

WEIGHT CONTROL AND POSSIBLE
ANOREXIA NERVOSA IN JOCKEYS

To Duane, for his love and understanding and months of help, and to Mom and Dad for their patience.

BODY TYPE, WEIGHT CONTROL
AND POSSIBLE ANOREXIA NERVOSA
IN JOCKEYS

by

PENELOPE JANE THOMPSON, B.A.

A Thesis
Submitted to the School of Graduate Studies
in Partial Fulfilment of the Requirements
for the Degree
Master of Arts

McMaster University

June 1982

MASTER OF ARTS (1982)
(Anthropology)

McMASTER UNIVERSITY
Hamilton, Ontario

TITLE: Body type, weight control and possible anorexia
nervosa in jockeys

AUTHOR: Penelope Jane Thompson, B.A. (McMaster University)

SUPERVISOR: Dr. E.V. Glanville

NUMBER OF PAGES: viii, 115

ABSTRACT

The eating and weight reducing behaviours of a group of male jockeys were investigated to determine a possible relationship to the disorder Anorexia Nervosa.

Informal interviews and the Eating Attitudes Test were used to assess the degree of anorexic-like behaviour present and to determine the relative contributions of personal and socio-cultural factors in the development of their eating patterns. Somatotyping was used to define the general physical type of the jockey and to determine the extent to which physical factors contributed to the observed eating behaviours.

These data indicate that the eating behaviours of the population simulate Anorexia Nervosa and that this is an adaptive response to cultural pressure to maintain a low body weight.

ACKNOWLEDGEMENTS

I wish to thank Dr. E.V. Glanville, my thesis supervisor, for his support, advise and patience during the course of this work. I would also like to thank the other members of my committee, Dr. P.G. Ramsden and Dr. J.E. Anderson for their suggestions.

Special thanks is extended to the officials of the Ontario Racing Commission, Mr. Bruce Walker of the Ontario Jockey Club, and the jockeys at Greenwood and Woodbine Racetracks in Toronto. Without their cooperation much of the information in this thesis could not have been collected.

Finally, I express my gratitude to Helen Kennelly and her wonderful typing skills.

TABLE OF CONTENTS

	<u>Page</u>	
CHAPTER 1	AN INTRODUCTION TO ANOREXIA NERVOSA	1
	The Purpose of this Research	11
CHAPTER 2	METHODOLOGY	13
CHAPTER 3	CULTURAL DESCRIPTION	25
CHAPTER 4	PHYSICAL DATA	35
	Age	35
	Height	37
	Weight	40
	Somatotyping	45
	Grip Strength	53
CHAPTER 5	WEIGHT REDUCTION RELATED BEHAVIOURS	58
	Diet	58
	Meal Frequency and Regularity	60
	Vomiting	64
	Binging	69
	Drug Use	70
	Sauna Use	73
	Exercise	74
	The Eating Attitudes Test	75
	Body Image, Body Temperature and Pulse Rate	79
CHAPTER 6	DISCUSSION	82
CHAPTER 7	CONCLUSIONS AND RESEARCH NEEDS	101

	<u>Page</u>
APPENDIX A CANADIAN AVERAGE WEIGHTS FOR HEIGHT AND AGE: MEN (DEPT. OF NATIONAL HEALTH AND WELFARE, CANADA 1954)	104
APPENDIX B RETURNED LIQUID AND SOLID INTAKE FORMS	105
APPENDIX C EATING ATTITUDES TEST ITEM ANALYSIS	109
APPENDIX D RAW DATA FOR SOMATOTYPE PARAMETERS	111
BIBLIOGRAPHY	112

LIST OF TABLES AND ILLUSTRATIONS

<u>TABLE NO.</u>		<u>Page</u>
1.1	Diagnostic Criteria for Anorexia Nervosa (after Feighner et al., 1972)	8
1.2	Diagnostic Criteria for Anorexia Nervosa (after Dally, 1979)	9
2.1	Liquid and Solid Intake Form	15
2.2	Adult Deviation Chart of Physique (after Parnell, 1957)	19
2.3	Eating Attitudes Test (after Garner and Garfinkel, 1979)	21
4.1	Parental and Sibling Height	39
4.2	Specific Jockey Weights Compared with Canadian Standards (from "Canadian Ave- rage Weights for Height, Age and Sex" 1954)	43
4.3	Natural Lightweights	44
4.4	Range and Mean of Specific Somatotype Parameters	46
4.5	Somatotype Distribution	48
4.6	Jockey Somatotype Clustering	49
4.7	Somatotype Distribution of Mean Somato- types for Various Male Sports Groups (from de Garay, Levine, Carter, 1974)	54
4.8	Jockey Population Grip Strength	55
5.1	Liquid and Solid Consumption Among Four Jockeys	61
5.2	The Self-Reported Prevalence of Vomiting	65
5.3	Somatotypes of 11 Self-Reported Vomiters	68
5.4	Binging and Vomiting Among a Group of Jockeys	70

<u>Table No.</u>		<u>Page</u>
5.5	EAT Scores Compared to Weight and Somato- type	76
5.6	Response Examples from the Eating Attitudes Test	78
5.7	Adult Weight Fluctuation Among 27 Jockeys	80
6.1	Characteristics of Anorexia Nervosa and Their Prevalence Among Jockeys	90

Figures, Graphs and Photos

Figure 1	The Track Layout	26
Graph 4.1	Age Distribution Among 32 Jockeys	36
Graph 4.2	Height Distribution Among 32 Jockeys	38
Graph 4.3	Weight Distribution Among 32 Jockeys	41
Photo 4.1	Somatotype 2,5,4 (taken from Sheldon, 1954)	52

CHAPTER 1

AN INTRODUCTION TO ANOREXIA NERVOSA

In 1868, the British physician William Gull referred to "... a peculiar form of disease occurring mostly in young women, and characterized by extreme emaciation..." (Lancet 2: 171, 1868). In a later publication (Gull, 1873) he noted that individuals suffering from the disorder were mostly female and between the ages of 16 and 23, and that the disease was occasionally seen in males of the same age group. Writing independently in the same year, Lasegue, a prominent French physician, described a disorder he called "Hysterical Anorexia" in which young women decrease their food intake and are "... able to pursue a fatiguing life in the world" because of accompanying hyperactivity (in Evolution of Psychosomatic Concepts, Kaufman and Heiman ed - 1964). These disorders reported by Gull and Lasegue had very similar symptomologies and are known today as anorexia nervosa (AN).

In its severe form, anorexia nervosa appears quite simple to recognize. It manifests itself as pronounced thinness brought about by the individual's apparent lack of hunger, or over emphasis on careful eating. As Lasegue noted, this

emaciation does not interfere with their activities, and often despite appearing wasted and ill they will undertake strenuous sports such as jogging and swimming with increasing frequency. Their clothes usually hang loosely on them, covering up the marked absence of subcutaneous fat, and socially they appear withdrawn, sad and preoccupied. Often they are intelligent and do very well in school, and many come from successful professional families (Bruch, 1978).

A less apparent feature of the disease is total preoccupation with food, stemming from the ongoing attempts to repress hunger. Depression is also common, as is cessation of menstruation in female patients.

For unknown reasons, females are affected about 10 times more frequently than males (Crisp, 1977) with a high proportion being less than 25 years old and having an average age of onset of 17 - 18 years (Crisp 1980 p. 23).

Although the term anorexia, implying a loss of appetite, is used to describe the illness, it is incorrect. In actuality there is no appetite loss, rather the wilful and successful refusal of food (Reese, 1976). Those anorexics who lack the willpower to continually avoid food, may begin to eat large quantities. However, since their central concern is to pursue thinness (Bruch, 1973) and to avoid gaining weight at all costs, they may turn to vomiting. This provides them with a freedom to eat all those foods that they previously avoided, therefore, sessions of bulimia or over eating are

often associated with vomiting behaviour.

It has been suggested that within the last 10 years the rate of incidence for the disorder in both males and females has steadily increased (Crisp 1980). This may be related to a greater awareness of AN among physicians. Also, in 1979 the following song could be heard on FM radio throughout Europe and North America,

"...You used to be my one and only,
now you're just my Boney Morony,
Pretty little Anna Rexia,
Surely gonna waste away."
(The Fabulous Poodles, Think Pink, Phono
Disc 1979)

The airplay this song received attests to the vast amount of public awareness of the disorder. This combination of medical and public awareness may result in the estimates for the increase in rate of incidence of the disorder to be slightly overinflated.

Since anorexia nervosa became a clinical entity in 1873, there have been continual debates over its cause, diagnosis and treatment. The first controversy began with Gull and Lasegue who admitted they were describing the same disorder but could not agree on its etiology. Gull emphasized a central but not organic origin, while Lasegue, in postulating that the illness was spawned from an active negative reaction to food on the part of the patient and was related to some emotional upset, offered the first psychogenic concept of the disease. Their descriptions of the disorder were remarkably

similar, however. Both spoke of severe weight loss, constipation, amenorrhoea, hyperactivity, slow pulse and respiration and the patients manipulation of friends and relatives to assist her in refusing nourishment. As anorexia nervosa became more widely recognized in the years that followed, many individuals such as Pierre Janet (in Kaufman and Heiman, 1964), and Gilles de la Tourette attempted to redefine the disorder and separate it from the symptomology of other psychiatric conditions (Dally, 1979). Throughout this period, it was generally agreed that anorexia nervosa was a psychological illness and was to be treated by removing the patient from the family and providing encouragement to eat.

The emphasis on psychological theories to explain the development of AN was shifted abruptly in 1914. Simmonds (1914) suggested that pituitary destruction leading to a general wasting of the body was responsible for the disease, and this explanation dominated the theories on etiology for the next twenty years (Bruch 1973).

Since the middle 1930's anorexia nervosa has remained within the field of psychiatry, however the endocrine versus psychology debate still continues. Researchers such as Garfinkel et al. (1975), Jeuniewicz (1978) and Vigersky et al. (1976) have concluded that there is an evident dysfunction of the hypothalamus during the disease and this is causally related to the amenorrhoea that most female patients

exhibit. Beumont (1979) states however that,

"... the endocrine dysfunctions that occur...are secondary phenomena, resulting from the disturbance in behaviour. Their presentation is different from that of any primary endocrine disease, and their occurrence should not lead to difficulties in differential diagnosis."

These conflicting ideas have stimulated much research into AN although they have not yet been helpful in settling debates related to the limits and specific manifestations of the disease. For many years there has been a disagreement over whether anorexia nervosa constitutes a separate disorder or an amalgamation of many different syndromes. Dally (1979) states, "... disagreement arises from there being no strict diagnostic criteria, so that virtually anyone in the past who lost weight, in the absence of organic disease, was liable to be labelled anorexia nervosa." Attempts to rectify this problem have been made by King (1963), Bruch (1966) and Dally (1969), all of whom have subdivided the disorder into primary and secondary forms. In 1963, King wrote, "Two clear phenomenal varieties of anorexia occurred. In one, there appeared to be a primary disorder of appetite, eating being felt by the subject to be unpleasant in itself... in the second form... abstinence was endured for the sake of some greater gain, eg, avoidance of pain." Bruch, in her article "Anorexia Nervosa in its Differential Diagnosis" (1966), defined true anorexia nervosa as a disease characterized by body image disturbances

of "delusional proportions", failure to recognize signs of nutritional needs, and an all-pervading sense of ineffectiveness. This primary anorexia group was concerned with thinness itself and pursued it to gain control over their bodies. Dally (1969), offered a three-scale classification that further defined primary anorexia nervosa as the pursuit of thinness for its own sake. With a slightly different emphasis, Crisp (1977) views primary anorexia nervosa as a "weight phobia" that can "arise briefly, remit spontaneously, or continue in recurrent or chronic form."

In 1976, Beumont and his colleagues subdivided anorexia patients into two groups, "dieters", who drastically and consistently restricted their caloric intake, and "vomitters and purgers", those who ingested food, but attempted to stop absorption. This observation has been substantiated by Casper et al. (1980), Garfinkel et al. (1980) and Russell (1979), and they have given the name "Bulimia" to the subgroup of anorexia nervosa patients who episodically overeat, then use laxatives, diuretics, and vomiting to control weight gain. Both restricters and bulimics have a morbid fear of becoming fat, however, bulimics give in to the sensations of hunger experienced by many anorexic patients. Although Beumont believes both behaviours to be different expressions of the same disorder, i.e. anorexia nervosa, Russell believes that only the dieters have AN. Those who compulsively over-

eat and then vomit are described as suffering from a disorder he calls bulimia nervosa, and they are characterized by a poorer prognosis.

In an attempt to limit the boundaries of the disease and to enable the clear identification of anorexic individuals, various diagnostic criteria have been developed. The two most commonly used are criteria proposed by Feighner et al. (1972), illustrated in table 1.1, and those proposed by Dally (1979), illustrated in table 1.2. Slade and Russell (1973) and Dally (1979) are very critical of Feighner's criteria. In emphasizing an age limit of 25 years, and a weight loss of greater than 25% of original body weight, it is highly specific for severe cases of anorexia nervosa only. Dally suggests that less rigid criteria should be used so that those who have not yet lost 25% of their body weight may be identified.

As reports of anorexia nervosa occurring in males were very rare, many researchers concluded that the disorder only affected females. The rate of incidence of the disease has risen however and more males are being diagnosed as anorexic. Authors such as Crisp and Toms (1972), Hasaan and Tibbetts (1977), Dally (1979) and others confirm that the psychopathology exhibited by male patients is characteristic for the disease and very similar to female anorexic behaviour. "Their eating ranges from strict abstention to bulimia associated

Table 1.1 Diagnostic Criteria for Anorexia Nervosa
(after Feighner et al. 1972)

- A. Age of onset prior to 25.
- B. Anorexia with accompanying weight loss of at least 25% of original body weight.
- C. A distorted, implacable attitude towards eating, food, or weight that overrides hunger, admonitions, reassurance, and threats: eg., 1) denial of illness with a failure to recognize nutritional needs; 2) apparent enjoyment in losing weight with overt manifestation that food refusal is a pleasurable indulgence; 3) a desired body image of extreme thinness with overt evidence that it is rewarding to the patient to achieve and maintain this state; and 4) unusual hoarding or handling of food.
- D. No known medical illness that could account for the anorexia and weight loss.
- E. No other known psychiatric disorder with particular reference to primary affective disorders, schizophrenia, obsessive-compulsive and phobic neurosis.
- F. At least two of the following manifestations: 1) amenorrhea, 2) lanugo, 3) bradycardia (persistent resting pulse of 60 or less), 4) periods of overactivity, 5) episodes of bulimia, 6) vomiting (may be self-induced).

Table 1.2 Diagnostic Criteria for Anorexia Nervosa
(after Dally 1979)

1. Active refusal by the patient to eat enough to maintain a normal weight and/or determined sustained efforts to prevent ingested food from being absorbed.
2. Loss of at least 10% of previous body weight.
3. Amenorrhea of at least 3 months duration when menstruation has previously been regular.
4. The patient's age of onset should lie between 11 and 35 years. But it is recognized that atypical anorexia nervosa can occur at any time after this.
5. There must be no sign of organic disease which might account for weight loss, serious affective disorder, or schizophrenia.

with vomiting and purging. They pursue thinness fanatically, terrified of gaining weight", (Dally 1979). Bruch (1973) states that in males displaying primary anorexia nervosa the leading motif, as with female anorexics, appears to be the relentless pursuit of thinness.

Although the disease in the male is being diagnosed with more frequency, its incidence is far below that seen for females. Crisp (1972, 1980) suggests that despite this, the prevalence of the condition in males is most probably greater than presently recognized. Also, anorexia nervosa in males

tends to have a poorer prognosis than it has in the female patient. As some physicians are hesitant to diagnose the disease in males, the poorer prognosis may simply reflect the stage to which the disease has been allowed to progress before a diagnosis is made.

Recent investigations into anorexia nervosa are extensive, ranging from epidemiology to drug therapy, and including physiopathology, and perceptual disturbances relating to body image. Environmental and sociocultural factors in the development of AN, also appear to be getting more attention. Although Gull (1873), Bruch (1973) and Crisp (1980) have characterized the disease as one which affects "... the daughters of well-to-do, educated and successful families" (Bruch 1973), in past research cultural pressures have not been seriously considered as relevant to the development of the disorder. In a study designed to determine the effects of social and cultural influences on the rate of incidence of AN, Garner and Garfinkel (1978,1980) studied dance and modelling students. Their very specific environment and culture places increased emphasis on absolute body size, and a parallel can be drawn between this extreme group and the pressures a normal individual feels in a fashion-conscious, thin oriented society. It was expected therefore that there would be a higher incidence of AN in the dance and modelling groups, and this was found to be the case. They concluded from this

that "...cultural variables may play a significant role in interacting with psychobiological forces in the development of anorexia nervosa..." (Garner and Garfinkel, 1978).

Within the same study Garner and Garfinkel also investigated the controversial question of defining limits to the disease. They found many females within these specific cultures who behaved excessively in relation to food but who for various reasons were not able to be diagnosed as anorexic. Despite this finding, as well as the overall increased incidence of characteristic AN in this group, they felt there remained insufficient evidence to adequately discuss the question of variability and continuity within the disorder.

Purpose of This Research

The research undertaken for this thesis was an attempt to determine whether a male population, under pressure to retain a very low body weight, would show behavioural signs of eating disorders or characteristic anorexia nervosa in relation to this pressure. Due to the extreme emphasis on body size the population chosen for study consisted of jockeys.

Somatotyping was used to define the general physical type of the jockey. This procedure developed by Sheldon (1940) and modified by Parnell in 1954 and 1957 divides the human body into three major components, endomorphy, relating to the amount of body fat present, mesomorphy, relating to the degree of muscle bulk, and ectomorphy, a measure of linearity. It

was hoped that the somatotyping would help to identify those jockeys who were at increased risk of developing anorexia nervosa based on their natural propensity for increased weight.

It was anticipated that there would be a raised incidence of anorexia nervosa within this population compared to the incidence of AN in males in the normal population. It was also anticipated that the incidence of anorexia and anorexic-like behaviours among the jockeys would be similar to that noted by Garner and Garfinkel (1978) in an equivalent female population.

This research provides further indication of the importance of cultural factors in the identification and categorization of eating disorders.

CHAPTER 2

METHODOLOGY

Initial plans for this research began in July 1979 during an interview with Mr. Bruce Walker, Public Relations Officer for the Ontario Jockey Club. In August following a second meeting with Mr. Walker, and an interview with a prominent trainer it was decided to investigate the lifestyle and weight concerns of jockeys more fully. With Mr. Walker's assistance, field work was undertaken at Greenwood Racetrack for a period of four weeks during November and early December 1979, and again for a second four week period in April 1980.

The object of November's work was to become acquainted with the jockey population, and carry out informal personal interviews. These interviews were designed to collect data on social, cultural, and dietary aspects of the professional and apprentice jockey.

In total, 15 jockeys were interviewed in the fall of 1979, including five apprentices, four male and one female. This represented approximately 40% of the riders normally available at Greenwood during the late fall season. The interviews were carried out in the kitchen of the Jockey's

Room between 9:00 am and 12:00 pm Wednesday to Sunday. Although it was not possible to set up a completely private interview area, this setting proved successful in that the riders found it comfortable, and the morning routine could be easily observed.

Interviews were informal and unscheduled and generally were initiated by the rider. On the whole, the group was very enthusiastic about the study and willing to sit and talk about themselves at great length. Discussions concerning weight reduction methods were often uncomfortable however, and had to be approached carefully - and tactfully. There was a reluctance to discuss vomiting and binging especially and this was accompanied initially by denial of these behaviours. To gather further information on this topic a more confidential method was used that allowed for individual and private reporting. Riders were given a report sheet, illustrated in table 2.1, and asked to complete it over a six day period. This form was then to be returned by mail in the provided stamped and addressed envelope to the Department of Anthropology at McMaster University. Although the confidentiality of this method was clear, it yielded only four completed forms in the return mail.

To achieve a clearer understanding of the racetrack environment, other types of individuals were interviewed during the November - December period. Trainers, agents, valets and

Table 2.1 Please list all foods and beverages taken in. If this food or beverage is not kept in your stomach please place an asterisk (*) beside the item(s). I would also appreciate it if you would record all vitamins and medication ingested (water pills, appetite suppressants etc.) Do not put your name on this form.

LIQUID AND SOLID INTAKE FORM

	<u>DAY 1</u>	<u>DAY 2</u>	<u>DAY 3</u>	<u>DAY 4</u>	<u>DAY 5</u>	<u>DAY 6</u>
6:00 am						
7:00						
8:00						
9:00						
10:00						
11:00						
12:00						
1:00						
2:00						
3:00						
4:00						
5:00						
6:00						
7:00						
8:00						
9:00						
10:00						

track physicians all commonly interact with both professional and apprentice jockeys, and in order to determine their respective roles and relationships to the riders, informal interviews were held with members from all four groups. These interviews took place in the stable area of the track during the early morning.

The April field work period was designed to collect physical data on the jockeys in relation to direct questions regarding eating behaviours and weight reduction. A total of 26 riders volunteered to be measured and interviewed. The jockeys were seen individually, and prior to any examination were told of the purpose and strict confidentiality of their participation. They were then measured and interviewed on eating patterns and how they controlled their weight. Following this direct questions were asked regarding vomiting, over-eating, and marked weight fluctuation, and the Eating Attitudes Test was explained and handed to the rider to be completed. To determine the constitutional type of the jockey, and to attempt to relate somatotype findings to the eating behaviour data, the method proposed by Parnell in 1954 was used. Parnell's procedure was favoured as it eliminated the necessity for photographs of the subjects and hence was more time efficient and inexpensive. This method includes the measurement of height and weight, the distance between median

and lateral epicondyles of the humerus and femur, biceps and calf muscle girth, biacromial and bi-iliac width, and subcutaneous fat measurements from the subscapular and suprailiac regions, and over the triceps muscle.

In this study the weight was recorded from the daily weigh-in sheet and supplied together with a height measurement by the jockey. The bone measurements were taken using outside curved calipers, and the muscle girth was measured using a cloth tape. The biacromial and bi-iliac distances were taken using a modified meter stick with a sliding perspex arm, and the three skinfold thicknesses were taken from the right side of the body using Lange skin calipers. All of this information was recorded on cards and then transferred to Parnell's Adult Deviation Chart of Physique (1957) illustrated in table 2.2. Measurements resulting in values not specifically found on the chart were rounded to the closest category, and for those values located directly between two categories an alternate rounding up and down was applied. Although an androgyny score was calculated for all of the riders it was not analyzed in this study.

From Parnell's chart, the somatotype is arrived at by estimating the component for endomorphy from the total skinfold fat measurements. Referring to appendix D, jockey 32 had a subcutaneous fat measurement of 5.0 mm. over the triceps, 7.0 mm. under the scapula and 6.0 mm over the iliac crest.

This resulted in a total skinfold measurement of 17.0 mm. which for his 26 years corresponded to an endomorphy estimate of 1.5.

To obtain the first mesomorphy estimate the measurements in cm. for the humerus, femur, biceps and calf were circled on the chart. The mean of their positions was calculated in relation to the column the height measurement fell in. An estimate was allotted according to the number of columns the mean score lay to the right or left of the height column, with each successive column representing $\pm 1/2$ from a standard 4. For jockey 32, the mean positions of his bone and muscle measurements approximated his height column, therefore the first estimate of mesomorphy was 4. The corrected estimate for mesomorphy was arrived at by using the total fat measurement to justify either an increase or a decrease in the first mesomorphy score. Parnell includes this step in his method to correct for overestimates in muscularity (1957) when more than average fat is present, and for underestimates in muscularity when less than average fat is present. The 18 mm. of total fat present on jockey 32 brought his mesomorphy estimate up to 4 1/2.

The third estimate, ectomorphy is calculated directly from the ponderal index, the height in inches divided by the cube root of the weight in pounds. Jockey 32 at 63" and 109 lbs. had a ponderal index of 13.2 which for his age corresponded to an ectomorphy score of 4 1/2.

This resulted in a total somatotype score of 1 1/2, 4 1/2, 4 1/2 for jockey 32, with half values in all components

Table 2.2 (after Parnell 1957)

ADULT DEVIATION CHART OF PHYSIQUE (MALE STANDARDS)		NAME		AGE										DATE					
		M	S											REF NUMBER					
		Age		Total 3 Skinfold measurements															
Fat: (mm)	Skinfold _____	16-24	12	15	18	22	27	33	40	48	57	68	83	100	120				
	Over triceps _____	25-34	15	18	22	27	33	42	50	59	70	84	101	120	142				
	Subscapular _____	35-44	17	21	25	30	37	46	55	66	78	95	116	138	162				
	Suprailiac _____	45-54	18	22	27	32	40	49	59	71	84	102	124	147	172				
	Total fat _____																		
	Endomorphy Estimate _____		1	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7				
Height (in.) _____		55.0	56.5	58.0	59.5	61.0	62.5	64.0	65.5	67.0	68.5	70.0	71.5	73.0	74.5	76.0	77.5	79.0	80.5
Bone (cm): Humerus _____		5.34	5.49	5.64	5.78	5.93	6.07	6.22	6.37	6.51	6.65	6.80	6.95	7.09	7.24	7.38	7.53	7.67	7.82
Femur _____		7.62	7.83	8.04	8.24	8.45	8.66	8.87	9.08	9.28	9.49	9.70	9.91	10.12	10.33	10.58	10.74	10.96	11.16
Muscle (cm): Biceps _____		24.4	25.0	25.7	26.3	27.0	27.7	28.3	29.0	29.7	30.3	31.0	31.6	32.2	33.0	33.6	34.3	35.0	35.6
Calf _____		28.5	29.3	30.1	30.8	31.6	32.4	33.2	33.9	34.7	35.5	36.3	37.1	37.8	38.6	39.4	40.2	41.0	41.8
First estimate of Mesomorphy _____			1	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7				
Correction for fat (total fat mm)		12	15	18	22	27	33	40	48	57	68	83	100	120	14				
Age: 16-24		+1/2	+1/2	+1/4	+1/4	0	-1/4	-1/2	-1	-1-1/2	-2	-2-1/2	-3	-4					
25-34		(+1/2)	(+1/2)	+1/4	+1/4	0	-1/4	-1/2	-3/4	-1-1/4	-1-3/4	-2-1/4	-2-3/4	-3-1/2	-4				
35+		(+1/2)	(+1/2)	+1/4	+1/4	0	-1/4	-1/4	-1/2	-1	-1-1/2	-2	-2-1/2	-3	-3-				
Mesomorphy (corrected estimate)		1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6	6-1/2	7					
		Ponderal Index																	
Weight (lb): _____ (present)		18	12.1	12.3	12.5	12.7	12.9	13.1	13.3	13.5	13.7	13.8	14.0	14.2	14.4				
		23	11.7	12.0	12.2	12.5	12.8	13.0	13.2	13.4	13.6	13.8	14.0	14.2	14.4				
		28	11.5	11.8	12.1	12.4	12.6	12.8	13.0	13.3	13.5	13.7	13.9	14.2	14.4				
		33	11.3	11.7	12.0	12.3	12.5	12.7	12.9	13.2	13.4	13.6	13.9	14.1	14.4				
		38	11.2	11.5	11.8	12.1	12.4	12.6	12.8	13.1	13.3	13.6	13.9	14.1	14.4				
		43	11.1	11.4	11.7	12.0	12.3	12.6	12.8	13.1	13.3	13.6	13.9	14.1	14.4				
Ectomorphy Estimate _____		1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6	6-1/2	7					
Biacromial (cm): _____		30.7	31.6	32.4	33.3	34.2	35.1	36.0	36.9	37.7	38.6	39.5	40.4	41.3	42.2	43.0	43.9	44.8	
Bi-iliac (cm): _____				23.0	23.8	24.6	25.4	26.2	27.0	27.8	28.6	29.4	30.2	31.0	31.8	32.6	33.4		
Androgyny: (3xBiAc)- _____		66.4	68.8	71.2	73.5	75.9	78.3	80.6	83.0	85.4	87.8	90.1	92.5	94.8	97.2	99.6	102.0	104.3	
Bi-iliac _____																			

Somatotype:

endomorphy, mesomorphy and ectomorphy being represented. For comparative purposes this score was then adapted to Sheldon's (1954) whole number somatotype classification by rounding each individual component to the closest whole number. Using Sheldon's numbers, the somatotype for jockey 32 was 2,5,5.

After taking the necessary somatotype measurements grip strength values were obtained. Each jockey was asked to apply full force on the dynamometer in any comfortable manner, providing only one hand was used. Two trials were allowed with a rest period in between. The grip strength score recorded for each hand was the force in kilograms exerted in the better of the two trials. The total grip strength was calculated by adding the recorded scores for each hand.

The two final physical measurements that were taken were resting pulse rate and body temperature. These measurements were included, as specific abnormalities in either of these parameters can aid in a diagnosis of anorexia nervosa (Feigner, 1972).

In order to determine the extent of anorexia nervosa, or anorexic-like behaviour in the riders, the Eating Attitudes Test or EAT, illustrated in table 2.3, was supplied by Dr. David Garner of the Clarke Institute of Psychiatry in Toronto. It was anticipated that the use of the EAT would be significant as results from previous studies (Garner and Garfinkel 1978) had proven it to be useful in detecting cases of primary anorexia nervosa that had not been previously diagnosed.

Table 2.3 Eating Attitudes Test
(after Garner and Garfinkel,
1979)

Name: _____ Date: _____ Age: _____
 Present Weight: _____ Height: _____ Sex: _____
 Highest Past Weight: _____ How Long Ago? _____
 Lowest Past Adult Weight: _____ How Long Ago? _____

Instructions: Please place an (X) under the column which applies best to each of the numbered statements. All of the results will be strictly confidential. Most of the questions directly relate to food or eating, although other types of questions have been included. Please answer each question carefully. Thank you.

- | ALWAYS | VERY OFTEN | OFTEN | SOMETIMES | RARELY | NEVER | |
|--------|------------|-------|-----------|--------|-------|---|
| () | () | () | () | () | () | 1. Like eating with other people. |
| () | () | () | () | () | () | 2. Prepare foods for others but do not eat what I cook. |
| () | () | () | () | () | () | 3. Become anxious prior to eating. |
| () | () | () | () | () | () | 4. Am terrified about being overweight. |
| () | () | () | () | () | () | 5. Avoid eating when I am hungry. |
| () | () | () | () | () | () | 6. Find myself preoccupied with food. |
| () | () | () | () | () | () | 7. Have gone on eating binges where I feel that I may not be able to stop. |
| () | () | () | () | () | () | 8. Cut my food into small pieces. |
| () | () | () | () | () | () | 9. Aware of the calorie content of foods that I eat. |
| () | () | () | () | () | () | 10. Particularly avoid foods with a high carbohydrate content. (e.g. bread, potatoes, rice, etc.) |

Table 2.3 (continued)

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
()	()	()	()	()	()	11. Feel bloated after meals.
()	()	()	()	()	()	12. Feel that others would prefer if I ate more.
()	()	()	()	()	()	13. Vomit after I have eaten
()	()	()	()	()	()	14. Feel extremely guilty after eating.
()	()	()	()	()	()	15. Am preoccupied with a desire to be thinner.
()	()	()	()	()	()	16. Exercise strenuously to burn off calories.
()	()	()	()	()	()	17. Weigh myself several times a day.
()	()	()	()	()	()	18. Like my clothes to fit tightly.
()	()	()	()	()	()	19. Enjoy eating meat.
()	()	()	()	()	()	20. Wake up early in the morning.
()	()	()	()	()	()	21. Eat the same foods day after day.
()	()	()	()	()	()	22. Think about burning up calories when I exercise.
()	()	()	()	()	()	23. Have regular menstrual periods.
()	()	()	()	()	()	24. Other people think that I am too thin.
()	()	()	()	()	()	25. Am preoccupied with the thought of having fat on my body.
()	()	()	()	()	()	26. Take longer than others to eat my meals.

Table 2.3 (continued)

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARE:U	NEVER	
()	()	()	()	()	()	27. Enjoy eating at restaurants.
()	()	()	()	()	()	28. Take laxatives.
()	()	()	()	()	()	29. Avoid foods with sugar in them.
()	()	()	()	()	()	30. Eat diet foods.
()	()	()	()	()	()	31. Feel that food controls my life.
()	()	()	()	()	()	32. Display self control around food.
()	()	()	()	()	()	33. Feel that others pressure me to eat.
()	()	()	()	()	()	34. Give too much time and thought to food.
()	()	()	()	()	()	35. Suffer from constipation.
()	()	()	()	()	()	36. Feel uncomfortable after eating sweets.
()	()	()	()	()	()	37. Engage in dieting behaviour.
()	()	()	()	()	()	38. Like my stomach to be empty.
()	()	()	()	()	()	39. Enjoy trying rich new foods.
()	()	()	()	()	()	40. Have the impulse to vomit after meals.

The use of the Eating Attitudes Test was also practical as it has a self-report format which allows for privacy when responding, it is easy to score, and it is economical. Also, it appears to measure specific symptoms that are found much more frequently in an anorexic population than in others.

Following the completion of the physical measurements each rider was given an Eating Attitudes Test and asked to complete and return it within the morning. Upon return of the test it was examined to insure a reasonable amount of consistency with the earlier interview. In the case of major inconsistencies the rider was privately asked to explain.

A difficulty throughout both periods of field work was time constraint. Strict rules set by the Ontario Racing Commission govern the use of the Jockeys' room and consequently it was necessary to leave at 12:00 pm daily. Although the room opened at 7:30 am it was generally unused until 9:15, leaving only 2 1/2 hours in which to interview and take measurements. This narrow time frame would have been sufficient if interviews had been carried out in the sauna, for it was precisely at this time that jockeys who needed to reduce would head for the sauna where they would stay until weigh-in time at 11:30 am. Nevertheless, permission to stay past 12:00 pm was not granted, which cut down considerably on the availability of some riders.

CHAPTER 3

CULTURAL DESCRIPTION

Prior to discussing the physical and behavioural data collected during this project it is useful to examine some cultural aspects of the jockey. This chapter will attempt to familiarize the reader with the racetrack environment. Emphasis will be placed on the training, development and characteristic lifestyle of the riders.

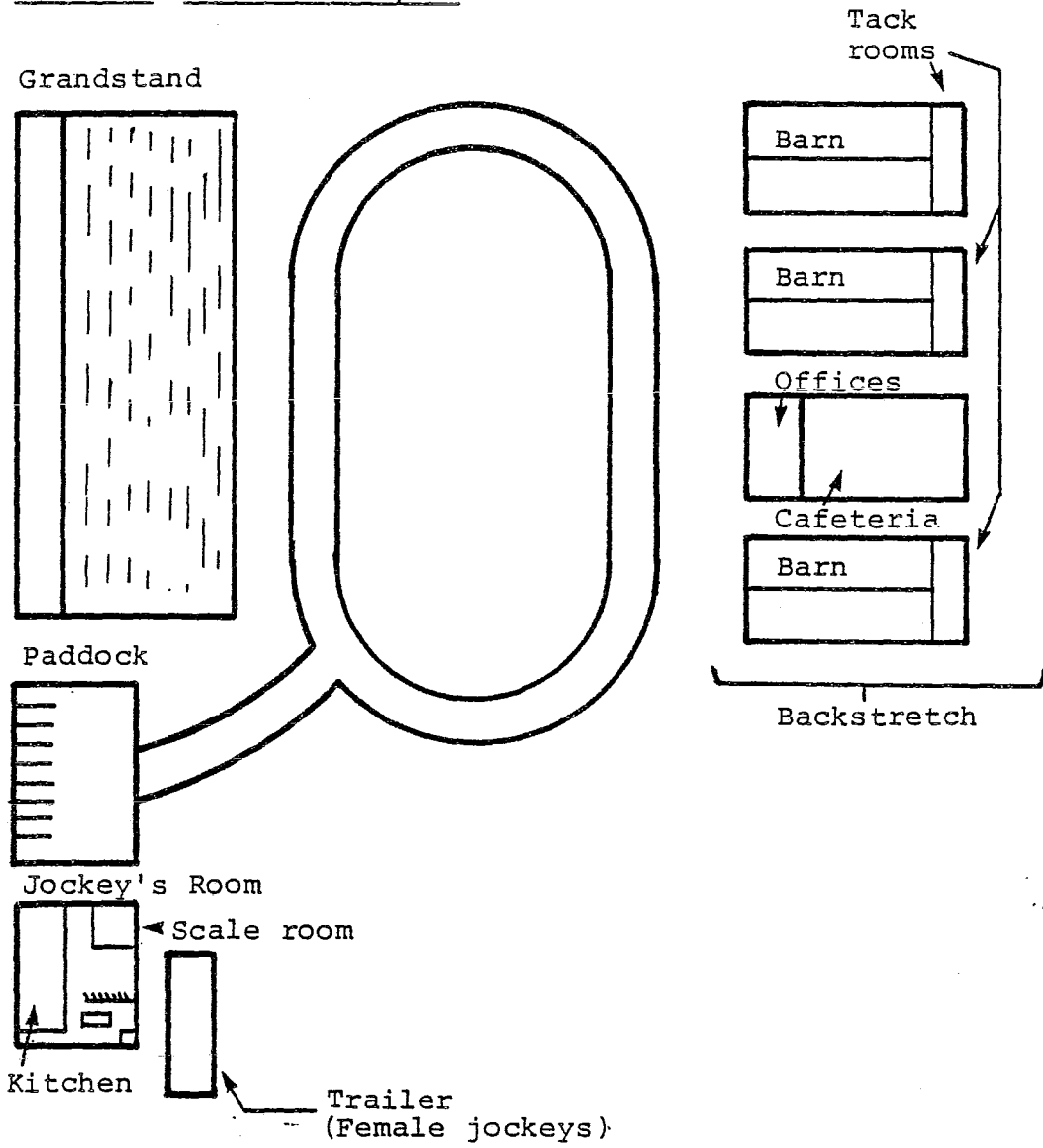
A schematic layout of the racetrack is provided in figure 1. To the public the major features are the grandstand and the track. To racetrack employees the major feature is the stable area, or colloquially, the backstretch. A conservative estimate is that 90% of the track's employees, ranging from veterinarians to grooms, work in this area.

Track Employees

Track employees may be conveniently divided into three categories depending on whether their job relates primarily to the horse, the jockey, or the Racing Commission. Positions falling into the first category are hotwalkers, grooms, exercise boys and trainers, and these will be described first.

The hotwalkers have the most junior position in the field of horse care. Typically they are teenaged males em-

FIGURE 1 The Track Layout



ployed by horse trainers to walk the horses cool after the morning exercise session and the afternoon race. Often the individual is placed in this job after expressing some interest in becoming a jockey. Since the position demands close interaction with the horses it is intended to dispel any fears of the animal the boy may have. After mastering the position of hotwalker one may be promoted to the ranks of groom. The groom keeps the stall clean, brushes the animal and provides it with food and water. Recently greater numbers of females have been employed as both hotwalkers and grooms, perhaps as a reaction to the growing acceptance of female jockeys.

The major advantage to being a groom is in the opportunity it offers to learn to ride. Although riding is not a necessary skill for the groom it is necessary for advancement. Those grooms who have been taught to ride by the more senior stable staff may progress to be exercise boys who are employed to ride the horses in a morning pre-race workout.

The progression through these positions may take place over numerous racing seasons. Consequently many young people who begin their employment at the track based on an interest in becoming a jockey are too old or too heavy to race by the time they develop adequate riding skills. The exercise boys are never in a competitive riding situation however so age and weight are unimportant. The typical exercise boy is a

male, greater than 25 years old who weighs up to 170 pounds (77.3 kg).

Many individuals leave the track after realizing they have become too heavy to ride professionally. Those who stay and wish to become more involved with the preparation of the horses may attempt to become trainers. This is very difficult to achieve as it is the most prestigious and powerful position available. A trainer is hired by a horse owner to take full responsibility for the schooling and performance of the animal. All junior staff who walk, groom or exercise the horse are also the trainer's responsibility as is providing the best jockey for the horse. The trainer is also responsible for entering the horse in the appropriate races and this is the basis of his livelihood. One fifth of all the winnings the horse brings in belongs to the trainer. This situation places the trainers in a superior position to the jockeys who must compete to be selected to ride the best horses. All of the individuals in business for themselves as trainers have spent many years "apprenticing", either through direct involvement in the actual training of a horse or through previously working for a trainer as either a groom, exercise boy or apprentice jockey.

Those track employees who prefer to be less involved with horses may opt to work for the jockey or apprentice jockey. Valets and agents are the largest groups in this cate-

gory. A valet is required to work for a minimum of four riders, and they are responsible for the maintenance of all the jockeys' riding equipment. Many exercise boys choose to become valets as their income is directly proportional to the success of the riders who employ them.

Jockeys are not allowed to solicit mounts for themselves so it is necessary for them to employ agents. The agent is the middle man between jockey and trainer and his salary comes from a percentage of the jockeys standard \$35.00 mount fee plus winnings. His job is to provide his client the jockey with the best possible mounts in the highest number of races daily. Although many individuals come into the job from other track positions, the agent is one of few individuals for whom an apprenticeship is unnecessary.

The third major group of employees are those who make up the beaurocracy. The track officials and stewards ensure that the guidelines as explained in the Rules of Thoroughbred Racing (Ontario Racing Commission 1979) are adhered to. They are also responsible for all matters concerning the organization and running of races, such as weight standards, handicaps and proof of wins. Since every track employee must hold a valid license for his specific job as issued by the Racing Commission, the Commission stewards act as supervisors and overseers to the operation and employees of the entire track.

The Jockey

Jockeys are those individuals who after learning to ride, remain small and light enough to race. Although this may appear simplistic, size is the essential prerequisite for this position. It is also the predominant reason given by the riders for initially approaching the racetrack. Many were brought by their parents, and some were sent by Canada Manpower because they were small for their age. It is not possible however to be hired directly as an apprentice jockey. Everyone must progress through the levels of hotwalker, groom and exercise boy as outlined previously. Those who come to the track knowing how to ride must still pass through these positions although they may do so at a much faster rate.

Traditionally a trainer who was looking for a prospective rider would assess the size of a young man's hands and feet, and possibly compare the boy with his father and siblings. A 17 year old with big hands and feet was considered a bad risk as it was clear that he had not stopped growing. Hands and feet that were proportional to the rest of the body were considered as indicative of growth cessation and the boy was then taken on as a hotwalker. A very high rate of track staff turnover has led to the more recent trend of accepting everyone who has an interest in horses and riding, irrespective of their body proportions. An estimated 700 boys approach the track annually, out of which 4 may develop into jockeys.

After the individual has successfully learned to ride and providing he is under 25 years of age, under 115 pounds and has had at least one year of experience with a racing stable he may apply for an apprentice jockey license. Essentially this apprenticeship allows the jockey to ride at 10 pounds less than the specified weight for the particular race. This weight advantage overrides the boy's inexperience and he is offered mounts. After he has ridden five winners the handicap is reduced to five pounds, or seven pounds if he is under contract to a specific trainer, for a total of three years or forty-five winners.

It is often while still apprenticing that these riders experience the first difficulties with weight control. To remain valuable to a trainer they must ensure that they weigh 10 pounds less than the more experienced jockeys, so they are taught how to reduce. From the very beginning of their career the emphasis is on weight control, and the pressure to not gain weight is provided by the trainer, agent and other jockeys. Those apprentices who have the most trouble controlling their weight drop out of the programme and usually become valets or exercise boys.

After forty-five wins. or three years the apprentice rider applies for a jockey's license. On becoming a jockey he is no longer allowed a weight handicap.

Unlike the apprentice rider, the jockey is never contracted out to a particular trainer. He must compete for each

new mount and in order to keep riding that horse he must successfully race it.

Although some of the jockey's work takes place on the backstretch, most of his day is spent in the Jockey's Room. The average rider arrives in the room around 9 am after having watched the morning workout of the horses he is racing that day. The room is equipped with beds, sauna, whirlpool, cafeteria, masseur, closed circuit and cable T.V., scales and the brightly coloured tunics they wear in each race to represent the horse's owner. These amenities are necessary as the jockeys are not allowed to leave the room except when racing. The specific rules concerning the Jockey's Room state that no person, including the jockey's agent may be admitted after 10:30 am, and all visitors must leave by 10:30 am. This arrangement is designed to sequester the jockey from the highly suspicious racing public.

All riders must weigh in by 11:30 on every day they are racing. After every race they must also weight out, and they are then escorted back to the Jockey's Room where they watch a replay of the race on closed circuit television and change into the appropriate colours for the next race. They are allowed to leave only after they have finished all of their races for the day.

The success of the rider is measured by the number of races he wins and the amount of purse money he is awarded.

As his agent and valet are paid percentages of this purse the jockey's net income can be overestimated. Many of the riders feel that it is this overestimation of income that attracts many young people to the track. However, the financial attraction may be justified as although a small number of jockeys struggle around the \$10,000 per annum range, the average income was assessed to be between \$30,000 and \$35,000. A more successful rider, aged 27, admitted to have earned greater than \$110,000 during 1979.

As the jockeys become older, a high proportion of them develop problems associated with controlling their weight. Many stop racing around the age of 30 in response to weight gain, and depression associated with constant dieting. Some may go on to become trainers, owners and track officials, while the less successful exercise horses or work in the grandstand. Only a very small number of them leave the racetrack. A possible reason for this is that the average education level of the apprentice and the jockey is grade 10. This makes it difficult for them to find employment in other fields without going through an extensive period of training. Also, as the racetrack is a very social environment, individuals prefer to confine their relationships to other track employees, thus severely limiting their off-track interactions.

In summary, a vast number of people are employed at the track in a diversity of positions. In many respects the

jockey, and his ability to optimize the performance of the horse, is representing the many hours of work that others have put into preparing the horse for the race. Often the pressures associated with this responsibility are focused on the jockeys' necessity to maintain an appropriate riding weight.

CHAPTER 4
PHYSICAL DATA

The physical data collected during the two field work periods of November and April will be presented and discussed. Specifically, this includes data pertaining to age, height, and weight. The data obtained through somatotyping, a process which attempts to classify the human body type, will provide the major emphasis of this chapter.

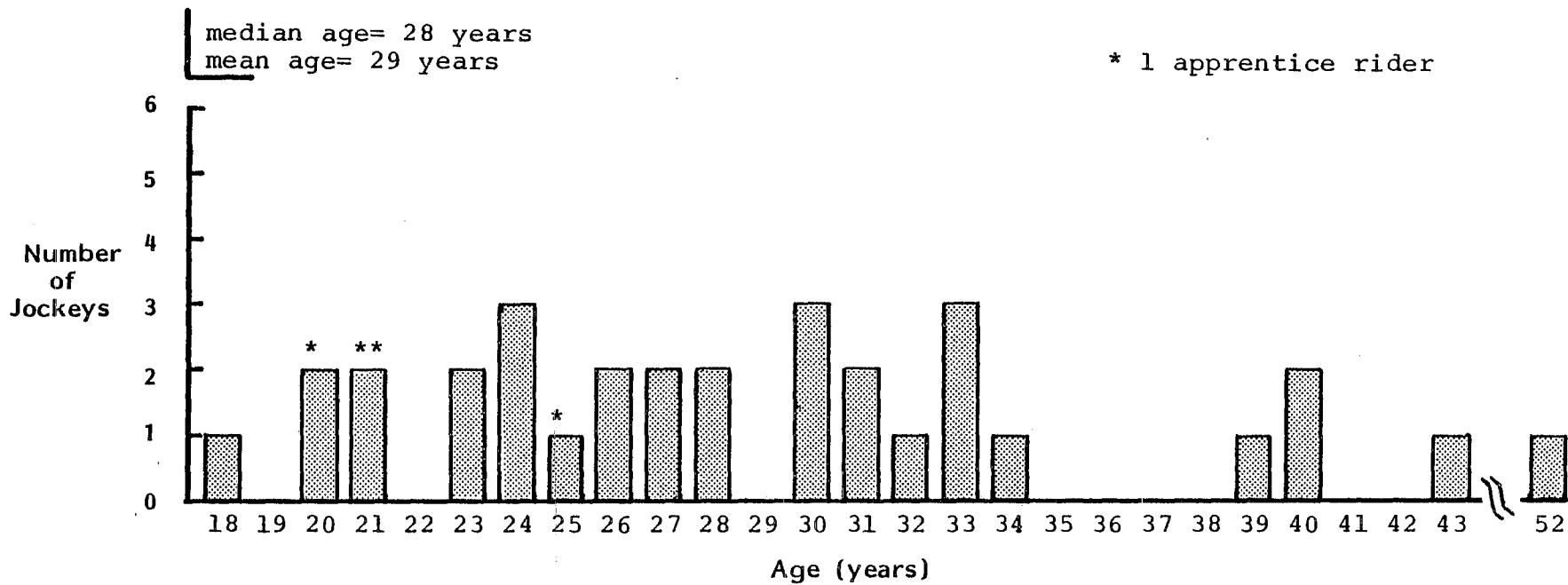
AGE

Ages were collected on a total of 32 jockeys including 4 apprentice riders. The mean age was 29, the median was 28 and the age range was 18 - 52 years. 53% of this group was less than 30 years old. The mean age calculated for the apprentice riders was 22 years, with an age range of 20 - 25 years. On the whole, the data pertaining to the apprentice jockey group was less representative than that pertaining to the other categories due to the smaller number of apprentices that ride in the spring and fall seasons.

Graph 4.1 summarizes the age data.

The mean age of the apprentice riders is considerably lower than the mean for the non-apprentices. Since apprentice licenses are available from the age of 16 to 25 years only,

GRAPH 4.1 Age Distribution Among 32 Jockeys



however, this mean was expected to be even lower.

Within the pool of all riders, the highest percentage of them fell between the ages of 20 - 30 years. This reflects the expected results due to the difficulty the older riders have maintaining a sufficiently low weight.

HEIGHT

Height is extremely important to trainers as it provides some indication of the possible weight difficulties a jockey may experience with time. Graph 2 summarizes these data.

From the graph it can be calculated that 78% of the jockeys are 5'3" and under. Although there are no formal height restrictions that disallow taller riders, it is clearly evident that shorter riders are far more common. Khosla and Lowe in Tanner and Eveleth's (1976) overview of the world wide variance in growth rate provide a comparative group consisting of British steelworkers between the ages of 20 - 29 years. The mean height of this group was 68.6 inches (174.2 cm), 2.3 in. taller than the tallest rider measured, and 6.3 in. taller than the mean calculated for the jockey population.

In an attempt to qualitatively determine the familial influence on the stature of the jockey population 10 of the riders volunteered information relating to the height of their parents and siblings. Table 4.1 represents this data. Although it is not conclusive, these data suggest there is a

GRAPH 4.2 Height Distribution Among 32 Jockeys

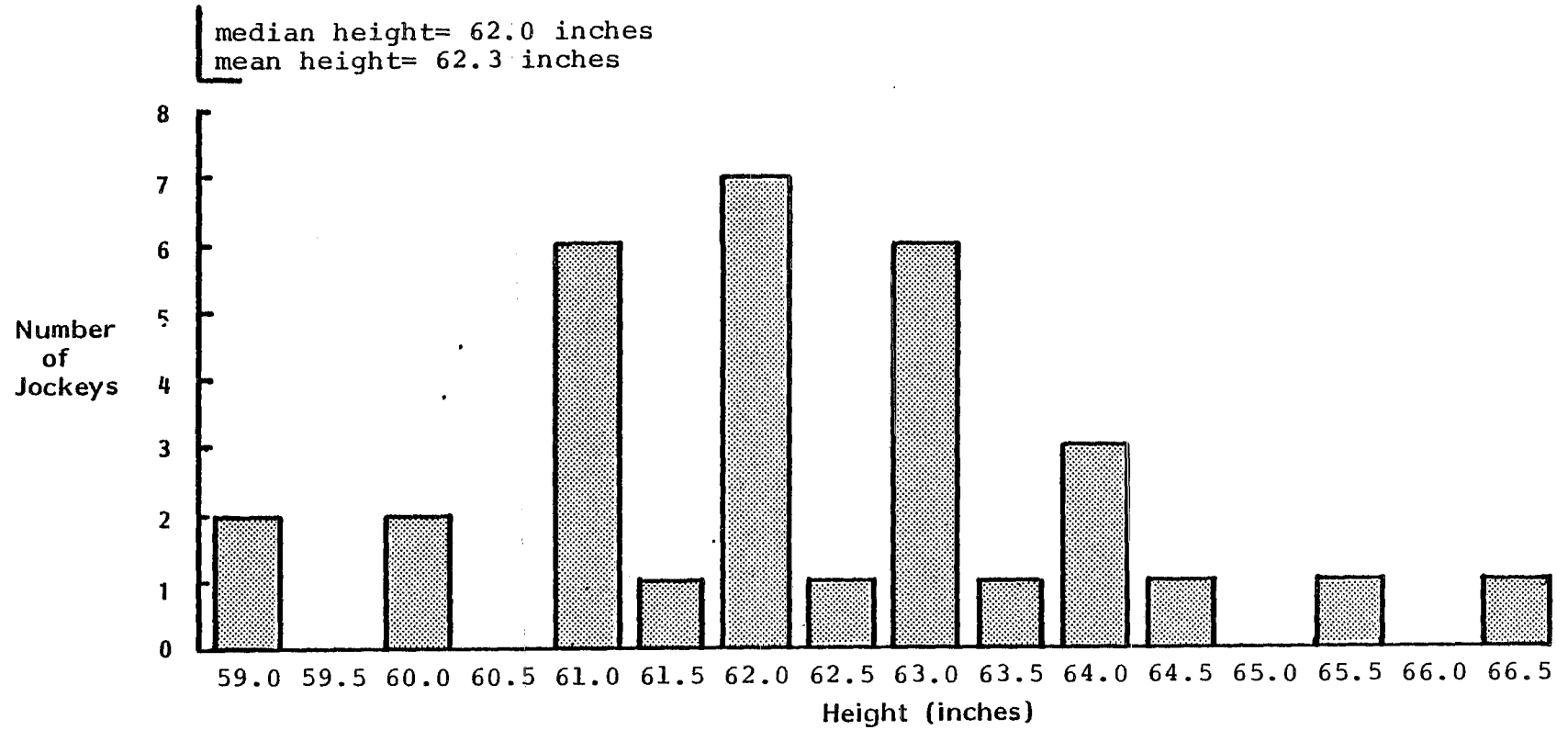


Table 4.1 Parental and Sibling Height

Jockey No.	Jockey ht. (in.)	Mother ht. (in.)	Father ht. (in.)	Sibling(s) ht. (in.)
1	63	61	70	males: 63,66,70
2	60	60	63	—————
3	60	64	70	male: 73 female: 64
4	61	59	68.5	males: 61
7	59	59	65	—————
8	64	60	66	male: 65
11	66.5	62	71	male: > 66.5
12	62	60.5	61.5	tallest of 9: 65
13	65.5	62	64	males: 62,64
14	61	—	63	males: 62,63

normal relationship among the height of the jockey, his parents and siblings. The possible exception to this may be jockey 3, who at 60" is considerably shorter than both his parents and siblings. Jockey 3 also, along with jockey 7, stated that he had undergone pituitary growth hormone treatments as a child, indicating that his height was seen as a problem at that time.

Although the majority of the riders are significantly below the mean height of the comparative group there are no data, with the exception of jockey 3, to suggest that their heights are pathological. It indicates that the sport attracts naturally shorter males.

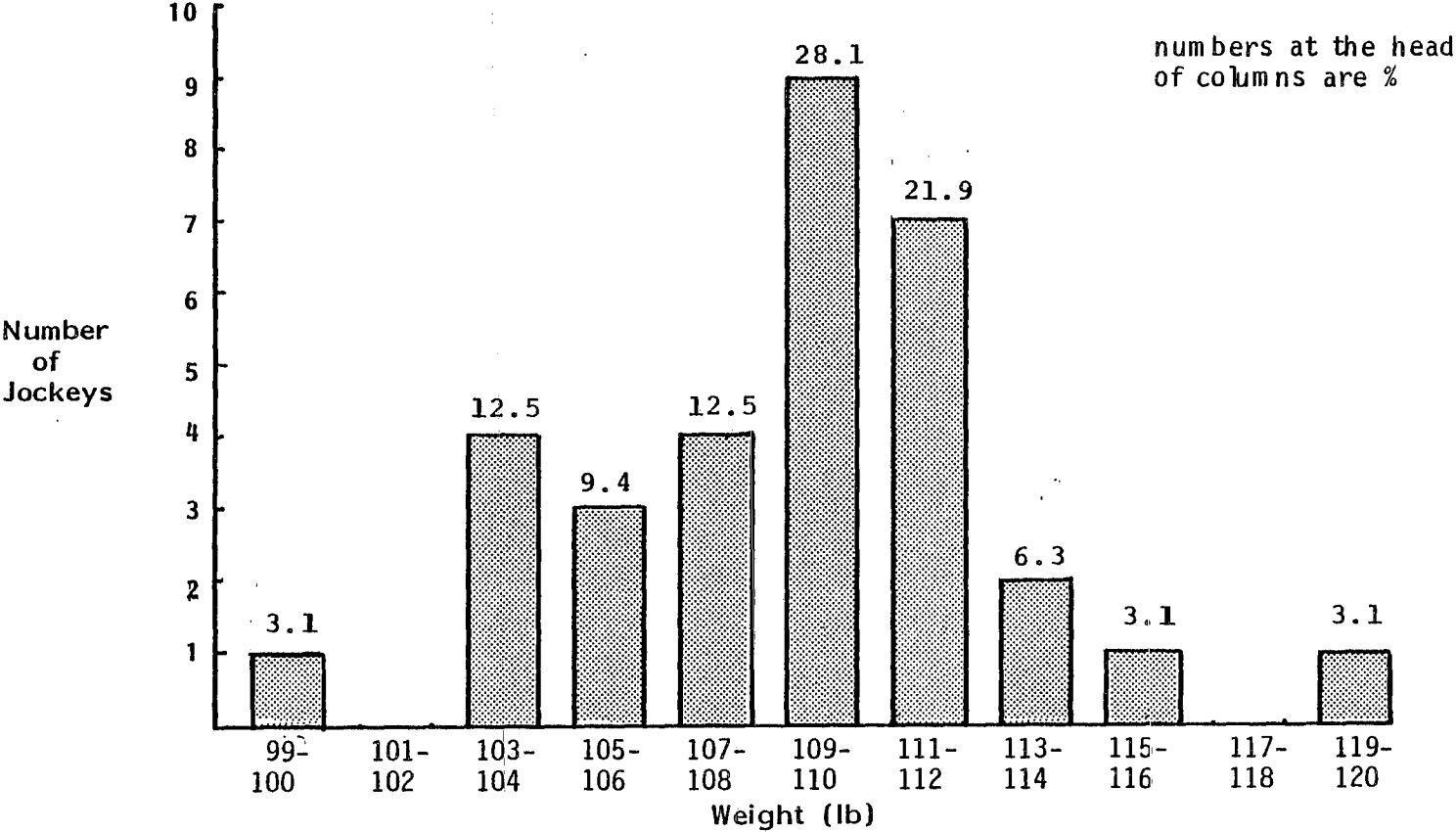
Other data collected indicate that many of these men felt self-conscious about their height prior to becoming a jockey, and in fact this self-consciousness actually led them to search for a career that would take advantage of their height.

WEIGHT

Weight is of the utmost concern for the jockey as it is imperative that when actively riding it does not rise above 115 - 117 pounds. If it reaches this level or above the number of horses that can be raced is significantly reduced, and hence their income is also reduced.

Weights were collected from the sample of 32 jockeys and ranged from 99 - 120 pounds. These data are represented in graph 4.3.

GRAPH 4.3 Weight Distribution Among 32 Jockeys



The mean weight was 109 pounds, and 50.0% of the riders were located between 109 and 112 pounds. These weights, in relation to the heights previously reported are significantly below the average weights for Canadian males as set out in the 1954 publication "Canadian Average Weights for Height, Age and Sex". Table 4.2 compares the weight data collected with these Canadian averages, and states the jockeys' weight as a percentage of the average.

The weight data set out in table 4.2 show that 72% of the jockey population is greater than 20% below the average weight for their specific height. The tallest rider, having a difference of 51 pounds between his actual weight and the Canadian average is 31.3% below the average weight. Jockey 17, at 5'2" and 114 pounds has a weight 87% of the Canadian average, which is the highest of the sample. Compared to these weight for height standards, all of the riders are underweight, and to much the same degree. To determine the degree to which these low weights are directly related to riding, the jockeys were asked to provide information concerning the fluctuation of their weights over 1 year. Of the 20 individuals who responded, 17 stated that they gain weight off season, 2 stated that they lose weight, and 1 said that he experienced no weight fluctuation. The off-season weight gains ranged from 1.5 lbs. to 38 lbs, and averaged around 12 lbs. Adding this 12 lbs to their respective riding weights however does not equate any of the riders with the Canadian

Table 4.2 Specific Jockey Weights Compared with Canadian Standards. (from "Canadian Average Weights for Height, Age, and Sex" 1954).

No.	Height	Weight (lbs.)	Can. Av. wt.(lbs.)	Difference (lbs.)	Wt. as % Can. Av.	% Below Average
01	5'4"	109	146	37	74.7	25.3
02	5'0"	105	139	34	75.5	24.5
03	5'0"	105	124	19	84.7	15.3
04	5'1"	103	141	38	73.1	26.9
06	5'0"	112	139	27	80.6	19.4
07	4'11"	103	121	18	85.1	14.9
08	5'4"	115	146	31	78.8	21.2
09	5'2"	120	141	21	85.1	14.9
10	5'5"	110	156	46	70.5	29.5
11	5'7"	112	163	51	68.7	31.3
12	5'2"	104	127	23	81.9	18.1
13	5'6"	106	145	39	73.1	26.9
14	5'1"	113	141	28	80.1	19.9
16	5'1"	111	142	31	78.2	21.8
17	5'2"	114	131	17	87.0	13.0
18	5'3"	110	142	32	77.5	22.5
19	5'3"	106.5	134	27.5	79.5	20.5
20	5'5"	112	149	37	75.2	24.8
21	5'1"	112	141	29	79.4	20.6
22	5'2"	107	145	38	73.8	26.2
23	5'4"	109	146	37	74.7	25.3
24	5'3"	112	134	22	83.6	16.4
25	5'1"	110	141	31	78.0	22.0
26	5'2"	108.5	146	37.5	74.3	25.7
27	5'3"	110	148	38	74.3	25.7
28	5'2"	108	139	31	77.7	22.3
29	5'4"	103	138	35	74.6	25.4
30	5'2"	99	125	26	79.2	20.8
31	5'3"	110	134	24	82.1	17.9
32	5'3"	109	142	33	76.7	23.3
33	5'2"	107	145	38	73.8	26.2
34	5'1"	112	141	29	79.4	20.6

ht. rounded off.

Average deviation from Canadian standard weight is 22.2%

average. These data indicate that, while off season weights are not high, and are possibly constrained, riding weights are frugally trimmed by another 10%.

In an attempt to explain the prevalence of low body weights, the riders may refer to themselves and specific others as "natural lightweights". Of the total 32 jockeys, 9 (28%) referred to themselves as natural lightweights at some point over the 2 month period. Table 4.3 presents the height and weight data on the natural lightweights.

Table 4.3 Natural Lightweights

Jockey No.	Height (in.)	Weight (lb.)	Age (years)
2	60	105	40
3	60	105	21
7	59	103	24
12	62	104	20
22	62	107	31
23	64	109	26
25	61	110	31
29	63.5	103	24
32	63	109	26
Mean	61.6	106	27
Median	62	105	26

Slight differences between the age, weight and height data for those riders referring to themselves as natural lightweights and the regular riders are evident. The means for these three categories are higher in the latter group of riders, indicating that the greater values for age, height and weight are not represented among the natural lightweights. However, due to weight fluctuation, one's inclusion in this group is not consistent, and some riders are skeptical of its validity. Hence the concept of the natural lightweight as an individual who because of his body size has less difficulty controlling his weight is doubtful.

SOMATOTYPING

Data necessary to establish somatotype were collected during the April fieldwork period. A total of 26 men (24 jockeys and 2 apprentice riders) volunteered to have measurements taken corresponding to the method for somatotyping proposed by Parnell in 1954. These data have been analyzed using Parnell's 1957 Deviation Chart of Physique (table 2.2), which incorporates Sheldon's descriptive categories. This allows for a comparison to be made to Sheldon's 1954 population as presented in the Atlas of Men. Data on grip strength, pulse and temperature collected during this month will also be discussed.

In order to better understand the variety and range of the many measurements that are included in the final 3 digit somatotype, table 4.4 presents the range and mean for each

Table 4.4: Range and Mean of Specific Somatotype Parameters

Parameter	Units	Range	Mean
Age	years	18 - 52	29.4
Height	inches	59 - 66.5	62.7
Weight	pounds	99 - 120	109.2
Epicondylar Width (Femur)	cm.	7.3 - 9.2	8.4
Epicondylar Width (Humerus)	cm.	5.7 - 7.0	6.2
Biacromial Distance	cm.	35.5 - 40.3	38.5
Bi-iliac Distance	cm.	23.8 - 28.4	25.3
Biceps girth - lt	cm.	26.4 - 32.6	29.6
- rt	cm.	27.0 - 31.2	29.2
Calf girth - lt	cm.	29.2 - 33.7	30.9
- rt	cm.	29.3 - 33.1	30.7
Subscapular fat	mm.	5.5 - 7.0	6.5
Supra-iliac fat	mm.	3.5 - 10.5	6.5
Triceps fat	mm.	2.5 - 7.0	4.6

measurement taken from the 26 jockeys.

The age, height and weight data are very similar to that which has already been reported in this chapter. This is expected as the group of individuals somatotyped were a component of the larger group. As there are no major variances within any of the categories it would be expected that the somatotypes overall would be quite similar. Table 4.5 lists the specific somatotype for each jockey measured using Parnell's method.

The range of somatotypes found in the jockey population was extremely narrow and extended from an ectomorphic 1,3-1/2,4 to a slightly less ectomorphic 2-1/2,4,5-1/2. From the external appearance of the population, and the chosen occupation of the group this was the expected result.

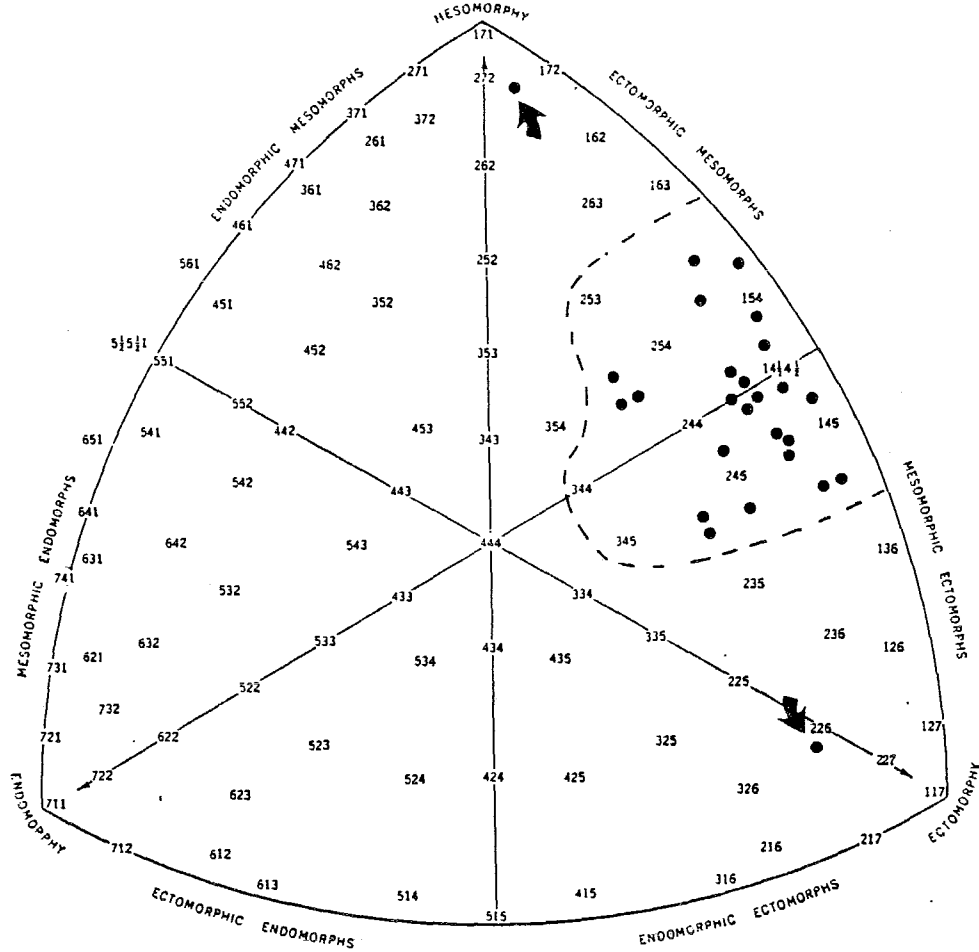
From the 26 individuals sampled, 22 separate somatotypes were calculated using Parnell's 13 point scale. Sheldon (1954) preferred a 7 point scale, so for descriptive purposes the somatotypes have been adapted to Sheldon's scale. This was achieved by rounding each component to the closest whole number. Table 4.5 illustrates this conversion. Using Sheldon's scale the somatotypes extend from the ectomorphic 1,4,4 to the near central and less ectomorphic 3,4,6. Also, the number of distinct somatotypes is reduced to 14. The clustering of these somatotypes can be seen clearly from table 4.6 which indicates the 13 point scale in dots, and the more conservative 7 point scale in dashed lines. Although

Table 4.5 Somatotype Distribution

Jockey	Parnell's Scale (1957)	Sheldon's Scale (1954)
01	2,4,4-1/2	2,4,5
06	1-1/2,7,3	2,7,3
09	1,4-1/2,3 1/2	1,5,4
10	1-1/2, 4,5-1/2	2,4,6
11	2,2,6	2,2,6
12	1,5,3-1/2	1,5,4
13	2-1/2,4,5-1/2	3,4,6
16	1-1/2,5,4	2,5,4
17	2,4-1/2,3	2,5,3
18	1-1/2,4,4	2,4,4
19	1-1/2,4-1/2,4-1/2	2,5,5
20	1,4-1/2,5	1,5,5
21	1-1/2,5,3-1/2	2,5,4
22	1,4-1/2,4-1/2	1,5,5
23	1,3-1/2,5	1,4,5
24	2,4-1/2,3-1/2	2,5,4
25	2,4-1/2,3-1/2	2,5,4
26	1-1/2,3-1/2,4	2,4,4
27	1-1/2,4-1/2,4-1/2	2,5,5
28	1-1/2,4-1/2,4	2,5,4
29	1-1/2,4,5	2,4,5
30	1,3-1/2,4	1,4,4
31	2-1/2,3-1/2,3-1/2	3,4,4
32	1-1/2,4-1/2,4-1/2	2,5,5
33	1,5,4	1,5,4
34	2-1/2,3-1/2,3-1/2	3,4,4

Numbers correspond to endomorphy, mesomorphy and ectomorphy respectively.

TABLE 4.6 Jockey Somatotype Clustering
(chart after Sheldon, 1954)



- Parnell's 13 point scale
- Sheldon's 7 point scale
- ➔ Outliers

the 13 point scale may be more precise, and hence more indicative of the population's somatotypes, the area included in the 7 point scale also shows clustering within a narrow range.

By 1954, Sheldon had delineated only 88 somatotypes on a 7 point scale, hence his descriptions in the Atlas of Men are limited to less than 60% of the somatotypes determined for the jockeys. From his descriptions of similar somatotypes however, generalities can be made.

Those somatotypes beginning with the number 1, namely 1,4,4, 1,4,5, 1,5,4, 1,5,5 comprise 27% of the jockey population. These are defined as the extreme endopenes and have very low amounts of subcutaneous body fat as evidenced by the 1 in the first component of their somatotype. They progress from a brittle and delicate frame accompanying an angular appearance, to a far more muscularly powerful individual possessing a similar appearance to the 1,4,4 and 1,4,5. Sheldon (1954) found that the incidence of somatotypes 1,4,5 and 1,5,4 were 4 per thousand, and that both types were likely to be "genuinely competent at certain kinds of athletic enterprises" (p. 47). The stronger and more agile 1,5,4 is more likely to be the more successful of the two in an athletic sense. Of the 7 extreme endopenes found in the jockey population, 5 were assessed as 1,5,4 and 1,5,5.

The majority of jockeys fall into the second group of somatotypes, those that begin with 2. From the cluster chart it is evident that these types continue to exhibit an extreme lack of endomorphy. The somatotypes calculated range from

2,2,6, which Sheldon states to be quite common, to 2,7,3, which are seen as being exceedingly strong and sturdy athletes. Approximately 30% of this group clusters around the 2,4,4 - 2,4,6 somatotypes, indicating balanced mesomorphy-ectomorphy, and are seen to be quite common in the general population with an incidence of 24 - 40 per thousand (pg. 93,99).

The most common somatotypes within the jockey population occur between 2,5,3 and 2,5,5. 35% of the total population falls into these categories. Photo 4.1 taken from Sheldon illustrates this body type. Characteristics displayed by individuals possessing the somatotypes are relaxed agility and good athletic sense. Although it is unclear how many jockeys may have been present in Sheldon's sample, he was clearly correct in suggesting that "little 2,5,3's can train down to become jockeys". (p. 197).

The category of somatotypes beginning with 3 includes only 3 of the 26 jockeys measured, 13, 31 and 34. This group is described by Sheldon as being balanced midrange mesomorph-ectomorphs. They are not particularly competent in an athletic sense and are the second most common somatotype in the general population.

It is possible that those jockeys possessing body types associated with greater athletic ability have more successful careers. However as success is measured financially it was not easily studied, hence it is not possible to state how jockeys 13, 31 and 34 compared to the other riders.

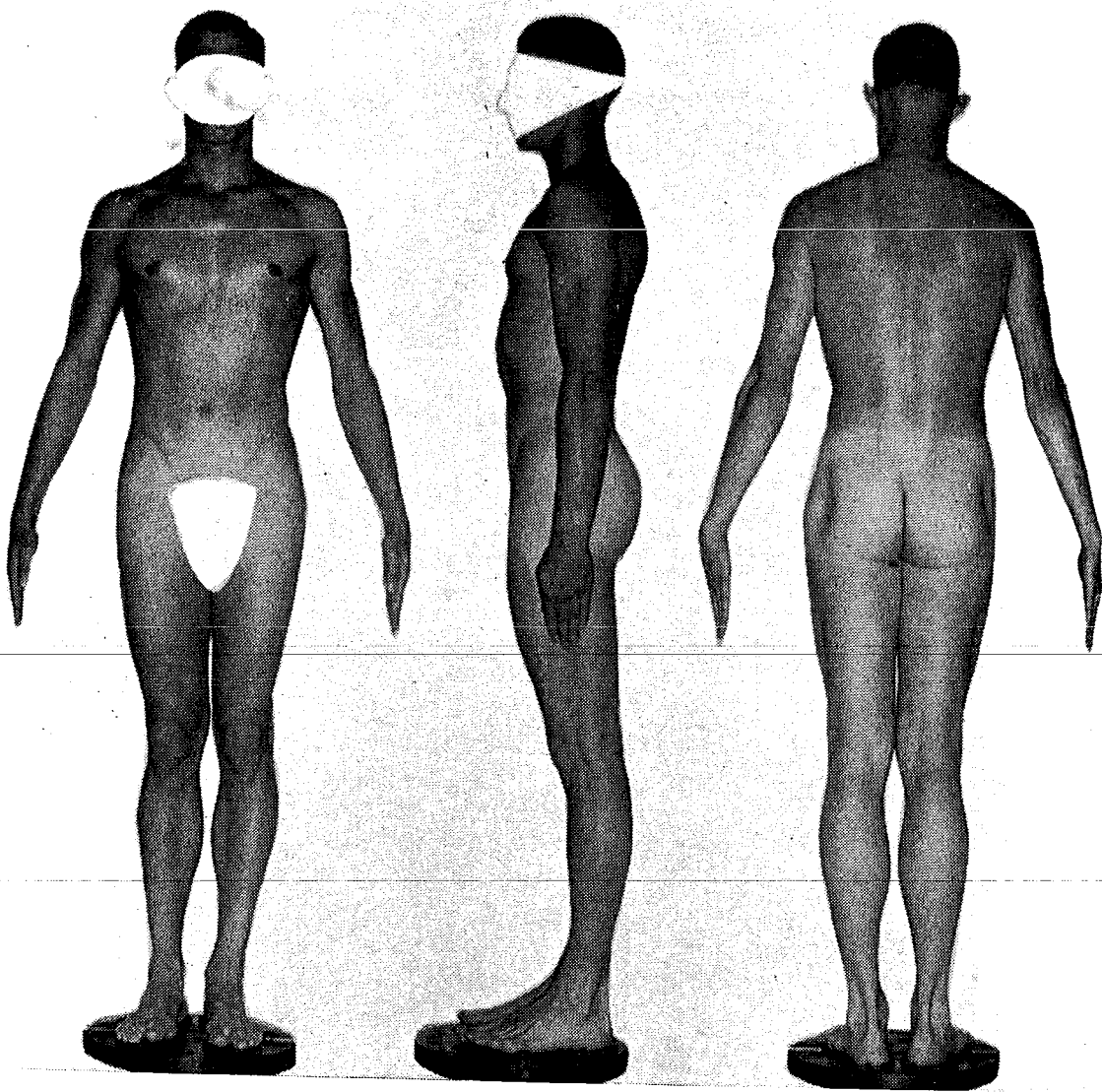


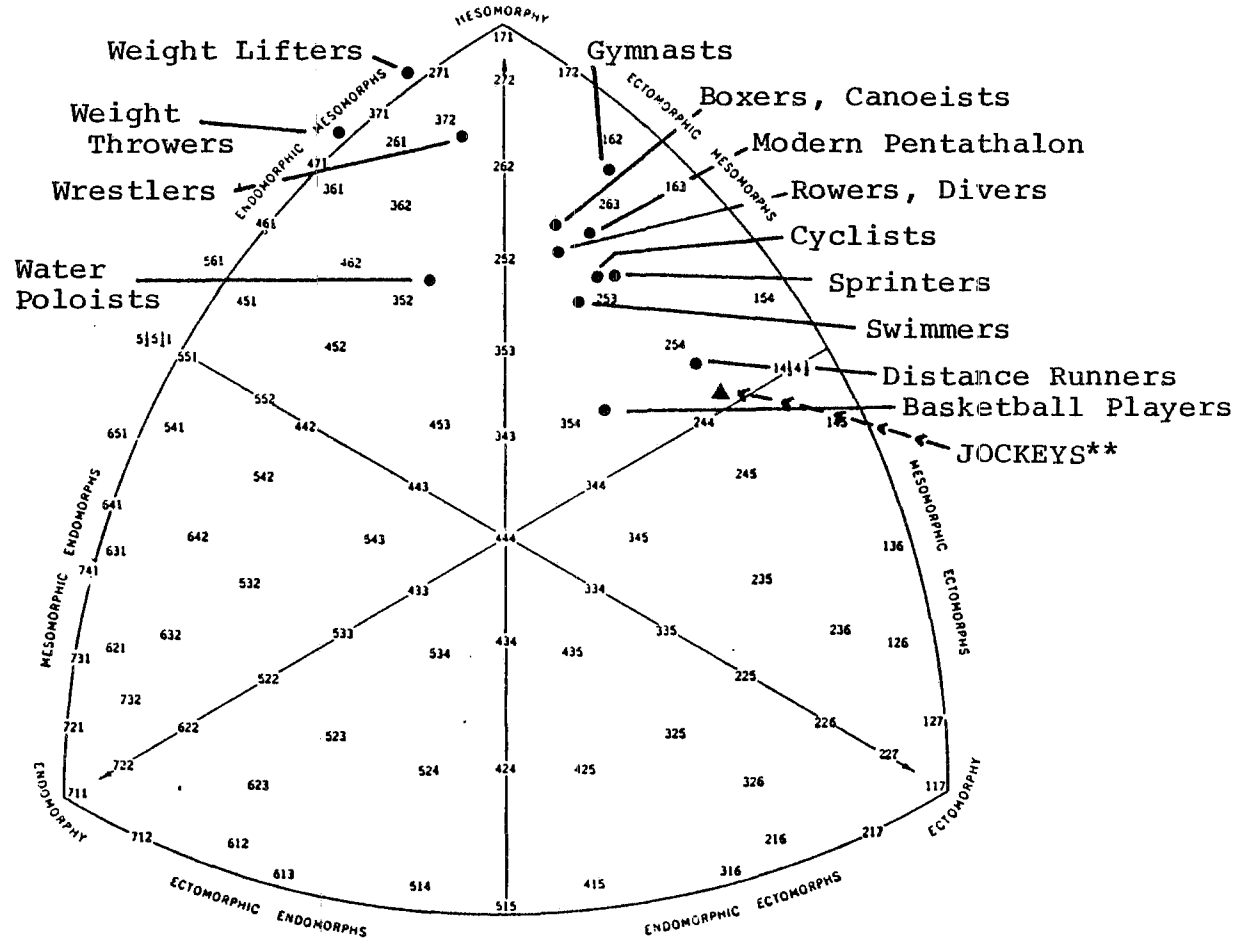
Photo 4.1 Somatotype 2,5,4.
(taken from Sheldon, 1954)

In summary, on a 7 point scale, 14 somatotypes were determined using Parnell's anthropometric method. Of the 14, Sheldon described 8 directly, and generalizations could be made for the remaining somatotypes based on these descriptions. 50% of the somatotypes in the population were characterized as athletic and 40% were discussed as continuing to gain weight into the 5th and sixth decades of life. This latter characterization may in part explain the very low percentage of jockeys 40 years of age and older.

Averaging each component independently, a mean somatotype of 255 is arrived at, and table 4.7 compares this mean somatotype for jockeys with the means for male olympic athletes (de Garay, Levine, Carter 1974). The chart indicates that athletically, jockeys appear to be most similar in somatotype to distance runners who, together with basketball players were noted by de Garay et al as being more linear than the other groups studied.

A measure of muscular strength was obtained by using the grip dynamometer. Two trials separated by a short rest period were allowed for each hand. The total grip strength is the sum of the better trials for both right and left hand. Although a definite relationship has not been established to indicate the proportionality of strength to weight, Tinkle and Montoye (1961), Everett and Sills (1952), and Jones (1947) indicate that of all body size parameters, weight correlates

TABLE 4.7 Somatotype Distribution of Mean Somatotypes for Various Male Sports Groups



(from de Garay, Levine, Carter, 1974)

** this work

highest with grip strength. Jones states also that the static dynamometric strength, received from a grip test is quite independent of the overall gross body size. Therefore a strength/body weight ratio has been calculated by dividing each strength measure by the individuals body weight. Table 4.8 illustrates these data and comparisons are made to data received by Montoye and Lamphiear (1977) while studying the grip strength of greater than 2700 North American males between the ages of 18 - 69.

Table 4.8 Jockey Population Grip Strength

	Jockeys (n = 26)	Control (n = 2738)
Age range	18-52	18-69
Sum of Grip Strengths		
(kg) range	62-102	75-124
mean	82.4	99.7
S.D.	12.2	16.0
Strength/weight ratio		
range	1.14-2.03	.89-1.75
mean	1.66	1.31
S.D.	.26	.23

Table 4.8 indicates quite a large discrepancy between the jockeys and the control group in both the sum of grip strengths and the strength/body weight ratio categories. Although data are not available for the average weights of the control population it is assumed that the jockeys are considerably lighter than this group of North American males. Therefore it is possible that the grip strength totals for the two groups can be explained by the differences in their weights.

The strength/weight ratio, providing an indication of whether or not an individual is able to lift his own body weight, or support himself in an assumed position (Montoye and Lamphiear 1977) clearly shows that, for their weight, the jockey population is stronger than the control group. Expressed as a percentage, the average rider, with a strength/body weight ratio of 1.66, is 21.1% stronger than the average man. This result is not surprising as the somatotyping procedure indicated that many of the riders had a high mesomorphic component and table 4.6 shows clustering in the mid mesomorphy-ectomorphy area. Also Jones (1947) found that although strength was related to body size it was also related to the mesomorphic component in body build. This was reiterated when Everett and Sills (1952) found grip strength to be positively correlated with a mesomorphic variable. Considering that for their height the jockeys weigh an average of 22% less than the normal Canadian male, the high strength to weight ratio also indicates the lack of body fat present on these individuals.

This is supported by the very low endomorphy scores calculated during the somatotyping procedure.

The final two physical measurements obtained were pulse rate and body temperature. These measurements will be included with the data to be presented in chapter 5.

CHAPTER 5

WEIGHT REDUCTION RELATED BEHAVIOURS

In addition to the physical data that were collected, methods of weight control, weight reduction and eating behaviours were also examined during the study. As outlined in the methodology the information pertaining to these areas was collected through formal and informal interview and the administration of the eating attitudes test (Garner and Garfinkel 1979). The behavioural material relating to dieting and weight control will be presented in this chapter and an attempt will be made to relate this material to those data presented in chapter 4.

DIET

Due to the necessity to sustain a trim figure it was expected that all of the riders would follow a preferred diet plan. Questions relating to dieting and food type avoidance were asked of all the riders, and 18 of the 32, or 56% indicated that they were particular about the caloric or carbohydrate content in the food they ate. For most of these individuals this applied to their daily eating habits consistently and only jockey 13 stated that he dieted on and off, dependent on his weight. When dieting, 3 riders used a personally devised meat and raw vegetable diet, generally consisting of

steak and salad. Only 5 riders bought and ate commercially available dietetic foods, and only 2 riders consistently avoided desserts and starchy foods such as breads, potatoes or pastas. Surprisingly none of the jockeys exercised caution with the use of salt on their food, although many were concerned about the weight related effects of water retention as evidenced by their use of diuretics.

Jockeys 4 and 20 were the most diet conscious of the population. Both of these individuals consumed health foods only, and jockey 20 visited a nutritionist every two weeks to plan a menu that was limited in calories but high in food value. Due to his interest in health foods jockey 4 believed that many of his colleagues were out of shape and abused their bodies through lack of proper exercise and the use of unorthodox dieting techniques. He often attempted to guide the others in proper diet selection, however this was met with little interest.

Some unusual dieting procedures found among the riders interviewed are worth noting. Jockey 9 stated that he ate steak with lettuce and tomatoes to the exclusion of all other foods, and this was then smothered in salt to enhance its flavour. He also made a practice of adding one to three teaspoonfuls of sugar to a can of his preferred non-diet soft drink. Other unusual practices noted were a range in eating frequency among the riders, extending from zero to up to 20 meals daily,

the ingestion of copious quantities of predominantly carbonated liquids every morning, and vomiting meals almost immediately after they have been ingested. These practices will be referred to in depth in this chapter.

MEAL FREQUENCY AND REGULARITY

Further information on the eating habits of the riders was elicited by asking individuals to record on a simple form (table 2.1) what they ate and drank over a six day period. This time period was considered to be appropriate as it included both working days and off-days and as such would provide an indication of the relationship between the amount and type of food eaten, and work schedule. In order to analyse this material, a meal has been arbitrarily defined as that occasion when a substantial quantity of solid food, together with a liquid is consumed at one sitting. For example, breakfast consisting of cereal, toast and coffee would be considered as a meal, whereas one or two regular-sized muffins plus coffee would be a snack rather than a meal. Likewise, a lunch or supper consisting of a cup of soup with an accompanying cup of tea or coffee has been designated as a snack rather than a meal. This arbitrary definition is necessary as it was not possible to gather the requisite information for a determination of caloric intake.

A summary of the four forms that were completed and returned is provided in table 5.1. Copies of the original

Table 5.1: Liquid and Solid Consumption Among Four Jockeys

Jockey	Time	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
A (113 lb)	Morn.	liquids*	meal	liquids*	liquids	liquids*	liquids*
	After.	liquids	shack	liquids	liquids	liquid	liquids
	Even.	meal	meal	meal*	meal*	meal	liquid
B (109 lb)	Morn.	liquid	meal	liquid	snack	snack	liquid
	After.	snack	snack	snack	meal	—	snack
	Even.	meal	meal	meal	liquid	meal	meal
C (110 lb)	Morn.	liquids*	liquids*	liquids*	liquids*	liquids*	liquids*
	After.	liquids*	meal + liquids*	meal*	2 meals+ liquids*	meal + liquids*	meal + liquids*
	Even.	2 meals*	meal + liquids*	meal	meal	meal*	meal
D (108 lb)	Morn.	liquids	liquids	meal	snack	snack	snack
	After.	snack	liquid	snack	snack	snack	liquid
	Even.	meal	meal	meal*	meal*	meal*	meal

[]: day off

* : food, liquid not digested

completed forms can be seen in appendix B. A number of interesting points can be raised from table 4.1. It appears that the preferred time for consuming a regular meal is in the evening. Liquids alone are preferred in the morning prior to racing, and the snacking occurs more frequently in the afternoon. The average number of meals eaten per day is one, and a regular three meal day was not reported by any of the four riders over the six day period. Three of the four jockeys report a regular incidence of vomiting, and approximately 25% of the time this vomiting takes place even if only one meal has been consumed on any day. Jockey C appears to rely more heavily on vomiting than his three colleagues and because of this he may find it unnecessary to restrict his food intake to the same extent as the other riders.

Table 5.1 also indicates that body weight is not an important factor in the decision to, or frequency of vomiting in that jockey B at 109 lbs does not vomit his food or liquids while jockey D at 108 lbs does, and jockey A at 113 lbs vomits less frequently than jockey C at 110 lbs. Also, two of the riders tend to ingest and then vomit large quantities of liquid in the morning. Interviews showed that this practice is widespread.

A total of 18 meals were eaten and retained over the six day period, and 14 of these were evening meals. Seven was the highest number of meals eaten by an individual throughout the period, while jockey C claimed to have digested only

three meals within 6 days. Snacks were eaten with regularity by 2 of the 4 riders, while the remaining 2 did not include these in their meal plans.

Questions relating to meal frequency and time preference were also asked through interview. Information was collected from 24 individuals, 10 of whom stated that they ate only one meal daily to help control their weight. Eleven ate two meals a day, and 3 ate as many as 20 meals per day, vomiting all, or all but the last meal, similar to the behaviour of jockey C in table 1. None of the riders digested as many as 3 regular meals a day even on their days off, and there was no preferred meal time.

An average weight difference of 2.1 pounds exists between group 1, eating 1 meal a day, and group 2 who state that they eat 2 meals a day. It is possible that group 1 consists of naturally heavier males, thus unable to eat the same quantity of food as the group 2 males who weigh on average approximately 108 lbs. If a greater difficulty with weight control is assumed for group 1, a higher incidence of vomiting would also be expected for this group. This was found to be the case, with 5 of the 10 individuals in group 1 reporting self-induced vomiting, and only 3 of the 11 individuals in group 2 reporting use of the practice. Unfortunately the differences in the daily caloric intakes of the two groups are not known so the possibility exists that both

groups are eating calorically equivalent meals despite the number of times they eat daily. This would indicate that there is actually no distinction between the 2 groups. Also, although there is a two pound difference between them, the standard deviation of the mean weights of group 1 and 2 are too large to indicate that the groups are statistically significantly different in relation to weight.

VOMITING

Those data relating to meal frequency and food intake are vastly complicated by the fact that many riders prefer to empty their stomachs by vomiting rather than to impose a dramatic restriction on their eating and drinking. This practice, alternatively referred to as "flipping" or "heaving", or implied in the more general phrase "pulling weight" is introduced to the apprentice jockey by the other riders as a useful way to keep hunger and weight off. It is such a common practice that one track official stated that eating is done to merely satisfy hunger, and vomiting after eating is followed by almost all of the boys. It is generally believed that once the rider begins to use this method of weight control he will continue to do so throughout his entire career. An extreme example of this is jockey 6 who has vomited both food and liquids daily for the 25 years he has been riding.

In total, 33 riders provided information on their use of vomiting. Table 5.2 provides a summary of these data.

Table 5.2 The Self-Reported Prevalence of Vomiting

Vomiters	Non-vomiters	Unknown
13	17	3
(39%)	(52%)	(9%)

Of the 33 riders questioned, 13 stated that they vomited, and of these, 11 vomited on a daily basis, averaging twice a day but ranging from 1 to 20 times. Seventeen individuals reported that they did not use this method of weight control.

Although the number of vomiters seems high at 39% of the population, these results are low compared to the estimate of the prevalence of vomiting provided by the jockeys themselves. Estimates ranging from 25% to 100% were provided, and the large majority of riders suggested that a minimum of 75% of all riders vomit as a means of controlling their caloric intake. The discrepancy between the estimated and reported amounts of vomiting may be indicative of an effort to keep the knowledge of this practice away from the public. It may also indicate a degree of denial pertaining to this behaviour.

Referring back to table 5.1, jockeys A and C both ingested large quantities of liquids during the morning hours prior to racing. Usually these were carbonated beverages, and they were taken to the sauna to be consumed. The carbonated

beverages are used as they make vomiting easier, and this in turn is believed to lead to a greater amount of body fluid loss while in the sauna. Jockey 6 showed the most obvious behaviour in this regard as he could be seen every morning consuming simultaneously two cans of soft drink, often immediately followed by a second pair.

The vomiting is accomplished with varying degrees of difficulty by the riders depending on how long they have been using the practice, and the frequency with which they use it. Jockeys 6, 15 and 18 flip so frequently that they need only to bend over to initiate the response. Some of the other riders find it necessary to induce a gag reflex. This factor may play an important part in preventing a greater number of jockeys from vomiting, as 2 of the non-vomitters stated that they had tried to use vomiting but stopped as they found it both difficult and unpleasant.

Also, an attempt was made to collect data on the use of vomiting during periods when the riders were off work. Although much effort was expended by the jockeys to ensure that it was understood that vomiting accompanied the riding periods, it is possible that this method was also used to a lesser extent off-season to control weight gain.

Seven of the 13 self-reported vomitters stated that they regularly gained weight off-season. They all indicated that they became less conscientious about foods that were

eaten, but at the same time were careful not to put on too much weight as they found it difficult to get back into shape for the start of the riding season. When asked specifically whether or not vomiting was curtailed during off-season periods comments such as "...no one flips if it's unnecessary" were offered. Jockey 11 was less vague and stated that he believed constant vomiting to be a necessity if he wanted to keep riding. The most interesting comment pertaining to vomiting in general was provided by a trainer, who in stating, "...some 'kids' just like to heave" indicated that weight stability is not the only factor considered in the decision to begin and continue vomiting.

In an attempt to physically distinguish between the vomiters and the non-vomiters the weights of the 2 groups were compared. This proved unsuccessful as the standard deviations of both categories were much greater than the one pound difference in their means. Age differences for the 2 groups were also calculated, and these too were very similar, as were ponderal indices.

Somatotype data were available on 11 of the 13 vomiters, and this can be seen in table 5.3. Aside from the population's overall somatotype pattern, as described in chapter 4, no patterns or preference for a specific somatotype are present. The average somatotype among the vomiting group is 2,5,4 compared with the average of 2,5,5 within the

population. This indicates that the vomiters are a slightly less ectomorphic group than the general population. Endomorphy and mesomorphy components for the two groups were the same which is somewhat surprising as it was expected that the more endomorphic and mesomorphic individual would be likely to induce vomiting to control his weight.

Total 5.3 Somatotypes of 11 Self Reported Vomiters

Jockey	Somatotype
06	2,7,3
11	2,2,6
12	1,5,4
13	3,4,6
17	2,5,3
18	2,4,4
25	2,5,4
27	2,5,5
28	2,5,4
31	3,4,4
33	1,5,4
Total: 11	\bar{x} 2,5,4

Although there may be a slight shift to a less ectomorphic somatotype among the vomiting jockeys, this is not seen to be conclusive. These data indicate that the decision to

use vomiting as a means of weight control is based on psychological, social and perhaps metabolic factors rather than the physical factors of weight, height, age and somatotype.

BINGING

Although there is no history of a jockey becoming obese until many years after he had ceased to race, a proportion of riders interviewed admitted to having a tendency to overeat to a substantial degree. Jockeys 6, 15 and 18 have previously been mentioned in relation to their consumption of up to 20 meals daily, all followed by vomiting. These were the most severe cases encountered. Other riders stated in interview that they binged once daily, while still others were less specific. Table 5.4 illustrates the number of jockeys who binge, and compares these data with those jockeys who reported self-induced vomiting.

Of the 26 riders asked directly if they binged on food, 10 replied that they did. The use of the practice by jockey 15 had been ascertained informally at an earlier time, bringing the total of bingers up to 11. Of the 11 bingers, 10 relied on vomiting to control the caloric side effects of the practice.

Table 5.4 Binging and Vomiting Among a Group of Jockeys

Binging Behaviour		Vomiting
Jockey #	Frequency	Yes, no
6	~ 20× daily	Yes
11	often	Yes
12	sometimes	Yes
13	sometimes	Yes
15	~ 20× daily	Yes
16	often	No
17	1× daily	Yes
18	~ 20× daily	Yes
27	2× week-1× daily	Yes
31	sometimes	Yes
33	rarely	Yes

As only a total of 13 jockeys reported self-induced vomiting, these data indicate that 77% of the vomiters binge. If this is so, it is possible that the vomiting behaviour is not related simply to dieting, but has other ramifications.

DRUG USE

Initial interviews with the track doctor suggested that a wide range of drugs are used by the riders in an attempt to help them better control their weight. The most common of

these are laxatives and diuretics, but amphetamine-related appetite suppressants, and a variety of vitamins are all used to a certain extent. Due to the tendency they have of increasing muscle bulk, and hence weight, steroids were used by none of the riders interviewed.

Twenty-seven riders volunteered information about their use of laxatives for the purpose of weight control. Eighteen, or 66% stated that they had never used laxatives for that reason. Of the remaining 9 individuals, 6 used them fairly regularly, and 3 stated that they rarely used laxatives to keep their weight down.

The use of diuretics was mentioned by both the public relations officer and a trainer during the preliminary interviews for this study in the summer of 1979. It was stated at that time that diuretic use was prominent among the jockeys, and that they were generally prescribed through the track doctor. When questioned, 8 riders indicated that they used diuretics regularly, and at least one, and possibly 2 had been hospitalized for dehydration. Lasix is the drug of choice and it is a very potent diuretic which requires careful medical supervision. Although the long term usage of Lasix should be combined with a high potassium diet, only jockeys 14 and 17 stated that they took Slow K, a potassium supplement in combination with the diuretic. Ironically, jockey 14 was the only rider witnessed to have been resigned

from a race by the track doctor due to temporary weakness resulting from water loss. He was not the only rider however to over-indulge in this practice. On one occasion jockey 15 was observed falling off his horse, and dizziness due to dehydration was given as the probable cause.

Many of the riders over the age of 30 stated that they had used amphetamines regularly to help suppress their appetite as well as increase their energy expenditure until those drugs were removed from over-the-counter sales in 1972.

As it has become more difficult to obtain amphetamines such as Dexedrine and Benzedrine, many have turned to the drug Tenuate. This is an amphetamine congener that acts as an anorexiant, and although it is supposed to be used in the treatment of non-physiological obesity, it is commonly prescribed to riders by the track doctors as an appetite suppressant to aid in controlling weight gain.

Surprisingly, the most common drug used by the jockeys is Vitamin B-12. At one point, many riders were receiving B-12 shots every 3 months at the track infirmary. They believe that it has both a beneficial effect on their athletic performance, as well as helps them to curb their appetite and thus lose weight. From the track doctor's point of view, the use of the drug was faddish since there was no proof that it had any of the effects the riders thought it had. Regardless of this, approximately 1/3 of the jockeys interviewed take Vitamin B-12 regularly; either daily in tablet form or quar-

terly via injection.

SAUNA USE

The most commonly used method of weight reduction on the track was the dry sauna, or "hot-box". Twenty-two (67%) of the riders used it regularly, and 15 of the 22 used it daily for periods of time ranging from twenty minutes to three hours. It was expected that those individuals who used the sauna the most frequently, or for prolonged periods of time for weight loss purposes would have the biggest weight problem. Those data collected generally support this expectation. The average weight of the 15 riders using the sauna on a daily basis was 110 ± 3 lbs. This compared with the average weight of 108 ± 2 lbs for the 6 weekly users, and 107 ± 5 lbs among the eleven non-users of the sauna. Also, the prevalence of vomiting was much greater among the group of daily sauna users, with 8 of the 15 riders in that category vomiting compared to only 2 of the 11 non-users.

Four riders, 6, 11, 14 and 15 stated that they regularly spent up to three hours daily attempting to lower their weight from 1 to 6 pounds through the use of the sauna. To further increase the amount of water loss, jockeys 11 and 14 accompanied their 3 hour stay with a diuretic 2 to 3 times a week.

Two other practices were used by the riders to induce profound body fluid loss while in the sauna. Buckets of ice were regularly retrieved and kept inside the sauna, and perio-

dically the riders would immerse their head in the ice water to cool down. This was done to enable them to withstand the high temperatures for long uninterrupted periods of time.

The second common practice associated with the sauna was the use of oils. Baby oil was placed over the entire body to keep the optimum amount of heat next to the skin surface, and to stop the natural cooling of the body through perspiration by clogging the pores. The supposed effect of this procedure was a prolonged period of extreme sweating where the body would attempt to cool down. It is unclear how the desired effect was achieved as fluid loss through perspiration would be difficult under those conditions. This practice was commonly followed however.

EXERCISE

As an adjunct to restricted food intake and an aid to keeping weight gain minimized it was expected that exercise would be important to the riders. Questions were asked specifically about their participation in sports and the reasons behind their participation.

Data were collected from eighteen riders, only seven of whom engaged in regular exercise activity. Swimming and jogging were the most popular sports, and weight lifting and racquet sports were also mentioned. Jockeys 1 and 14 exercised only during the spring training season, and riders 6 and 9 exercised strenuously only when it was necessary to lose a

substantial amount of weight. The remaining seven riders stated that they did no exercise at all, and that "extra" exercise was believed to be unnecessary as many of them rode horses during the morning workout.

Based on this information it is generally indicated that regular exercise, independent of riding was not considered to be an important aid in weight control. Also, since athletic injuries from riding were not encountered by any of the riders, preparatory or warm-up exercises were not considered to be important either.

THE EATING ATTITUDES TEST

As outlined in the methodology, the eating attitudes test (Garner and Garfinkel 1978) was included in the April fieldwork period and followed the somatotyping procedure. Twenty-six riders completed the EAT which was used to determine the degree to which "anorexic-like" behaviour was present in the jockey population. Table 5.5 illustrates the scores calculated for the Eating Attitudes Test in conjunction with weight and somatotype data.

In clinical evaluations of anorexia nervosa a score of 30 or above is considered worthy of further investigation (Garner and Garfinkel 1978). From table 5.5, only 2 jockeys, 18 and 31 scored greater than or equal to 30 on the Eating Attitudes Test. However, question 23 which is normally a high scoring response dealing with menstrual irregularity was

Table 5.5 EAT Scores Compared to Weight and Somatotype

Jockey	Weight	Somatotype			EAT Score
1	109	2	4	4-1/2	27
6	112	1-1/2	7	3	27
9	120	1	4-1/2	3-1/2	27
10	110	1-1/2	4	5-1/2	10
11	112	2	2	6	28
12	104	1	5	3-1/2	10
13	106	2-1/2	4	5-1/2	14
16	111	1-1/2	5	4	21
17	110	2	4-1/2	3	27
18	109	1-1/2	4	4	32
19	106.5	1-1/2	4-1/2	4-1/2	9
20	112	1	4-1/2	5	29
21	112	1-1/2	5	3-1/2	9
22	107	1	4-1/2	4-1/2	11
23	109	1	3-1/2	5	8
24	112	2	4-1/2	3-1/2	15
25	110	2	4-1/2	3-1/2	24
26	108.5	1-1/2	3-1/2	4	19
27	110	1-1/2	4-1/2	4-1/2	9
28	108	1-1/2	4-1/2	4	9
29	103	1-1/2	4	5	8
30	99	1	3-1/2	4	14
31	110	2-1/2	3-1/2	3-1/2	30
32	109	1-1/2	4-1/2	4-1/2	5
33	107	1	5	4	8
34	112	2-1/2	4-1/2	4-1/2	7

inappropriate to this study indicating that scores less than 30 may be noteworthy in this population. To compensate for the removal of question 23, the high score of 30 was dropped to 27. Of the total 26 jockeys, 8 riders scored greater than or equal to 27, and 18 scored less than 27 points. Although there were no clear distinctions in somatotype between the two groups a possible distinction in weight was found. Group 1, scoring 27 or better had a weight range of 109 to 120 pounds, with an average weight of 112 and a standard deviation of 4 pounds. The recorded weight for group 2 ranged from 99 to 112 pounds and the average was calculated at 108 with a deviation of 3 pounds. The standard deviations indicated a slight overlap or continuity between the groups.

Eleven of the 26 riders completing the EAT were vomiters, and 9% of these were both bingers and vomiters. Not surprisingly these groups shared a higher incidence of EAT scores 27 or greater with 5 of the 11 vomiters, and 4 of the 9 bingers and vomiters (45% of both groups) having high scores.

A complete item analysis of the 40 questions on the Eating Attitudes Test can be seen in appendix D. As an example of the received responses, 7 questions and answer categories have been summarized in table 5.6.

Although the test had a self-report format, and was usually filled out privately, the answers given appeared to be more guarded than those responses offered during interview. This could be due to a reluctance to have this information

Table 5.6 7 Response Examples from the Eating Attitudes Test

Question	Always	Very often	Often	Sometimes	Rarely	Never
(7) Have gone on eating binges where I feel I may not be able to stop.	0	1	2	4	2	17 (65%)
(10) Particularly avoid foods with a high carbohydrate content.	1	3	0	6	2	14 (54%)
(11) Feel bloated after meals.	3	3	3	15	0	2 (8%)
(13) Vomit after I have eaten.	2	2	1	5	1	15 (58%)
(15) Am preoccupied with a desire to be thinner	3	1	1	4	3	14 (54%)
(31) Feel that food controls my life.	2	1	0	7	5	11 (42%)
(40) Have the impulse to vomit after meals.	0	4	1	3	1	17 (65%)

"permanently" recorded under their own names, or to a certain degree of personal denial. Despite these possible difficulties 11 of the 26, or 42% of the riders completing the EAT indicated that they vomited after meals to varying degrees. 35% reported that they had binged, and 46% and 58% reported that they were preoccupied with a desire to be thinner, and that food controlled their life to certain extents.

The EAT was also used to gather information on the amount of weight fluctuation that was present in the population. Table 5.7 illustrates these data.

The weight fluctuation reported in table 5.7 ranged from a low of 4.5 pounds to a high of 47.0 pounds during these individuals' adult life. 41%, or 11 of the riders experienced fluctuations of 15 pounds or more, and many of them related this to off-season weight gain. Expressed as a percentage of their highest adult weight, 7, or 26% of the jockeys had lost over 10% of their body weight to achieve the present weight indicated.

BODY IMAGE, BODY TEMPERATURE AND PULSE RATE

In an attempt to study and come to comprehensive conclusions on the eating and related behaviours, information was obtained that related to how the jockeys felt about themselves, and in particular their bodies. The EAT addressed body image difficulties through the following questions, 4, 15, 17, 18 and 25. The riders were asked also through interview whether

Table 5.7 Adult Weight Fluctuation Among 27 Jockeys

Jockey	Highest Weight (lb)	Lowest Weight (lb)	Present Weight (lb)	Fluctuation (lb)	% Wt. Loss (highest→present)
1	111	106.5	109	4.5	1.8
*4	103	98	103	5	0
6	135	94	112	41	17.0
9	142	109	120	33	15.5
10	114	105	110	9	3.5
11	140	112	112	28	20.0
12	109	100	104	9	4.6
13	135	102	106	33	21.5
16	122	103	111	19	9.0
17	118	110	110	8	6.8
18	130	105	109	25	16.2
19	110	102	106.5	8	3.2
20	150	103	112	47	25.3
21	125	108	112	17	10.4
22	112	104	107	8	4.5
23	115	107	109	8	5.2
24	115	103	112	12	2.6
25	112	104	110	8	1.8
26	118	101	108.5	17	8.1
27	117	105	110	12	6.0
28	115	101	108	14	6.1
29	103	98	103	5	0
30	99	94	99	5	0
31	112	101	110	11	1.8
32	118	104	109	14	7.6
33	114	97	107	17	6.1
34	119	101	112	18	5.9

(*Those data relating to jockey 4 were collected through interview.)

they had any thoughts or concerns about their shape or size.

It was expected that there would be a great deal of anxiety expressed about weight, however the most common topic was height. Many of the riders stated that they had been disappointed with their height while at high school. After beginning to ride however they no longer considered it a disadvantage and were unconcerned with it.

The results pertaining to body image from the Eating Attitudes Test reflect anxiety and concern over weight. Approximately one third of those riders completing the EAT felt occasional or more than occasional preoccupation with a desire to be thinner and the thought of having fat on their bodies. The same number admitted to being terrified about being overweight, although this may be a more valid fear as their income is so closely related to strict weight limits.

The temperature and pulse rate data were collected during the somatotyping procedure. After all of the data had been collected it was realized that both pulse and body temperature could be affected by the use of the sauna. Taking this into account the results recorded indicated that body temperature was within normal range. The pulse rate data ranged from 56 - 100 beats per minute, and six individuals had a resting pulse rate of 60 beats per minute or less. Three of the six riders in this latter category practised both binging and vomiting.

CHAPTER 6

DISCUSSION

In chapter one an overview of the literature pertaining to the description, causes and diagnosis of anorexia nervosa was presented. It is now possible, based on the physical and behavioural data presented in chapters four and five to determine to what extent the jockey population reflects the characteristics of this disorder. The diagnostic criteria favoured by Dally (1979) p. 11, and which allow for the inclusion of males are as follows:

1. Active refusal by the patient to eat enough to maintain a normal weight and/or determined sustained efforts to prevent ingested food from being absorbed.
2. Loss of at least 10% of previous body weight
- *3. Amenorrhea of at least 3 months duration when menstruation had previously been regular.
4. The patient's age of onset should lie between 11 and 35 years, but it is recognized that atypical anorexia nervosa can occur at any time after this.
5. There must be no sign of organic disease which might account for weight loss, serious affective disorder, or schizophrenia.

*This criterion is irrelevant in the assessment of males.

These criteria together with the characteristic behavioural factors of anorexia nervosa and the scores from the Eating Attitudes Test (Garner and Garfinkel 1979) have been used to determine the presence and the degree of anorexia nervosa within the jockey population.

Table 4.2 illustrates the jockeys' weights as a percentage of the Canadian standard weights for height and age (1954). The results show that approximately 72% of the jockey population is greater than 20% below the Canadian average weight for their specific height. The mean deviation from the average weight is -22.2%. Although this is not specifically symptomatic for anorexia nervosa it is similar to the degree of weight deviation found in groups exhibiting anorexic-like behaviour and a high frequency of anorexia nervosa (Garner and Garfinkel 1980, p. 649).

The off-season weight gains reported earlier suggest that a more relaxed, and less competitive environment allows the riders to be more lenient in their eating habits. Despite the more relaxed environment however, the mean weight gain off-season among the riders was 12 pounds, which is still substantially below the average Canadian weight for their height, suggesting that weight remains a great concern even off-season.

As expected, the somatotyping results indicated a homogeneous population, extremely low in the first component endomorphy, and relatively high in the second and third com-

ponents mesomorphy and ectomorphy respectively. The low endomorphy scores supported the results in table 4.2, and reflected the general lack of subcutaneous fat among the jockeys.

It was hoped that the somatotyping procedure, by identifying those individuals with a naturally heavier body type, would point out those who may be at a greater risk to develop extreme eating behaviours symptomatic of anorexia nervosa. Unfortunately no relationship between specific somatotype groups and eating behaviours could be found, possibly due to the prevalence of low body weights throughout the entire population, and the related prevalence of unconventional eating habits such as vomiting and bingeing over the range of somatotypes.

The adult weight fluctuation reported in table 5.7 indicated that seven, or approximately 26% of the jockeys lost over 10% of their highest reported adult weight. None of the riders reported the presence of any organic disease that may have been responsible for weight fluctuation or any weight or appetite loss. Also it has been reported earlier that six of the twenty-six jockeys tested had resting heart rates of 60 beats per minute or less, a cardiovascular feature suggestive of the undernourished body's attempt to conserve energy. Significantly, these factors correspond to Dally's criteria, and the presence of a low resting heart rate, or bradycardia, has been reported among anorexics by many authors

including Dally (1979, Feighner (1972) and Crisp (1980).

As reported in chapter 5, the Eating Attitudes Test was taken by 26 riders. Eight jockeys, 31%, scored greater than or equal to 27 which was interpreted as indicative of a high degree of anorexic symptoms. The mean EAT score was 17.2. This compares with a mean score of 8.6 for an independent group of 49 male controls, and a mean of 15.6 for female controls tested by Garner and Garfinkel (1979). As the Eating Attitudes Test reflects such factors as food preoccupation, body image and vomiting behaviour, the mean score reported indicates that these factors are present to a greater extent among the riders than in the normal population.

Self-induced vomiting among the riders was reported in chapter 5 at an approximate rate of 40%. Bruch (1973, p. 205) states that, "the young, the college crowd, have revived the Roman custom of regurgitation after indulging in large meals. This method has become commonplace." Despite the acknowledgement of this practice, the extremely high occurrence of vomiting in this group, and its relation to consistent eating and overeating must be interpreted as differing substantially from the behaviour of the general population. In this study it has been found that of the thirteen individuals who admit to using self-induced vomiting, eleven combine this with bingeing behaviour. It is possible that the vomiting began as an infrequently used method to aid in weight

control. This developed into a much larger problem when the users realized that it allowed for normal and even over-indulgent eating. It appears that those jockeys who binge and vomit have entered a cycle where continuous overeating is followed by continuous efforts to prevent the absorption of the ingested food. Not only is this behaviour consistent with criteria followed by Dally, it is also in agreement with Crisp's experience with males. He states (1980, p. 94),

"Diagnosis within the male is usually more difficult, such that it may be assumed that the prevalence of the condition amongst males is greater than presently recognized, although most certainly it remains much more rare amongst them than amongst females ... Amongst those males with anorexia nervosa who reach the clinic there is a greater proportion who habitually overeat and vomit than there is amongst the female population of anorectics."

The dieting behaviours evident among the riders were also investigated. Those individuals who were uncomfortable using vomiting to control their caloric intake frugally limited their eating often to one meal, or one snack for the day, with evening being the preferred time to eat. This severe restriction on food intake is commonly seen in anorexics although they are known to experience normal hunger, with no loss of appetite until late in their illness (Halmi, 1978, p. 138).

Other methods used by the jockeys to accomplish weight loss included laxative and diuretic abuse, and amphetamine and appetite suppressant use. The first two methods listed are quite common among anorexic individuals (Halmi, 1978, p.

137), but amphetamines and appetite suppressants appear to be less common, perhaps due to the necessity for a prescription. Two methods widely used by the jockeys but not seen in the literature pertaining to anorexia nervosa are vitamin B-12 and excessive perspiration in the sauna. This behaviour is solely directed at weight loss, and as such may be regarded as anorexic-like, although it is believed to be common among many athletic groups.

Hyperactivity, a commonly seen trait among anorexic individuals (Feighner et al., 1972) was not evident among the jockeys. Surprisingly, strenuous exercise undertaken for purposes of weight loss was admitted to by jockeys 6 and 9 only, and 39% of those interviewed indicated that they did not consider exercise to be a useful tool for maintaining a low body weight. A possible explanation for this is that hyperactivity is believed to be a response to an altered metabolic state that results from extremely limited food intake (Crisp 1980, p. 80). As the numbers of severely restricting riders were smaller than the bulimic riders, and the restricters were less communicative about their behaviour, the data on exercising may be biased in favour of the bingeing and vomiting groups, resulting in insignificant levels of hyperactivity being reported.

Dally's diagnostic criteria for anorexia nervosa (1979 p. 11) does not include a description of the common body

image and psychological disturbances experienced by these patients, however other researchers in the area (Garner and Garfinkel, Bruch, Halmi, Crisp) include these symptoms in their operational criteria. In the Eating Attitudes Test (EAT), body image for thinness and the intense fear of obesity is tested directly through questions such as "I am terrified about being overweight", (#4), "I am preoccupied with a desire to be thinner" (#15), and, "I am preoccupied with the thought of having fat on my body" (#25). 35% of the jockeys felt that they were preoccupied with wanting to be thinner, and 29% feared, or were preoccupied with gaining weight. Thirteen of the 26, or 50% were preoccupied with food, and approximately 40% felt that food controlled their lives. These responses are indicative of the underlying fears in anorexia nervosa and emphasize that the sole opposition to eating is based on avoiding weight gain.

A common socio-cultural characteristic of anorexia nervosa has been the prevalence of the disorder among the middle and upper social classes (Bruch 1973, Morgan and Russell 1975). Of the 27 riders asked about their parents livelihood, 18, or 66% indicated that they came from lower and lower-middle class families. None of the riders interviewed came from professional families. In contrast, Crisp has recently stated (1980, p. 94) that anorexic males reaching medical attention are more likely than females to come from a working class background, and that on the whole, due to the

increasing numbers of "anorexics" of both sexes the prevalence of the disease within certain socio-economic classes is becoming less specific.

Table 6.1 summarizes the characteristics of anorexia nervosa and assesses each of the jockeys in relation to these features. As there was no organic disease reported, and all of the riders were between the ages of 11 and 35 when their specific eating behaviours developed, as per Dally's criteria, these categories have not been included. The table is divided into two sections. Section one includes anorexic diagnostic characteristics as well as columns for the EAT score and weight phobia. Those riders who exhibited any of these features had one X or two X's placed in the relevant columns depending on the severity. This facilitated a total score to be tallied which appears in column 8. Based on presently used diagnostic criteria, a total score of greater than or equal to four has been interpreted as being conclusive for the presence of anorexia nervosa in that individual. Section two lists symptoms the jockey exhibits that have not been included in the diagnosis either because their presence is inconclusive, or as in the case of combined laxative and diuretic abuse the purging behaviour has already been accounted for in the bingeing and vomiting. The evidence for the presence of a "weight phobia" (Crisp's term 1970), or a fear of obesity was arrived at by averaging the individual riders'

responses to questions 4, 15 and 25 on the Eating Attitudes Test.

The results indicate that based on Dally's criteria alone, five riders, 5, 11, 13, 18 and 20 have anorexia nervosa. Of this group only jockey 13 lacked a total score of 4 or greater and therefore would not have been included by this author. Riders not filling Dally's criteria due to the loss of less than 10% of their adult body weight, but nevertheless scoring 4 or greater were 17 and 31. Therefore, using either set of criteria 5 to 7 individuals, or 15 to 21% of the population have displayed characteristic symptoms severe enough to be defined as anorexia nervosa.

Another occupational group that places much emphasis on body size, and who must work at very low body weights is the ballet dancer. Vincent (1979) describes the eating behaviours of the dancer and this compares closely with that seen among the riders. "Ellen has virtually tortured herself with laxatives, vomiting and semistarvation. At the time of our interview, she was pursuing a ridiculous dietary regime composed predominantly of liquids and diuretics (pg. 106)". He also quotes a dancing instructor who states:

"The thing I've noticed most of all is that they eat in excess; it's either one or the other. Instead of cutting down their food generally if they're trying to lose weight, they just cut everything out. And then they go from one extreme to the other; they're starving one day and they're gorging the next day. (pg. 35).

These observations would serve equally to describe the jockeys as the similarities between them are abundant. Both groups place almost an obsessional emphasis on body size, resulting in a population of underweight individuals. They approach common extremes in the attempt to control their weights, and suffer from common preoccupations and physiological drawbacks such as dehydration and depression as a result of their practices. Another important similarity is that they have both chosen professions in which the weight standard is different, and much lower, than that for normal males and females. Clearly their weight should be considered in relation to their professions. Acknowledging the many parallels between dancers and anorexic females, Vincent (1979 p. 129) is firm in his opinion that there remains a major distinction between the two groups. He feels that as there is no display of "irrational denial" dancers and dance students should be seen as pseudo-anorexic, or anorexoid, and not common with the classic anorexic population.

Denial has often been cited as a symptom of anorexia nervosa, and in fact is included in the diagnostic criteria proposed by Feigner et al (1972). Slade and Russell (1973, p. 188) also refer to the presence of denial among anorexics,

"The patient may set for herself a sharply defined limit for her weight above which she is most reluctant to rise. Patients therefore often deny that they are abnormally thin, and in extreme cases may even state that they are fat, in spite of appearing emaciated."

There is a large amount of similarity between the description of anorexic denial as quoted above, and that offered by Vincent throughout Competing with the Sylph. Hence, it is unclear on what grounds he concludes the absence of denial, and concomitantly, anorexia nervosa within his population.

The presence or absence of denial among the jockeys was not studied directly, however conclusions can be made based on the amount of conflicting information that was received from the group. It was found that individuals were reluctant to offer information about various behaviours. Many would in fact deny that they, or their peers vomited, or used diuretics until they were assured that the specific behaviour had been reported by others and it was simply the extent of its presence that was being questioned.

There are a few possible reasons for the denial among the riders. They are very concerned with the general population's opinion of them, and specifically the media's acceptance of them as athletes; hence they feared leakage to the press. Also it appeared that in relation to the vomiting and excessive sauna use, many riders were embarrassed to admit that they found it necessary to approach such extremes in trying to control their weight. In chapter four, the category Natural Lightweight (NLW) was briefly discussed with the data on weight. It was not conclusive that there was a distinct category of lightweight individuals and it is now

being proposed that this internal classification represents group denial of the situation and extreme weight reducing behaviours. As previously mentioned, a small number of riders were admittedly skeptical of the NLW category. It is possible that a large proportion of riders who included themselves, or whose peers promoted to the NLW group were simply more adept at periodically covering up their reducing behaviours.

One final reason for the denial that was observed may have been the jockeys embarrassment associated with discussing personal matters such as food preoccupation, vomiting and elimination with a female interviewer. It was noted that initially they were more willing to divulge this information to a male interviewer, however this corrected itself within a couple of days.

It could be argued that denial is indeed present in Vincent's dancers, but as with the jockeys it is rational denial as opposed to irrational. Its presence serves a dual purpose in affording protection from unwanted opinions from those outside the group, and maintaining physical homogeneity within the group.

Other investigators have also looked at dancers for clues to the development of anorexia nervosa, and to aid in delineating boundaries for the disorder. Garner and Garfinkel (1978,1980), studied 183 professional dance students and 56 modelling students. Using the criteria proposed by Feighner et al. (1972) they detected primary anorexia nervosa in 6.5% of the total dance sample and in 7% of the modelling

group. They conclude from the over-representation of the disorder within these groups that, "... individuals who must focus increased emphasis on a thin body shape are at risk to develop anorexia nervosa and related dieting problems. Intense performance expectations are also relevant to the expression of the disorder." (1980, p. 655).

Clearly jockeys are comparable to these groups in that they must weigh in daily thus focusing much emphasis on maintaining a low body weight, and they are also under much financial and personal pressure to perform well. It is believed however that this approach is inadequate to explain the magnitude of the behaviours observed, and the consistency of the practices followed throughout the group.

Smith (1980) discusses weight loss and food aversion in athletes,

"... Coaches and athletes are increasingly aware of the advantage of reducing fatness for optimal athletic performance in almost all sports. This urgency to minimize body fat may lead to excessive voluntary weight reduction associated with a pathologic degree of food and fatness aversion. The degree of body wasting experienced by these starving young athletes is often so severe as to satisfy the major diagnostic criteria of primary anorexia nervosa." (p. 139)

He distinguishes this from classic anorexia nervosa by the fact that both males and females are at equal risk and the abusive weight loss is often a reaction to immediate concerns rather than to chronic problems which is often seen in anorexia. Also, the prognosis for reversing the weight loss is good.

Hansen (1978) reports similar behaviour in male wrestlers who must lose weight for competition, although he states no parallels to anorexia nervosa in his discussion.

In an attempt to understand the position of the jockey with respect to anorexia nervosa and the above mentioned reports of anorexia and/or anorexic-like behaviour in dance, modelling, and athletics, it appears more sensible to approach the problem from Smith's (1980) viewpoint. It is necessary for these individuals, for advantage purposes, to possess a very high power to weight ratio. This is only achieved by reducing the body fat level to the absolute minimum necessary for top performance ability. This can readily be seen in female gymnasts who over the last few years have progressively got smaller and younger in an attempt to use the optimum combination of size and strength for competition. The high grip strength to body weight ratios reported in chapter four indicate that the jockeys are also striving for maximum power with minimum weight.

The quest for thinness among athletes can achieve obsessional levels but it is necessary in that they are reacting to a real pressure to be markedly underweight. It could be argued that dancers and models cannot be included in this approach, as their body shape is dictated by fashion. This however is not necessarily so. Public opinion has begun to favour the female dancer who can keep pace with her partner

and yet maintain an ethereal look. A good power to weight ratio is extremely important to enable her to execute the highly athletic demands of the profession. Therefore the purpose of the obsessional emphasis on body weight and size in the dancer is primarily equivalent to that in the jockey and athlete in general.

Certainly each specific group has its own corollary set of pressures such as the aesthetic ideal in dance, the physical advantage in wrestling, and the handicapping procedures for the jockey. The similarities of the eating and dieting behaviours result from a common adaptive response to a set of common pressures. These pressures relate to professional standards, striving for excellence for artistic, financial or competitive reasons, and peer expectations. In general these pressures are perceived by the entire community, and the food preoccupation and reducing methods become a normal part of the daily activities of the subculture. It may be for this reason that individuals within these subcultures do not find it significant to recognize the disorder anorexia nervosa.

Identifying and even relating to the pressures experienced by these individuals does not necessarily justify the extremes of behaviour they exhibit in an attempt to keep their weight low. From outside looking in, the vomiting, starvation and dehydration is startling, however it must be

remembered that these people have voluntarily chosen to be a part of a subculture where it is normal to be an average of 20% below the national average weight for their height.

Although some individuals may have a natural propensity for thinness it would appear that the average individual within these groups must approach the extreme in non-conventional food related behaviour. The consequence of not following a course of abusive weight loss is loss of livelihood for the professional athlete or performer. Perhaps unwittingly the public supports this behaviour in their desire for speed at the racetrack and power and technique on the stage. It is possible that as long as the public demands these extremes in performance, individuals will attempt to optimize their power to weight ratios with weight loss and corresponding habits.

This explanation explains and justifies the presence of anorexic-like symptoms, or even anorexia nervosa within the groups. This raises the question as to the correctness of diagnosing the disorder within these subcultures. It has been suggested that in relation to dance schools anorexic individuals may selectively enter this environment as their pathological behaviour would be hidden in an environment full of excessively weight conscious people (Garner and Garfinkel 1978). This author believes that it is the chosen environment and culture of the individual which demands that certain behaviours be adopted in relation to which a diagnosis of anorexia nervosa is futile.

The major limitation in the data obtained during this work was the somatotyping. It was hoped that Parnell's procedure would be useful as an aid in determining the physical type of the jockey and perhaps even identifying those jockeys who would find it necessary to approach extremes in weight reducing behaviour. Unfortunately the latter objective was not realized using this method.

Although physical types were identified and the results were as expected for a homogeneous group of athletes, somatotype scores may have been biased by the undernourished state of the jockey population. Sheldon (1954) defined endomorphy as the relative predominance of the vegetative system (that system which the embryonic endoderm develops into), with a consequent tendency to put on fat easily, however this was for descriptive convenience only and he had no method available to obtain a measurement of this predominance. Consequently, both Sheldon and Parnell used only subcutaneous fat measurements or estimates to calculate an endomorphy score. This was based on the definition: "A somatotype is a trajectory or pathway through which the living organism will travel under standard conditions of nutrition and in the absence of grossly disturbing pathology (Sheldon, 1954)." Therefore, the quantitative somatotype score did not objectively take the nutritional status of the individual into account. It was to be used as a frame of reference so that later problems in diet and nutrition could be identified.

For the jockey population, in which many individuals are restricting their weights to abnormally low levels, and subcutaneous fat measurements would be low, endomorphy scores would concomitantly be low. This was found to be the case in this population with 24 riders exhibiting endomorphy scores of 1 or 2, and only 2 riders having a score of 3. These scores would be expected to rise as the individual gained weight.

Scores for the component ectomorphy would be similarly affected by the lack of subcutaneous body fat. Since ectomorphy estimates rely solely on the ponderal index, the height divided by the cube root of the weight, it would be expected that these scores would lower as the individual gained weight.

CHAPTER 7

CONCLUSIONS AND FURTHER RESEARCH NEEDS

Food related, and weight reducing behaviours, similar to the disorder anorexia nervosa have been identified within a sample of jockeys. Using accepted diagnostic criteria for anorexia nervosa, a minimum of 15% of the individuals within this subculture displayed the characteristic symptoms as defined by Dally (1979). This is a significantly higher representation than that found in the normal population (Crisp 1980, p. 154). Similar behaviours in males have been reported in many other athletic groups (Smith 1980, Hansen 1978) and the presence of anorexic-like behaviours and anorexia nervosa among female dancers has been documented by Garner and Garfinkel (1980) and Vincent (1979).

Behavioural similarities exist among these groups in relation to the extremes that are approached in an effort to maintain body weights far below the norms for their sex, age and height. Also, they are all socially attached to specific subcultures that are highly weight conscious. It is proposed that behaviours observed among the jockeys, and reported in other weight conscious groups are adaptive to pressures associated with their lifestyle and culture. Although Crisp (1980) views anorexia nervosa as an adaptive disorder, distinctions between classic AN and the anorexoid behaviour of the jockeys

can be made. Unlike anorexics, jockeys face loss of income if they gain weight, hence their behaviour is functional for economic survival. Also, as they are members of a highly weight conscious culture they are constantly feeling external pressure to reduce their body weight. Anorexics often perceive pressure to gain weight, and react to this pressure by further reducing their weight (Bruch 1978). Also, jockeys, like dancers, may be aided in their maintenance of a low body weight by the desire to identify closely with their profession and subculture. Anorexics may be driven to extremes of low weight for the opposite reason - to declare uniqueness and vulnerability (Crisp 1980). Distinctions such as these indicate that although it is possible to classify a proportion of the jockey community as anorexic, it is not probable that many of them have classic anorexia nervosa.

Despite these distinctions, it is possible that within highly weight conscious groups there remain individuals who are unable to cope with the constant necessity to diet, and for their specific population they become abnormally thin and obsessed with weight loss. Under these conditions it would no longer be possible for that person to ride, dance, or compete, and they could be faced with a loss of livelihood. As yet, diagnostic criteria are not fine enough to differentiate between those who can consistently reduce with minimum psychological effects, and those who may later develop classic anorexia in response to the constant dieting. Further research

is necessary to aid in delineating the more susceptible individual prior to the jeopardy of his or her career.

Also, in subcultures demanding a highly-specific body type it is not yet possible to accurately distinguish between individuals who possess a high proportion of anorexic symptoms (some of whom could be diagnosed as anorexic) for functional purposes, and individuals who have come into the subculture with classic anorexia nervosa. The diagnostic criteria need to be carefully defined to adequately deal with this problem.

It is hoped that further studies into the role of socio-cultural factors in AN will aid in more specifically delineating the boundaries of the disorder. At this time it remains unclear whether it exists within strict limits, or whether it occurs on a continuum with some exhibiting a mild fear of obesity and others approaching starvation. Clearly a more specific set of criteria are necessary to identify those who are responding to cultural pressures for thinness be they from fashion, sports or art. Without these necessary distinctions it is possible that as athleticism becomes an even greater social pressure within the general population, the perceived prevalence and diagnosis of the disorder among both males and females will continue to rise.

APPENDIX A

CANADIAN AVERAGE WEIGHTS FOR HEIGHT AND AGE: MEN
(in ordinary indoor clothing, without shoes)

Height in Feet-Inches	15 years	16-17 years	18-19 years	20-24 years	25-29 years	30-34 years	35-44 years	45-54 years	55-64 years	65 years and over
4' 11"	92	99	116	121	123	134	135	127	138	126
5' 0"	97	103	119	124	132	138	139	132	141	130
1"	102	103	122	127	135	141	142	136	144	135
2"	106	113	125	131	139	145	146	141	148	140
3"	111	118	128	134	142	148	150	146	151	144
4"	116	122	131	138	146	142	153	150	154	149
5"	121	127	134	142	149	145	157	155	157	154
6"	125	132	133	145	153	159	161	160	160	158
7"	130	136	141	149	156	163	164	165	163	163
8"	135	141	144	152	160	166	168	169	166	167
9"	139	146	147	156	163	170	172	174	169	172
10"	144	151	150	152	167	173	175	179	172	177
11"	148	155	153	163	170	177	179	183	176	181
6' 0"	153	160	156	166	174	181	183	188	179	186
1"	158	165	160	170	177	184	186	193	182	191
2"	163	169	163	173	181	188	190	197	185	195
3"	167	174	166	177	184	191	194	202	188	200

(Department of National Health and Welfare, Canada 1954)

Please list all foods and beverages taken in. If this food or beverage is not kept in your stomach please place an asterik (*) beside the item(s). I would also appreciate it if you would record all vitamins and medication ingested (water pills, appetite suppressants etc.). Do not put your name on this form,

APPENDIX B
LIQUID AND SOLID INTAKE FORM

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
6:00 am						
7:00						
8:00			8:37 tea.	9:20 tea.	8:00 tea.	8:30, tea.
9:00	tea (1 1/2 sugar)	(10:00) 2 eggs + tea + 4 chocolate chip cookies				
10:00						
11:00				11:30 tea + muffin	11:00 tea + muffin	
12:00		(12:00) chicken noodle and soup + UP.	12:30. tea + Muffin + P.P.			12:00 tea + cake.
1:00	1 small muffin + tea.					
2:00	+ orange pop.					
3:00			3:00. coffee.			
4:00						
5:00				5:00 pepper steak.		
6:00		6:30 tea Bone steak dinner	6:00 Roast beef dinner + glass of JUP			6:00 steak dinner
7:00	Chinese food + 3 glasses coke + pear.				7:00 chicken dinner.	
8:00						
9:00				9:00 tea.		
10:00			9:37 glass of JUP			

APPENDIX B (continued)
LIQUID AND SOLID INTAKE FORM

	Friday DAY 1	Saturday DAY 2	Sunday DAY 3	Monday DAY 4	DAY 5	DAY 6
6:00 am	Juice 4 *	4 Juice *	5 Juice *	2 coffee	Juice 3 *	2 Coffee *
7:00	Coffee 4 *	3 pop *			3 Coffee *	* Orange
8:00	Cafe 3 *	4, pop *		1 Soup *	1 Soup *	1 Orange *
	Pop 4 *	1 Soup *	1 Coffee	2 Juice *	2 pop + 4 *	4 pop *
9:00	Hot Water 5 *	2 Coffee *		6 pop *		Water *
	Orange 1 *			1 Soup *	3 pop *	3 pop *
0:00	Soup 1 *			2 Juice *	1 Soup *	1 Soup *
1:00	Pop 4 *			2 Pop *	1 Soup *	
12:00	Coffee 1 *	1 Soup *		1 Sandwich *	1 Juice *	2 pop *
	Pop 2 *	2 Juice *	2 Beer *	2 Juice *	1 Sandwich *	2 Juice *
1:00	2 Juice * + 1	1 Sandwich *	2 Sandwich *	2 pop *	3 pop *	1 Sandwich *
	3 Pops *	2 pop + 1 *	1 Coffee *	1 coffee *	1 coffee *	1 Sandwich *
2:00	1 Hot Lemon *	2 Juice *	Water *	2 pop *	1 Soup *	1 See *
3:00	2 pop * + 2	1 pop *		1 Dinner *	2 pop *	1 pop *
	1 Lemon Hot *	1 Appel *		1 Lemon Hot *	1 coffee *	1 Juice *
4:00	2 Pop + 1 *	1 Soup *		1 Pop *	1 drink	1 pop *
	1 See	2 Pop *		1 See	1 Beer	
5:00		1 Juice *				
6:00	2 Beer *	1 Pop	1 Beer	6 Orange	3 Juice *	
	1 Diner *	Coffee 1)	1 Dinner	1 Dinner	2 Juice	
7:00	1/2 Liter of Wine *	2 Beer *	1/2 Liter Wine	2 Beer	1 Dinner *	Dinner
8:00	1 Dinner *	1 Dinner *			1 Beer	2 Beer
9:00	3 Water *					
	2 Juice *					
10:00	4 Pop *					
3 to 1 am		3 whiskey				
		3 Beer - days				

Please list all foods and beverages taken in. If this food or beverage is not kept in your stomach please place an asterisk (*) beside the item(s). I would also appreciate it if you would record all vitamins and medication ingested (water pills, appetite suppressants etc.). Do not put your name on this form.

GREENWOOD
APPENDIX B (continued)
LIQUID AND SOLID INTAKE FORM

Sat. 8 Dec.
DAY 1

SUN.
DAY 2

MON.
DAY 3

Tues
DAY 4

Wed
DAY 5

Last DAY
Thurs
DAY 6

6:00 am	Tea-honey	Day off	Tea, honey 1/2 water pill which I would Loose 2 LBS	Tea	Coffee change 3 lbs To lose 2 pops & Tea * Grapefruit white losing weight.	Tea & honey 2 1/2 lbs To Loose pops & Soup & Fruit *
7:00	Loose 2 LBS. (2 orange pop) * Tea - apple white losing weight	Tea	COFFEE Loose weight. + 1/2 LBS by noon	Lighter today Loose - 1/2 LBS	2 pops & Tea * Grapefruit white losing weight.	2 1/2 lbs To Loose pops & Soup & Fruit *
8:00		Two eggs Toast MILK	pops & SOUP *			
9:00						
10:00						
11:00						
12:00	Tea-honey		coffee	Tomato Juice	milk	Coffee
1:00		1 Beer				
2:00		Beer ↑ peanuts ↓	Riding a couple pops or catorade	Ride / Gatorade or pop ↓ Finished early	Riding colder Today Tea or Coffee	Riding coffee or Tea.
3:00	Riding maybe a pop.					
4:00	Beer					
5:00		Ham + Brussel Sprouts	soup Chinese Food *	Beer 3 Soup Bacon lettuce Tomato Sandwich	Beer salad & vegetables	nothing have to ride. that night.
6:00	Steak + mushrooms milk.		pop.			
7:00	2 Beer	2 Beers	Beer + Vitamin	pops *	2 Beers	
8:00			Beer.	Beer 2		tea.
9:00						
10:00						

Please list all foods and beverages taken in. If this food or beverage is not kept in your stomach please place an asterik (*) beside the item(s). I would also appreciate it if you would record all vitamins and medication ingested (water pills, appetite suppressants etc.). Do not put your name on this form.

APPENDIX B (continued)
LIQUID AND SOLID INTAKE FORM

	<u>DAY 1</u>	<u>DAY 2</u>	<u>DAY 3</u>	<u>DAY 4</u>	<u>DAY 5</u>	<u>DAY 6</u>
6:00 am						
7:00	1 Coffee.	1 Coffee.		Coffee. 2 Muffins Box.	Coffee 2 Muffins	Coffee. 2 Box Muffin.
8:00						
9:00	1 Coffee.	1 Coffee.		Coffee.	Coffee.	Coffee.
10:00						
11:00			Grapefruit Cereal Coffee Bread.			
12:00	1 Coffee.			Coffee.	Coffee.	Coffee.
1:00		1 Coffee.				
2:00					Coffee.	Coffee.
3:00			Apple Pie			
4:00	4 Apples.		Coffee.	2 Apples.	Candies	
5:00				2 Pop.	2 Apples	
6:00		Fish & French Fries	Roast Pork	Roast Pork	Fish & Chicks.	Cornd Beef
7:00	Steak or Box French Fries.	Hot Chocolate	Potato	Potato		Sandwich
8:00		2 Soda Pop.	Veg.	Veg.	Coke *	French Fries
9:00	Coffee.		Coffee *	Coffee *		Coffee.
10:00						

* Means
Heard.

Please list all foods and beverages taken in. If this food or beverage is not kept in your stomach please place an asterisk (*) beside the item(s). I would also appreciate it if you would record all vitamins and medication ingested (water pills, appetite suppressants etc.). Do not put your name on this form.

APPENDIX C
EATING ATTITUDES TEST ITEM ANALYSIS

Question	Always	Very Often	Often	Sometimes	Rarely	Never	Total
1	7 (27%)	1 (3.8%)	6 (23)	12 (46%)	0	0	26
2	2 (7.7%)	0	0	1 (3.8%)	4 (15.4%)	19 (7.3%)	26
3	3 (11.5%)	2 (7.7%)	2 (7.7%)	6 (23%)	3 (11.5%)	10 (38.5%)	26
4	2 (7.7%)	0	0	6 (23%)	6 (23%)	12 (46%)	26
5	0	1 (3.8%)	3 (11.5%)	5 (19.2%)	4 (15.4%)	13 (50%)	26
6	1 (3.8%)	1 (3.8%)	2 (7.7%)	9 (34.6%)	6 (23%)	7 (27%)	26
7	0	1 (3.8%)	2 (7.7%)	4 (15.4%)	2 (7.7%)	17 (65.4%)	26
8	3 (11.5%)	2 (7.7%)	2 (7.7%)	8 (30.8%)	3 (11.5%)	8 (30.8%)	26
9	3 (11.5%)	1 (3.8%)	0	3 (11.5%)	3 (11.5%)	16 (61.5%)	26
10	1 (3.8%)	3 (11.5%)	0	6 (23%)	2 (7.7%)	14 (53.9%)	26
11	3 (11.5%)	3 (11.5%)	3 (11.5%)	15 (47.7%)	0	2 (7.7%)	26
12	0	1 (3.8%)	2 (7.7%)	6 (23%)	3 (11.5%)	14 (53.9%)	26
13	2 (7.7%)	2 (7.7%)	1 (3.8%)	5 (19.2%)	1 (3.8%)	15 (57.7%)	26
14	1 (3.8%)	0	0	6 (23%)	1 (3.8%)	18 (69.2%)	26
15	3 (11.5%)	1 (3.8%)	1 (3.8%)	4 (15.4%)	3 (11.5%)	14 (53.9%)	26
16	2 (7.7%)	2 (7.7%)	0	7 (27%)	3 (11.5%)	12 (46%)	26
17	10 (38.5%)	0	2 (7.7%)	5 (19.2%)	5 (19.5%)	4 (15.4%)	26
18	8 (30.8%)	1 (3.8%)	2 (7.7%)	6 (23%)	5 (19.5%)	4 (15.4%)	26
19	16 (61.5%)	5 (19.20%)	2 (7.7%)	3 (11.5%)	0	0	26
20	20 (77%)	1 (3.8%)	1 (3.8%)	3 (11.5%)	1 (3.8%)	0	26
21	4 (15.4%)	1 (3.8%)	3 (11.5%)	11 (42.3%)	2 (7.7%)	5 (19.5%)	26

APPENDIX C (continued)

Question	Always	Very Often	Often	Sometimes	Rarely	Never	Total
22	2 (7.7%)	3 (11.5%)	3 (11.5%)	4 (15.4%)	1 (3.8%)	13 (50%)	26
24	2 (7.7%)	2 (7.7%)	4 (15.4%)	6 (23%)	6 (23%)	6 (23%)	26
25	1 (3.8%)	0	3 (11.5%)	3 (11.5%)	5 (19.5%)	14 (53.9%)	26
26	2 (7.7%)	0	0	5 (19.2%)	6 (23%)	13 (50%)	26
27	4 (15.4%)	2 (7.7%)	5 (19.2%)	13 (50%)	1 (3.8%)	1 (3.8%)	26
28	0	3 (11.5%)	0	2 (7.7%)	3 (11.5%)	18 (69.2%)	26
29	0	2 (7.7%)	0	3 (11.5%)	4 (15.4%)	17 (65.4%)	26
30	0	0	1 (3.8%)	4 (15.4%)	0	21 (80.8%)	26
31	2 (7.7%)	1 (3.8%)	0	7 (27%)	5 (19.2%)	11 (42.3%)	26
32	3 (11.5%)	3 (11.5%)	1 (3.8%)	9 (34.6%)	5 (19.5%)	5 (19.5%)	26
33	0	1 (3.8%)	2 (7.7%)	4 (15.4%)	1 (3.8%)	18 (69.2%)	26
34	0	0	0	6 (23%)	7 (27%)	13 (50%)	26
35	0	0	0	4 (15.4%)	6 (23%)	16 (61.5%)	26
36	2 (7.7%)	0	2 (7.7%)	4 (15.4%)	5 (19.2%)	13 (50%)	26
37	2 (7.7%)	1 (3.8%)	0	7 (27%)	2 (7.7%)	14 (53.9%)	26
38	1 (3.8%)	2 (7.7%)	1 (3.8%)	2 (7.7%)	8 (30.8%)	12 (46%)	26
39	3 (11.5%)	1 (3.8%)	6 (23%)	11 (42.3%)	2 (7.7%)	3 (11.5%)	26
40	0	4 (15.4%)	1 (3.8%)	3 (11.5%)	1 (3.8%)	17 (65.4%)	26

APPENDIX D

RAW DATA FOR SOMATOTYPE PARAMETERS

Jockey	Skinfold (mm.)			Bone (cm.)		Muscle (cm.)		Biacromial (cm)	Bi-iliac (cm)	Ponderal Index
	Triceps	Subscapular	Suprailiac	Humerus	Femur	Biceps	Calf			
01	6.5	8.0	8.0	6.4	8.7	30.2	30.5	38.0	25.2	13.4
06	6.5	6.0	7.0	7.0	9.2	31.2	32.4	38.7	26.6	12.4
09	5.5	7.0	4.5	6.5	8.7	31.0	29.2	40.3	26.3	12.6
10	5.0	6.0	6.5	6.5	8.6	26.4	31.3	35.5	27.1	13.6
11	5.5	8.0	8.5	6.1	8.4	29.8	29.8	37.3	25.5	13.8
12	2.5	5.0	3.5	6.7	9.1	28.3	30.4	38.8	25.7	13.2
13	5.0	7.0	9.0	6.6	8.9	28.1	32.0	38.8	26.0	13.8
16	6.5	6.5	7.0	5.9	8.8	29.3	31.5	38.4	25.9	12.7
17	4.0	7.0	8.5	6.0	8.4	29.8	31.5	40.0	26.6	12.8
18	3.0	7.0	8.5	6.2	8.6	27.3	30.0	39.9	26.7	13.1
19	4.0	5.5	5.0	6.4	8.3	28.9	30.6	37.6	26.5	13.3
20	2.5	6.5	4.5	6.3	8.5	29.0	31.0	39.4	26.4	13.4
21	4.5	9.0	6.0	6.1	8.3	30.5	33.7	38.2	24.8	12.7
22	3.0	5.0	4.5	5.8	8.1	31.4	31.5	37.1	24.6	13.1
23	3.0	5.5	5.0	5.8	8.2	30.1	31.1	39.8	25.9	13.4
24	4.0	7.5	5.0	6.0	8.2	31.7	31.9	39.0	24.8	13.0
25	7.0	9.5	7.5	6.0	7.5	32.6	31.4	39.3	25.6	12.7
26	6.0	7.0	6.0	5.7	7.6	29.3	29.9	36.3	26.4	12.9
27	5.0	6.5	6.0	6.2	8.5	28.7	30.2	38.3	26.2	13.2
28	4.0	7.0	7.5	6.4	8.7	30.1	29.5	38.7	28.4	13.0
29	3.0	6.5	5.0	6.5	8.9	27.9	30.1	40.1	23.8	13.5
30	2.5	6.0	5.0	5.9	8.0	27.6	30.2	39.1	25.4	13.4
31	6.0	7.5	8.0	5.8	8.1	27.9	30.9	39.1	23.9	13.1
32	5.0	7.0	6.0	6.1	8.3	28.3	32.0	38.3	25.1	13.2
33	4.0	5.0	7.0	6.3	7.9	33.0	31.6	36.4	25.0	13.1
34	5.5	11.0	10.5	5.7	7.6	31.0	29.9	38.6	25.2	12.7
range:	2.5-	5.5-	3.5-	5.7-	7.3-	26.4-	29.2-	35.5-	23.8-	12.4-
	7.0	11.0	10.5	7.0	9.2	32.6	33.7	40.3	28.4	13.8
mean:	4.6 mm	6.5 mm	6.5 mm	6.2 cm	8.4 cm	29.6 cm	30.9 cm	38.5 cm	25.3 cm	13.1

BIBLIOGRAPHY

1. Beumont, P.J.V. et al (1976)
"Dieters and Vomitters and Purgers in anorexia nervosa:
Psychol. Med. 6:617
2. Beumont, P.J. V. (1979)
"The Endocrinology of Anorexia Nervosa:
Med. J. of Australia 1:611-613
3. Bruch, H. (1966)
"Anorexia Nervosa and its Differential Diagnosis"
Journal Nerv. and Ment. Diseases. 141:555
4. Bruch, H. (1973) Eating Disorders
Basic Books Inc., New York
5. Bruch, H. (1978) The Golden Cage
Harvard Univ. Press, Cambridge, Mass.
6. Canadian Average Weight for Height, Age and Sex (1954)
Nutrition Division, Department of National
Health and Welfare
7. Casper, R.C. et al. (1980)
"Bulimia: Its incidence and Clinical Importance in
Patients with Anorexia Nervosa"
Arch. Gen. Psychiat. Vol. 37:1030-1035
8. Crisp, A.H. (1970)
"Anorexia Nervosa: Feeding disorder, nervous mal-
nutrition or weight phobia?"
World Rev. Nutr. 12:452-504
9. Crisp, A.H. (1977)
"The Differential Diagnosis of Anorexia Nervosa"
Proc. Roy. Soc. Med. Vol. 70:686-690
10. Crisp, A.H. (1980) Anorexia Nervosa: Let Me Be
Academic Press, London
11. Crisp, A.H., Toms, D.A. (1972)
"Primary Anorexia Nervosa or Weight Phobia in the
Male: Report on 13 cases".
British Med. Journal 1:334-338.
12. Dally, P. (1969) Anorexia Nervosa
Heinemann Medical, London

13. Dally, P. and Gomez, J. (1979) Anorexia Nervosa
Heinemann Medical, London
14. de Garay, A., Levine, L., Carter, J.
Genetics and Anthropological Studies of Olympic
Athletes
Academic Press, New York 1974
15. Everett, P.W. and Sills, F.D. (1952)
"The Relationship of Grip Strength, Somatotype
Components, and Anthropometric Measurements of
the Hand"
Research Quarterly 23:161-166
16. Feighner, J.P. et al. (1972)
"Diagnostic Criteria for Use in Psychiatric Research"
Arch. Gen. Psychiat. Vol. 26:57
17. Garfinkel, P., Brown, G., Moldofsky, H. (1975)
"Hypothalamic-pituitary function in anorexia
nervosa"
Arch. Gen. Psychiat. 32:739-744
18. Garfinkel, P., Moldofsky, H., Garner, D. (1980)
"The Heterogeneity of Anorexia Nervosa"
Arch. Gen. Psychiat. Vol. 37:1036-1040
19. Garner, D. and Garfinkel, P. (1978)
"Sociocultural Factors in Anorexia Nervosa" (letter)
Lancet, 2(8091):674
20. Garner, D. and Garfinkel, P. (1979)
"The Eating Attitudes Test: an index of the symptoms
of anorexia nervosa"
Psychol. Med. 1979(9):273-279
21. Garner, D., and Garfinkel, P. (1980)
"Anorexia Nervosa: Socio-Cultural Factors"
Psychol. Med. 10(4):647
22. Gull, William (1873) "Anorexia Nervosa (Apepsia
Hysterica, Anorexia Hysterica)
Trans. Clin. Soc. London 7:22
23. Gall, William (1868)
The Address on Medicine
Lancet 2:171
24. Halmi, K.A. (1978)
Anorexia Nervosa: Recent Investigations
Ann. Review Med. 29:137-48

25. Hansen, N.C. (1978)
"Wrestling with Making Weight"
Physician Sports Med. 6:106-111
26. Hasaay M.K. and Tibbetts, R.W. (1977)
"Primary Anorexia Nervosa (weight phobia) in males"
Postgrad. Med. Journal Vol. 53:146
27. Janet, Pierre,
"The Major Symptoms of Hysteria" (excerps)
in Kaufman, M.R. and Heiman, M. Evolution of
Psychosomatic Concepts
International Univ. Press, New York, 1964
28. Jeuniewicz, Nikolai et al. (1978)
"Hypothalamic Function as Related to Body Weight
and Body Fat in Anorexia Nervosa"
Psychosomatic Med. Vol. 40(3):187-198
29. Jones, H.E. (1947) "The Relationship of Strength to
Physique"
American J. Physical Anthropology Vol. 5: 29-39
30. Khosla, T., and Lowe, C.R.
"Height and Weight of British Men"
in Eleventh, P.B. and Tanner, J.M. (1976) Worldwide
Variation in Human Growth
Cambridge Univ. Press, Cambridge
31. King, A. (1963)
"Primary and Secondary Anorexia Nervosa Syndromes"
British Journal Psychiatry 109:470
32. Lasegue, E.C. (1973)
"On Hysterical Anorexia in Kaufman, M.R. and
Heinan, M. Evolution of Psychosomatic Concepts
International Univ. Press, New York, 1964
33. Ministry of Consumer and Commercial Relations
Rules of Thoroughbred Racing
Ontario Racing Commission (1979).
34. Montoye, H. J. and Lamphiear, D. (1977)
"Grip and Arm Strength in Males and Females,
Age 10 to 69"
Research Quarterly 48(1):109
35. Morgan, G.H. and Russell, G.E.M. (1975)
"Value of family background and clinical features as
predictors of long-term outcome in Anorexia Nervosa:
4 year follow-up study of 41 patients"
Psychol. Med. 5:355-372

36. Parnell, R.W. (1954)
"Somatotyping by Physical Anthropometry"
Amer. Journal Physical Anthropol. Vol. 12:209-239
37. Parnell, R.W. (1957)
"Physique and Mental Breakdown in Young Adults"
British Med. Journal June 29:1485-1490
38. Reese, R.M. (1976)
"Anorexia Nervosa"
Amer. Fam. Physician 13:121
39. Russell, G. (1979)
"Bulimia Nervosa: an ominous variant of anorexia nervosa"
Psychol. Med. 9:429-448
40. Sheldon, W.H. (1954) Atlas of Men
Harper, New York
41. Sheldon, W.H., Stevens, S., and Tucker, W. (1940)
The Varieties of Human Physique
Harper and Brothers, New York
42. Slade, P.D. and Russell, G.F.M. (1973)
"Awareness of Body Dimensions in Anorexia Nervosa:
cross-sectional and longitudinal studies"
Psychol. Med. 3:188-199
43. Smith, N.J. (1980)
"Excessive Weight Loss and Food Aversion in Athletes
Simulating Anorexia Nervosa"
Pediatrics Vol. 66(1):139-142
44. Tinkle, W.F. and Montoye, H.J. (1961)
"Relationship between Grip Strength and Achievement
in Physical Education among college men"
Research Quarterly 32:238
45. Vigersky, R.A. et al. (1976)
"Delayed pituitary hormone response to LRF and TRF
in patients with Anorexia Nervosa with secondary
amenorrhea associated with simple weight loss"
Journal Clin. Endocrinol Metab. 43:893-900
46. Vincent, L.M. (1979) Competing with the Sylph
Andrews and McMeel Inc., New York