive if I used performance enhancing drugs”

“If I wanted to I could tell someone how to correctly administer anabolic steroids”

**Self-Esteem / Body Image.** The following questions were used to measure CIAU athletes’ level of self-esteem and/or their perceptions of body image. Self-esteem is generally believed to be a global concept that relates to “one’s attitude towards the discrepancy between the actual and ideal self” (Robinson & Shaver, 1991, p. 116). One of the widely researched facets of self-esteem is body image, or one’s satisfaction with one’s physical appearance.

The focus of this investigation is the Theory of Planned Behaviour and the variables of attitudes, subjective norms, and perceived control. Research has shown, however, that measures of self-esteem and body image may contribute
to the understanding of athletic drug use. Because self-esteem is closely linked to body image (Pope, Katz & Champoux, 1988), these two variables were grouped together in the analysis. As before, subjects were given the choice of selecting one of the following responses: (1) Strongly disagree, (2) Somewhat disagree, (3) Undecided, (4) Somewhat agree, or (5) Strongly agree, to each of the following questions.

- "I usually like the way that I look"
- "Most of my peers are better liked than me"
- "I think that I do well at school"
- "People rarely judge me on my appearance"
- "I am content being who I am"
- "Usually, if I have something to say, I say it"
- "Anabolic steroids will help me look better"

**Habit Strength.** Research in the areas of exercise behaviour and recreational drug use suggest that measures of habit strength can enhance the understanding of intentions and behaviour. Question 9 asks, "In the last 12 months, have you ever used any of the following to help you do better in sports?" (i.e. caffeine, narcotic pain-killers, alcohol, stimulants/speed, beta blockers, doping methods, alphabodies, diuretics, extra protein). Alcohol, a recreational drug, and "Alphabodies", a made-up/imaginary drug were included to expose individuals who responded carelessly and/or did not understand which drugs will
"help you do better in sports". Subjects are offered the opportunity to respond to Question 9 in the following manner: “Never used”, “Don’t know”, ‘1-2 times”, “3-5 times”, “6-10 times” and “More than 10 times”.

Knowledge. In addition to testing the Theory of Planned Behaviour, a secondary purpose for this investigation was to determine what aspects of the CIAU’s drug education program may require modification. One such aspect is the level of instruction athletes are given about the effects of performance enhancing drugs. Three questions, therefore were used to examine CIAU athletes’ knowledge of the effects of performance enhancing drugs. Question 8 asked “Do you think that any of the following will help an athlete perform better” (Caffeine, narcotic pain killers, alcohol, stimulants/speed, anabolic steroids, beta blockers, doping methods, alpha bodies, diuretics, extra protein). Question 10 asked “Do you think that any of the following will be harmful to your health if you use them? (Caffeine, narcotic pain killers, alcohol, stimulants/speed, anabolic steroids, beta blockers, doping methods, alpha bodies, diuretics, extra protein). Question 11 asked “Which of the following statements do you agree with most?”, (1) “Anabolic steroids do not have any side effects”, (2) “Anabolic steroids have some side effects but they are pretty rare”, (3) “Any side effects from anabolic steroids will go away when you stop using them”, (4) “The side effects from anabolic steroids can show up even after you stop using them”, and (5) “Don’t know".
Perceptions of Drug Use Among Other Groups. When a self-report questionnaire is used to gather information on sensitive issues (e.g. drug use) there is a tendency for individuals to under-report, (although over-reporting may occur) the frequency with which they perform a behaviour (e.g. take drugs) (Sherman & Bigelow, 1992; Skog, 1992). When there is reason to doubt the accuracy of subjects' self-reported behaviours it may be necessary to “double-check” them against other measures of behaviour such as reports by others (Darke, et al 1991; Henerson, Morris & Fitz-Gibbon; 1978). For this reason, several questions relating to athletes' perceptions of drug use among their cohorts were included. It was believed that while the athletes may be reluctant to report information about their own drug use, they may not be so reluctant to report the drug use of others. Information about their perceptions of drug use among their peers also provided some interesting information about CIAU football, wrestling, swimming, ice hockey and track & field athletes' perceptions of the social norms surrounding performance enhancing drug use. For example, in many studies it was found that individuals who report drug use also tend to report having friends who use drugs (Dinges & Oetting, 1993; Iannotti & Bush, 1992; Khavari, 1993).

A total of eight questions (seven newly created, one from the NSYA) were included to assess subjects' perceptions of performance enhancing drug use amongst their peers. Three of these questions related to subjects' perceptions of
drug use amongst female groups. These questions were included in order to prevent subjects from suspecting that only males have been targeted in this study. For the first question subjects had the option of responding “yes” or “no”. Subjects could respond “0%”, “1-10%”, “11-30%”, “31-50%”, or “51-100%” to all the remaining questions.

“Do you personally know someone who is using performance enhancing drugs?”

“What percentage of males 19-28 yrs. who do not participate in organised sport would you estimate use performance enhancing drugs?”

“What percentage of females 19-28 yrs. who do not participate in organised sport would you estimate use performance enhancing drugs?”

“What percentage of all male CIAU athletes would you estimate use performance enhancing drugs?”

“What percentage of all female CIAU athletes would you estimate use performance enhancing drugs?”

“What percentage of male CIAU athletes in your sport would you estimate use performance enhancing drugs?”

“What percentage of female CIAU athletes in your sport would you estimate use performance enhancing drugs?”

“What percentage of your team-mates in your CIAU sport would you estimate use performance enhancing drugs?

Extra Questions. Several questions and/or question options that were not analysed were included in the questionnaire to prevent subjects from suspecting that only male football, wrestling, swimming, ice hockey and track & field athletes were targeted by this study. These questions include: Question 2
"Are you...?  Male?  Female?, Question 3 "What CIAU sport(s) do you compete in?....[All CIAU sports, male and female, are listed], and Questions 14, 16 and 18 relating to perceived percentages of females who use performance enhancing drugs.

**Eliminated Questions.** Questions 15 through 20 that were included on the original questionnaire (i.e. the NSYA) before it was modified to become "The CIAU Modified Version of the National Survey of Youths' Attitudes Towards Performance Enhancing Substances" were eliminated. These questions examined steroid use, athletes' reasons for using them, needle use, needle sharing and naming of others who pressured athletes to use drugs. These questions were removed as their inclusion would present ethical problems, and would raise topics that this study was not designed to address.
Appendix B

Stratified Random Sampling Procedures
Sampling Procedures for the CIAU Drug Attitude Questionnaire

The following is an outline of the sampling method I believe should provide the most even distribution of questionnaires across sports, provinces and universities. Please let me know of any changes that you may make during the sampling process.

- In the hopes of achieving a minimum 30 percent return rate, or approximately 300 questionnaires, I ask that 956 questionnaires be mailed.
- These questionnaires are to be sent to male CIAU athletes in the following "high risk sports": Swimming, Track and Field, Wrestling, Football & Ice Hockey.

- The sampling procedure should be as follows,

1) Sort athletes by sport, then alphabetically by university, then alphabetically by their surnames.

   ie. Men's Track & Field

   UBC Watts, J.
   UBC White, T.
   UBC Williams, S.
   U of T Adams, N.
   U of T Andrews, P.

2) Determine the number of athletes needed from each sport. Divide the number of active male athletes in each sport by 25%. Round up the numbers as necessary. (See lists attached for the numbers).

3) By draw randomly select a starting point between 1 and the number of active male athletes needed from each sport (See lists attached for number range).

4) Determine the interval at which athletes should be sampled by dividing the number of active male athletes in each sport by the number of subjects needed from that sport (See lists attached for the numbers). The intervals that have been selected have been rounded up as necessary. This means that all athletes in the selected sports will have an opportunity to be sampled, but it may be necessary to go through the list more than once to select the appropriate number of athletes.

   ie. sample size = 10, number to be sampled = 4, sample range = 3 (rounded up from 2.5).

   First round sampling; 3, 6, 9 sampled
   1 2 3 4 5 6 7 8 9 10

   Second round sampling, counting from "10", 2 selected as the third in order from the remaining subjects making a total sample of four subjects.
   1, 2, 4, 5, 7, 8, 10
The break-down of the sample will be as follows:

**MALES** (n=956, ~25% from each sport)

<table>
<thead>
<tr>
<th>Sport</th>
<th>Number to be Sampled</th>
<th>Starting Point Range</th>
<th>Sampling Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football</td>
<td>372</td>
<td>1 - 1489</td>
<td>4</td>
</tr>
<tr>
<td>Ice Hockey</td>
<td>249</td>
<td>1 - 993</td>
<td>4</td>
</tr>
<tr>
<td>Swimming</td>
<td>117</td>
<td>1 - 466</td>
<td>4</td>
</tr>
<tr>
<td>Track &amp; Field</td>
<td>149</td>
<td>1 - 594</td>
<td>4</td>
</tr>
<tr>
<td>Wrestling</td>
<td>69</td>
<td>1 - 277</td>
<td>4</td>
</tr>
</tbody>
</table>

Please let me know if you have any questions about the sampling procedure.
Appendix C

Questionnaire Materials:

English and French Versions
Please fill out this form only after you have completed the attached questionnaire.

The primary purpose of phase 1 of this study is to evaluate the wording and content of "The CIAU Modified Version of the National Survey of Athletes' Attitudes Towards Performance Enhancing Substances".

Your comments are essential to this phase of the questionnaire development. Please provide as much information as you can in each of the sections listed below. Thank-you for your assistance.

Approximately how long (in minutes) did it take you to complete the questionnaire?

Did you find any of the questions awkward to read?  
(Please list either the question number or a part of the question statement)

Were there any questions that you felt other University athletes would have difficulty understanding? 
(Please list either the question number or a part of the question statement)
Are there any questions that you feel should be removed from the questionnaire? Why?
(Please list either the question number or a part of the question statement)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Are there any questions that you feel should be added to the questionnaire?
(Please list your question suggestions)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Do you have any additional comments to make about the questionnaire?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Thank-you for your assistance!
1re ÉTAPE
COMMENTAIRES SUR LE QUESTIONNAIRE

Ne remplissez cette formule qu'après avoir rempli le questionnaire joint.

La première étape de cette étude a comme but d'évaluer la formulation et le contenu de la version modifiée du questionnaire d'enquête nationale sur les attitude de athlètes envers les substances pour améliorer la performance athlétique de l'USIC.

Vos commentaires jouent un rôle très important dans l'élaboration de ce questionnaire. Veuillez fournir le plus d'information possible dans chacune des sections ci-dessous. Nous vous remercions de votre collaboration.

Combien de temps (en minutes) avez-vous pris pour répondre au questionnaire?

Certaines questions vous ont-elles paru difficiles à lire?
(Indiquez le numéro de la question ou une partie de la question)

Le questionnaire comprenait-il des questions que les autres étudiants et étudiantes de l'université auraient peine à comprendre?
(Indiquez le numéro de la question ou une partie de la question)
Y a-t-il certaines questions qui devraient être éliminée du questionnaire? Pourquoi?
(Indiquez le numéro de la question ou une partie de la question)

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Y a-t-il des questions qui doivent être ajoutées au questionnaire?
(Indiquez les questions suggérées)

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Avez-vous d'autre commentaires sur le questionnaire?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Merci de votre collaboration!
CIAU Modified Version of the National Survey of Athletes' Attitudes Towards Performance Enhancing Substances**

You are being asked to take part in a survey about how CIAU athletes feel about using substances to do better at sports or to change their appearance.

This survey is anonymous. You should not put your name or the name of your university on your survey. Because your answers are confidential, we ask you to respond as honestly as you can. There are no good or bad answers. Please answer all questions based on what you think.

Please put a check mark in the appropriate boxes.

1. How old are you?
   - □ 19 - 21
   - □ 22 - 24
   - □ 25 - 28

2. Are you...
   - □ Male
   - □ Female

3. What CIAU sport(s) do you compete in?
   - □ Soccer
   - □ Track & Field
   - □ Basketball
   - □ Cross Country
   - □ Football
   - □ Field Hockey
   - □ Ice Hockey
   - □ Volleyball
   - □ Swimming
   - □ Wrestling

4. Are you involved in a weight training program, for example do you lift weights or work out on machines?
   - □ Yes
   - □ No

** The researcher gratefully acknowledges the contribution the Canadian Centre for Drug-free Sport (CCDS) in the use of their questions for this survey.
5. Please read each statement carefully before answering. Circle one number for each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I usually like the way that I look.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>In sports, winning is the most important thing to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>To me, doing my best at sports is more important than winning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Most of my peers are better liked than me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have little control over my choice to use performance enhancing drugs such as anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Only a small percentage of Olympic athletes use drugs to perform better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Only a small percentage of university athletes use drugs to perform better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I think that I do well at school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>For me, it is easy to resist the temptation to use performance enhancing drugs such as anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Olympic athletes using drugs such as anabolic steroids should be allowed to compete.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Athletes using drugs such as anabolic steroids should be allowed to compete on a university team.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>People rarely judge me on my appearance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My coach believes athletes should not use drugs to improve their performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>It is okay to try anabolic steroids once.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>If a close friend offered me a drug that would make me do better in sports, I would try it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- continued on next page -
<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Undecided</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am content being who I am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>There are substances that will improve my athletic performance (see Question 8 for examples).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>If I wanted to, I could easily obtain performance enhancing drugs such as anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Usually, if I have something to say, I say it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>It would be difficult for me to avoid testing positive if I used performance enhancing drugs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Using drugs to do better in sports is cheating.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Anabolic steroids will help me look better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>It is important to me to do everything my coach wants me to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>It is hard to tell if someone is taking anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>The use of anabolic steroids for non-medical reasons should be against the law.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>If I wanted to, I could tell someone how to correctly administer anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>People who sell anabolic steroids should go to jail.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Is is nobody's business but my own if I choose to take anabolic steroids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please put a check mark in the appropriate boxes.

6. What is the probability out of 100 that in the next six months you will use a performance enhancing drug to improve your sport performance?

1 - 20% 21 - 40% 41 - 60% 61 - 80% 81 - 100%

7. Presently, do you think that you will use performance enhancing drugs over the next six months?

Extremely Likely Very Likely Somewhat Likely Very Unlikely Extremely Unlikely
8. Do you think that any of the following will help an athlete perform better?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don't know effects</th>
<th>Never heard of this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine (for example, in pills)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotic Pain Killers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulants / Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anabolic Steroids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta Blockers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doping Methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alphabodies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra Protein</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. In the last 12 months, have you used any of the following to help you do better in sports?

<table>
<thead>
<tr>
<th></th>
<th>Never used</th>
<th>Don't know</th>
<th>1 - 2 times</th>
<th>3 - 5 times</th>
<th>6 - 10 times</th>
<th>More than 10 times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine (for example, in pills)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotic Pain Killers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulants / Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anabolic Steroids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta Blockers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doping Methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alphabodies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra Protein</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. Do you think any of the following will be harmful to your health if you use them?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don't know effects</th>
<th>Never heard of this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine (for example, in pills, in chocolate, in soft drinks)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pain Killers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Alcohol</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stimulants / Speed</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Anabolic Steroids</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Doping Methods</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Alphabodies</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Diuretics</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Extra Protein</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

11. Which of the following statements do you agree with most?

**Check one statement only.**

- ☐ Anabolic steroids do not have any side effects.
- ☐ Anabolic steroids have some side effects, but they are pretty rare.
- ☐ Any side effects from anabolic steroids will go away when you stop using them.
- ☐ The side effects from anabolic steroids can show up even after you stop using them.
- ☐ Don't know.

---

Please proceed to page 6
Please put a check mark in the appropriate boxes.

12. Do you personally know someone who is using performance enhancing drugs?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. What percentage of males 19-28 yrs. who do not participate in organized sport would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. What percentage of females 19-28 yrs. who do not participate in organized sport would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. What percentage of all male CIAU athletes would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. What percentage of all female CIAU athletes would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. What percentage of male CIAU athletes in your sport would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. What percentage of female CIAU athletes in your sport would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. What percentage of your teammates in your CIAU sport would you estimate use performance enhancing drugs?

<table>
<thead>
<tr>
<th>0 %</th>
<th>1 - 10%</th>
<th>11 - 30%</th>
<th>31 - 50%</th>
<th>51 - 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank-you for your participation!
Version Modifiée de l'USIC de l'Étude Nationale sur l'Attitude Des Athlètes Envers les Drogues pour Améliorer la Performance Sportive**

On vous a demandé de bien vouloir participer à une étude sur la façon dont les athlètes de l'USIC perçoivent l'utilisation de drogues pour améliorer leur performance sportive ou pour changer leur apparence.

L'étude est anonyme. Vous ne devriez pas écrire votre nom ni le nom de votre université sur le questionnaire. Comme vos réponses sont confidentielles, nous vous demandons de répondre le plus honnêtement possible. Il n'existe pas de bonnes ou de mauvaises réponses. Veuillez répondre aux questions selon vos opinions personnelles.

Veuillez cocher la case appropriée.

1. Quel âge avez-vous?
   - 19 - 21
   - 22 - 24
   - 25 - 28

2. Quel est votre sexe?
   - Masculin
   - Féminin

3. Dans quelle discipline sportive de l'USIC compétitionnez-vous?
   - Soccer
   - Basketball
   - Football
   - Natation
   - Athlétisme
   - Cross Country
   - Hockey sur gazon
   - Hockey sur glace
   - Volleyball
   - Lutte

4. Levez-vous des poids ou travaillez-vous sur des appareils ?
   - Oui
   - Non

**Le chercheur est reconnaissant de la contribution du Centre Canadian sur le Dopage Sportif (CCDS) pour l'utilisation de ces questions pour cette recherche."
5. Veuillez lire attentivement chaque énoncé avant de répondre. Encerclez **un seul chiffre** par réponse.

<table>
<thead>
<tr>
<th>Énoncé</th>
<th>Complètement en désaccord</th>
<th>Quelque peu en désaccord</th>
<th>Indécis</th>
<th>Quelque peu d'accord</th>
<th>Complètement d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>J'aime généralement mon apparence</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pour moi, gagner est-ce qui compte le plus aux sports.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pour moi, il est plus important de faire de mon mieux que de gagner aux sports</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>La plupart des jeunes de mon âge sont plus populaires que moi.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>J'ai peu de contrôle par rapport à ma décision d'utiliser des substances telles que les stéroïdes anabolisants, pour améliorer ma performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Seulement un petit pourcentage d'athlètes font usage de drogues pour améliorer leur performance aux Jeux olympiques.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Seulement un petit pourcentage d'athlètes universitaires font usage de drogues pour améliorer leur performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Je pense que je réussis bien dans mes études.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pour moi, il est facile de résister à la tentation d'utiliser des substances, telles que les stéroïdes anabolisants, pour améliorer ma performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Les athlètes olympiques qui prennent des stéroïdes anabolisants devraient pouvoir participer aux compétitions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Les athlètes qui prennent des stéroïdes anabolisants devraient pouvoir être membres d'une équipe universitaire.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Les gens me jugent rarement sur mon apparence.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mon entraîneur croit que les athlètes ne devraient pas utiliser des drogues pour améliorer leurs performances.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Il n'y a rien de mal à essayer les stéroïdes anabolisants une fois.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Je ne refuserais pas si un ami proche m'offrait une drogue pour améliorer ma performance sportive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Complètement en désaccord</td>
<td>Quelque peu en désaccord</td>
<td>Indécis</td>
<td>Quelque peu d'accord</td>
<td>Complètement d'accord</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------</td>
<td>---------</td>
<td>---------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>Je suis satisfait d'être qui je suis.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Il existe des substances qui contribuent à améliorer la performance sportive (référez Question 8 pour des exemples).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Si je voulais, je pourrais facilement obtenir des drogues pour améliorer ma performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>En général, je dis ce que je pense.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Il serait difficile pour moi d'éviter un test positif si j'utilisais des drogues pour améliorer ma performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Faire usage de drogues pour améliorer la performance athlétique, c'est tricher.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Les stéroïdes anabolisants m'aideront à avoir meilleure apparence.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Il est important pour moi de faire tout ce que mon entraîneur veut que je fasse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>II est difficile de dire si quelqu'un prend des stéroïdes anabolisants.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Faire usage de stéroïdes anabolisants (sauf pour des raisons médicales) devrait être interdit par la loi.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Si je voulais je pourrais dire à quelqu'un comment administrer correctement des stéroïdes anabolisants.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Les gens qui vendent des stéroïdes anabolisants devraient être emprisonnés.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Si je choisis de faire usage de stéroïdes anabolisants, c'est de mes affaires et ça ne regarde que moi.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Veuillez cocher les cases appropriées.**

6. Quelle est la probabilité que dans les prochains six mois vous utiliserez des drogues pour améliorer votre performance sportive?  

- 1 - 20%   
- 21 - 40%   
- 41 - 60%   
- 61 - 80%   
- 81 - 100%   

7. Croyez-vous présentement que vous utiliserez dans les prochains six mois des drogues pour améliorer votre performance?  

- Extrêmement probable   
- Très probable   
- Quelque peu probable   
- Très peu probable   
- Extrêmement peu probable
8. Croyez-vous que les substances ou méthodes suivantes aideront un athlète à améliorer sa performance?

<table>
<thead>
<tr>
<th>Substances ou méthodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caféine (par exemple, en pilule)</td>
</tr>
<tr>
<td>Analgésiques narcotiques</td>
</tr>
<tr>
<td>Alcool</td>
</tr>
<tr>
<td>Stimulants / amphétamines</td>
</tr>
<tr>
<td>Stéroïdes anabolisants</td>
</tr>
<tr>
<td>Bétabloquants</td>
</tr>
<tr>
<td>Méthodes de dopage</td>
</tr>
<tr>
<td>Substances alpha</td>
</tr>
<tr>
<td>Diurétiques</td>
</tr>
<tr>
<td>Suppléments de protéines</td>
</tr>
</tbody>
</table>

9. Au cours des 12 derniers mois avez-vous fait usage des substances suivantes pour vous aider à améliorer votre performance sportive?

<table>
<thead>
<tr>
<th>Substances ou méthodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caféine (par exemple, en pilule)</td>
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<tr>
<td>Substances alpha</td>
</tr>
<tr>
<td>Diurétiques</td>
</tr>
<tr>
<td>Suppléments de protéines</td>
</tr>
</tbody>
</table>
10. Croyez-vous que les substances et méthodes suivantes pourraient avoir un effet néfaste sur votre santé si vous les utilisiez?

<table>
<thead>
<tr>
<th>Substances et méthodes</th>
<th>Oui</th>
<th>Non</th>
<th>Ne sais pas</th>
<th>Ne connais pas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine (par exemple, en pilule)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analgésiques narcotiques</td>
<td></td>
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</tr>
</tbody>
</table>

11. Parmi les énoncés suivants, avec lequel êtes-vous le plus en accord?

- Les stéroïdes anabolisants n'ont pas d'effets secondaires.
- Les stéroïdes anabolisants ont certains effets secondaires, mais ceux-ci sont assez rares.
- Les effets secondaires causés par les stéroïdes anabolisants disparaissent lorsqu'on arrête d'en faire l'usage.
- Les effets secondaires causés par les stéroïdes anabolisants peuvent se manifester même lorsqu'on cesse d'en faire usage.
- Ne sais pas.

Veuillez continuer à la page 6
12. Connaissez-vous personnellement quelqu'un qui utilise des drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>Oui</th>
<th>Non</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

13. Estimez quel est le pourcentage d'hommes, 19-28 ans, ne participant à aucun sport organisé, font usage de drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
<th>51-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

14. Estimez quel est le pourcentage de femmes, 19-28 ans, ne participant à aucun sport organisé, font usage de drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
<th>51-100%</th>
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</tbody>
</table>

15. Estimez quel est le pourcentage d'athlètes masculins de l'USIC qui utilisent des drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
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<th>51-100%</th>
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<td>☐</td>
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</tbody>
</table>

16. Estimez quel est le pourcentage d'athlètes féminins de l'USIC qui utilisent des drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
<th>51-100%</th>
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</tr>
</tbody>
</table>

17. Estimez quel est le pourcentage d'athlètes masculins de l'USIC, de votre discipline sportive, font usage de drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
<th>51-100%</th>
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<tbody>
<tr>
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<td>☐</td>
</tr>
</tbody>
</table>

18. Estimez quel est le pourcentage d'athlètes féminins de l'USIC, de votre discipline sportive, font usage de drogues pour améliorer la performance?

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
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<td>☐</td>
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</tbody>
</table>

19. Estimez quel est le pourcentage de vos co-équipiers (ières), de votre discipline sportive de l'USIC, font usage de drogues pour améliorer la performance.

<table>
<thead>
<tr>
<th>0%</th>
<th>1-10%</th>
<th>11-30%</th>
<th>31-50%</th>
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</tbody>
</table>

Merci de votre participation!
Appendix D

Ethical Review Certificate and Documents