

Wasting Away: The Influences of Weight Management on Jockeys' Physical,  
Psychological and Social Wellbeing.

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Declaration

I, Vivienne M. Sullivan, declare that the PhD thesis entitled *Wasting Away: The Influences of Weight Management on Jockeys' Physical, Psychological and Social Wellbeing* is no more than 100,000 words in length, exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

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## Abstract

Little research has examined the effects of weight management on jockey's wellbeing. However, there is a consensus that pervasive weight-loss practices (WLP) in the racing industry negatively impact on jockey's physical, psychological and social wellbeing. The research reported herein examined the effects of the WLP used by flat-race jockeys on their physical, psychological and social wellbeing. In Study 1, 42 jockeys (10 women and 32 men) completed questionnaires examining eating behaviour, WLP and their physical, psychological and social effects of WLP. In Study 2, six male jockeys completed race day and non-race day assessments of WLP and mood and were interviewed about their experiences. In Study 3, eight jockeys (two women and six men); five family members (three wives and two fathers); and six industry professionals were interviewed about their perceptions and experiences of the lives of jockeys. Together the results of the studies showed that the WLP of jockeys have serious negative effects on their physiological, psychological and social wellbeing. Jockeys experience symptoms of life-threatening heat illness, negative mood, limited social interactions and strained relationships. Disordered eating behaviour was common and many jockeys reported symptoms consistent with DSM IV-TR disorders including Anorexia Nervosa, Bulimia Nervosa, Depression, General Anxiety Disorder and Social Phobia. Weight restriction symbolised a range of other restrictions that characterise jockeys' lives. The term, Occupational Weight-Loss Disorder (OWLD) was coined to describe and explain the findings. Recommendations to reduce the harms documented included determining minimum weights, increasing time off, professional advice and profession suitability.

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## Chapter 1: Introduction

Horseracing is a highly competitive and dangerous sport that requires jockeys to have strength, balance and the ability to maintain high levels of concentration (DeBenedette, 1987). To give themselves the best chance of winning races and staying injury free, jockeys need to be physically and mentally fit (DeBenedette, 1987; Hillenbrand, 2001; Presnell, 2008; Sperling, 2002). In addition, jockeys need to strive for a low body weight<sup>1</sup> that will maximise their opportunities for offers of rides in races (Apted, 1988; Hill & O'Connor, 1998). The ongoing requirement for jockeys to achieve and maintain low body weights negatively impacts on their physical, psychological and social wellbeing (Speed, Seedsman, Morris, & Sullivan, 2001).

Despite their generally small stature, most jockeys have difficulty meeting the low riding weights required by the sport (Apted, 1988; Bishop & Deans, 1996; M. B. King & Mezey, 1987). To achieve low body weights jockeys engage in short-term and/or long-term weight-loss behaviours that are detrimental to their health (Apted, 1988; Pruscino, McGregor, Jones, Flanagan, & Sullivan, 2005).

Jockeys' weight-management practices include behaviours that limit food intake, promote a negative energy balance and promote fluid loss (Atkinson, Storrow, & Cable, 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios, Kotze, Momberg, & Kotze, 1993; Leydon & Wall, 2002; Moore, Timperio, Crawford, Burns, & Cameron-Smith, 2002; Speed et al., 2001). For jockeys, the use of short-term

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<sup>1</sup> The terms weight and body mass are used interchangeably throughout the research and refer to kg measurement

weight-loss practices, or *wasting* as it is known in the horseracing industry, appears to be common (Apted, 1988; Moore et al., 2002). The body composition of jockeys generally consists of increased muscle bulk and low body fat levels (Hill & O'Connor, 1998; Pruscino et al., 2005) and thus wasting behaviours (e.g., sauna use, fluid restriction, food restriction) are necessary for weight loss (Apted, 1988; Norton, Olds, Olive, & Craig, 1996). The use of unhealthy weight-management behaviours to meet riding weight requirements is a concern because Victorian jockeys can ride in races, and engage in weight-management behaviours, 363 days a year (Racing Victoria Limited, 2006b). It is entirely possible that jockeys ride all year, without taking a break, as there is a fear that if they reject a riding offer they will lose the support of the owner and/or trainer (Thomas, 2008). Only a small number of studies have examined the effects of weight management on jockeys' physical, psychological and social wellbeing (e.g., Caulfield, Karageorghis, Terry, & Chatzisarantis, 2003; Labadarios et al., 1993; Speed et al., 2001).

A review of the literature revealed two United Kingdom studies that explored the psychological consequences of wasting experienced by jockeys. These studies showed that while jockeys were wasting they experienced increased levels of irritability, fatigue (Caulfield et al., 2003; M. B. King & Mezey, 1987), anger, depression, confusion and tension (Caulfield et al., 2003). Most of the evidence pertaining to the effects of weight management on jockeys' psychological wellbeing is anecdotal, coming from newspaper articles (e.g., Eddy, 2007; Harris, Whittaker, & Dore, 2001; Stewart & Habel, 2001) or novels (e.g., Hillenbrand, 2001). This evidence indicates primarily negative effects on jockeys' mood while they are wasting. Further anecdotal evidence is provided by jockeys themselves. Jockeys have

attributed both aggressive physical and verbal behaviour to wasting (Cormick, 2006; Prendergast, 2001).

Research examining athletes from sports other than horseracing, and research examining other individuals who use extreme weight-loss behaviours, provides further evidence for the contention that weight-loss behaviours are linked to increased negative affect (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950; Landers, Arent, & Lutz, 2001; Lane, 2001; Terry, Lane, & Warren, 1999). Jockeys can engage in weight-management behaviours for most of the year. Thus, further research specifically designed to investigate the negative consequences of these behaviours on mood and affect is required.

In addition to previously mentioned studies on the effects of wasting on jockeys' mood, two additional studies exploring disordered eating in jockeys were identified in published research. Unfortunately, their findings were contradictory, with one study revealing no evidence of clinical eating disorders among jockeys (M. B. King & Mezey, 1987), and the other showing that 20% of jockeys had EAT-26 (Eating Attitudes Test-26) test scores that indicated disordered eating (Leydon & Wall, 2002). Research examining athletes from other sports has shown that the pressure for athletes to maintain a low body weight increases the risk of developing disordered eating (Haase, Prapavessis, & Owens, 1999; Sundgot-Bogen, 1993; Sundgot-Bogen & Klunland, 2002). Given the serious physical and psychological consequences of disordered eating behaviours (Landers, 2002), more research on jockeys eating behaviours is needed.

Wasting has also been associated with decreased social interaction (Keys et al., 1950). Keys et al. (1950) found that restricting food intake leads to decreased social engagement and decreased social interaction in a sample of healthy male

conscientious objectors. Jockeys restrict food intake year round. Therefore, research on their extreme behaviour and its effects on physical, psychological and social aspects of their lives is required.

The use of fluid loss and food restriction by jockeys to meet race weights raises questions about the physical consequences of wasting (Hassanien, Razack, Gavalier, & Van Thiel, 1992; Sparling, 2000). A limited number of studies have been carried out which indicate that jockeys are dehydrated on race days and non-race days (Pruscino et al., 2005; Warrington, McGoldrick, & Griffin, 2006). Dehydration is associated with an increased risk of heat illness which includes symptoms such as muscular cramps, dizziness and loss of consciousness (American Association of Family Physicians, 1998; Armstrong & Maresh, 1993; Coris, Ramirez, & Van Durme, 2004; Coris, Walz, Duncanson, Ramirez, & Roetzheim, 2006; Howe & Boden, 2007). Considering the nature of horseracing and the need for jockeys to be physically fit (DeBenedette, 1987; Hillenbrand, 2001; Presnell, 2008; Sperling, 2002), further research into the physical consequences of wasting is needed.

The Victorian thoroughbred horseracing calendar lists race meetings 7 days per week for 363 days of the year (Racing Victoria Limited, 2006b). Thus jockeys are potentially meeting low riding weight requirements every day of the year. The aim of the research reported here was to explore the effects weight-management behaviour has on jockeys and those associated with them and also to make recommendations about how their physical, psychological and social physical wellbeing might be improved.

## Chapter 2: Thoroughbred Horseracing in Australia

Thoroughbred horseracing is Australia's oldest national sport (International Event Resources, 2001). Attendance statistics indicate that it is currently the second most popular spectator sport following closely behind Australian Rules Football (AFL; Australian Bureau of Statistics, 2002). However, unlike Australian Rules Football, horseracing is year round on 355 racetracks across the country. During the financial year spanning 2005/2006 there were 19,963 individual races, which translates to an average of 55 races per day (Australian Racing Board, 2006).

In Australia, horseracing is not just a popular sport it is a thriving, economically important industry. Per capita, Australia's thoroughbred racing industry is one of the largest racing industries in the world, boasting the greatest number of registered race clubs (one club for every 50,000 people), horses in training, thoroughbred racehorse owners and race meetings (Australian Racing Board, 2006; International Event Resources, 2001). Although there is an understanding that racing is "big business" there is little public comprehension of its immense economic contribution to the country. During the 1999-2000 racing season, the industry supported 249,063 full-time, part-time and casual jobs. The hours worked in the industry equated to 77,755 full-time jobs, making horseracing the fourth largest employment industry in Australia (Harding, 2004; International Event Resources, 2001).

During the same season, owners, breeders, trainers, race clubs and patrons outlaid \$5.6 billion within the racing industry. This direct spending caused a \$2.2 billion flow through to the Australian economy. Add to this taxes, employment and indirect income and this equates to a gross economic impact of \$7.74 billion. From

the 1999-2000 figures, it was estimated that over the following five years the racing industry would have a \$41.1 billion direct impact on the Australian economy (International Event Resources, 2001).

Although popular throughout Australia, the state of Victoria is considered the home of horseracing (Dabkowski, 2003; Harding, 2004; International Event Resources, 2001). Each year, racing contributes \$1.8 billion dollars in direct spending to the state of Victoria, including in excess of \$240 million to the Victorian state government and \$263 million to the Federal government by way of taxes. It also provides direct employment for around 48,500 people in full-time, part-time or casual capacities. When considering support industries, there are a further 27,900 employment positions (International Event Resources & Monash University Centre of Policy Studies, 2006). There is a race meeting (and sometimes more than one) every day of the year, except Christmas Day and Good Friday. In summer, the racing industry also runs twilight and night meetings (International Event Resources, 2001; International Event Resources & Monash University Centre of Policy Studies, 2006; Kron, 1998; Racing Victoria Limited, 2006b).

Victoria hosts the nation's biggest thoroughbred horseracing event, the Spring Racing Carnival (annually during October and November). According to an independent report prepared by International Event Resources (IER) Pty Ltd. on behalf of Racing Victoria, the 2003 Spring Racing Carnival, which included the Melbourne Cup, the Caulfield Cup, and the Cox Plate, injected a gross economic benefit of \$388.5 million into the Victorian economy (Racing Victoria Limited, 2003). In 2005, the Spring Racing Carnival's contribution to the Victorian economy rose to \$524.3 million (International Event Resources & Monash University Centre of Policy Studies, 2006; Westerman & Ahmed, 2006). The Melbourne Cup, which is

known as “the race that stops a nation”, attracts more than 100,000 international and interstate visitors to Victoria and is watched by an audience of over 700 million people from 120 countries and territories (International Event Resources & Monash University Centre of Policy Studies, 2006).

Thoroughbred horseracing is not the only sport that thrives in Victoria. In fact, since the 1956 Olympics, Melbourne has become known as the sporting capital of Australia. Every year Melbourne hosts a number of major sporting events, including the AFL finals, the Australian Tennis Open and the Heineken Golf Classic. These events mean an Olympic-size number of ticket sales, hotel occupancies, international broadcasts, and economic benefits each year (Dabkowski, 2003; Sport and Recreation Victoria, 2003).

Over the years, Australia’s reputation as a sporting nation has grown along with increases in spectatorship and participation. Testimony to the increased profile of sport within the country are the improvements in performances at the Commonwealth Games and Olympic Games (Australian Bureau of Statistics, 2002). Coupled with these improvements in performances has come the increased professionalism of many sports (e.g., training facilities, business contributions, governing bodies, player representative bodies) and of the athletes themselves (Australian Bureau of Statistics, 2002; Speed et al., 2001; Sport and Recreation Victoria, 2003).

Despite its popularity and significance to the Australian economy and culture, the horseracing industry has been slower than most sporting bodies to invest resources into the development and welfare of its athlete population. However, in 2001, Racing

Victoria Limited (RVL)<sup>2</sup> and the Victorian Jockeys' Association (VJA)<sup>3</sup> commissioned research into the welfare of jockeys. This research examined the responses of 72 retired jockeys, 64 currently registered jockeys and 22 apprentices, on a specially designed questionnaire, along with the responses of seven retired and five currently registered jockeys in follow-up interviews (Speed et al., 2001). The research provided the most comprehensive picture to date of the life of a jockey (e.g., weight-management behaviour, financial remuneration) and highlighted a number of areas of concern for both retired and working jockeys. An important concern arising from this research was the physical and psychological effects of wasting and other weight-loss methods used by jockeys to meet industry weight requirements (Speed et al., 2001).

For jockeys, the struggle to maintain weight is a serious one. Speed et al. (2001) found that for many it can mean the end of their careers and that it can continue to be a problem even after retirement. Among retired jockeys, weight-management difficulties were the second most common reason for retirement (20%; second to injury 36%) and 13% reported that they experienced excessive weight gain after their riding career ended.

For the currently riding jockeys, the effects of wasting and weight management were no less serious. The results of Speed et al.'s (2001) research revealed that jockeys felt wasting contributed to psychological problems such as severe mood disturbances, despair, loss of confidence and anxiety. Fourteen percent

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<sup>2</sup> RVL provides independent governance of thoroughbred horseracing in Victoria

<sup>3</sup> VJA has a membership base of registered Victorian jockeys and works with RVL on issues effecting the welfare of jockeys e.g., occupational health and safety procedures, minimum weights, vest and skull cap regulations

of participants felt that weight would influence their decision to retire (behind lack of rides 21% and injury 15%).

### *The Demands of Horseracing on Jockeys*

The weight restrictions placed on jockeys are the most stringent of any of the weight restriction sports (Hawley & Burke, 1998). The Rules of Racing (Racing Victoria Limited, 2006c) state that currently 46 kg is the minimum weight to be carried by any horse in handicap flat races (see Appendix A for 2007 amendments). Apprentices are eligible to claim weight allowances on the listed weight allocation from 1.5 kg to 3 kg. This means they may ride at a reduced weight of up to 3 kg (Racing Victoria Limited, 2006c). Being eligible to claim weight does not necessarily mean that the jockey is physically able to do so. If an apprentice is unable to claim the full weight allowance (e.g., lose 1.5 kg not 3 kg) their riding offers may be limited (Bartley, 2007a).

For jockeys, weighing-out (before the race) occurs at least half-an-hour before the appointed start time of any race in which he/she is to ride. Unlike other sports, jockeys are also required to weigh-in (after the race) if they have ridden a placed horse or if directed to do so by stewards (racing officials). If jockeys do not meet their allocated riding weight they can be reported to the racing stewards. That is, if the jockey weighs less than the allotted amount that the horse should carry at weigh-in, the horse can be disqualified from the race and the rider punished (e.g., suspended). Conversely, if jockeys weigh over half a kilogram more than their allocated weight, they can also be punished (Racing Victoria Limited, 2006c). Jockeys can, and usually

do, ride in more than one race during a race meeting, therefore, they are required to weigh-out and weigh-in several times. Furthermore, their mounts may have different weight allocations, meaning they have to meet several different weight requirements during the race meeting (Hawley & Burke, 1998). Added to this are the continuous demands of the racing year, with race meetings scheduled 7 days a week, year round (Racing Victoria Limited, 2006b). This means that jockeys have no set off-season and can potentially be required to ride 7 days a week.

Horseracing also differs from other weight category sports in that jockeys must weigh-out and weigh-in in their racing colours (boots, pants, shirts) and with their saddles (Racing Victoria Limited, 2006c). In other weight category sports (e.g., boxing, judo, wrestling), only the participant's body weight is measured (International Judo Federation, 2003; National Collegiate Athletic Association, 2005; Walberg-Rakins, 2000).

The stringent weight requirements in racing mean that physical stature is an important consideration for anyone wishing to enter professional riding as a career. Individuals applying to become apprentice flat-race jockeys are required to be over 15 years old, undergo a medical examination and thorough screening process for physical suitability and weigh no more than 48 kg. The initial weight restriction and screening process attempts to aid in the selection of applicants who will be able to maintain a low body weight after maturation (Racing Victoria Limited, 2006c). However, for most jockeys the continued weight restrictions throughout their working lives makes it necessary to learn and develop methods of weight loss (M. B. King & Mezey, 1987).

Although many jockeys are attracted to, and stay in the profession, because of the possibility of high monetary rewards, financially racing is an uncertain profession

(Bartley, 2007a; Manley, 2008). Jockeys have no guarantee of securing rides, let alone of securing horses with the ability to win races. This means that earnings vary considerably between colleagues (Beadman & Young, 2003; DeBenedette, 1987; Hislop, 2002; Ray & Grimes, 1993; Schmidt, 2004). Jockeys also compete against each other to obtain rides, creating a high-pressure environment within the industry (DeBenedette, 1987). For these reasons any problems with performance, weight or injury are kept quiet. If a jockey's struggles become common knowledge, it can mean he/she will lose future rides (Beadman & Young, 2003; Schmidt, 2004).

Female jockeys seem to face another hurdle, their gender. Horseracing is one of the only major sports where men and women regularly compete against each other and must adhere to the same rules (Ray & Grimes, 1993). Despite evidence suggesting neither gender has a physical advantage over the other, research on jockeys in the United States has shown that male jockeys can earn up to nine times more than their female counterparts even though, on average, women are more likely to perform better in their races (Bennett, 1989; Ray & Grimes, 1993). Ray and Grimes (1993) felt that the difference in earnings came from the fact that females rode in half as many races as males, and the races they did ride in were not as prominent (less prize money). Although it is possible that female jockeys could be turning down rides, Ray and Grimes (1993) felt it was more likely that they were not being offered as many opportunities as male jockeys. They speculated women were being closed out of riding networks as statistical analysis revealed that their future rides depended on their performance in previous races. This was not the case for male jockeys. The researchers felt that male jockeys were obtaining rides through their reputation and networking. Anderson and Shirako (2008) pointed out that the development of a person's reputation relied on complex factors such as stereotypes, social attention and

visibility in the community. They said that a community could not pay attention to the behaviour of all its members so there was an inclination to use inaccurate information to create some people's reputation.

Anecdotal evidence on Australian racing supports that gender-based discrimination is not just limited to the USA. During the 2007 Melbourne Cup Carnival two female jockeys won races in the carnival, bringing the tally of winning female jockeys during the carnival to just five in the last decade. The small number of winning female jockeys during the most prestigious racing carnival in Australia could indicate that, like their American counterparts, Australian female jockeys are being offered less riding opportunities and less quality riding opportunities (mounts are less likely to win). This notion is supported by the fact that the two female winners had only one ride each at the meet they won at and for one of them, the horses odds were 101 to 1 to win (Habel & Windmill, 2007; Thomas, 2007a).

Racing seems to be a sport of glaring disparities between jockeys. Large gaps exist between the number of rides secured by jockeys and their earnings. During the 1998/1999 racing season, the top twenty Victorian jockeys who regularly rode in metropolitan race meetings earned an average of \$59,000 from their losing rides (684 rides). For other jockeys, their losing rides (294 rides) earned them an average of \$35,500. With winnings, consolidated earnings increased to averages of \$197,472 (top twenty jockeys) and \$45,380 (other jockeys) respectively (Speed et al., 2001).

In addition to uncertain financial conditions, jockeys must also face the risk of injury (Wilmoth, 2007). Although research has shown that injury arising from riding accidents is less common than in some other sports, when injury does occur the extent and severity of the injury is often far greater than it is in most other sports (Press et al., 1995; Turner, McCrory, & Halley, 2002; A. E. Waller, Daniels, & Weaver, 2000).

Every time a jockey rides, whether it is for track training, trials or races, he/she runs the risk of injury. Riding accidents often result in serious injuries requiring long periods out of the saddle, paralysis or even death (DeBenedette, 1987; Schmidt, 2004; Turner et al., 2002; Wilmoth, 2007).

The sport demands that jockeys control a 500 kg thoroughbred racehorse, which requires strength, quick reflexes, balance and the ability to gauge position, pace, strategy and the condition of the horse (DeBenedette, 1987; Presnell, 2008; Schmidt, 2004; Sperling, 2002). Given the highly competitive and dangerous nature of horseracing, jockeys need to be physically and mentally fit (Presnell, 2008). This is required not only to increase their chances of winning races, but also to safeguard against injury (DeBenedette, 1987; Sperling, 2002).

### Chapter 3: Weight Restrictions in Sport

Jockeys are not the only athletes who are required to achieve a specified weight as a condition of participating in their chosen sport. Sports such as boxing, judo, wrestling and rowing all have weight requirements as part of competition rules. Despite differences in minimum weights and weigh-in procedures (see Table 1), a review of the literature showed there are similarities in the type of weight-loss methods used by athletes across weight category sports and similarities in the negative physical and psychological impact of these practices (Fogelholm, Koskinen, Laakso, Rankinen, & Ruukonen, 1993). Considering the importance of jockeys competing at optimal physical and psychological peak to guard against injury (Hawley & Burke, 1998), it is interesting to note the similarities between jockeys and other weight category athletes.

Similarly to jockeys, other athletes competing in sports like boxing and wrestling face the potential threat of exclusion from competition if they exceed the specified weight for the particular division of the sport. The threat of exclusion, and for some, the threat of financial penalties, leads athletes to engage in what can only be considered unhealthy weight-loss behaviours (Coles, 1999; Groeller & Galloway, 1996; Lane, 2001; Terry et al., 1999).

Groeller and Galloway (1996) surveyed 200 lightweight rowers at three national level regattas. The participants reported a large decrease in body weight between race weight and “in-season” weight, indicating that lightweight rowers employ short-term weight-loss measures to meet weight requirements. Over half the participants reported a weight fluctuation of 2 kg to 3 kg between regattas, and just under a third reported a fluctuation of 3 kg to 5 kg. Eighty-two percent of the rowers

reported losing weight in the three days prior to competing. Over half did this through food restriction. The next most utilised weight-loss method was exercising in thermal clothes (for an average of 40 minutes) with the participant usage peaking on race day (33%). Although fluid restriction was not examined, 37% of participants reported drinking one and a half litres or more of fluids after weigh-in (prior to performing). Three quarters of the participants also ate between the weigh-in and race, and all drank something.

Lane (2001) found that in a bid to qualify within their nominated weight category, amateur boxers habitually restricted food and fluid intake prior to the official weigh-in for an event. Ohhashi et al. (2002) investigated the weight-management practices of 632 Japanese boxers and reported similar results. On average the athletes lost 5.56 kg over 29.5 days. The researchers' findings showed that, preferably, most boxers wanted at least a month to lose the weight so that they could increase their exercise and gradually decrease their food intake. When the time lead-up was insufficient, the boxers reported using rapid weight-loss measures such as saunas (46%). Of these boxers, 67.7% reported feeling weakness, exhaustion, dizziness, and a lack of concentration after rapid weight loss. Immediately after the official weigh-in and prior to competing, 89.9% of the boxers reported eating and drinking.

Similarly, judoka (judo players) have been shown to use rapid weight-loss techniques to make nominated weight divisions (Coksevim, Ustdal, Saritas, & Karakas, 1997; Coles, 1999). Coles (1999) administered a questionnaire to 165 English judoka that asked about the frequency and magnitude of weight-loss methods used. The results showed that 81% of the athletes skipped meals, 78% trained in sweat gear, 62% restricted fluid intake and 47% reported going without food or fluid for

periods over 24 hours prior to a tournament. The use of laxatives was reported by 6% of the athletes, 5% reported self-induced vomiting and 3% using diuretics.

Table 1 *Minimum Weight Requirements/Categories and Weigh-In Procedures for Weight Category Sports*

Sport	Gender	Minimum Weight	Weigh-in Procedure
Boxing	Males:	48 kg	Day of competition - three hours prior to first bout. Medical check required.
	Females:	46 kg	
Judo	Males:	60 kg	Day of competition - two hours prior to first bout.
	Females:	48 kg	
Taekwondo	Males:	58 kg	Day of competition – one to two hours prior to first bout.
	Females:	49 kg	
International Wrestling	Males:	55 kg	Day prior to competition. Medical check required.
Collegiate Wrestling	Males:	55 kg	Day of competition - two hours or less prior to first bout.
	Females:	48 kg	
Rowing	Males:	72.5 kg	Day of competition - one to two hours prior to first race
	Females:	59 kg	
Horsereading*			
Prize > \$55,000	Males:	46 kg	Day of competition – half an hour prior to each race. Place getters and those directed by the stewards also weigh immediately after the race.
	Females:	46 kg	
Prize ≤ \$55,000	Males:	52 kg	
	Females:	52 kg	

\* Handicap flat racing

Similarly, Groeller and Galloway (1996) reported that taekwondo players use exercising in vapour-impermeable suits, saunas, and food and fluid restriction, to make weight. After they weigh-in and prior to competing, they would immediately eat and drink to rehydrate and replenish glycogen stores (Lee, 1997).

### *Weight Restrictions for Jockeys*

Like athletes in other weight category sports, Leydon and Wall (2002), reported that most jockeys find it takes a concerted effort to attain the low weight required for their profession. Jockeys usually have to use both short-term and long-term weight-loss methods to achieve their weight goals. A review of the research on the methods jockeys use while wasting, as well as long-term weight-loss techniques used supports this observation. Most studies indicate that jockeys engage in a variety of unhealthy weight-control behaviours (e.g., extreme food and fluid restriction, long hours in saunas, over use of diuretics) to maintain or lose weight. M.B. King and Mezey (1987) interviewed 14 English jockeys and found that they all reported using unhealthy weight-control methods. These behaviours included extreme fasting, long hours in saunas (up to 4 hours), very strenuous exercise, over use of diuretics, laxatives, and appetite suppressants and self-induced vomiting.

Labadarios, Kotze, Monerge and Kotze (1993) carried out a similar study in South Africa. The aim of their study was to explore the extent of unhealthy weight-control methods and assess the nutritional status of jockeys. Ninety-three South African jockeys participated in the study. Dietary intake was assessed via a dietary history, a seven-day food history record and a 24-hour recall on the morning of two

race meetings. Labadarios et al. (1993) reported that 64% of the jockeys experienced difficulty maintaining race weight and that as a result, the mean intake of energy and nutrients experienced by jockeys fell well below the recommended daily intake. The methods that were used either alone or in combination to achieve race weight included food and fluid restriction, saunas, exercise, hot baths, smoking, and using diuretics and appetite suppressants.

More recently, similar findings were reported by Atkinson, Storrow and Cable (2001). They investigated the eating habits and body mass control methods of 92 male professional jockeys (flat race and national hunt). They administered a questionnaire on the timing and types of foods that are normally ingested by the jockeys and the most commonly used weight-loss methods. A substantial number of jockeys reported missing meals in an attempt to maintain a low body weight (49% missed breakfast, 47% missed lunch, 59% missed dinner, and 41% did not eat snacks). The jockeys also reported that the most commonly used weight-control methods were sauna, exercise and fasting. Forty-six percent of the jockeys indicated that weight control was “difficult”, while 20% reported that they had considered retiring from the sport as a result of these difficulties.

Leydon and Wall (2002) also supported the view that jockeys use unhealthy weight-control behaviours. In an attempt to explore the health impact of dietary habits in New Zealand jockeys, they administered the Eating Attitudes Test 26-item (EAT-26) to nine senior jockeys and 11 apprentice jockeys (two males and nine females). In addition, all jockeys completed a seven-day diary that included food and fluid intake, exercise/training levels, and any methods used to *make weight*. In horseracing circles, to make weight refers to behaviours aimed at meeting riding weight requirements (M. B. King & Mezey, 1987). Leydon and Wall’s (2002) found that nutritional practices

and weight-control behaviours of jockeys have a negative impact on short-term and long-term health. Energy and carbohydrate intake was below levels recommended for athletes. Sixty-seven percent of the jockeys reported using other unhealthy weight-control methods that included saunas, hot baths, exercise, diuretics and fluid restriction. Fifty percent of those who smoked reported that they smoked as a weight-control method. Forty percent of the jockeys had a body mass index (BMI)<sup>4</sup> of less than 20 which is considered underweight, and 20% had EAT scores indicative of disordered eating.

A review of the literature identified four studies that dealt with the lifestyle and dietary behaviours of Australian jockeys. Speed et al. (2001) found that most jockeys had to resort to unhealthy weight-loss methods to achieve their race weight (methods included sauna use, fasting, fluid restriction, laxative and diuretic misuse, self-induced vomiting).

Apted (1988) interviewed nine successful jockeys about the methods they used to lose weight and found energy intake was below half of the kilocalories (energy producing potential in food) required for basal metabolism (basal metabolic rate – BMR<sup>5</sup>) and physical activity for a moderately active male (Mader, 1990). Three of the nine jockeys had a BMI of under 20 and were categorised as underweight at the time of the study (Shetty & James, 1994), three had BMIs of 20, which is the lower limit of the current healthy weight range, 18.5-20, (World Health Organisation, 2004) and one had a BMI of 21.

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<sup>4</sup> Medical ratio measure of fatness that allows a comparison between people based on their weight relative to their height (Marieb, 2001).

<sup>5</sup> Energy required, at rest, to maintain regulated body temperature and maintain the systems of the body (Burke & Deakin, 2002)

Hill et al. (1998) explored the lifestyle and health status of jockeys, including their dietary, exercise and weight-loss practices. The researchers developed a questionnaire based on information gained via a focus group with experienced jockeys and mailed it to all registered jockeys in New South Wales. Sixty-five jockeys completed the questionnaire. From the information gathered, Hill et al. (1998) surmised that a jockey's lifestyle revolved around chronic dietary and fluid restriction and often involved extreme weight-loss measures which were potentially detrimental to their health. The jockeys in Hills et al. (1998) study described weight control as being the most difficult aspect of being a jockey. To maintain a low body weight, jockeys consumed a mean of  $2.2 \pm 0.6$  meals per day on non-race days and  $1.3 \pm 0.8$  on race days. Methods used to make weight were reported to include dehydration (through sweat-loss activities and fluid restriction), fasting, exercise and diuretics.

Moore et al. (2002) also explored the eating, drinking and riding behaviours of Australian jockeys. They administered questionnaires to 91 male and 25 female Victorian jockeys to determine weight-loss or weight-maintenance practices, attitudes to food and eating, achieving riding weight and nutritional and weight-management advice. The results showed that most jockeys preferred to manage their weight using short-term weight-control practices. The most common practices included the sauna, diuretics and energy restriction in the form of skipping meals. Nine percent of the jockeys reported using self-induced vomiting as a weight-control method. Eighty percent of the jockeys reported restricting food and fluid 24 hours prior to racing.

Anecdotal evidence supports the suggestion that jockeys use unhealthy weight-control and weight-loss methods to make race weight. One jockey described his experiences of wasting by saying "sure, wasting is not something you enjoy and having the luxury of just a good hearty meal of a Sunday night is not what you would

imagine as highlight for many people, but it is for me” (Bartley, 2007a, p. 38).

Hillenbrand (2001) suggested that jockeys view water as their prime enemy because of its weight when ingested (i.e., 100 ml of water equates to 100 g of weight), and sweating in the sauna as one method to keep fluid out of their systems. Darren Beadman (a successful Australian jockey) describes racing as a high pressure industry where a successful jockey learns to control himself mentally and physically and not to complain about “punishing the body by wasting” (Beadman & Young, 2003, p. 2). To meet the recently increased minimum riding weight of 53 kg, Beadman normally eats only one meal a day (Beadman, 2005; Guinness, 2006) and explained “... hunger is a way of life” (Guinness, 2006, p. 14). Another jockey also reported surviving on one meal a day, even after deciding to only accept rides over 54 kg (Thomas, 2006). Generally jockeys seemed to have a policy of eating very little (Beadman, 2005; Dunn, 2008; Guinness, 2006; Thomas, 2006).

Laffit Pincay, one of the most successful jockeys of all time, had a similar story. Although he stated that racing was a “pretty good life”, he was thought to starve himself as a means of continued success (Scott, 1999). In Scott (1999), Pincay described a very big (cheating) meal as a small piece of chicken, four slices of tomato, a spoon of plain rice, a small potato and a miniature dinner roll. Scott (1999) suggested that Pincay ate around 600-750 calories a day. This was reinforced by Hoffer (2001) who described Pincay’s diet as a life-long starvation diet (850 calories per day) finely calibrated to get him through training and racing. Pincay suggested that before this diet, he ate nuts and dry cereal only for 2 years. When flying, he would take a nut from the airline pack, cut it in half, eat the first portion and save the rest for later in the flight (Hoffer, 2001).

These stories about jockeys, and the results from research into the weight-management behaviours of athletes (e.g., Coles, 1999; Ohhashi et al., 2002) support the idea that jockeys tend to use similar weight-loss practices to athletes involved in other in weight category sports. As stated previously, the main difference between athletes in other weight category sports and jockeys is that jockeys are not able to drink or eat prior to performing. This means that unlike other athletes, many jockeys appear to compete in a dehydrated and energy deficient state (Moore et al., 2002).

## Chapter 4: Weight Management and Physical Wellbeing

There is little research on the physical effects wasting has on jockeys' health and performance. However, research on the effects of rapid weight loss on the health and performance of athletes in other sports offers some insights into the physical effects rapid weight loss might have on jockeys. During high intensity exercise, a well-trained athlete has a 20-fold increase in heat metabolism. Due to regularly experiencing heat stress, most athletes develop a higher heat tolerance than people who exercise little. Nevertheless, hydration must be carefully monitored, as a drop in hydration of more than 3% of body weight is a significant risk factor for heat illnesses (Hassanien et al., 1992; Sparling, 2000).

### *Dehydration*

Dehydration occurs when there is inadequate water available to maintain the required water levels within body tissue and systems (Mader, 1990; Marieb, 2001; Oppliger & Bartok, 2002; Walberg-Rakins, 2000). Athletes who engage in short-term weight-loss methods, such as exercising in vapour-impermeable suits, fluid restriction, saunas, diuretics and vomiting, put themselves at a high risk of dehydration and associated physical consequences such as heart failure and death (American Association of Family Physicians, 1998; Armstrong & Maresh, 1993; Oppliger & Bartok, 2002).

Dehydration can have serious consequences on physical functioning. One mechanism that is especially vulnerable during dehydration is thermal homeostasis

(Hassanien et al., 1992). Body temperature is regulated within a narrow range through the delicate and complex balance between heat load (production and heat storage) and heat dissipation. The most effective forms of heat dissipation use the circulatory system. Excess heat is carried in the blood stream away from the core of the body to blood vessels in the skin where it is lost via: (1) conduction: heat is transferred through direct contact with a cooler object; (2) convection: air currents carry heat lost through conduction away; (3) evaporation: heat is used as the energy to change sweat to a vapour; and/or (4) radiation: heat loss due to infrared emissions (Armstrong & Maresh, 1993; Brewster, O'Conner, & Lillegard, 1995; Howe & Boden, 2007; Jordan, 2004; Starr & Taggart, 1987).

Dehydration causes a decrease in intravascular volume through a loss of plasma volume. This may lead to the diversion of blood flow to the vital organs rather than the skeletal muscles and vascular beds of the skin. Further compounding this is the fact that the ability to produce sweat is reduced and heat loss is quickly exceeded by heat gain and core body temperature increases (Armstrong & Maresh, 1993; Brewster et al., 1995; Caldwell, 1984; Caldwell, Ahonen, & Nousiainen, 1984; Lee, 1997; Nadel, Mack, & Nose, 1990; Pawelczyk, 2001; Shirreffs, Armstrong, & Chevront, 2004; Sparling, 2000; Starr & Taggart, 1987; Wade, Freund, & Claybaugh, 1987; Walberg-Rakins, 2000).

Warrington, McGoldrick and Griffin (2006) examined 17 Irish flat-race jockeys and 10 national hunt jockeys and compared their hydration status on racing and non-racing days. Evidence that jockeys were dehydrated on both race days and non-race days was found. Urine Specific Gravity tests revealed that 76.7% of jockeys were dehydrated on non-race days and 93% of jockeys showed high to severe levels of dehydration on race days. The results of the study led Warrington et al. (2006) to

conclude that jockeys are habitually dehydrated on non-race days, and to an even greater extent, on race days.

A study carried out by Pruscino, McGregor, Jones, Flanagan and Sullivan (2005) found that similar to Irish jockeys, Australian jockeys were also likely to be consistently dehydrated. Pruscino et al. (2005) collected blood and urine samples from seven Victorian jockeys on five separate occasions (including up to three race days and two non-race days). They also recorded the jockeys' body temperatures on race days. They reported that 9% of jockeys recorded a post-race body temperature over 38.5 °C and that markers of dehydration were evident on both race days and non-race days.

Pruscino et al.'s (2005) findings were cause for concern, because the rise in body temperature observed increases the risk of heat illness (American Association of Family Physicians, 1998). There are five common types of heat illness; heat oedema, heat syncope, heat cramps, heat exhaustion and heatstroke. Each illness is associated with varying degrees of physical and psychological impairment (Armstrong & Maresh, 1993; Barrow & Clark, 1998; Coris et al., 2004; Coris et al., 2006; Howe & Boden, 2007; Wexler, 2002).

Heat oedema is the mildest form of heat illness and usually occurs in people not acclimatised to extreme heat. It is characterised by an excessive accumulation of serous fluid in the intracellular spaces of tissue in the lower extremities. It appears to have no lasting effects, and can be treated by elevating the affected area and periodic exercise, coupled with gradual acclimatisation (Barrow & Clark, 1998; Brewster et al., 1995; Coris et al., 2004; Howe & Boden, 2007; Lee-Chiong & Stitt, 1995).

Heat syncope is characterised by dizziness, light-headedness or a loss of consciousness when a person stands for a long time or rises suddenly from a sitting or

lying position (Howe & Boden, 2007; Sandor, 1997). It is often the consequence of an insufficient cardiac output and/or abnormally low blood pressure caused by dehydration, a failure to cool down after exercise or poor heat acclimatisation. Treatment involves fluid replacement and lying in a supine position with the lower extremities raised so blood flow can return to the central nervous system (Holtzhausen et al., 1994; Howe & Boden, 2007; Wexler, 2002).

Heat cramps represent the next level of heat illness. They are characterised by the painful spasms of skeletal muscles in the arms, legs, abdomen and/or trunk. Cramps are often attributed to a negative sodium balance due to changes in blood chemistry. Treatment involves the replacement of fluid and sodium. Although sometimes thought of as annoying, cramps can be severe and act as a warning sign of impending heat exhaustion (Caldwell et al., 1984; Howe & Boden, 2007; Latzka & Montain, 1999; Mellion & Shelton, 1997; Oppliger & Bartok, 2002; Wexler, 2002) as they can occur concurrently with heat exhaustion symptoms. During an episode of heat cramps a person's core body temperature may start to become elevated (Howe & Boden, 2007).

The fourth and most common heat illness is heat exhaustion. It occurs under conditions of extreme heat and/or dehydration, when the cardiovascular system is unable to respond to the workload. Although the onset is usually sudden and the duration brief, it results in an inability to continue exercising (Armstrong & Lopez, 2007; Armstrong & Maresh, 1993; Lee-Chiong & Stitt, 1995; Wexler, 2002). Distinguishing features can include a core body temperature greater than 38 °C (but by definition lower than 40.5 °C), heat syncope, heat cramps, extreme sweating, "heat sensation" on the head and neck, headache, chills, "goose bumps", weakness, vertigo, dizziness, vomiting, nausea, tachycardia, hypotension and irritability. Less common

symptoms include hyperventilation, ataxia, agitation, impaired judgement and confusion (Armstrong & Maresh, 1993; Howe & Boden, 2007; Wexler, 2002). Short-term treatment involves rapid cooling and fluid replacement. The long-term consequences are not known (Coris et al., 2004), but athletes returning to activity should be fully hydrated and should undergo regular assessments of hydration levels during activity. A minimum of 7 to 10 days of gradually increasing exercise is also recommended for athletes in hot environments (Armstrong & Lopez, 2007; Coris, Walz, Konin, & Pescasio, 2007). For extremely fit athletes who experience mild heat exhaustion, 1 to 2 days may suffice (Armstrong & Lopez, 2007).

Heatstroke is the fifth level of the heat illnesses and the most severe.

Heatstroke is considered a clinical and pathological condition, where an elevated body temperature results in damage to body tissue and affects multiple organs. Symptoms are similar to those of heat exhaustion, but include a body temperature above 40.5 °C, failing or cessation of the sweating mechanism and neurological problems, including coma (Coris et al., 2004; Hassanien et al., 1992; Howe & Boden, 2007). Typically, heatstroke occurs during periods of extreme heat and humidity, but has been observed in cool to temperate environments (Armstrong & Maresh, 1993; Coris et al., 2004). When intrinsic heat production is the main reason for hyperthermia the condition is known as exertional heatstroke (Howe & Boden, 2007). In either classic (environmental) or exertional heatstroke it is essential that patients receive whole body cooling quickly as organ damage and mortality rates are proportional to the duration between an elevation in body temperature and cooling therapy (Coris et al., 2004). The published mortality rates for heatstroke victims vary from 10% to 75%, with an average of 25% (Armstrong, De Luca, & Hubbard, 1990; Hassanien et al., 1992). In the athletic population exertional heatstroke is the third leading cause of

death (Coris et al., 2006; Lee-Chiong & Stitt, 1995). For athletes who recover from heatstroke, there may be a period of reduced heat tolerance and an increased susceptibility to severe heat illness when exercising in hot environments (Armstrong et al., 1990; Coris et al., 2007).

The prevention of most heat illness symptoms in athletes is relatively simple, monitor the person's hydration levels and ensure they ingest enough water and salt-containing solutions to maintain his/her fluid and sodium levels (Coris et al., 2007; Howe & Boden, 2007). Howe and Bowden (2007) went as far as to say that heatstroke was completely preventable in athletic populations. Unfortunately, as reported by Warrington et al. (2006) and Pruscino et al. (2005), even on non-race days most jockeys are not fully hydrated. More alarmingly, jockeys actively dehydrate themselves to meet riding weight-loss requirements (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001).

Pruscino et al. (2005) found that 18% of jockeys in their study reported experiencing three or more symptoms of heat illness on race days and that there was a direct relationship between the number of behaviours designed to induce fluid loss and the number of heat illness symptoms experienced prior to racing.

### *Restricted Food Intake*

Restricted food intake is another weight-loss method used by athletes that can also impact upon body fluid levels. Consuming solid food has been shown to play an important role in post-exercise fluid balance restoration because the consumption of

sodium enhances fluid retention and plasma volume restoration (Hawley & Burke, 1998; Pendergast, Horvath, Leddy, & Venkatraman, 1996).

Athletes tend to use two forms of dietary restraint, long-term dieting and short-term starvation (Filaire, Maso, Degoutte, Jouanel, & Lac, 2001; Steen, Oppliger, & Brownell, 1988). As well as putting themselves at risk of dehydration, these weight-loss practices can put athletes at a high “nutritional” risk (Wahl, 1999). Of particular concern for athletes is the lack of “fuel” for the body (Hawley & Burke, 1998). Dietary restriction is associated with decreased energy stores, increased fatigue, increased injury and impaired recovery. Moreover, food restriction can lead to electrolyte imbalances and decreased iron levels that are linked to reduced oxygen transport. Inadequate dietary intake of proteins could cause problems with the maintenance of muscle protein, a reduction in glycogen resynthesis, whereas an inadequate intake of carbohydrates could lower the rate of glycogen repletion resulting in lowered liver and muscle glycogen stores in the muscles and the likelihood of hypoglycemia (Filaire et al., 2001; Fogelholm et al., 1993; Hawley & Burke, 1998; Horswill, Park, & Roemmich, 1990; Ivy, 1991; Keys et al., 1950; Pendergast et al., 1996).

On a longer term basis, further adverse consequences include the loss of bone density, body pains, loss of muscle mass, neuroendocrine disturbances, gastrointestinal discomfort or upset, decreased immune function, hypomatraemia and menstrual dysfunction (American College of Sports Medicine, American Dietetic Association, & Dieticians of Canada, 2000; Burke, 2000; Dae et al., 2002; Fichter, Pirke, & Holsboer, 1984; Filaire et al., 2001; Fogelholm et al., 1993; Hawley & Burke, 1998; Horswill et al., 1990; Kaye, Gendall, & Kye, 1998; Kenardy, Brown, & Vogt, 2001; Kowatari et al., 2001; Lee, 1997; Wang, Amato, & Fernandes, 2001). In

extreme situations, the combination of restricted food intake and dehydration can lead to collapse and even death (Maughan, 2000).

### *Physical Effects of Weight Management on Athletes*

Unfortunately, in the sporting arena severe dehydration results in the injury and death of many athletes each year (Oppliger & Bartok, 2002). Oppliger and Bartok (2002) stated that the numbers of dehydration related injuries are too numerous to record. Even so, there have been stand out cases that have received a great deal of attention. Several of these cases have occurred in American football. For instance, during the same week in 2001, two players died from heatstroke related injuries. One player's core body temperature at the time of his death was more than 42.5°C. (Mueller & Diehl, 2006; Oppliger & Bartok, 2002). These deaths are just two of 21 heatstroke related deaths reported by The National Centre for Catastrophic Sports Injuries (NCCSI) in American footballers in the last 10 years (Mueller & Diehl, 2006). The increase in dehydration-related deaths over recent years has been attributed to several factors. Some of these include a lack of heat acclimatisation, incompetent planning of training sessions and the growing trend of using weight-loss supplements that speed up metabolism or supposedly build muscle (Gatorade Sports Science Institute, 2002).

It is not unexpected that the risk of dehydration related injury is even higher in weight-division sports where athletes purposely dehydrate to lose weight. These athletes often couple dehydration with dietary restraint (Brownell, Steen, & Wilmore, 1987), which can increase dehydration levels and put athletes at a high nutritional risk

(Wahl, 1999). Evidence of the negative effects of rapid weight-loss strategies were reported by Green, Petrou, Fogarty-Hover and Rolf (2007) who examined the correlation between rapid weight loss, gender, grade, weight category and injury rate in 392 judoka. They found that rapid weight loss was the only significant variable for increased injury risk during competition. Further evidence of the negative effects of rapid weight loss was shown by Alderman et al.'s (2004) investigation of international-style wrestling. Competitors used rapid weight-loss methods to lose an average of 5% of their body weight and experienced effects such as headaches (47%), dizziness (44%), nausea (42%), hot flushes (22%), nosebleeds (20%), fever (17%), disorientation (9%) and racing heart rate (4%).

In 1997, three collegiate wrestlers died as a consequence of rapid weight loss (Walberg-Rakins, 2000). The first casualty was 19-year-old William Saylor who was more than 17.3 kg (38 pounds) over his weight class (195 pounds, 88.6 kg) at the beginning of the wrestling season. He lost the first 10.5 kg (23 pounds) over 10 weeks and a further 4.1 kg (9 pounds) 2 days prior to a tournament. Eight hours before weighing in, William attempted to lose the last 2.7 kg (6 pounds) through fluid and food restriction and exercise in a vapour-impermeable suit in a hot environment. After a 2-hour break, he resumed exercise and reported experiencing extreme fatigue. He then became unresponsive. William suffered a cardiorespiratory arrest and could not be resuscitated (Centre for Disease Control and Prevention, 1998; Viscardi, 1998; Walberg-Rakins, 2000).

The second fatality was that of 22-year-old Joseph LaRosa who weighed 178 pounds (80.9 kg) during the wrestling off-season, more than 11 kg over his 153-pound (69.5 kg) weight division. He lost six of these kilograms (13 pounds) in 9.5 weeks and a further 3.6 kg (8 pounds) in the 3 days leading up to a tournament. The day before

the competition, he was also exercising in a vapour-impermeable suit, this time riding a stationary bike in a steam-filled bathroom. Joseph reported shortness of breath and feeling unwell and took time to rest and drink some water. He collapsed and became unresponsive despite attempts to cool him. His temperature at the time of death was 42.8 °C. Joseph had suffered a cardiorespiratory arrest and the cause of his death was reported as hyperthermia (Centre for Disease Control and Prevention, 1998; Viscardi, 1998; Walberg-Rakins, 2000).

The third casualty was 21-year-old Jeff Reese, who was attempting to lose 12.3 kg (27 pounds) to wrestle in the 153-pound (69.5 kg) weight class. He lost 10 pounds (4.5 kg) over 12.5 weeks and then 5 kg (11 pounds) in the 3 days prior to the competition. He attempted to lose the last 2.7 kg (6 pounds) in the 3 hours before the weigh-in. He died after a 2 hour work out in a vapour-impermeable suit in a 33 °C room. The cause of death was cited as rhabdomyolysis (the cellular break down of skeletal muscles) combined with kidney failure and heart malfunction due to dehydration (Centre for Disease Control and Prevention, 1998; Viscardi, 1998; Walberg-Rakins, 2000).

Examples of athletes dying from unhealthy weight-loss methods are also available from other weight category sports. Korean judoka, Se-Hoon Chung, a medal favourite for the half-lightweight division (under 65 kg) at the 1996 Olympics, died of a heart attack while dehydrating in the sauna before he could compete. He had already lost 8 kg through diet and fluid restriction and was attempting to lose even more. Se-Hoon had already won a bronze in the lightweight division (under 71 kg) at the 1992 Olympics, a gold in the same division at the 1993 World Titles and a bronze at the Junior World Championships in the under 65 kg division (CBC, 2004; International Judo Federation, 2003). Se-Hoon is not the only Korean judoka to die because of use

of rapid weight-loss techniques. A Korean judo coach can recall three or four other high school judoka who have died attempting to make weight for school competitions. One death had occurred in the last year (K. J. Ha, personal communication April 12, 2004).

Australian judoka seem to have been more fortunate than their Korean counterparts. Victorian judo coach, Neil Whitehead, recalled two separate incidences of international level players being hospitalised due to rapid weight loss. In one case, despite fainting the night prior to the competition, the judoka continued to restrict food intake and dehydrate using the sauna. She collapsed on the scales while attempting to weigh-in and required 6 litres of intravenous fluid to rehydrate. She now suffers from a heart condition (N. P. Whitehead, personal communication October 26, 2006).

### *Physical Effects of Weight Management on Jockeys*

Although there is little research on the physical effects rapid weight loss has on jockeys and/or the incidents of heat illness, there is the feeling that weight-loss methods are extreme and pervasive in the profession and require some jockeys to sacrifice their health (Baptiste, 2000a, 2000b; Thomas, 2006). Some retired jockeys reported that they were lucky to be healthy considering the rigorous methods of weight control they had used (Christine, 2001; Finely, 2000). Although not attributed entirely to weight-loss behaviours, a study of South African jockeys revealed that 25% had musculoskeletal problems, 13% gastrointestinal problems and 5% renal problems (Labadarios et al., 1993).

Anecdotal reports from jockeys confirm that some are concerned about their health. One jockey revealed being unable to sleep before race days because of the pain caused by dehydration and feeling “so nauseated ... so thirsty you could drink battery acid ... your mouth feels like leather” (Harris et al., 2001, p. 39). On the flip side, wasting has been reported to leave jockeys exhausted physically. One of Australia’s most successful jockeys was so drained from wasting that after a winning ride he lay on the parade path unable to make it into the jockeys’ rooms (Edwards, 2008). There are also several reports of jockeys being light-headed and/or collapsing after wasting (Christine, 2001; Hinds, 2006; Hoffer, 2001; Stewart & Habel, 2001; Thomas, 2006) and experiencing excruciating cramps due to fluid, electrolyte and mineral depletion, “all of a sudden your body cramps up ... a red hot poker going through your hips” (Baptiste, 2000a, p. 31).

One jockey believed that dangerous weight-loss practices had contributed to his liver and kidney transplants (Schmidt, 2004). Although it has not been investigated, some jockeys considered severe wasting to be a factor in the onset of epidemics of fatal lung disease such as tuberculosis and pneumonia (Hillenbrand, 2001).

One case that was thoroughly scrutinised was that of an Australian jockey who suffered a heart attack in an on-course sauna. The jockey was awarded over one million dollars in compensation after it was found that dehydration from the sauna contributed to a clot in an artery and brought on the heart attack. During a come-back attempt, physical weakness stemming from the heart attack contributed to a fall and the jockey’s career was permanently ended due to the orthopaedic injuries he suffered (Bourke, 2002; Phillips & Meldrum, 2001). Not surprisingly, the court ruling in favour of the injured jockey had repercussions throughout the racing industry.

Victorian on-course saunas were closed for 8 months while RVL considered solutions that would decrease the potential liability risk of on-course saunas. Eventually, on the 22<sup>nd</sup> of July 2002, saunas were re-opened with their use being contingent on several conditions including: (1) use be strictly supervised; (2) use be limited to a maximum of three separate 15 minute sessions per day; (3) jockeys attend seminars on alternative weight-loss practices; and (4) jockeys sign a waiver against taking legal action for any alleged accident that could occur in an on-course sauna (Bourke, 2002).

Anecdotal reports indicated that this case was not the only incident of a jockey experiencing severe health problems because of sauna use. In fact, it seems that this particular jockey may have been fortunate. Some jockeys recalled a colleague who also suffered a heart attack in the sauna, but in his case it was fatal (Stewart & Habel, 2001).

Australia is not the only country to experience jockey injury and mortality due to wasting-related behaviours. One instance occurred in the USA in 2000. Twenty-nine year old jockey, Chris McKenzie, died of a heart arrhythmia that was attributed to depleted potassium levels because of constant wasting. Chris reportedly sat in the sauna for hours to lose weight and survived on sunflower seeds, a few pieces of dry cereal, an occasional salad and some icy-poles. Tragically, a track physician had noted his abuse of his body and tried unsuccessfully to have him banned. The same physician indicated that Chris was not an isolated case of using extreme weight-loss methods and suggested that he may not be the last to die because of it (Christine, 2001; Finely, 2000; Schmidt, 2004).

Debate on the contribution of extreme weight loss to the death of another jockey that same year may never be settled. The coroner concluded that Chris Antley's death was accidental because he was found with the evidence of four drugs in his

system. One was a banned weight-loss drug known to cause fatal heart attacks. These incidents of wasting-related injury and mortality lead to concerns for jockeys' physical and psychological capacity while racing. Some jockeys reported that despite the consequences of wasting, adrenalin could push them through and help performance on race day (Hoffer, 2001). However, other jockeys, indicated penalties that impaired their functioning (Baptiste, 2000a). The combination of wasting and riding could leave some jockeys feeling exhausted and experiencing cognitive difficulties (Prendergast, 2001). One jockey reported that "more than half of the jockeys on race days were mentally and physically incapable of riding properly as a result of dehydration and starving themselves to make correct weight" (Harris et al., 2001 p. 18).

Jockeys seem to accept the negative physical effects of wasting as part of the sacrifice for their career. They have been known to be so tolerant of the negative effects of weight management that they have brushed aside symptoms of serious, life-threatening health issues as nothing more than the effects of wasting (Thomas, 2007b).

## Chapter 5: Weight Management and Physical Performance

Given the adverse health consequences of dehydration and nutritional deficits, it is not surprising that the effect on physical performance has been of interest to researchers (Burge, Carey, & Payne, 1993; Buskirk, Iampietro, & Bass, 1958; Caldwell, 1984; Doscher, 1944; Keys et al., 1950; Latzka & Montain, 1999; Oppliger & Bartok, 2002). Arguably, one of the most powerful studies highlighting the detrimental effects of nutritional deficit on physical performance was conducted over 50 years ago by Keys et al. (1950). In an effort to research dietary rehabilitation for troops returning from prisoner of war camps, 36 physically and psychologically healthy young men (mean age 25 years) were chosen from one hundred volunteer conscientious objectors. Participants weighed an average of 69.3 kg and undertook a 3-month control period, 6-month semi-starvation period and 3 to 5-month rehabilitation period. During the control period, participants were given individualised, palatable and nutrient rich diets to bring them as close as possible to their “healthy weight” (average of 3493 calories per day). During the semi-starvation period, they received two meals a day (average of 1570 calories) consistent with famine food in Europe (cereals, wheat bread, potatoes, turnips, cabbage and token amounts of meat and dairy). On average, participants lost 16.82 kg, 24% of their body weight. Participants were served two “relief” meals during the last 3 months of the semi starvation period. To make up a 48 hour “work” week, participants were required to work (e.g., clerical work) for 15 hours, walk outdoors for 35.4 kilometres, exercise for half an hour on a treadmill at 5.6 kilometres per hour at a 10% grade and complete 25 hours of study (e.g., sociology, languages). They also had a 3 to 5 kilometre round trip to the dining hall each day. Participants started to have difficulty

completing their work during the later part of the experiment due to weakness and apathy. In fact, by the end of the semi-starvation period, total work capacity (running on a treadmill until exhausted) had decreased by 84.2% and muscular strength in the back and forearm had decreased by 28.2% and 29.8% respectively. Anaerobic work capacity was also impaired, with decreases in oxygen debt and lactate production. The latter can also be seen as an indication of the greater contribution of fat to energy metabolism (Lee, 1997).

These results are interesting considering the workload of both apprentice and registered jockeys (see Appendix B) and their reported under-consumption of energy and carbohydrates (Apted, 1988; Labadarios et al., 1993; Leydon & Wall, 2002; Moore et al., 2002). Speed et al. (2001) reported that the average amount of time that jockeys engaged in jockey duties was 49.8 hours per week. The number of races they rode varied from between 1 to 30 rides, with an average of 9.5 rides a week. The participants in Keys and colleagues' (1950) study were consuming 1570 calories a day in the semi-starvation phase, which equates to two meals a day. Reports from the research on jockeys indicated that while they worked long hours, jockeys also skipped meals, and had an energy and carbohydrates consumption level below the recommended level for athletes (Hill et al., 1998; Labadarios et al., 1993). Many were considered to be underweight and at the lower end of normal, using the BMI classifications (Apted, 1988; Leydon & Wall, 2002).

Considering that the participants in Keys et al. (1950) study experienced decreased physical capacity and decreased muscular strength in their backs and forearms after food restriction, these results have implications for the physical performance of jockeys. Research on the effects of rapid weight loss have on the performance of athletes has supported the findings reported by Keys et al. (1950).

Studies examining lightweight rowers, boxers, judoka, taekwondo players and wrestlers have shown that rapid weight loss can decrease oxygen consumption, anaerobic threshold, strength, power, muscular endurance, thermal regulation, flexibility, agility and even perceived performance ability (Burge et al., 1993; Filaire et al., 2001; Lane, 2001; Lee, 1997; Webster, Rutt, & Weltman, 1990). For instance, Filaire et al. (2001) examined dietary restraint (7 days) in 11 male judoka competing in weight categories below 73 kg. Participants lost an average 3.6 kg by restricting diet to 1000 calories per day. It was assumed that dehydration also contributed to weight loss as this only equated to a 1 kg of body mass. Participants undertook judo specific tests of static strength (muscular strength in grips), vertical jumps and mechanical power of lower limbs with successive maximal jumps. Comparative to the control tests, there was a decrease in grip strength and power noted after the dietary restraint period (Filaire et al., 2001).

Decreases to physical performance were also evident when examining 20 taekwondo players (average weight of 61 kg) who lost 6% of their body weight over three days (rapid condition) or 10 days (gradual condition). Participants in the gradual condition did so through diet control and exercise, while those in the rapid condition used the sauna, exercise in vapour-impermeable suits and fluid and food restrictions. Cardio-respiratory performance and muscle function were tested before and after losing weight. Participants were given 2 hours to rehydrate and eat before being tested. Muscular endurance decreased between pre-tests and post-tests for both forms of weight loss. Pre-test and post-test differences also occurred for the rapid weight-loss condition participants with regard to muscular strength, maximal oxygen uptake and cardio respiratory endurance. Moreover, rapid weight-loss participants showed decreases in maximal running time, maximal heart rate and maximal blood lactate

when compared to the participants who lost weight over a 10-day period. The researchers attributed these deficits to a reduction in plasma volume (and inability to replace it) and a decreased ability to use glycogen. The results showed that for taekwondo players, 2 hours was insufficient time to compete in a condition where they were able to sustain work at a high intensity (Lee, 1997).

Although researchers have been reporting similar results for the last two decades (American College of Sports Medicine et al., 2000; Armstrong & Epstein, 1999; Burge et al., 1993; Caldwell, 1984; Costill & Sparks, 1973; Latzka & Montain, 1999; Walsh, Noakes, Hawley, & Dennis, 1994), many athletes do not appreciate that it may take 24 to 48 hours to fully recover from rapid weight loss, and that during this time their performances can still be impaired. In fact, research has shown that a fluid deficit as small as 2% of body weight can adversely affect physical performance (American College of Sports Medicine et al., 2000).

Despite the fact that athletes in other weight division sports were able to eat and drink between weigh-in and performing, they were not able to fully restore their plasma volume and glycogen stores in this time period (Groeller & Galloway, 1996; Lee, 1997). Nevertheless, other weight division athletes were in a better position than jockeys who had no opportunity to eat or rehydrate prior to performing as they were required to weigh in before and after each race (Racing Victoria Limited, 2006c).

## Chapter 6: Weight Management and Cognition

Unlike physical effects, the consequences of rapid weight loss on cognition are still unclear. Nevertheless, it has been reported that a dehydration deficit as small as 2% of body weight reduces mental performance (Gopinathan, Pichan, & Sharma, 1988; Kubitz & Pthakos, 1997; Sharma, Sridharan, Pichan, & Panwar, 1986; Tomporowski, 2003).

Gopinathan et al. (1988) induced dehydration in 11 healthy young soldiers using a combination of water restriction and exercise in a hot environment. To control for the effects of heat acclimatisation, participants spent 8 days in a climatic chamber with a 45 °C temperature and 30% humidity. They spent 2 hours of each day doing step-ups in cycles of 50 minutes with 10-minutes rest in between. After heat acclimatisation, participants were hypo-hydrated and rested before exercising in the same climatic chamber on four separate occasions to induce dehydration levels of 1%, 2%, 3% and 4% of body weight. After each dehydration session, participants completed tests for short-term memory, arithmetic efficiency, motor speed and attention. With all tests, deterioration was seen at a minimum of a 2% loss of body weight.

Choma, Sforzo, and Keller (1998) reported findings that partially supported the idea that dehydration leads to cognitive deficits in athletes. They compared competing college wrestlers who had lost a minimum of 5% of body weight through dehydration to a control group of college-aged athletes in their “off-season” and found that there was a difference between group scores on short-term memory, with the control group scoring better than wrestlers. After rehydrating, wrestlers’ short-term

memory scores returned to baseline levels. Attention, visual acuity and visuomotor skills appeared to be unaffected (Choma et al., 1998).

In a similar study, Landers, Arent, and Lutz (2001) also examined attention, visuomotor skills, short-term memory and choice reaction of high school wrestlers. Unlike Choma et al. (1998), who failed to control for competition anxiety, the control group for this study were competing wrestlers who either maintained or lost less than 1% of their body weight. The results did not support the notion that rapid weight loss induced deficits in cognitive functioning as there was no significant difference between the groups on the cognitive performance tests.

A criticism of research in this area is the possible effects of the exercise itself on cognition. In an attempt to control for the effect of exercise on cognition, Cian, Koulmann, Barraud, Raphel, Jimenez and Melin (2000) compared participants' cognitive test results after they had maintained euhydration (full hydration) and dehydration (2.8% of body weight) through exercise or heat. Dehydration was found to decrease decision making, tracking performance and short-term memory with no significant differences between the two types of fluid reduction methods. However, after an exercise session at 85% of maximal heart rate, similar performances were recorded for all participants on all tests except visual tracking and long-term memory.

Despite finding minimal or no test result differences among participants, some studies have reported that dehydration has left athletes feeling less alert (Neave et al., 2001). Similar results have also been found with food restriction. For instance, Keys and colleagues' (1950) examination of semi-starvation in healthy young men showed little quantifiable change in cognitive ability. However, participants' reports, showed that compared to the control period, there was a 25% increase in participants who thought their memory was impaired and a 54% increase in those who had difficulty

keeping their mind on the job. Some participants reported that persistent hunger broke their concentration. Forty-one percent felt that there was a decrease in their judgment and comprehension skills.

Although researchers have used different methods to test the effects of rapid weight loss on cognitive functioning and have found varied results, a common finding is the negative impact of wasting on memory (Choma et al., 1998; Cian et al., 2000). As jockeys' success depends on being mentally alert and able to gauge the position and condition of a horse, remembering riding instructions, maintaining quick reflexes and to plan and carry out strategy (Presnell, 2008; Schmidt, 2004; Speed et al., 2001; Sperling, 2002), thus any deficit in cognition may adversely affect performances.

Once again the stringent weight requirements of horseracing should be considered. Jockeys lack the opportunity to eat and drink prior to performing, they can be scheduled to ride multiple races on the same day (which may have different weight requirements) so they can be dehydrated for long periods of time and horseracing is a year round industry with no off-season for jockeys to recuperate (Hawley & Burke, 1998; Racing Victoria Limited, 2006b). The lack of an off-season means jockeys can be restricting food intake and dehydrating themselves for extended periods of time. Speed et al. (2001) reported that the average duration of the riding career for Australian jockeys was 19.8 years. Conceivably, jockeys could be practicing weight-loss methods for this entire period and be experiencing the negative effects that go along with these practices (e.g., memory deficits, physical performance reductions).

## Chapter 7: Weight Management and Eating Disorders

Another potential concern for athletes in weight category sports is the impact of continued weight-control behaviours on long-term eating behaviours. Despite quite extensive research concerning athletes and eating disorders, Fogelholm and Hilloskorpi (1999) suggested that the association between the two was not clear-cut. Fogelholm and Hilloskorpi (1999) and Byrne and McLean (2002) made the point that as previous research in this area did not use standardised definitions of eating disorders, which may have led to the large variations in the reported estimates of the prevalence of eating disorders in athletes.

The term *eating disorders* describes a wide range of unhealthy eating behaviours that are associated with psychological disturbance that lead to serious health problems (Landers, 2002). Eating disorders usually develop in females during adolescence and/or young adulthood, but could begin at any age and in either gender (American Psychiatric Association, 1994, 2000; Anorexia Nervosa and Related Eating Disorders Inc, 2004; Baum, 2006; Franko & Keel, 2006; Gidwani & Rome, 1997; Theander, 1995).

The two most well-known forms of eating disorders are Anorexia Nervosa and bulimia nervosa. Anorexia Nervosa is a life-threatening disease of unknown etiology (Kashubeck-West & Mintz, 2001; Pollice, Kaye, Greeno, & Weltzin, 1997). The main symptom of Anorexia Nervosa is the refusal to eat food. Essentially, people with Anorexia Nervosa starve themselves (Lamberg, 2003; Montenegro, 2006). Their weight has been found to drop below 85% of that expected for their age and height (Lamberg, 2003), or their body weight has been found to drop less than 85% of that expected for their age and height because they failed to gain weight during periods of

growth (Halmi, 1995). According to the Diagnostic and Statistical Manual for Mental Disorders (*DSM-IV-TR*; American Psychiatric Association, 2000) people with Anorexia Nervosa have (a) a body weight below the minimal standard for their height and weight; (b) an intense fear of gaining weight or becoming fat despite being underweight; (c) a distorted view of their body composition and a denial of the seriousness of their low body weight and (d) amenorrhea. The *DSM-IV-TR* identifies two subtypes of Anorexia Nervosa based on behaviours during an eating disorder episode; restricting type where there is no binge eating or purging and binge eating/purging type where there is regular binge eating and purging. Anorexia Nervosa is thought to occur in 1% to 5% adolescent and adult women (Franko & Keel, 2006).

Similarly to Anorexia Nervosa, people with bulimia nervosa are preoccupied with eating and weight, and self-evaluation is influenced by body weight and shape (American Psychiatric Association, 2000; Franko & Keel, 2006; Mauler, Hamm, Weike, & Tuschen-Caffier, 2006). The most prominent feature of Bulimia Nervosa is an abnormal eating pattern. People with Bulimia Nervosa often engage in unhealthy behaviours (e.g., self-induced vomiting, fasting, strict dieting and/or abuse of laxatives, and/or excessive exercise) aimed at preventing weight gain (American Psychiatric Association, 1994, 2000; Lamberg, 2003; Montenegro, 2006). Repeated episodes of binge eating were included in the *DSM-IV-TR* diagnostic criteria for this disease (American Psychiatric Association, 2000). That is, individuals with Bulimia Nervosa ate large amounts of food hurriedly at least two or more times a week, often in secret, and reported feeling out of control at these times (American Psychiatric Association, 1994, 2000; Lamberg, 2003; Mauler et al., 2006). Based on the types of unhealthy behaviours two subtypes of Bulimia Nervosa have been identified; purging

type where there is regular self-induced vomiting, use of laxatives and/or diuretics or enemas and non-purging type where there is fasting or excessive and no regular purging (American Psychiatric Association, 2000). Unlike anorexics who tend to see themselves as much larger than they actually are, bulimics have a more realistic view of their size and are more likely to see their behaviour as abnormal (Franko & Keel, 2006). It was approximated that 4 in every 100 college aged women suffered bulimia, although it is difficult to know if this statistic was correct given the secretive nature surrounding the disorder (Anorexia Nervosa and Related Eating Disorders Inc, 2004).

Less severe or *sub-clinical* forms of eating disorders that met some, but not all of the diagnostic criteria for an eating disorder, have also been identified and can be classified as eating disorder not otherwise specified (American Psychiatric Association, 1994, 2000; Beals & Manore, 1994). According to Fries (cited in Beals & Manore, 1994) eating and dieting behaviours occurred along a continuum. At one end of the continuum is healthy concern for weight management that involves the monitoring of food intake to maintain a healthy weight. Moving along the continuum, a healthy concern for weight management could lead to food restriction, which further along the continuum could turn to serious eating disorders. Fries suggested that sub-clinical eating disorders were one possible point along this continuum. Sundgot-Borgen (1993) suggested that the sub-clinical form of Anorexia Nervosa that athletes experienced was Anorexia Athletica. Individuals with Anorexia Athletica engaged in excessive exercise (beyond that required for good health), were generally extreme about their weight and diet, and were rarely satisfied with their athletic performance.

Although eating disorders are categorised under distinct types, diagnostically there are some overlaps. Research has indicated eating disorders have similar causes

and origins and that individuals may alternate between the criteria for each (Kashubeck-West & Mintz, 2001).

For females, one concern associated with eating disorders is the increased likelihood of developing menstrual dysfunction (Beals & Hill, 2006; Sherman & Thompson, 2006). Menstrual dysfunction has been found to occur in 1% to 58.3% of female athletes (Beals & Manore, 1994; Rouveix, Bouget, Pannafieux, Champley, & Filaire, 2007; M. K. Torstveit & Sundgot-Bogen, 2005) and is often associated with low bone density (Fruth & Worrell, 1995; Myburgh, Hutchins, Fataar, Hough, & Noakes, 1990; Punpilai, Sujitra, Ouyporn, Teraporn, & Sombut, 2005) which can play a role in the development of injuries such as stress fractures (Bennell, Malcolm, Wark, & Brukner, 1997; Fruth & Worrell, 1995; Peer, 2004). For some athletes who have suffered menstrual dysfunction, even after regular menses has resumed for several years, low bone density can continue to be an ongoing issue (Keen & Drinkwater, 1997).

### *Predisposing Factors of Eating Disorders*

Determining the source of eating disorders is difficult because there are multiple elements, both within and between individuals (Garner & Bemis, 1982). These elements are multifaceted and influenced by biological, psychological and socio-cultural variables (Carron, Hausenblas, & Estabrooks, 2003; Pirke & Ploog, 1986). However, according to Garner and Bemis (1982), the most common single factor identified as causal in the development of an eating disorder was the conclusion on the part of the individual that he/she must become thin.

According to Halmi (1995), Anorexia Nervosa and Bulimia Nervosa begin with the common practice of monitoring and restricting food intake to achieve a desirable appearance. Although the conscious practice of changing eating and exercise behaviours to lose weight is very common, only a few people develop eating disorders (Lamberg, 2003). The question of why some people developed eating disorders and others did not, was complex (Halmi, 1995). However, it is generally thought that some individuals may be more prone to developing eating disorders than others (Lamberg, 2003). For example, Pollice et al. (1997) and Franco-Paredes, Mancilla-Díaz, Vázquez-Arévalo (2005) suggested that individuals suffering from Anorexia Nervosa often display the characteristics of rigidity, ritualism, perfectionism and meticulousness. Another explanation offered by Gattanach, Phil, Malley and Rodin (1988) suggested that psychological and physical reactivity to stress may affect the eating behaviours of some individuals.

The link between eating disorders and mood and anxiety has been well established over several decades. (Cantwell, Sturzenberger, Burroughs, Salkin, & Green, 1977; Garner et al., 1990; Herpertz-Dahlmann, Wewetzer, Schulz, & Remschmidt, 1996; O'Brien & Vincent, 2003; Pirke & Ploog, 1986; Rosenthal & Heffernan, 1986; Shafran, 2002; Swoap & Murphy, 1995; G. Waller et al., 2003; Wildman, Lilenfeld, & Marcus, 2004; G. T. Wilson & Lindholm, 1987). Mood and anxiety disorders have been found to occur in as many as 63% and 71% of eating disorder patients respectively (Godart et al., 2003; Westen & Harden-Fischer, 2001).

Although depression and anxiety are among the most common comorbid conditions, when considering eating disorders they are not the only concurrent psychiatric disorders that can occur (Braun, Sunday, & Halmi, 1994; Brunello et al., 2000; John, Meyer, Rumpf, & Hapke, 2006; Kashubeck-West & Mintz, 2001). Table

2 shows some of the comorbid conditions that have been identified by researchers and their symptoms according to the *DSM-IV-TR* (American Psychiatric Association, 2000; Braun et al., 1994; O'Brien & Vincent, 2003; Woolsey, 2002). For some disorders, (e.g., Borderline Personality Disorder, Seasonal Affective Disorder), the different categories of eating disorders are highlighted as distinct subgroups (Conason, Brunstein Klomek, & Sher, 2006; Franko et al., 2005; Ghadirian, Marini, Jabalpurwala, & Steiger, 1999; Holderness, Brooks-Gunn, & Warren, 1994; O'Brien & Vincent, 2003; Stock, Goldberg, Corbett, & Katzman, 2002). For others, (e.g., depression), the occurrence of comorbid conditions is similar across the eating disorder types (O'Brien & Vincent, 2003; Westen & Harden-Fischer, 2001).

Table 2 *Comorbid Conditions Commonly Associated with Anorexia Nervosa (AN), Bulimia Nervosa (BN) and/or Eating Disorder Not Otherwise Specified (EDNOS)*

Condition	Diagnostic criteria*	Research
	Mood Disorders	
Major Depressive Episode	<p>A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure.</p> <p><i>Note:</i> Do not include symptoms that are clearly due to a general medical condition, or mood-incongruent delusions or hallucinations.</p> <ol style="list-style-type: none"> <li>(1) depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful). <i>Note:</i> In children and adolescents, can be irritable mood.</li> <li>(2) markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective report or observation made by others)</li> <li>(3) significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), a decrease or increase in appetite nearly every day. <i>Note:</i> In children, consider failure to make weight gains.</li> <li>(4) insomnia or hypersomnia nearly every day</li> <li>(5) psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feeling of restlessness or being slowed down)</li> <li>(6) fatigue or loss of energy nearly every day</li> <li>(7) feelings of worthlessness or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt</li> </ol>	<p>(1) <i>Participants:</i> 103 female eating disorder; 48 AN (35 binge purge, 13 restrictive), 45 BN. <i>Results:</i> 29% of participants reported experiencing major depression (Westen &amp; Harden-Fischer, 2001).</p> <p>(2) <i>Participants</i> 105 female eating disorder inpatients; 34 AN restrictive, 31 BN, 22 AN and BN, 18 BN with history of AN. <i>Results:</i> 50.5% of participants experienced at least one episode of major depression, in their lifetime (more prevalent in dual-eating disorder patients; Braun, et al., 1994).</p>

Condition	Diagnostic criteria*	Research
Dysthymic Disorder	<p>about being sick)</p> <p>(8) diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)</p> <p>(9) recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide</p> <p>B. The symptoms do not meet criteria for a Mixed Episode.</p> <p>C. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.</p> <p>D. The symptoms are not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hypothyroidism).</p> <p>E. The symptoms are not better accounted for by Bereavement, i.e., after the loss of a loved one, the symptoms persist for longer than 2 months or are characterized by marked functional impairment, morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms, or psychomotor retardation.</p> <p>(1) Depressed mood for most of the day, for more days than not, as indicated either by subjective account or observation by others, for at least 2 years. <i>Note:</i> In children and adolescents, mood can be irritable and duration must be at least 1 year.</p> <p>(2) Presence, while depressed, of two (or more) of the following:</p> <ol style="list-style-type: none"> <li>(1) poor appetite or overeating</li> <li>(2) insomnia or hypersomnia</li> <li>(3) low energy or fatigue</li> <li>(4) low self-esteem</li> </ol>	<p>1) <i>Participants:</i> 103 female eating disorder; 48 AN (35 binge purge, 13 restrictive), 45 BN. <i>Results:</i> 20% of participants experienced Dysthymia (Westen &amp; Harden-Fischer, 2001)</p> <p>2) <i>Participants</i> 105 female eating disorder inpatients; 34 AN restrictive, 31 BN, 22 AN and BN, 18 BN with history of AN. <i>Results:</i> 15% of participants experienced</p>

Condition	Diagnostic criteria*	Research
	<p>(5) poor concentration or difficulty making decisions  (6) feelings of hopelessness</p> <p>(3) During the 2-year period (1 year for children or adolescents) of the disturbance, the person has never been without the symptoms in Criteria A and B for more than 2 months at a time.</p> <p>(4) No Major Depressive Episode (see Criteria for Major Depressive Episode) has been present during the first 2 years of the disturbance (1 year for children and adolescents); i.e., the disturbance is not better accounted for by chronic Major Depressive Disorder, or Major Depressive Disorder, In Partial Remission.</p> <p><i>Note:</i> There may have been a previous Major Depressive Episode provided there was a full remission (no significant signs or symptoms for 2 months) before development of the Dysthymic Disorder. In addition, after the initial 2 years (1 year in children or adolescents) of Dysthymic Disorder, there may be superimposed episodes of Major Depressive Disorder, in which case both diagnoses may be given when the criteria are met for a Major Depressive Episode.</p> <p>(5) There has never been a Manic Episode (see Criteria for Manic Episode), a Mixed Episode (see Criteria for Mixed Episode), or a Hypomanic Episode (see Criteria for Hypomanic Episode), and criteria have never been met for Cyclothymic Disorder.</p> <p>(6) The disturbance does not occur exclusively during the course of a chronic Psychotic Disorder, such as Schizophrenia or Delusional Disorder.</p> <p>(7) The symptoms are not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hypothyroidism).</p>	Dysthymia in their lifetime (Braun, et al., 1994).

Condition	Diagnostic criteria*	Research
	(8) The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.	
<b>Anxiety Disorders</b>		
General Anxiety Disorder (GAD)	<p>(1) Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).</p> <p>(2) The person finds it difficult to control the worry.</p> <p>(3) The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms present for more days than not for the past 6 months). <i>Note:</i> Only one item is required in children.</p> <ol style="list-style-type: none"> <li>(1) restlessness or feeling keyed up or on edge</li> <li>(2) being easily fatigued</li> <li>(3) difficulty concentrating or mind going blank</li> <li>(4) irritability</li> <li>(5) muscle tension</li> <li>(6) sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)</li> </ol> <p>(4) The focus of the anxiety and worry is not confined to features of an Axis I disorder, e.g., the anxiety or worry is not about having a Panic Attack (as in Panic Disorder), being embarrassed in public (as in Social Phobia), being contaminated (as in Obsessive-Compulsive Disorder), being away from home or close relatives (as in Separation Anxiety Disorder), gaining weight (as in Anorexia Nervosa), having multiple physical complaints (as in Somatization Disorder), or having a serious illness (as in Hypochondriasis), and the anxiety and worry do not occur exclusively during</p>	<p>1) <i>Participants:</i> 271 female eating disorder (111 AN restrictors, 55 AN binge/purge, 19 BN non purging and 86 BN purging) patients and 271 female matched controls</p> <p><i>Results:</i> Significantly more (71%) eating disorder patients were identified as having at least one anxiety disorder when compared to controls. The most common lifetime and currently reported anxiety disorder reported by AN restrictors (48.6%) and AN binge/purge (45.5%) was GAD. For BN purge (26.3%) and BN non-purge (32.6%) GAD was the second most common anxiety disorder (Godart et al., 2003).</p> <p>2) <i>Participants:</i> 672 female eating disorder participants (97 AN; 293 AN/BN; 282 BN)</p> <p><i>Results:</i> GAD was the fifth most common anxiety disorder (10%) reported by eating disorder participants. Thirteen percent of AN participants (4<sup>th</sup> most common); 10% of AN/BN participants (5<sup>th</sup> most common) and 13% of BN participants were found to also suffer from GAD (Kaye, Bulik, Thornton,</p>

Condition	Diagnostic criteria*	Research
	<p>Posttraumatic Stress Disorder.</p> <p>(5) The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.</p> <p>(6) The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hyperthyroidism) and does not occur exclusively during a Mood Disorder, a Psychotic Disorder, or a Pervasive Developmental Disorder.</p>	<p>Barbarich, &amp; Masters, 2004)</p>
<p>Posttraumatic Stress Disorder (PTSD)</p>	<p>(1) The person has been exposed to a traumatic event in which both of the following were present:</p> <p>(1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others</p> <p>(2) the person's response involved intense fear, helplessness, or horror. <i>Note:</i> In children, this may be expressed instead by disorganized or agitated behaviour</p> <p>(2) The traumatic event is persistently reexperienced in one (or more) of the following ways:</p> <p>(1) recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. <i>Note:</i> In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.</p> <p>(2) recurrent distressing dreams of the event. <i>Note:</i> In children, there may be frightening dreams without recognizable content.</p>	<p>1) <i>Participants:</i> 90 BN, 54 BN, 20 EDNOS  <i>Results:</i> 11% of participants had met criteria for PTSD at some stage (4% at time of assessment) compared to lifetime rates of approximately 1% in the general population. No difference in prevalence was found between the different eating disorders (Turnbull, Troop, &amp; Treasure, 1997)</p> <p>2) <i>Participants:</i> 53 women identified as having a likelihood of presenting abnormal eating behaviours from a sample of 513 women aged 12-29 years (identified four years earlier), 168 women as a comparison subsample  <i>Results:</i> Participants identified as having a likelihood of presenting abnormal eating behaviour were found to be at higher risk of PTSD (Nunes, Olinto, Camey, Morgan, &amp; de</p>

Condition	Diagnostic criteria*	Research
	<ul style="list-style-type: none"> <li>(3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur.</li> <li>(4) intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event</li> <li>(5) physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event</li> <li>(3) Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:               <ul style="list-style-type: none"> <li>(1) efforts to avoid thoughts, feelings, or conversations associated with the trauma</li> <li>(2) efforts to avoid activities, places, or people that arouse recollections of the trauma</li> <li>(3) inability to recall an important aspect of the trauma</li> <li>(4) markedly diminished interest or participation in significant activities</li> <li>(5) feeling of detachment or estrangement from others</li> <li>(6) restricted range of affect (e.g., unable to have loving feelings)</li> <li>(7) sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)</li> </ul> </li> <li>(4) Persistent symptoms of increased arousal (not present before the</li> </ul>	<p>Jesus Mari, 2006)</p>

Condition	Diagnostic criteria*	Research
	<p>trauma), as indicated by two (or more) of the following:</p> <ol style="list-style-type: none"> <li>(1) difficulty falling or staying asleep</li> <li>(2) irritability or outbursts of anger</li> <li>(3) difficulty concentrating</li> <li>(4) hypervigilance</li> <li>(5) exaggerated startle response</li> </ol> <p>(5) Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.</p> <p>(6) The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.</p>	
Obsessive-Compulsive Disorder (OCD)	<p>(1) Either obsessions or compulsions:</p> <p>Obsessions as defined by (1), (2), (3), and (4):</p> <ol style="list-style-type: none"> <li>(1) recurrent and persistent thoughts, impulses, or images that are experienced, at some time during the disturbance, as intrusive and inappropriate and that cause marked anxiety or distress</li> <li>(2) the thoughts, impulses, or images are not simply excessive worries about real-life problems</li> <li>(3) the person attempts to ignore or suppress such thoughts, impulses, or images, or to neutralize them with some other thought or action</li> <li>(4) the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind (not imposed from without as in thought insertion)</li> </ol> <p>Compulsions as defined by (1) and (2):</p> <ol style="list-style-type: none"> <li>(1) repetitive behaviours (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating</li> </ol>	<p>1) <i>Participants:</i> 48 AN (35 binge purge, 13 restrictive), 45 BN  <i>Results:</i> Restrictive AN had significantly higher dimensional scores on OCD personality disorder than binge/purge AN and BN participants (Westen &amp; Harden-Fischer, 2001)</p> <p>2) <i>Participants:</i> 53 women identified as having a likelihood of presenting abnormal eating behaviours from a sample of 513 women aged 12-29 years (identified four years earlier), 168 women as a comparison subsample  <i>Results:</i> Participants identified as having a likelihood of presenting abnormal eating behaviour were found to be at higher risk of OCD (Nunes et al., 2006)</p>

Condition	Diagnostic criteria*	Research
	<p>words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly</p> <p>(2) the behaviours or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviours or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive</p> <p>(2) At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable. <i>Note:</i> This does not apply to children.</p> <p>(3) The obsessions or compulsions cause marked distress, are time consuming (take more than 1 hour a day), or significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships.</p> <p>(4) If another Axis I disorder is present, the content of the obsessions or compulsions is not restricted to it (e.g., preoccupation with food in the presence of an Eating Disorder; hair pulling in the presence of Trichotillomania; concern with appearance in the presence of Body Dysmorphic Disorder; preoccupation with drugs in the presence of a Substance Use Disorder; preoccupation with having a serious illness in the presence of Hypochondriasis; preoccupation with sexual urges or fantasies in the presence of a Paraphilia; or guilty ruminations in the presence of Major Depressive Disorder).</p> <p>(5) The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.</p>	

Condition	Diagnostic criteria*	Research
Social Phobia (Social Anxiety Disorder)	<p>(1) A marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others. The individual fears that he or she will act in a way (or show anxiety symptoms) that will be humiliating or embarrassing. <i>Note:</i> In children, there must be evidence of the capacity for age-appropriate social relationships with familiar people and the anxiety must occur in peer settings, not just in interactions with adults.</p> <p>(2) Exposure to the feared social situation almost invariably provokes anxiety, which may take the form of a situationally bound or situationally predisposed Panic Attack. <i>Note:</i> In children, the anxiety may be expressed by crying, tantrums, freezing, or shrinking from social situations with unfamiliar people.</p> <p>(3) The person recognizes that the fear is excessive or unreasonable. <i>Note:</i> In children, this feature may be absent.</p> <p>(4) The feared social or performance situations are avoided or else are endured with intense anxiety or distress.</p> <p>(5) The avoidance, anxious anticipation, or distress in the feared social or performance situation(s) interferes significantly with the person's normal routine, occupational (academic) functioning, or social activities or relationships, or there is marked distress about having the phobia.</p> <p>(6) In individuals under age 18 years, the duration is at least 6 months.</p> <p>(7) The fear or avoidance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition and is not better accounted for by another mental disorder (e.g., Panic Disorder With or Without Agoraphobia, Separation Anxiety Disorder, Body Dysmorphic Disorder, a</p>	<p>1) <i>Participants:</i> 271 female eating disorder (111 AN restrictors, 55 AN binge/purge, 19 BN non purging and 86 BN purging) patients and 271 female matched controls <i>Results:</i> Seventy-on percent of participants reported having a lifetime history or current anxiety disorder. The most common lifetime and currently reported anxiety disorder reported by BN purge (36.8%) and BN non-purge (36%) was social phobia It was the second most common anxiety disorder for AN restrictors (30.6%) and AN binge/purge (32.7%; Godart et al., 2003).</p> <p>2) <i>Participants:</i> 70 female eating disorder (17 AN restrictors, 10 AN binge/purge, 19 BN and 24 EDNOS) patients <i>Results:</i> Unhealthy eating behaviours and attitudes were positively associated social anxiety (Hinrichsen, Waller, &amp; van Gerko, 2004).</p>

Condition	Diagnostic criteria*	Research
	<p>Pervasive Developmental Disorder, or Schizoid Personality Disorder).</p> <p>(8) If a general medical condition or another mental disorder is present, the fear in Criterion A is unrelated to it, e.g., the fear is not of Stuttering, trembling in Parkinson's disease, or exhibiting abnormal eating behaviour in Anorexia Nervosa or Bulimia Nervosa.</p>	
<b>Personality Disorders</b>		
<p>Avoidant Personality Disorder</p>	<p>A pervasive pattern of social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation, beginning by early adulthood and present in a variety of contexts, as indicated by four (or more) of the following:</p> <ol style="list-style-type: none"> <li>(1) avoids occupational activities that involve significant interpersonal contact, because of fears of criticism, disapproval, or rejection</li> <li>(2) is unwilling to get involved with people unless certain of being liked</li> <li>(3) shows restraint within intimate relationships because of the fear of being shamed or ridiculed</li> <li>(4) is preoccupied with being criticized or rejected in social situations</li> <li>(5) is inhibited in new interpersonal situations because of feelings of inadequacy</li> <li>(6) views self as socially inept, personally unappealing, or inferior to others</li> <li>(7) is unusually reluctant to take personal risks or to engage in any new activities because they may prove embarrassing</li> </ol>	<p>1) <i>Participants</i> 105 female eating disorder inpatients; 34 AN restrictive, 31 BN, 22 AN and BN, 18 BN with history of AN. <i>Results:</i> Avoidant Personality Disorder was present in 14% of participants (Braun, et al., 1994).</p>
<p>Schizoid</p>	<p>(1) A pervasive pattern of detachment from social relationships and a</p>	<p>1) <i>Participants:</i> 48 AN (35 binge purge, 13</p>

Condition	Diagnostic criteria*	Research
Personality Disorder	<p>restricted range of expression of emotions in interpersonal settings, beginning by early adulthood and present in a variety of contexts, as indicated by four (or more) of the following:</p> <ol style="list-style-type: none"> <li>(1) neither desires nor enjoys close relationships, including being part of a family</li> <li>(2) almost always chooses solitary activities</li> <li>(3) has little, if any, interest in having sexual experiences with another person</li> <li>(4) takes pleasure in few, if any, activities</li> <li>(5) lacks close friends or confidants other than first-degree relatives</li> <li>(6) appears indifferent to the praise or criticism of others</li> <li>(7) shows emotional coldness, detachment, or flattened affectivity</li> </ol> <p>(2) Does not occur exclusively during the course of Schizophrenia, a Mood Disorder With Psychotic Features, another Psychotic Disorder, or a Pervasive Developmental Disorder and is not due to the direct physiological effects of a general medical condition.</p> <p><i>Note:</i> If criteria are met prior to the onset of Schizophrenia, add “Premorbid,” e.g., “Schizoid Personality Disorder (Premorbid).”</p>	<p>restrictive), 45 BN  <i>Results:</i> Restrictive AN had significantly higher dimensional scores on schizoid personality disorder than binge/purge AN and BN participants (Westen &amp; Harden-Fischer, 2001)</p>
Schizotypal Personality Disorder	<p>(1) A pervasive pattern of social and interpersonal deficits marked by acute discomfort with, and reduced capacity for, close relationships as well as by cognitive or perceptual distortions and eccentricities of behaviour, beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:</p> <ol style="list-style-type: none"> <li>(1) ideas of reference (excluding delusions of reference)</li> <li>(2) odd beliefs or magical thinking that influences behaviour</li> </ol>	<p>1) <i>Participants:</i> 48 AN (35 binge purge, 13 restrictive), 45 BN  <i>Results:</i> Restrictive AN had significantly higher dimensional scores on schizotypal personality disorder than binge/purge AN and BN participants (Westen &amp; Harden-Fischer, 2001)</p>

Condition	Diagnostic criteria*	Research
	<p>and is inconsistent with subcultural norms (e.g., superstitiousness, belief in clairvoyance, telepathy, or “sixth sense”; in children and adolescents, bizarre fantasies or preoccupations)</p> <p>(3) unusual perceptual experiences, including bodily illusions</p> <p>(4) odd thinking and speech (e.g., vague, circumstantial, metaphorical, overelaborate, or stereotyped)</p> <p>(5) suspiciousness or paranoid ideation</p> <p>(6) inappropriate or constricted affect</p> <p>(7) behaviour or appearance that is odd, eccentric, or peculiar</p> <p>(8) lack of close friends or confidants other than first-degree relatives</p> <p>(9) excessive social anxiety that does not diminish with familiarity and tends to be associated with paranoid fears rather than negative judgments about self</p> <p>(2) Does not occur exclusively during the course of Schizophrenia, a Mood Disorder With Psychotic Features, another Psychotic Disorder, or a Pervasive Developmental Disorder.</p> <p><i>Note:</i> If criteria are met prior to the onset of Schizophrenia, add “Premorbid,” e.g., “Schizotypal Personality Disorder (Premorbid).”</p>	

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\*American Psychiatric Association (2000)

*Eating Disorders and Athletes*

In an attempt to clarify the relationship between participation in sport and the development of eating disorders, Hausenblas and Carron (1999) conducted a meta-analytical review of the literature on Bulimia Nervosa indices, Anorexia Nervosa indices and the drive for thinness among athletes. They found that male and female athletes self-reported greater eating disorder symptomatology than the control groups. In addition, Byrne and McLean (2001) reviewed the research from the last 20 years on eating disorders in athletes. They suggested that, in general, despite the fact that findings had been contradictory, the majority of research indicated a higher prevalence rate of eating problems in athletic populations than in non-athletic populations. Moreover, research has suggested that female athletes may be at more risk of developing an eating disorder than male athletes (Johnson, Powers, & Dick, 1999; Rouveix et al., 2007; Stoutjesdyk & Jevne, 1993; Sundgot-Bogen & Klungland, 2002; Sundgot-Bogen, Klungland, Torstveit, & Rolland, 1999).

Hausenblas and Carron (1999) listed four explanations that had been proposed to explain why athletes could be a high-risk population when it came to the development of eating disorders; these included the socio-cultural explanation, the exercise and physical activity explanation, the intra-individual explanation and the sport environment explanation. The socio-cultural explanation for the existence of eating disorders in the athletic population maintained that societal pressures within western cultures promoted thinness as an ideal, especially for females, and that athletes were not immune to these pressures (Baum, 2006; Byrne & McLean, 2001). Possible support for this idea comes from research examining gender differences in athletes involved in sports that have been identified as high risk for eating disorder

development based on their focus on weight (Brownell & Rodin, 1992). For example, Rouviex et al.'s (2007) examined 24 judoka (12 male and 12 female) and 31 controls (17 male and 14 female) results using the EAT-26. They found that only female judoka (25%) were at risk of developing an eating disorder despite there being no difference between the male and female judokas eating behaviours.

The exercise and physical activity explanation was based on the assumption that the high activity levels required of athletes could result in the development of activity-based Anorexia Nervosa and the associated decrease in food intake associated with this disorder (Hausenblas & Carron, 1999). For example, Davis, Kennedy, Ravelski and Dionne (1984) explored the relationship between exercise aimed at weight loss and the development of eating disorders. They interviewed forty-five women who were hospitalised with an eating disorder and 51 age-matched participants without an eating disorder. A content analysis of the participant interviews suggested that of those with eating disorders, 60% were dancers or elite athletes. A pattern was also noted that indicated that retirement from sport, often due to injury or academic pressures, was followed by significant food restriction because of an intense fear of gaining weight.

The intra-individual explanation for why athletes may be an at risk population for developing an eating disorder suggested that the characteristics required to make an elite athlete were characteristics that had also been linked to individuals with eating disorders: for example, high achievement expectations, perfectionism and meticulousness (Abood & Black, 2000; Byrne & McLean, 2001). In essence, the intra-individual explanation for the increased risk of eating disorders in the athletic population maintained that the very nature of sporting endeavors attracted individuals

who were at high risk of developing eating disorders (Wilmore, 1995). The tendency towards perfectionism and an obsessive-compulsive personality sometimes characteristic of an athlete, coupled with a preoccupation with weight issues triggered by involvement in sport, could lead to an increased risk of eating disorders (Davis et al., 1995). To illustrate this explanation, Haase, Prapavessis and Owens (1999) administered the Positive and Negative Perfectionism Scale and the Eating Attitude Test-40 to 449 elite Australian and New Zealand rowers and reported that negative (unhealthy) perfectionism scores were positively related to disturbed eating attitude scores. In addition, Ruggiero, Levi, Ciuna and Sassaroli (2003) suggested that stress, which is often a component of competition, may give rise to disordered eating behaviours in individuals with a perfectionist personality.

The sport environment explanation for why the athletic population may be at an increased risk of developing eating disorders maintained that the sport environment placed unique pressures on athletes to be thin. As most sports encouraged a low percentage of body fat as a means of improving performance and achieving a competitive edge (Baum, 2006; Swoap & Murphy, 1995), weight management was an integral part of most athletes' training programs (Muller, 2002). Consequently, low body weight had become characteristic of many sports (Muller, 2002), and individuals were exposed to an environment with higher pressures to achieve and maintain lower body weights than would normally occur (Taylor & Ste-Marie, 2001). This concentration on low body weight meant that for some athletes, weight concerns and a focus on dieting had become the focal point of their athletic experience (Beals & Manore, 1994). According to Swoap and Murphy (1995), for some athletes, weight control could become equated with performance to such a degree that they experienced an almost obsessive preoccupation with maintaining a low body weight.

As noted previously, to achieve low body weights many athletes used a number of unhealthy weight-loss behaviours (Dale & Landers, 1999). These methods included self-induced vomiting, laxative and diuretic misuse, fasting and excessive exercise. Many of these behaviours were precursors of Anorexia Nervosa and Bulimia Nervosa (Dale & Landers, 1999). As a consequence, Kiningham and Gorenflo (2001) suggested that for individuals predisposed towards eating disorders, rapid weight loss and concerns about body weight and weight reduction could progress into clinical eating disorders (Fogelholm & Hilloskorpi, 1999; Swoap & Murphy, 1995), and sub-clinical forms of eating disorders (Beals & Manore, 1994). In addition, Black and Burckes-Miller (1988) suggested that the sporting environment could put individuals at an increased risk of developing eating disorders because athletes encouraged one another in the use of these inappropriate weight-loss behaviours.

For some athletes (e.g., jockeys, boxers, wrestlers, judoka), the pressures to maintain a low body weight were increased by the nature of their sport (Swoap & Murphy, 1995). According to Haase et al. (1999) there was consistent evidence to support the idea that athletes from sports that emphasise leanness, whether to make a weight category or for aesthetic appeal, were at a greater risk of developing eating disorders than athletes from other sports and the general population.

The findings of Sundgot-Borgen (1993) supported this notion. Sundgot-Borgen (1993) administered the EDI to 522 Norwegian female elite athletes and 448 non-athletic controls, as a screening instrument to identify participants at risk of developing an eating disorder. One hundred and seventeen of the elite athletes were identified as at risk of developing an eating disorder and asked to participate in an interview and clinical examination. A control group composed of 30 non-athletes deemed at risk of developing an eating disorder, 30 non-athletes deemed not at risk of

developing an eating disorder and 30 athletes deemed not at risk of developing an eating disorder, also agreed to participate in an interview and clinical examination. The study aimed to investigate the prevalence of athletes who met the diagnostic criteria of an eating disorder and the differences in eating disorder prevalence between sports. Sundgot-Borgen (1993) reported that a significantly higher number of elite athletes (18%) than controls (5%) were found to have an eating disorder. In addition, a significantly higher number of participants in weight control sports and sports where leanness was important met the diagnostic criteria for an eating disorder (25%) compared to the athletes competing in other sports (12%) and to the control groups (5%).

Fogelholm and Hilloskorpi (1999) performed a similar study and found parallel results. By exploring the weight and diet behaviours of Finnish female and male elite athletes from a variety of sports (age range between 14 and 40 years), Fogelholm and Hilloskorpi (1999) concluded that the risk of eating disorders was dependent on the type of sport being played. They administered the EDI to 173 female and 190 male athletes. They also included an additional questionnaire that covered training schedules over the previous month, actual and preferred weight (participants were also weighed in a non-fasted state), any instruction on weight reduction, and any weight-reduction attempts and methods in the preceding 12 months. The results showed that for both male and female athletes, overall weight-reduction attempts and rapid weight-loss frequency were highest in weight class athletes.

More recently, these findings were supported by Sundgot-Borgen and Klungland (2002). They explored the prevalence of eating disorders in Norwegian men ( $n = 960$ ) and women ( $n = 660$ ) elite athletes from a variety of sports, and compared the results to a matched group of controls (916 men and 780 women).

Based on data collected from questionnaires, Sundgot-Borgen and Klungland (2002) reported that 12% of athletes compared to 5% of the control group were at risk of developing eating disorders. They also reported that individuals from weight division sports had a higher prevalence rate of eating disorders than athletes from other sports and concluded that sport specific demands (e.g., weight requirements) appeared to be related to the development of eating disorders.

### *Eating Disorders and Jockeys*

Although a lot of research has been conducted to increase the understanding of the relationship between participation in sport and eating disorders for some athletic populations, there has been relatively little research that has focused on jockeys. This is despite the fact that athletes in weight category sports have been identified as a high-risk population for the development of eating disorders (Baum, 2006; Sundgot-Borgen, 1993; Fogelholm & Hilloskorpi, 1999; Sundgot-Borgen & Klungland, 2002).

M.B. King and Mezey (1987) assessed disordered eating in jockeys using the Clinical Interview Schedule, the Eating Interview, and also conducted a semi-structured interview to investigate methods of weight control. They also administered the symptom rating scale, locus of control and eating attitudes questionnaires (26-item; EAT-26). M. B. King and Mezey (1987) found that all the jockeys reported that in the racing season, weight control was paramount over most other concerns. However, none of the jockeys showed evidence of symptoms diagnostic of eating disorders. The findings showed that jockeys' mean score on the Eating Attitude Test was 14.9,

significantly higher than scores reported for men in other studies (e.g., university students).

M.B. King and Mezey (1987) explained the absence of eating disorders in terms of the off-season acting as a buffer that protected the jockeys from developing clinical eating disorders. A second hypothesis was that those jockeys who had developed eating disorders had been unable to continue in the profession.

Leydon and Wall (2002) studied New Zealand jockeys using the EAT-26 to assess eating and weight concerns. They found that 20% of the jockeys had scores indicative of disordered eating and that the mean EAT-26 score for the sample was 16.0. These findings, and those of M.B. King and Mezey (1987), indicate that although most jockeys do not display symptoms diagnostic of an eating disorder, they are more likely to have higher scores on eating disorder constructs than non-athletic comparison groups.

## Chapter 8: Mood

The effect rapid weight loss has on mood was another concern reported by jockeys in Speed et al.'s (2001) study. Thirteen percent of retired jockeys indicated that emotional distress was a major problem during their career and that prolonged wasting was the main source of distress.

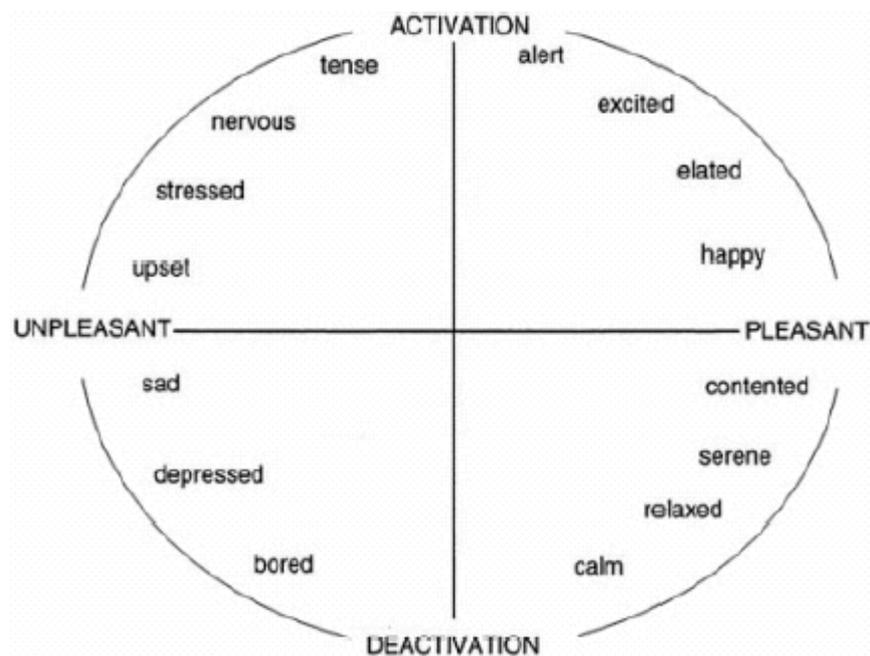
Given that athletic performance is significantly affected by mood before and during competition (Beedie, Terry, & Lane, 2000; Prapavessis, 2000; Terry, 2000, 2004; Vallerand & Blanchard, 2000), jockeys' mood on race day may be a factor that affects performance. Identifying the most favourable mood state for competition is not entirely straightforward. Both pleasant and unpleasant moods have been associated with optimal and substandard performance. Unpleasant moods may be advantageous in certain circumstances, while pleasant moods may be detrimental to performance in sports that require more stoicism (Hanin, 2000).

Recent research on affective states generally agrees that there are two main polar dimensions of mood: (1) valence or pleasure-displeasure and (2) perceived activation or arousal (Ekkekakis & Petruzzello, 2002; Vallerand & Blanchard, 2000). This structure has been referred to as the circumplex model and has been shown to be consistent across developmental stages, cultures and analytical methodologies. The two dimensions are usually represented by a graph that forms four affectively variant quadrants, two sections representing high and low pleasure and the other two sections representing high and low activation. Thus, each quadrant represents:

- (1) High activation and unpleasant affect (e.g., anger);
- (2) High activation and pleasant affect (e.g., energetic);
- (3) Low activation and unpleasant affect (e.g., fatigue);

- (4) Low activation and pleasant affect (e.g., relaxed).

Mood descriptors are systematically positioned around the circumference of a circle based on their underlying properties (degree of combination on the two dimensions) and relationship with each other (see Figure 1). Similar affective states are grouped together, while antithetical moods are placed at 180° from each other (Daniels, 2000; Ekkekakis & Petruzzello, 2002; Lane & Terry, 2000; Posner, Russell, & Peterson, 2005; J. A. Russell, 1980; Terry, 2000; Vallerand & Blanchard, 2000; Warr, 1990; Yik, Russell, & Feldman Barrett, 1999).



*Figure 1.* Graphical representation of the circumplex model of affect with the horizontal axis representing the valence dimension and the vertical axis representing the arousal or activation dimension (Posner et al., 2005, p. 716).

Ekkekakis and Petruzzello (2002) argued that the utility of the circumplex model is its use of a few dimensions to account for much of the variability among

affective states. This means that the circumplex model reflects differences and similarities among affective states in terms of two dimensions only, but also allows breadth of scope.

### *Weight Management and Mood*

Generally, the effect of dieting on mood is not positive (Kenardy et al., 2001; Keys et al., 1950). Keys et al. (1950) found that dietary restriction has a negative impact on mood. During the semi-starvation period, participants in the study reported increased depression, irritability, apathy and fatigue and mood swings, in comparison to the control period. During the semi-starvation period, participants reported a greater number of complaints. There was a 59% increase in periods of downheartedness, 46% increase tiredness during the day, 19% increase in mood swings and 15% increase in having spells of the blues in comparison to the control period. Observations indicated that participants were less tolerant, even-tempered and happy in comparison to the control period. Despite being aware of irritability, participants often had angry outbursts, periods of sulking and there were cases of some participants bullying others. The group was generally more serious and apathetic and some people had strong urges towards violence. It is interesting to note that even the participant who was thought to show the “least psychological deterioration” was “lethargic, mildly depressed and somewhat irritable” (p. 881). Four participants were unable to complete the semi-starvation period due to severe adverse psychological responses (e.g., “character neurosis”).

Stanga, Field, Iff, Stucki, Lobo and Allison (2007) examined 22 undernourished patients who had lost more than 5% of their body weight in one month (associated with gastrointestinal disease) and measured mood at the beginning and end of an eight-day nutrition treatment program. It was found that patients showed a significant improvement in depression, anger, vigour, fatigue, confusion and tension scores on the POMS (Profile of Mood States) questionnaire, after 8 days of nutritional support.

### *Weight Management, Mood and Athletes*

The findings reported by Keys et al. (1950) and Stanga et al. (2007) support the contention that most people undergoing food restriction experience a range of negative emotions. The limited scientific research investigating weight loss in sport and mood supports this notion as most studies have found an association between rapid weight loss and negative changes in mood.

For example, Filaire et al. (2001) tested 11 male judoka before and after 7 days of dietary restraint. They measured mood using the POMS and found that judokas experienced increased negative mood after a period of dietary restraint. Before the period of dietary restraint, judoka reported mean scores higher than average for vigour and below average for tension, depression, anger, fatigue and confusion. This profile has been called the “iceberg” profile and has been identified by researchers as desirable mood profile for successful sportspeople (Hassmen, Koivula, & Torsten, 1998). Following major weight loss, the profile was altered with

vigour lower and tension, anger, fatigue and confusion scores higher (Filaire et al., 2001).

Newton et al. (1993) conducted a similar study examining six male and two female body builders who had reduced calorie intake over 12 weeks to lose 7.3 kg (5% body fat) and 2.4 kg (3.7% body fat) respectively. During the weight-loss period, body builders showed a strong trend towards greater fatigue, tension, confusion, depression and reduced vigour.

Choma, Sforzo and Keller (1998) examined college wrestlers and found negative affect increased after rapid weight loss. Fourteen wrestlers, who lost a minimum of 5% of body weight, completed measures of mood and cognitive ability 1 week before competition, 18 to 24 hours before competition, immediately after weigh-ins, and 72 hours after competition (after rehydration and food consumption). Scores on the POMS-R (revised) showed that wrestlers affect was more negative after weight loss, with higher scores for tension, depression, anger, fatigue and confusion in comparison with the control group (15 participants not using rapid weight-loss techniques). Wrestlers' mood states returned to baseline levels after drinking and eating. A weakness of the study was that control participants' pre-competition affect (e.g. anxiety) and eating and drinking behaviour were not assessed during the period immediately prior to competing.

Landers, Arent and Lutz (2001) included a non-rapid weight loss control group in a study of 45 competitive wrestlers. Fourteen assigned to the control group maintained weight within 1% of their normal body mass. The remaining 31 were assigned to the rapid weight-loss group required to lose more than 1% body weight (mean=6.34%). Five to 10 days prior to competition, and 8 to 12 hours prior to weigh-in, all wrestlers completed the PANAS (Positive and Negative Affect Schedule) and

cognitive tests. Positive affect decreased significantly from baseline testing to weigh-in testing and there were correlations between the percent of weight lost and positive and negative affect, with positive mood decreasing and negative mood increasing with weight loss.

Similar findings were reported by Terry et al. (1999) who examined 103 junior lightweight and heavyweight rowers before a competition. Rowers' responses on the POMS-C (children) indicated greater mood disturbance (depression, confusion, tension) in lightweight compared to heavyweight rowers (who did not lose weight prior to competition).

Lane (2001) explored the effects of rapid weight loss on mood and performance in 16 experienced amateur boxers. Structured interviews were used to determine strategies that each boxer used to lose weight. Boxers then completed four, 2-minute circuit sessions (1 min recovery between each) at their usual training weight. Using the same methods they applied prior to tournaments, boxers dropped body weight by an average of 5.16% in one week. Methods included restricting food (for the week) and fluid intake (for at least one day prior). Mood was assessed using the POMS-A (adolescent). Rapid weight loss was significantly associated with higher scores for anger, fatigue and tension.

Yoshioka, Umeda, Nakaji, Kojima, Tanabe, Mochida and Sugawara (2006) examined gender differences between 27 male (22 weight reduction, 5 non-weight reduction) and 16 female (8 weight reduction, 8 non-weight reduction) judokas' mood before and after weight loss using fluid restriction, dietary restraint and exercise. Using the POMS to measure mood, their findings indicated that while males experienced greater mood disturbance after losing 3.4% of their body weight, females showed increased negative mood just prior to losing 4.9% of their body weight. It was

suggested by the authors that it was the idea of weight loss, rather than the actual weight reduction, that generated anxiety for female judoka. The researchers speculated that once female judoka started losing weight anxiety decreased because of successful progress or because of positively perceived aesthetic changes.

These studies show that making weight can add to the emotional load of participation (Beals & Manore, 1994; Fraser, 2001; Lane, 2001). Jockeys are constantly monitoring weight and regularly using extreme methods to lose weight (Baptiste, 2000a; Lane, 2001). These findings suggest that jockeys' physical and psychological wellbeing is probably in jeopardy for much of their working life.

### *Weight Management, Mood and Jockeys*

Jockeys frequently report that their lives are consumed by constant efforts to maintain and lose weight and that they also live a life of sacrifice and pressure that can have a high cost both mentally and socially (Baptiste, 2000a; Bartley, 2007b; Eddy, 2007; Lane, 2001). Despite much anecdotal evidence, there is little scientific research examining the consequences of the extreme strategies jockeys use to make weight on their mood and wellbeing.

M.B. King and Mezey (1987) did not include a formal measure of mood in their study, but interviews revealed that a significant number of jockeys reported increased irritability and decreased drive and energy during periods of wasting.

A more recent study in the United Kingdom by Caulfield, Karageorghis, Terry and Chatzisarantis (2003) examined mood and eating attitudes in 41 male professional flat and jump jockeys. Jockeys completed the POMS–A questionnaire and the EAT

while at their lightest riding weight, their optimal riding weight and their relaxed (out of competition) weight. It was found that rapid weight loss impacted negatively on mood, with the most significant effects observed on anger, depression, vigour, confusion and tension evident between the lightest riding weight and relaxed weight.

Much of the evidence concerning jockeys mood disturbances associated with weight loss is anecdotal. Jockeys have reported being miserable and depressed when wasting (Christine, 2001; Eddy, 2007) and upset when breaking restrictive diets, “sometimes you let yourself go and have a pizza but I had to pay the price the next day and I’d hate everybody who was with me” (Baptiste, 2000a, p. 31).

One reporter, while interviewing a jockey about his successful career, attributed his pale complexion and extremely grumpy mood to weight loss (Eddy, 2007). Several authors have referred to dehydration and malnutrition as a possible cause of irritability, depression, mood swings and emotional upset (Henke, 1999; Hillenbrand, 2001; Hislop, 2002). For one jockey who struggled with his weight, a quick temper and rudeness meant that he was associated with more than six different stables during his apprenticeship. Eventually he left racing because of the pressures of wasting (Bartley, 2007b). Hillenbrand (2001) goes as far as to describe a situation where a legendary nineteenth century jockey’s constant battle to make weight contributed to severe depression and eventual suicide.

Another case where the combination of wasting and riding was thought to contribute to negative mood states led to a year-long ban for a jockey who was verbally and physically violent towards a steward (Prendergast, 2001). More recently an Australian jockey hit (once with his open hand and once with his whip) another jockey as they passed the finish line. He cited psychological stress from wasting, riding at light weights and driving long distances to race meetings in high

temperatures, as factors that contributed to his violent outburst. He said that long hours of wasting had dramatically reduced his tolerance levels “you get dehydrated and sometimes you do get cranky” (Cormick, 2006, p. 52). Cormick (2006) also mentions two other incidents that occurred in 2006 that involved jockeys being physically violent towards one another. The incidents of physical violence and angry outbursts by jockeys have led to the inclusion of jockeys’ lifestyle, poor nutrition and dehydration as topics for discussion at the national safety review carried out by the Australian Racing Board (Cormick, 2006).

## Chapter 9: Weight Management, Social Networks and Social Interaction

Performance on the racetrack is not the only area of concern when considering the effects of rapid weight loss on jockeys. Another consequence of negative mood that seems to result from jockeys engaging in weight-loss behaviours is the impact this has on social and family life.

An integral part of emotion theory is the idea that emotions play an important role in our social bonds (Henschen, 2000; Izard, 1991). As social animals, humans gain a sense of belonging, identity and purpose from their communities (Butler, Doherty, & Potter, 2007; Wilkinson & Marmot, 2003) and these social networks (e.g., social ties, connectedness, integration, activities) can have an impressive effect on an individual's life, both physically and psychologically (Cohen, Gottlieb, & Underwood, 2000; Gheldof, Vinck, & Vlaeyen, 2007; Gould, Dieffenbach, & Moffet, 2002; Kaplan, Patterson, Kerner, Grant, & HIV Neurobehavioral Research Center, 1997; Murphy & Elliott, 2008; Pearson, 1990; Sarason, Sarason, & Pierce, 1990; Weinman, Wright, & Johnston, 1995). According to the World Health Organisation (Wilkinson & Marmot, 2003) the social environment is as important to health as the physical environment.

From a physical health perspective, social networks act as a protective factor against illness and disease because they help individuals feel valued and cared for. Behaviourally, it is thought that supportive relationships play a role in individuals engaging in more healthy activities (Wilkinson & Marmot, 2003). Given the benefits of social networks on physical health, it is not surprising that research has shown that people who are lacking in social support are two to five times more at risk of dying from all causes of death than those who have strong links to family, friends and community (Berkman & Glass, 2000).

From a mental health perspective, if a person is isolated from social support it can result in feelings of anger, loneliness, anxiety and depression (McDougall, Hymel, Vaillancourt, & Mercer, 2001). On the flip side, people who have or perceive themselves as having supportive social networks are more likely to experience better mood, less distress, lower occurrences of mental health issues and higher levels of self-esteem (Cohen & Willis, 1985; Sarason, Sarason, & Garung, 2001; Sohlman, 2004). Social support has also been found to be used as a coping strategy for people in stressful jobs where they work long hours (Sibnath, Tanusree, & Pooja, 2008).

Researchers have broadly defined social support as the interactions and resources offered by others who help individuals cope with problems (Weinman et al., 1995; Wills & Fegan, 2001). There is general agreement that these resources and interactions can be divided into emotional, information, material and companionship support (Hogan, Linden, & Najarian, 2002; Weinman et al., 1995). Emotional support refers to providing emotional comfort and showing individuals they are loved, valued and cared for. This type of support is thought to reduce stress by improving self-esteem and allowing the expression of emotions. Information support involves the availability of information sources that can assist individuals. This type of support is believed to improve an individual's perceived control by decreasing uncertainty and providing coping strategies to deal with issues. Material support refers to providing material aid such as physical assistance or financial support. This type of support may help individuals decrease their uncertainty. Companionship support involves reducing the effects of social isolation through being available to take part in leisure and recreation activities (Hogan et al., 2002; Weinman et al., 1995). It is believed that three distinct sources, personal (friends and family), formal (sporting clubs, religious

groups) and professional (support groups, counsellors), overlap to provide a person with social support (Hogan et al., 2002; Singer & Lord, 1984).

Social support is thought to influence health through two pathways. The first is referred to as the *stress-buffering model* and involves the giving and receiving of emotional, informational and instrumental support in times of crisis or stress. The second pathway, the *main-effect model*, is a less formal process whereby individuals can receive health benefits, even when they are not in crisis, by simply being a member of one or more social groups. That is that human relationships can add to feelings of self-worth, personal control and conformity to behavioural norms that have implications for health and wellbeing (Cohen et al., 2000).

A review of the literature revealed little empirical research examining the effects of rapid weight loss on social interactions in athletes. However, Keys et al.'s (1950) study of the effects of semi-starvation on 36 healthy young men is perhaps one of the most revealing when considering food restriction and social interactions. They showed that participants' social initiatives and sociability changed during the semi-starvation period. Participants showed a 50% increase in not wanting to mix with others, a 56% increase in being bored with other people, a 44% increase in feeling like being alone, a 38% increase in being impatient with people's questions or interruptions and a 25% increase in not wanting to talk. Participants' responses on the Minnesota Multiphasic Personality Inventory (MMPI) indicated increased social introversion, depression and other mood fluctuations and decreased liveliness, leadership qualities, self-confidence and freedom from irritability.

Keys et al. (1950) also observed that participants were increasingly more reluctant to become involved in group activities and spent more time alone because dealing with other people became "too much trouble" or "too tiring" (p. 837). There

was a decrease in the common interests and camaraderie within the group that was evident during the control period and most interactions became stilted. Participants reported that it took a conscious effort to control irritability and maintain socially acceptable behaviour. Over the course of the study, individual interests narrowed and there was a loss of enthusiasm for activities other than those imposed by the demands of the study (weight loss, eating and going hungry).

Another factor that may negatively affect social and family relations for athletes is that social facilitation can increase food intake (de Castro, 1995). It is well-known that there is an increase in food intake when people eat with other people. On average, there is a 33% increase with one other person present, a 58% increase with two other people, a 69% increase with three other people, a 70% increase with four other people, a 72% increase with five other people and a 96% increase with six other people (de Castro & Brewer, 1992). This effect is more evident when eating with family and friends because they are believed to reduce cognitive restraints, induce greater relaxation and increase meal time (de Castro, 1993, 1994). Social situations may cause fasting athletes to eat and drink greater amounts. Therefore, they often choose to restrict their social lives and not eat with family members (Fraser, 2001). This, in turn, may have negative consequences for social and family relations.

### *Jockeys Social Networks and Social Interactions*

There has been an increasing trend for industries and employers to recognise the importance of providing a work environment that promotes good psychosocial working conditions (Theorell, 2000). Despite this area attracting considerable

attention, there are very few studies examining the effects of wasting on jockeys' social networks and social interactions. Thus, evidence about the negative consequences of rapid weight loss on social relationships and interactions is mostly anecdotal. However, Labadarios' et al. (1993) examined 93 South African jockeys interpersonal relationships and reported that 21% found it difficult to make friends, 14% lost friends easily, 15% mistrusted friends and 18% did not see fellow jockeys as friends.

Anecdotal evidence suggested that jockeys were aware of the strain weight-loss methods put on their social networks and interactions. Jockeys, partners and parents acknowledged the pressure horseracing put on families because riding, and demands such as weight loss, gaining rides and travelling to and from races, required such a large amount of time and effort (Howell, 2008; K. Wilson, 2006). Even jockeys with an understanding family reported difficulties with relationships (Labadarios et al., 1993). The wife of Neil Williams, a successful Australian jockey who committed suicide in 1999, spoke of the pressure for jockeys to maintain low weight, "people don't realise what jockeys and their families go through when they are wasting" (Power, 1999, p. 24).

The use of diuretics and laxatives has also impacted on family relationships. One jockey's wife said that "life was hell" (Henke, 1999, p. 2) while her husband was using diuretics and laxatives for weight loss. Weight-loss pills have been associated with mood swings and emotional upheaval (e.g., irritability, anxiety and restlessness), which in turn, can lead to problems in families and other social interactions (Henke, 1999; Hillenbrand, 2001; Proietto, 1998).

Jockeys seem to recognise that negative moods associated with wasting can impact upon their spouses (Beadman, 2005; Thomas, 2006). Jockeys with children

may be under even more pressure. A journalist described one jockey as “proud of the fact that ... he doesn’t get irritable” (p. 48) when wasting as he has two children. If he does “crack the sad” (p. 48) he takes a break from riding for a couple of days (Bartley, 2004). Interestingly, one jockey’s partner felt that jockeys were not always able to identify their mood change, “they say they don’t get cranky, but they do” (K. Wilson, 2006, p. 44).

The possibility of jockeys clashing with family members because they are irritable when wasting causes concern. Interpersonal conflict has been linked to social withdrawal (Evans, Palasano, Lepore, & Martin, 1989) which is associated with negative psychological and social health (Berkman & Glass, 2000; McDougall et al., 2001).

The physical struggle to maintain a low body weight may not be the only weight related reason that leads jockeys to retire. One jockey’s plans for retirement developed partly because of the social impact on his family. He described it as “not fair on my wife to keep going ... I can’t eat, I can’t drink. It’s bloody hard” (Harris et al., 2001, p. 41). Another jockey said he was “sick of wasting and being unable to live life like everyone else” (Eddy, 2007).

Other jockeys have also mentioned restrictions on social activities. One young jockey said that he had had to mature quickly when he began his career as a jockey at 15 years old and that a social life was something “... left behind ...” when he left school (Bartley, 2007, p. 38). Hoffer (2001) quoted one jockeys as saying, “[I] had no life ... socially I wasn’t much fun” (p. 31). For another jockey, Christmas had been a particularly difficult time. He described a day of eating very little (e.g., steamed vegetables with rice) while others partook of traditional Christmas fare (e.g., roast turkey) and losing fluid in the sauna to make weight for Boxing Day races. The same

jockey said that changes to his weight-loss regime had made it easier for him to make weight, but that for a 56 kg ride on Boxing Day he still needed to "... watch ..." what he ate on Christmas Day (Reed, 2007).

Diet restrictions repeatedly placed jockeys in untenable situations socially. For example, on social outings jockeys have been known to bring their own lunch consisting of a slice of rye bread and a chicken breast, while everyone else ate the pasta provided: "It's uncomfortable when you make all that money and can't eat like a person" (Hoffer, 2001, p. 31).

## Chapter 10: Aims and Hypotheses of the Study

It is apparent that more research is needed to assess the impact of wasting on jockeys' psychological health and wellbeing. In an attempt to provide further insight into the experiences of jockeys, this study was designed to extend the limited available research by examining the weight-loss practices jockeys use to maintain weight. It also explored the effects of extreme weight-loss practices on jockeys' psychological health and wellbeing, paying particular attention to mood, effects on eating (disordered), and social interactions and lifestyle.

Although the impact of rapid weight loss on physical and psychological wellbeing has been well established in many weight-loss sports (e.g., Alderman et al., 2004; Choma et al., 1998), only limited research has focused on the effects of rapid weight loss on jockeys. Jockeys are of particular concern among the proponents of weight-restriction sports as they have one of the lowest weight limits, need to weigh-in before and after competing, are often not allowed to eat and drink after weigh-in, can compete several times a day, sometimes needing to vary their weights, have no set off-season and engage in more than one type of weight-loss behaviour that could be detrimental to their health (Moore et al., 2002; Racing Victoria Limited, 2002, 2003, 2006b).

### *Weight Management*

Previous research indicated that jockeys engaged in a variety of unhealthy weight-loss practices, including food restriction (Apted, 1988; Atkinson et al., 2001;

Hill et al., 1998; M.B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), fluid restriction (Hill et al., 1998; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), sauna use (Atkinson et al., 2001; Hill et al., 1998; M.B. King & Mezey, 1987; Leydon & Wall, 2002; Speed et al., 2001), hot baths (Labadarios et al., 1993; Leydon & Wall, 2002), exercise (Atkinson et al., 2001; Hill et al., 1998; M.B. King & Mezey, 1987; Leydon & Wall, 2002), diuretic use (Hill et al., 1998; M.B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), laxative use (M.B. King & Mezey, 1987; Speed et al., 2001), appetite suppressant use (M.B. King & Mezey, 1987; Labadarios et al., 1993), self-induced vomiting (M.B. King & Mezey, 1987; Speed et al., 2001) and smoking (Labadarios et al., 1993; Leydon & Wall, 2002). Therefore, it was hypothesised that jockeys would engage in a variety of weight-management behaviours to meet riding weight requirements.

### *Mood*

A review of the current literature revealed two empirical studies examining the effects of the weight-loss methods used by United Kingdom jockeys on mood. Parallel to research in other weight restriction sports, both studies showed an association between negative mood and wasting in jockeys (Caulfield et al., 2003; M. B. King & Mezey, 1987). Thus, it was hypothesised that jockey's weight-loss behaviours would be associated with increased fatigue, tension, anger and depression.

*Social Networks and Interactions*

There is also a paucity of literature concerning the effects of weight loss on jockeys' social relationships and interactions. However, Keys et al. (1950) demonstrated that food restriction reduced social interaction and social activities of participants. Labadarios et al. (1993) also indicated that jockeys had difficulty forming and maintaining friendships. The current study aimed to expand on this knowledge and thus it was hypothesised that jockeys' weight-loss behaviours would be associated with negative effects on social relationships and taking part in social engagements.

*Disordered Eating*

Although the results reported from the limited available research on the prevalence of disordered eating in jockeys (M.B. King & Mezey, 1987; Leydon & Wall, 2002) have been contradictory, research pertaining to athletes in other weight category sports indicated that athletes who play these sports show a higher prevalence rate of disordered eating than comparison non-athletic populations (Hausenblas & Carron, 1999; Byrne & Mclean, 2001). In addition, anecdotal evidence supports the notion that some jockeys engage in weight-loss behaviours similar to individuals with eating disorders. Therefore, it was hypothesised that jockeys who engage in wasting behaviours would be more likely to show a higher rate of disordered eating than comparison non-athletic populations.

*Physical Wellbeing*

Jockeys have been shown to exhibit signs of dehydration on race days, and to a lesser extent, also on days off (Pruscino et al., 2005; Warrington et al., 2006). By using methods such as fluid restriction, fluid loss (e.g., sauna, hot bath) and food restriction, jockeys put themselves at a high risk of dehydration and the associated possibility of negative physical effects (e.g., cramps, exhaustion, organ damage, death; American Association of Family Physicians, 1998; Armstrong & Maresh, 1993; Coris et al., 2004; Opplinger & Bartok, 2002). Thus, it was hypothesised that jockeys would report experiencing the negative physical effects associated with dehydration.

## Chapter 11: Study 1 – Jockeys' Physical and Psychological Wellbeing Questionnaires

Despite the generally small stature of jockeys, they often have difficulty meeting the low body weights required for races (Apted, 1988). Previous research indicated that jockeys engaged in unhealthy short-term and long-term weight-loss practices (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001). These weight-loss behaviours include food restriction (Apted, 1988; Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), fluid restriction (Hill et al., 1998; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), sauna use (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Leydon & Wall, 2002; Speed et al., 2001), hot baths (Labadarios et al., 1993; Leydon & Wall, 2002), exercise (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Leydon & Wall, 2002), diuretic use (Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Speed et al., 2001), laxative use (M. B. King & Mezey, 1987; Speed et al., 2001), appetite suppressant use (M. B. King & Mezey, 1987; Labadarios et al., 1993), self-induced vomiting (M. B. King & Mezey, 1987; Speed et al., 2001) and excessive smoking (Labadarios et al., 1993; Leydon & Wall, 2002).

When considering the possible physical, psychological and social effects of jockeys' weight-loss practices, a review of the literature revealed little research on these topics. Nevertheless, research involving other athletes and individuals using extreme weight-loss behaviours provides insight into the effects of wasting on jockeys' physical and psychological wellbeing. Weight-loss behaviour has been linked to increased negative mood (Keys et al., 1950; Landers et al., 2001; Lane,

2001; Terry et al., 1999), risk of heat illness symptoms (Hassanien et al., 1992; Pruscino et al., 2005; Sparling, 2000) and decreased social interaction (Keys et al., 1950). Research examining other athletes also raised concerns that the pressure for jockeys to maintain a low body weight could increase the risk of developing eating disorders (Haase et al., 1999; Sundgot-Bogen, 1993; Sundgot-Bogen & Klungland, 2002).

Study 1 investigated the weight-management and weight-loss techniques used by currently licensed and apprenticed jockeys. The study aimed to provide further insight into the weight-loss practices jockeys use to maintain riding weight. It also aimed to explore the effects of weight-loss behaviours on the psychological health and wellbeing of jockeys, paying particular attention to mood, disordered eating and social interactions.

### *Method*

#### *Participants*

##### *Licensed jockeys.*

At the time of the study there were 189 flat-race jockeys licensed in the state of Victoria. Each of these riders were approached to participate in the research. Their names and contact details were obtained from Inside Racing, an official monthly publication of the Victorian Horseracing Industry.

In Australia, flat-race jockeys are licensed under four categories, Jockey “A” (licensed to ride in flat races at professional meetings in Victoria), Jockey “B” (licensed to ride in flat races at professional meetings outside the suburban radius),

Jockey “A” Cross Country (licensed to ride in jumping races and/or any flat races at professional meetings outside the suburban radius) and Jockey “B” Cross Country (licensed to ride in jumping races and/or any flat races at professional meetings outside the suburban radius; Racing Victoria Limited, 2006c). Only group A and B flat-race jockeys were included in the study because these two categories of riders generally ride at lower weights than riders classified as either A or B Cross Country. Thirty-five licensed flat-race jockeys (30 male and 5 female) completed and returned the questionnaire (see “Measures” below), giving a response rate of 18.5%. A similar low response rate was observed by Speed et al. (2001) and this may be explained by the private nature of jockeys (Beadman & Young, 2003; DeBenedette, 1987; Hislop, 2002; Schmidt, 2004; Speed et al., 2001) and the demands on their time (Speed, et al., 2001). Other factors such as negative moods (Caulfield et al., 2003; M. B. King & Mezey, 1987) and jockeys’ low levels of education may have also played a role (Speed, et al, 2001; Wilmoth, 2007).

The average age of jockeys was 31.2 years ( $SD=8.4$ ) with a range of 20 to 56 years. The jockeys had an average riding career of 14.6 years ( $SD=9.0$ ), with the longest career spanning 42 years and the shortest career spanning 2.5 years. On average, the participating jockeys rode in 10 races ( $SD=6.5$ ) per week and spent 44.1 hours ( $SD=18.6$ ) involved in jockey duties (e.g., track work, race trials). Four jockeys were injured at the time of the study and were not able to ride.

#### *Apprentice jockeys.*

In addition to A and B group jockeys, all apprentice jockeys ( $n=63$ ) who were enrolled in the Certificate IV in Racing (Thoroughbred) at Racing Victoria’s

Education and Training Centre (see Appendix B) were approached to participate in the research. The names and contact details of apprentice jockeys were obtained from Racing Victoria.

Before becoming licensed jockeys, apprentices complete a 3 year nationally accredited Certificate IV in Racing (Thoroughbred) Jockey program and a 4 year indenture period supervised by licensed racehorse trainers who provide on-the-job training. Jockeys must also meet specific riding requirements to ride track work, official race trials, provincial, country and metropolitan races (Racing Victoria, 2006).

Seven apprentice jockeys (two male and five female) completed and returned questionnaires, giving a response rate of 11.1%. At the time of the research, four apprentice jockeys were in the third year of their apprenticeship and spent an average of 56.6 hours ( $SD=14.4$ ) per week involved in jockey duties and rode in an average of 12.3 races ( $SD= 4.7$ ) each week. Three of the apprentice jockeys were in the second year of their apprenticeships and spent an average of 48.3 hours ( $SD=9.6$ ) involved in jockey duties (e.g., riding track work, stable duties, apprenticeship studies) and rode in an average of five races ( $SD=6.8$ ) each week. At the time of the study, a single second year apprentice jockey was not riding due to weight problems.

*Total sample: licensed jockeys and apprentice jockeys.*

The total sample consisted of 42 flat-race jockeys (32 male and 10 female) currently riding in the state of Victoria, Australia. Gender representation was proportional to the jockey population. The average age of participants was 29.6 years ( $SD=8.6$ ) with ages ranging from 17 years to 56 years.

Jockeys varied widely in the amount of time they spent on professional tasks. However, on average jockeys rode in 10.5 ( $SD=6.9$ ) races per week and spent between 10 to 91 hours ( $M=46.8$ ,  $SD=19.1$ ) per week undertaking duties as a jockey. The duration of their riding careers also varied widely, ranging from 1 to 42 years, with an average of 12.9 years ( $SD=9.7$ ). At the time of the research, five jockeys were not riding, four due to injury and one due to weight problems. Given that they were still endeavouring to manage their weight during time away from race riding, their responses were included in the analysis.

Given that the research examined the effects of wasting on jockeys' social interactions, they were asked to report on their family situations. Participants involved in married or de facto relationships accounted for just less than half (46%) of the sample population. One jockey had divorced his partner and another was separated. Thirty-one percent of jockeys had one or more children, with just over half (15.2%) having two children.

### *Measures*

A questionnaire package (see Appendix C) consisting of three questionnaires was used to assess jockeys' weight-management behaviours and the perceived effects of these practices on physical, psychological and social wellbeing. The first two questionnaires were developed specifically for the current study based on previous research on jockeys by Labadarios et al. (1993), Moore et al. (2002) and Speed et al. (2001) and on comparative research in other sports that include weight categories (e.g., wrestling and boxing; Coris, Ramirez, & Van Durme 2004; Daece et al. 2002).

The Eating Disorders Inventory - 2 (EDI-2; Garner, 1991) was included as the third questionnaire.

*Questionnaire 1: demographics and riding information.*

The first questionnaire assessed jockeys' demographic information, including gender, age, marital status, height, weight, and career information (jockey status, duration of career, number of races per week, number of hours spent on jockey duties). Data from these items were used primarily to gain an understanding of the characteristics of the sample of jockeys who completed the questionnaire.

*Questionnaire 2: psychological, social and physical effects of weight management.*

The second questionnaire was developed specifically for the jockey population to examine the physical, psychological and social effects of weight-management practices. The questionnaire contained sections to assess weight-management behaviours and the physical, psychological and social effects of weight management.

To measure weight-management behaviours, jockeys were asked about current and past difficulties with weight management, usual weight loss to make riding weight requirements, and weight loss in the past 7 days to make riding weight. Jockeys were also provided with a list of common weight-loss practices used by other athletes (Apted, 1988; Atkinson et al., 2001; M. B. King & Mezey, 1987; Labadarios et al., 2003; Leydon & Wall 2002; Speed et al. 2001; Moore et al., 2002) and were

asked which practices they engaged in to either (a) maintain on-going weight, or (b) reduce weight rapidly.

To explore jockeys' perceptions of the effects of weight management, they were asked about the physical, psychological and social disturbances associated with wasting. Jockeys were provided with a list of common physical (Fogelholm et al., 1993; Lee, 1997; Pendergast et al., 1996) psychological (Caulfield et al., 2003; M. B. King & Mezey, 1987) and social symptoms (Labadarios, et al., 2003) and were asked to indicate frequency and severity of any of these effects while wasting.

The questionnaire also contained items relating to jockeys' general health. Jockeys were asked if they had been diagnosed by a health professional with any common illnesses (Labadarios, et al., 2003) associated with weight loss.

At the end of each section, jockeys were provided with space to include any symptoms of weight loss they believed the researcher had not included. Jockeys were also encouraged to include additional information in a comments section.

### *Questionnaire 3: Eating Disorders Inventory - 2.*

The third questionnaire in the package was the EDI-2 (Garner, 1991). The EDI-2 was used to assess common behavioural and psychological symptoms associated with eating disorders. The EDI-2 was not used as a formal tool for the diagnosis of eating disorder, but rather to explore the effects of engaging in weight-loss behaviour on jockeys. That is, it was used as a measure of characteristics clinically relevant to disordered eating and to evaluate jockeys propensity towards unhealthy eating behaviours.

The EDI-2 consists of 91 questions that load on eight main subscale scores and three provisional subscale scores (Garner, 1991). Participants are required to rate responses on a 6-point Likert-type scale from *never* (1), *rarely* (2), *sometimes* (3), *often* (4), *usually* (5) to *always* (6; Garner, 1991). The eleven subscales (8 main subscales and 3 provisional subscales) assessed by the EDI-2 are:

- (1) Drive for thinness: an intense desire to be thin or a fear of being fat (fear of weight gain, preoccupation with weight and dieting);
- (2) Bulimia: tendency toward thinking about and engaging in bouts of uncontrollable bingeing (overeating);
- (3) Body dissatisfaction: dissatisfaction with body shape and/or specific body regions (e.g., stomach, thighs);
- (4) Ineffectiveness: closely linked to low self-esteem and self-evaluation (inadequacy, worthlessness, lack of control over life, insecurity);
- (5) Perfectionism: degree of belief that personal achievements and performance should be of a superior standard (by self and others);
- (6) Interpersonal distrust: degree of isolation and disinclination to make close relationships and to express thoughts and feelings;
- (7) Interoceptive awareness: confusion and anxiety in recognising and correctly reacting to emotional states;
- (8) Maturity fears: wish to withdraw to the safety of childhood;
- (9) Asceticism: self-discipline, self-denial, self-restraint and the control of bodily urges are seen as spiritual ideals that can lead to self-virtue;
- (10) Impulse regulation: tendency towards destructiveness (self and interpersonal relationships, hostility, recklessness, impulsivity and substance abuse);

- (11) Social insecurity: tendency towards social self-doubt and the idea that relationships are tense, insecure, unrewarding and generally unsatisfactory (Garner, 1991).

The internal consistency reliability of the EDI-2 has been demonstrated with reliability coefficients (alphas) ranging from .83 to .93 for eating disorder samples on the eight standard subscales (Garner, 1991; Garner & Olmsted, 1984). The three provisional scales yield lower alphas (particularly for asceticism) ranging from .70 to .80 (Garner, 1991).

The convergent validity of the EDI-2 has been demonstrated by the EDI-2 subscales correlation with the Restraint Scale for Eating Disorder Patients and the EAT-26 (Eating Attitudes Test) subscales (Garner & Olmsted, 1984; Garner, Olmsted, & Polivy, 1983). Evidence of the EDI-2 discriminant validity is demonstrated by its use as a tool to distinguish between non-patient and eating-disordered samples (Garner, 1991; Reel & Gill, 1996).

Jockeys' responses to EDI-2 items were recoded with *always*, *usually* and *often* scored as 0, *sometimes* scored as 1, *rarely* scored as 2 and *never* scored as 3. Inversely scored items included 1, 12, 15, 17, 19, 20, 22, 23, 26, 30, 31, 37, 39, 42, 50, 55, 57, 58, 62, 69, 71, 73, 76, 80, 89 and 90. To arrive at each subscale score, items from each subscale were added to produce a total (see Appendix D for a list of items for each subscale).

### *Procedure*

Names and contact details of fully-registered Victorian jockeys were obtained from current publications of Inside Racing (Victorian Racing Industry's official publication). Apprentice jockeys' details were obtained from RVL (as their contact details are not published in Inside Racing). All licensed and apprentice jockeys were sent the questionnaire package together with a plain language statement by mail. The researcher coded the questionnaire packages so a follow-up reminder invitation could be mailed to jockeys who did not respond to the first mail-out.

The questionnaire packages took participants approximately 30 minutes to complete. Jockeys returned completed questionnaires to the researcher in the reply-paid envelopes included with the questionnaire packages. Returning the questionnaire was taken as consent to participate in the research.

Reminder letters were sent to all jockeys who had not returned questionnaire packages 4 weeks after the initial questionnaire mail-out. A reminder notice was also placed in the Victorian Jockeys' Association Newsletter, which is sent to all registered and apprentice jockeys within Victoria. Posters (see Appendix E) were also displayed in the jockeys' rooms at Metropolitan and Rural racing tracks around Victoria to remind jockeys about the research.

### *Data Analysis*

Data were primarily analysed using descriptive statistics. Analysis focused on the frequency of jockeys' weight-loss behaviour and the perceived

physical, psychological and social disturbances associated with wasting.

Pearson's Product Moment Correlations were used to gain an understanding of the relationships between weight-loss variables and the physical, psychological and social symptoms of wasting.

Participants' EDI-2 subscale scores were examined, using single sample *t*-tests to compare the samples mean subscale scores to a clinical population and a normal population. A Bonferroni adjustment was made to reduce the likelihood of Type I error and effect size calculations were used to examine difference between the means. Jockeys' individual subscale scores were also examined, using the guidelines recommended by Garner, Garfinkel, Rockert and Olmstead (1987) Malinauskas, Cucchiara, Aeby and Bruening (2007) in an attempt to identify participants' propensity towards disordered eating.

## *Results*

### *Weight, Height and Body Mass Index*

Participants' reported weight ranged from 47.5 kg to 66 kg ( $M=53.9$  kg,  $SD=3.1$  kg) and height ranged from 1.50m to 1.75m ( $M=1.62$ m,  $SD=0.6$ m). As might be expected, due to the stringent weight demands of horseracing (Apted, 1988; Moore et al., 2002), standard deviations for both the height and weight of jockeys were small.

The average height, weight and BMI scores for jockeys are presented in Table 3. The BMI is an internationally recognised anthropometric classification system used to categorise individual's weight status (H. Prentice & Jebb, 2001; Schoenborn,

Adams, & Barnes, 2002; World Health Organisation, 2004). According to the World Health Organisation guidelines (2004), an individual's BMI is calculated by weight (kg)/height (m)<sup>2</sup>. For adults there are four major classifications: (1) underweight - those with a BMI of less than 18.5; (2) normal weight - those with a BMI between 18.5 and 25; (3) overweight - those with a BMI between 25 and 30; and (4) obese - those with a BMI of 30 and above.

Table 3 *Mean (and Standard Deviation) Height, Weight and BMI of Male and Female Jockeys and the Total Sample.*

	Height			Weight			BMI		
	<i>n</i>	<i>Mean</i>	<i>(SD)</i>	<i>n</i>	<i>Mean</i>	<i>(SD)</i>	<i>n</i>	<i>Mean</i>	<i>(SD)</i>
Male	29	1.63 cm	(0.06)	31	54.4 kg	(3.2)	29	20.5	(1.7)
Female	9	1.59 cm	(0.06)	10	52.4 kg	(3.1)	9	20.7	(1.1)
Total	38	1.62 cm	(0.06)	41	53.9 kg	(3.1)	38	20.5	(1.6)

The jockey samples' BMI scores were approximately normally distributed with a mean of 20.5 and a standard deviation of 1.6. The average BMI scores for men ( $M=20.5$ ,  $SD=1.7$ ) and women ( $M=20.7$ ,  $SD=1.1$ ) fell within the normal range (18.5 – 20.0; 20.0 – 25.0; Australian Bureau of Statistics, 2001; World Health Organisation, 2004). Four jockeys (11.6%) had a BMI in the underweight range (less than 18.5) while all other participants fell within the normal range (Australian Bureau of Statistics, 2001; World Health Organisation, 2004).

Calculations of the effect size revealed negligible differences (*Cohen's d*=-0.07) between the BMI scores of male and female jockeys. For this reason, and

because of the small number of female jockey participants, male and female jockeys' data were pooled for all subsequent analyses.

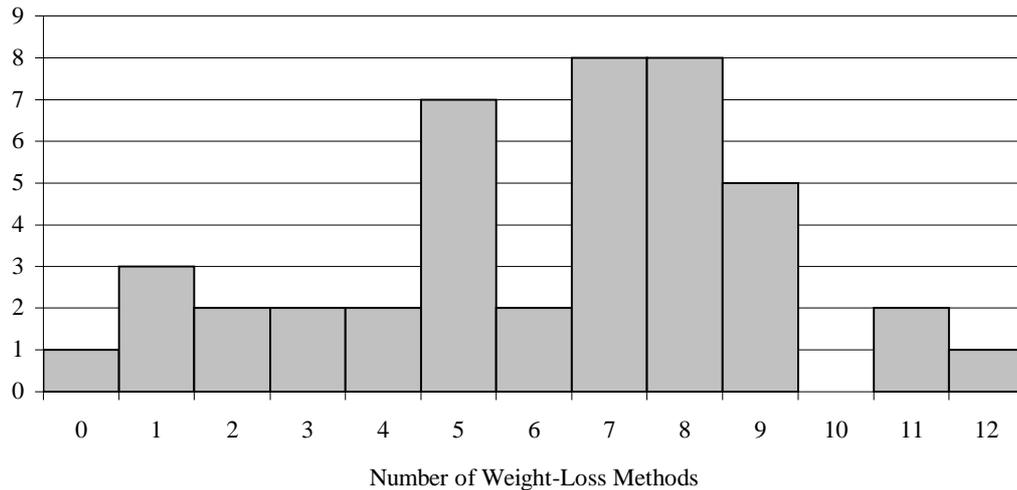
### *Weight Management*

Despite generally small and light stature, the majority of jockeys reported struggling to manage weight, with 80.5% of jockeys having experienced difficulties at some stage of their careers (*often* 36.6%, *usually* 12.2% and *sometimes* 31.7%). Eight participants (19.5%) reported never having any difficulty managing weight.

Nearly 78% of jockeys reported usually having to lose weight to meet race requirements. The amount of weight lost by jockeys to make weight ranged from 1 kg to 3.5 kg ( $M=1.7$ ,  $SD=0.6$ ), which corresponds to between 1.9% and 4.7% ( $M=2.6\%$ ,  $SD=1.36$ ) of body weight.

The average amount of weight jockeys reported losing in the previous 7 days was 2 kg ( $SD=0.9$  kg). When asked about the usual amount of weight lost to make race weight, two-thirds of jockeys (66.7%) reported losing between 1 kg and 4 kg in the past 7 days. This meant that jockeys had lost between 1.77% and 7.4% of their body weight in the last week ( $M=2.9\%$ ,  $SD=1.97$ ).

To meet race weight requirements, 97.6% of jockeys reported using between 1 and 12 weight-loss methods (see Figure 2). Only one jockey reported not using any weight-loss methods at all. On average, participants reported engaging in a combination of 6.3 ( $SD=2.8$ ) weight-loss methods to manage weight.



*Figure 2.* Number of weight-loss methods used by jockeys.

An examination of Table 4 reveals that the most common forms of weight management used by jockeys were exercise as a jockey (e.g., track work, stable duties; 95%), food restriction (88.1%), fluid restriction (78.6%), exercise other than as a jockey (76.2%) and exercise in “sweat gear” (72.5%). One jockey indicated using self-induced vomiting to maintain weight, while 10% of jockeys reported using laxatives and 11.9% reported using diuretics and/or appetite suppressants.

When asked to report any other weight-loss methods not included by the researcher, jockeys revealed using spa baths, drinking some alcohol the night before the races and sweating in the car on the way to the races. These weight-loss methods were used by jockeys to aid in the loss of body fluid and were employed the day before or on race days.

The trend of jockeys using weight-loss techniques that promoted fluid loss the day before and/or on race days is shown in Table 4. Jockeys were more likely to engage in fluid restriction (day before race day: 61.9%, race day 69.1%), sauna use (day before race day: 51.2%, race day 59.0%) and exercise in sweat gear (day before

race day: 52.5%, race day 44.5%) on the day before and on race day than between race days. In addition, it was more common for participants to lose weight using exercise in a hot environment (day before race day: 32.4%) and/or having a hot salt bath (day before race day: 40.0%) on the day before the races than between race days.

The weight-loss methods that jockeys reported using on the day before race days and on race days were also identified as rapid weight-loss techniques (e.g., fluid restriction 93.1%, sauna 91.7%, exercise in sweat gear 88.9%, exercise in a hot environment 77.8%, hot salt bath 80%). Weight-loss methods that were used more frequently than others to maintain weight were exercise as a jockey (100%), other exercise (89.7%) and food restriction (51.4%).

Table 4 *Percentage of Jockeys Using Specific Weight-Management Methods at Specific Times*

Weight-loss method	Overall Percentage	Time period		
		Between race days	Day before race day	On race day
Energy balance adjustment				
Exercise as jockey	95.0	92.5	62.5	57.5
Food restriction	88.1	47.6	47.6	57.1
Other exercise	76.2	64.3	31.0	28.6
Appetite suppressants	11.9	4.8	9.6	4.8
Laxatives	10.0	0.0	10.0	2.5
Self-induced vomiting	2.4	2.4	2.4	0.0
Body fluid reduction				
Fluid restriction	78.6	19.1	61.9	69.1
Sauna	71.8	17.8	51.2	59.0
Hot salt bath	47.5	20.0	40.0	27.5
Diuretics	11.9	0.0	2.4	9.5
Combination (Energy balance and fluid reduction)				
Exercise in sweat gear	72.5	25.0	52.5	44.5
Exercise in heat	54.1	24.3	32.4	18.9

*Note.* Overall percentages indicate the number of jockeys from the whole sample that used the specified method. Time period percentages refer to the number of jockeys who use the specified method during the indicated time period. Time period percentages are not mutually exclusive as jockeys used some weight-loss methods on more than one occasion.

The relationships between jockeys' weight loss and the difficulty they had managing weight were examined using correlational analyses (see Table 5). These results indicated that as the amount of weight jockeys needed to lose to meet riding weights increased, so did their difficulty losing weight ( $r=0.68, p<0.0005$ ) and the number of weight-loss methods they used ( $r=0.59, p<0.0005$ ). In addition, the results indicated that the more weight-loss practices jockeys engaged in, the greater difficulty they had managing weight ( $r=0.55, p<0.0005$ ). Correlational analyses of BMI and the four weight-related variables showed no significant relationship with the number of weight-loss methods used by jockeys, their difficulty managing weight and the average amount of weight lost to meet race weight. Not surprisingly, BMI was correlated with jockeys' usual weight ( $r=0.37, p<0.019$ ).

Table 5 *Correlations of Jockeys' Usual Weight, Difficulty Experienced Losing Weight, Number of Weight-Loss Methods Used to Make Race Weight and the Amount of Weight Usually Lost*

		1	2	3	4
1. Usual weight	<i>r</i>	1			
	<i>n</i>	41			
2. Difficulty managing race weight	<i>r</i>	.67**	1		
	<i>n</i>	40			
3. Number of weight-loss methods used	<i>r</i>	.37*	.55**	1	
	<i>n</i>	41	41	42	
4. Average weight usually lost	<i>r</i>	.52**	.68**	.59**	1
	<i>n</i>	35	36	36	36

\*  $p<0.05$ . \*\*  $p<0.01$ .

*Psychological Effects of Weight Management*

For some jockeys, a life of constantly trying to lose and/or maintain a low weight can mean a life of sacrifice and pressure that can be mentally harmful (Baptiste, 2000a; Christine, 2001). In the current study, jockeys were asked to report if they experienced any negative psychological disturbances while managing their weight.

Table 6 illustrates jockeys' responses to a range of negative psychological symptoms included by the researcher, based on previous research (e.g., Caulfield et al., 2003; M. B. King & Mezey, 1987). Clearly, many jockeys experienced a broad range of negative psychological effects, sometimes at a severe level. The most commonly reported psychological effect of wasting for jockeys related to affect, with 83.3% of participants experiencing mood swings at some stage when trying to make weight. Over a third (35.7%) of participants *often* or *always* experienced mood swings while they were wasting and over a quarter (26.2%) perceived this symptom's severity as serious.

The negative effects of weight-loss behaviour on mood were further illustrated by jockeys' responses on other mood related items included in the questionnaire. Twenty-five percent of jockeys *often* and *always* experienced feelings of irritability, while another 30% reported feeling irritable *sometimes*. Although not as commonly reported, 22% of jockeys also experienced regular (*often* and *always*) feelings of depression and 15% frequently (*often* and *always*) experienced anxiety when wasting.

Table 6 *Percentage of Jockeys to Experience Psychological Effects While Wasting*

Psychological Effects	<i>n</i>	Frequency of Psychological Effects (%)				Overall
		Rarely	Sometimes	Often	Always	
Mood swings	42	21.4	26.2	23.8	11.9	83.3
Anxiety	40	17.5	5.0	12.5	2.5	37.5
Depression	41	22.0	19.5	17.1	4.9	63.4
Irritability	40	22.5	30.0	17.5	7.5	77.5
Angry thoughts	41	19.5	17.1	7.3	7.3	51.2
Angry outbursts	42	14.3	31.0	7.1	0.0	52.4
Persistent thoughts - food	42	16.7	19.0	26.2	19.0	81.0
Persistent thoughts - thirst	42	9.5	19.0	19.0	28.6	76.8
Irrational thoughts	40	15.0	7.5	7.5	2.5	32.5
Suicidal thoughts	40	10.0	2.5	0.0	0.0	12.5
Mental fatigue	40	27.5	12.5	22.5	12.5	75.0
Sleep disturbance	41	9.8	19.5	14.6	4.9	48.8

*Note.* Overall percentages indicate the number of jockeys from the whole sample who experience specific psychological effects while using weight-management methods.

Angry thoughts and outbursts were another psychological effect identified by jockeys while they were trying to make weight. Thirty-one percent of jockeys sometimes experienced angry outbursts when they were wasting. Almost 15% reported *often* or *always* having angry thoughts while managing weight.

In addition to experiencing negative moods while wasting, many jockeys reported other psychological consequences. The most common of these effects were persistent thoughts about food (81%), with over half of the jockeys who reported this

effect experiencing it *often* or *always* (55.9% of jockeys who experienced persistent thoughts about food or 45.2% of total sample). Of even more concern, 31% of jockeys considered persistent thoughts about food to be serious in severity. Although less jockeys (76.8%) reported experiencing persistent thoughts about thirst than persistent thoughts about food, more jockeys reported thoughts of thirst as an *often* or *always* occurrence (47.6%). More jockeys (40%) felt that persistent thoughts about thirst were serious in severity.

Comparative to jockeys' responses on other items, a relatively small number reported suicidal thoughts while wasting (overall 12.5%). The number of jockeys revealing suicidal thoughts was significant in terms of the serious nature of the problem. Four participants reported experiencing suicidal thoughts *rarely* (10%), while one participant *sometimes* experienced this effect (2.5%). Interestingly, none of the jockeys felt suicidal thoughts were a serious problem.

The relationships between jockeys' difficulty managing weight, the number of weight-loss methods used, usual weight, average amount of weight usually lost and the frequency of psychological effects reported by jockeys were examined by correlations.

Table 7 shows positive relationships between the number of weight-loss methods used by jockeys and all psychological disturbances except angry outbursts. The strongest relationships with the number of weight-loss methods were with persistent thoughts about thirst  $r=0.68, p=0.0005$ , depression  $r=0.61, p=0.0005$ , irritability  $r=0.57, p=0.0005$ , mental fatigue  $r=0.53, p=0.0005$ , persistent thoughts about food  $r=0.51, p=0.001$  and mood swings  $r=0.50, p=0.001$ .

Correlational analyses also revealed that the average amount of weight lost by jockeys to meet race weight was positively associated with seven of the psychological

symptoms included in the research. As jockeys' average amount of weight loss increased, so did the frequency with which they experienced persistent thoughts about thirst  $r=0.63$ ,  $p=0.0005$ ,  $p=0.01$ , irritability  $r=0.46$ , mental fatigue  $r=0.44$ ,  $p=0.006$ , depression  $r=0.42$ ,  $p=0.013$ , persistent thoughts about food  $r=0.45$ ,  $p=0.006$ , angry thoughts  $r=0.43$ ,  $p=0.011$  and mood swings  $r=0.37$ ,  $p=0.028$ .

Table 7 also revealed that depression ( $r=0.40$ ,  $p=0.01$ ), persistent thoughts about thirst ( $r=0.40$ ,  $p=0.01$ ) and mental fatigue ( $r=0.35$ ,  $p=0.031$ ) were the only three variables associated with jockeys' usual weight. Moreover, these variables were the only variables associated with all four weight-related variables.

Table 7 *Correlations Between Jockeys' Difficulty Managing Race Weight, the Number of Weight-Loss Methods Used, Usual Weight, Average Amount of Weight Usually Lost and Frequency of Psychological Effects While Wasting*

	<i>n</i>	Difficulty managing race weight	<i>n</i>	Number weight-loss methods used	<i>n</i>	Usual weight	<i>n</i>	Average weight lost
Mood swings	41	.31*	42	.50**	41	.23	36	.37*
Anxiety	39	.20	40	.49**	39	.17	34	.31
Depression	40	.39*	41	.61**	40	.40*	35	.42*
Irritability	39	.43**	40	.57**	39	.194	34	.46**
Angry thoughts	40	.33*	41	.40**	40	.29	35	.43*
Angry outbursts	41	.13	42	.20	41	.13	36	.31
Persistent thoughts food	41	.36*	42	.51**	41	.17	36	.45**
Persistent thoughts thirst	42	.58**	42	.68**	41	.40**	36	.63**
Irrational thoughts	39	.17	40	.46**	39	.22	34	.38
Suicidal thoughts	39	-.01	40	.33*	39	.12	34	-.04
Mental fatigue	39	.52**	40	.53**	39	.35*	34	.44*
Sleep disturbance	40	.15	41	.41**	40	.12	35	.31

*Note.* The number of weight-loss methods used, difficulty managing weight, usual weight and average amount of weight lost were positively correlated (see Table 4).

\*  $p < 0.05$ . \*\*  $p < 0.01$ .

*Disordered Eating*

Jockeys have been identified as a high-risk population for the development of eating disorders (Thompson & Sherman, 1993). In the current study, the EDI-2 was used to gain further insight into the eating behaviours, cognitions and eating disorder symptomatology in jockeys. The EDI-2 produced individual participants' scores on 11 different subscales (drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation, social insecurity; Garner, 1991).

The means and standard deviations for jockeys on the 11 subscales of the EDI-2 are shown in Table 8. Table 8 also contains the possible score ranges for the 11 subscales. For jockeys, all the subscales' minimum scores were 0 and maximum scores varied from 8 (impulse regulation) to 24 (body dissatisfaction).

To examine the degree of manifestation of the traits measured by the EDI-2, Garner (1991) suggested that the higher the subscale score, the higher the trait manifestation. Jockeys' highest mean subscale scores were on body dissatisfaction, perfectionism, drive for thinness and interpersonal distrust. Considering the possible maximum scores, jockeys' mean scores on each subscale were relatively low. Most of the average scores achieved by jockeys were in the lower third of the scale scores indicating that, as a group, the current sample of jockeys did not display a high trait manifestation on any of the EDI-2 subscales.

Although the EDI-2 alone is not generally sufficient to identify eating disorders sufferers (Fairburn & Beglin, 1990), it can be used to identify those preoccupied with weight and at risk of developing an eating disorder (Garner, Olmsted, Polivy, & Garfinkel, 1984). Garner, Garfinkel, Rockert and Olmsted (1987)

reported that elevated scores on the drive for thinness and body dissatisfaction subscales were prominent when predicting ballet dancers' likelihood of developing eating disorders. Furthermore, Garner (1991) suggested that test takers' scores be compared to normative data when wishing to identify if participants were at possible future risk of eating disorders.

Table 8 *EDI-2 Subscales Score Ranges and Jockeys' Mean, Standard Deviation, Minimum and Maximum Scores on Each Subscale*

EDI Subscales	Jockeys					
	<i>n</i>	Possible score range	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>(SD)</i>
Drive for Thinness	38	0 - 21	0	15	4.55	(4.75)
Bulimia	38	0 - 21	0	13	1.57	(2.90)
Body Dissatisfaction	36	0 - 27	0	24	5.41	(6.32)
Ineffectiveness	39	0 - 30	0	19	2.64	(4.04)
Perfectionism	34	0 - 18	0	14	4.73	(3.78)
Interpersonal Distrust	38	0 - 21	0	15	4.55	(3.82)
Interoceptive Awareness	38	0 - 30	0	12	2.13	(2.87)
Maturity Fears	36	0 - 10	0	10	2.88	(2.54)
Asceticism	38	0 - 24	0	14	3.73	(2.30)
Impulse Regulation	37	0 - 24	0	8	1.18	(2.10)
Social Insecurity	39	0 - 24	0	12	4.23	(3.46)

Given these recommendations, jockeys' individual scores on the drive for thinness and body dissatisfaction subscales were compared to normative clinical data presented in the *Eating Disorders Inventory - 2 Professional Manual* (Garner, 1991).

Three participants in the current study had scores similar to or higher on both subscales than the mean scores of the clinical eating disorders comparison population (drive for thinness mean 14.5, body dissatisfaction mean 16.6). The first participant reported scores slightly less than the comparison population norms, with a drive for thinness subscale score of 14 and a body dissatisfaction subscale score of 16. The second participant's scores were higher than the comparison population on both subscales, with a drive for thinness score of 15 and a body dissatisfaction score of 24. The third participant reported scores of 14 and 17 for the drive for thinness and body dissatisfaction subscales, respectively. Interestingly, all three of the above mentioned jockeys were female.

Following another of Garner's (1991) recommendations, the current sample as a whole, was also compared to the clinical eating disorders comparison population and a non-clinical male comparison population. The results from single-sample *t*-tests and effect size analyses carried out to explore the differences between the three samples (jockeys and clinical eating disorder patients; jockeys and non-clinical males) on all 11 EDI-2 subscale are shown in Table 9. As multiple comparisons were made, a Bonferroni adjustment of the alpha level to 0.002 was made to reduce the likelihood of Type I error.

The results revealed that, as a group, jockeys did not exhibit disordered eating symptomology. Their scores on the EDI-2 subscales scores were significantly lower on 10 of the subscales compared to the eating disorder comparison group. Interpersonal distrust was the only subscale that revealed no significant difference between the two groups ( $t(37)=-2.01, p=0.052$ ).

According to Cohen's effect size conventions for mean differences (Aron & Aron, 1994), effect sizes of .2 are classified as small, .5 are considered medium and .8

are classed as large. When comparing the means of jockeys and the clinical eating disorder population, effect sizes varied from medium to large.

As expected, given the non-significant difference between jockeys and the clinical eating disorder populations' mean scores on the interpersonal distrust subscale, *t*-test comparisons of jockeys and a male non-clinical population revealed that jockeys' scores were significantly higher than the male sample on the interpersonal distrust subscale ( $t(37)=3.47, p=0.001$ ).

Single-sample *t*-tests also revealed that jockeys' mean scores were significantly lower on the EDI-2 subscales of impulse regulation ( $t(36)=-4.65, p=0.0005$ ) and perfectionism ( $t(33)=-3.64, p=0.001$ ) compared to the male non-clinical population. There was no significant difference between the two groups on the remaining eight subscales, although the difference between the populations on the drive for thinness subscale approached significance ( $t(38)=-4.55, p=0.004$ ).

When considering effect sizes for the jockey and non-clinical male groups, it was shown that perfectionism ( $d=-0.53$ ) and drive for thinness ( $d=0.56$ ) had medium effect sizes while impulse regulation ( $d=-0.47$ ) had an effect size that was approaching a classification of medium. The effect size for the interpersonal distrust subscale was approaching being classified as large ( $d=0.75$ ). According to Cohen, a large effect size means that the distribution of scores for each population only overlaps by approximately 53% (Aron & Aron, 1994).

Table 9 Means, Standard Deviations, Single Sample *t*-tests and Effect Sizes for the 11 EDI-2 Subscales for a Clinical Eating Disorder (Comparison) Population and a Non-Clinical Male (Comparison) Population

	Clinical Comparison Population ( <i>n</i> =889)					Male Non-Clinical Comparison Population ( <i>n</i> =101)				
	<i>Mean</i>	( <i>SD</i> )	Single-Sample <i>t</i> -test		Effect size	<i>Mean</i>	( <i>SD</i> )	Single-Sample <i>t</i> -test		Effect size
EDI Subscales			<i>t</i>	<i>p</i>	<i>Cohen's d</i>			<i>t</i>	<i>p</i>	<i>Cohen's d</i>
Drive for Thinness	14.5	(5.5)	-12.88	0.0005	-1.82	2.2	(4.0)	3.05	0.004	0.56
Bulimia	10.5	(1.2)	-18.96	0.0005	-6.83	1.0	(1.7)	1.23	0.226	0.28
Body Dissatisfaction	16.6	(12.2)	-10.61	0.0005	-0.93	4.9	(5.6)	0.49	0.627	0.09
Ineffectiveness	11.3	(2.3)	-13.35	0.0005	-0.62	1.8	(4.7)	1.29	0.202	0.19
Perfectionism	8.9	(6.2)	-6.41	0.0005	-0.68	7.1	(4.7)	-3.64	0.001	-0.53
Interpersonal Distrust	5.8	(2.0)	-2.01	0.052	-0.59	2.4	(2.5)	3.47	0.001	0.75
Interoceptive Awareness	11.0	(3.0)	-18.99	0.0005	-2.96	2.0	(3.0)	0.28	0.780	0.04
Maturity Fears	4.5	(2.7)	-3.71	0.001	-0.60	2.8	(3.4)	0.21	0.836	0.25
Asceticism <sup>a</sup>	8.3	(4.7)	-12.17	0.0005	-1.09	3.8	(2.9)	-0.17	0.867	0.03
Impulse Regulation <sup>a</sup>	6.0	(5.3)	-13.89	0.0005	-1.02	2.8	(3.8)	-4.65	0.000	-0.47
Social Insecurity <sup>a</sup>	8.6	(4.9)	-7.88	0.0005	-0.96	3.3	(3.2)	1.68	0.101	0.29

<sup>a</sup>*n*=107 for clinical Eating Disorder (comparison) population

To gain further insight into the eating behaviours and cognitions, jockeys responses on several EDI-2 items were considered. The first three items related to food intake (Item 7: “I think about dieting”, Item 28: “I have gone on overeating binges where I felt that I could not stop” and Item 38: “I think about bingeing - overeating”) were examined because previous research (e.g., M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002; Moore et al., 2002) and findings from the current study found food restriction to be a key method of weight management for jockeys. In addition, the current results showed that 81% of jockeys experienced persistent thoughts about food while wasting.

Figure 3 illustrates jockeys cognitive preoccupation with food (Item 7: “I think about dieting”). Given the high number of jockeys who reported using food restriction for weight management (88.1%), it is not surprising that only 18.4% of participants reported no cognitive preoccupation with dieting. Of jockeys who reported infrequently (*never* or *rarely*) thinking about dieting, 55.6% reported they usually did not need to lose weight to meet riding weight. In comparison, 55.2% of jockeys who usually lost weight frequently (*often*, *usually* or *always*) thought about dieting.

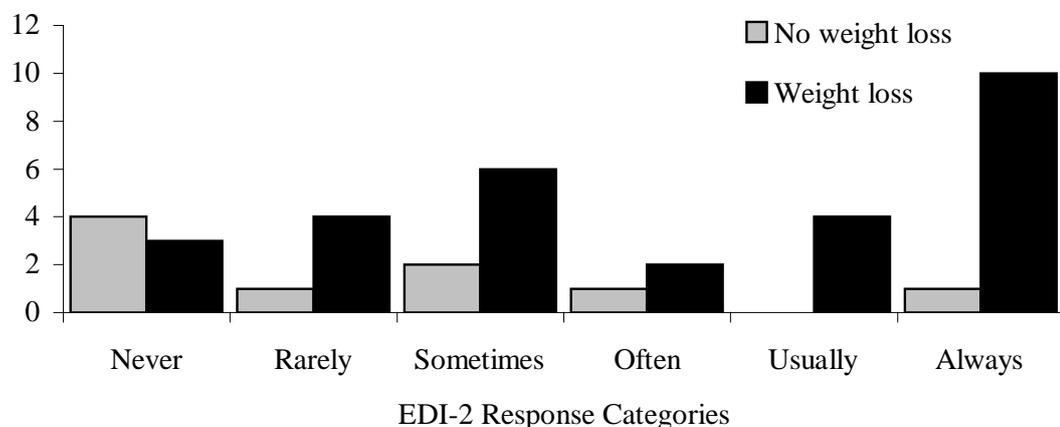
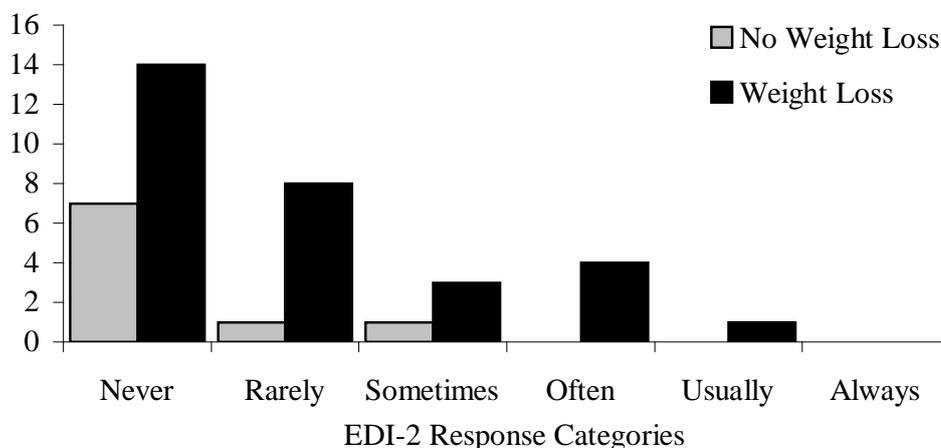


Figure 3. Frequency of responses for jockeys who did ( $n=29$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 7: I think about dieting.

Although there was no indication from the group data that jockeys had tendencies towards bulimic behaviour, it was interesting to examine participants' responses on questions relating to binge eating. Figures 4 and 5 illustrate jockeys' responses to the items 28 "I have gone on overeating binges where I felt that I could not stop" and item 38 "I think about bingeing (overeating)." Over half (52.6%) of the sample reported having thought about overeating and 41% of participants reported engaging in binge eating, although 59% reported they had never gone on an eating binge and 47.4% had never thought about bingeing. Interestingly, jockeys who did not usually have to lose weight to meet riding weight requirements seldom binged or thought about binge eating.



*Figure 4.* Frequency of responses for jockeys who did ( $n=30$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 28: I have gone on eating binges where I felt I could not stop.

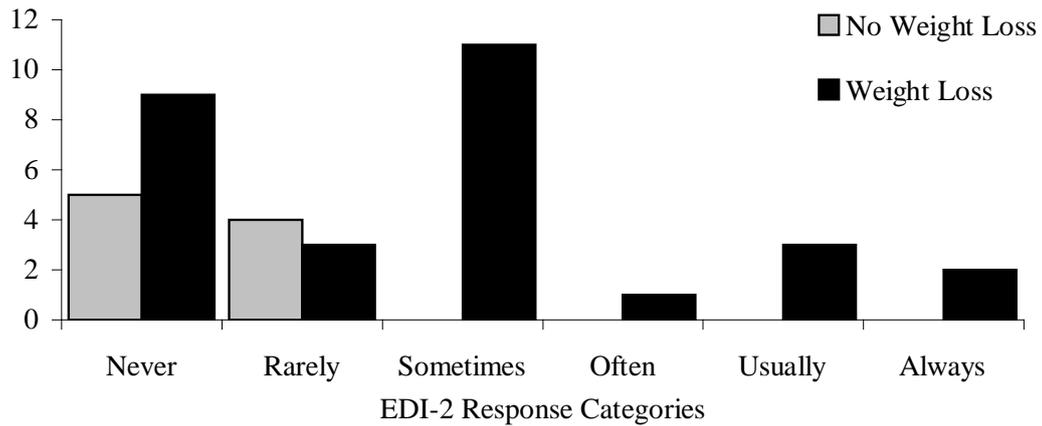


Figure 5. Frequency of responses for jockeys who did ( $n=29$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on Item 38: I think about bingeing (overeating).

Jockeys' responses to items relating to body weight were also of interest as maintaining a low body weight is an integral part of a jockey's career (Apted, 1988). Figure 6 (Item 16: "I am terrified of gaining weight") and Figure 7 (Item 49: "If I gain a pound, I worry I will keep gaining") show jockeys' responses on several body-weight related EDI-2 items.

Over 40% of participants reported that at some stage (*rarely, sometimes, often, usually or always*) they were terrified about gaining weight (45.9%) and/or worried about not being able to stop gaining weight if their weight increased (40.5%). Anxiety about general weight gain was more common among jockeys than the fear that they would continue gaining weight once they had started. Interestingly, 60.7% of jockeys who found it necessary to lose weight to meet their riding weight requirements feared gaining weight at some time (*rarely, sometimes, often, usually or always*). One quarter of jockeys who usually lost weight were *always* terrified of gaining weight while 39% *never* worried about gaining weight.

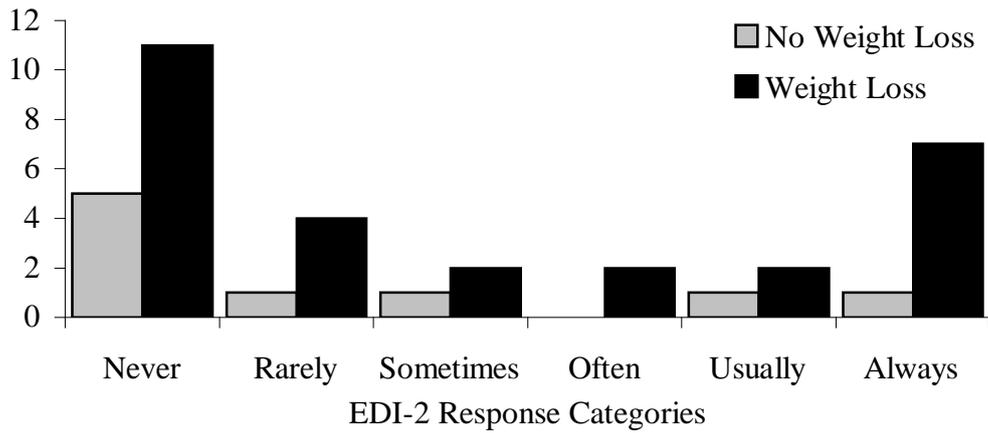


Figure 6. Frequency of responses for jockeys who did ( $n=28$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 16: I am terrified of gaining weight.

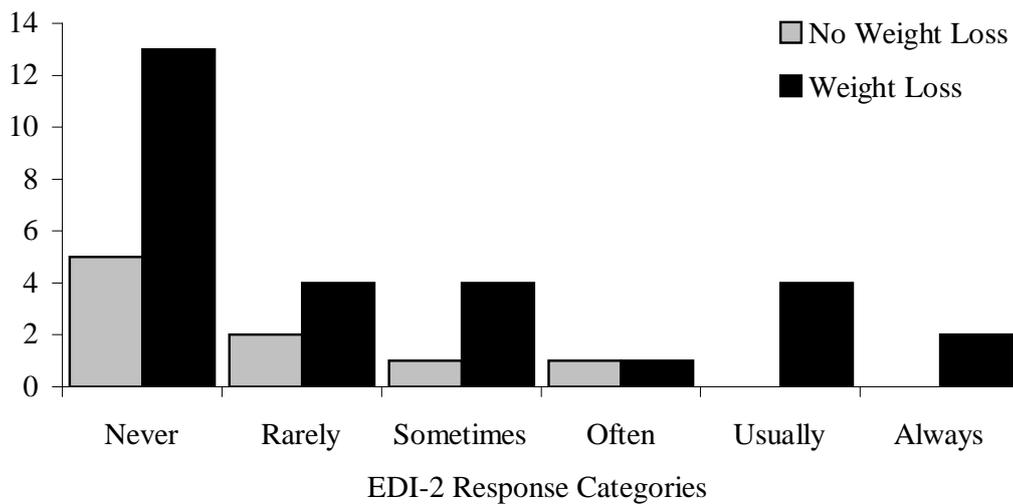


Figure 7. Frequency of responses for jockeys who did ( $n=28$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 49: If I gain a pound, I worry I will keep gaining.

In addition to weight-related items, mood-related questions were also of interest because previous research (e.g., M. B. King & Mezey, 1987; Caulfield et al., 2003) and findings from the current study indicate that jockeys experience negative moods when wasting. Figures 8, 9 and 10 report the responses of jockeys on three mood related items of the EDI-2 (Item 85: “I experience marked mood shifts”, Item 83: “Others would say that I get easily irritated” and Item 79: “I am prone to outbursts of anger or rage”). The largest difference between jockeys who usually need to lose weight to meet their riding weight requirements and those who did not can be seen in Figure 8. Seventy-six percent of jockeys who usually lost weight experienced mood shifts as some stage compared to 45% of jockeys who did not usually lose weight to meet their riding weight requirements. Interestingly, only jockeys who needed to lose weight to meet riding requirements reported frequently (*often* or *usually*) being prone to mood shifts, outbursts of anger and being described by others as irritable.

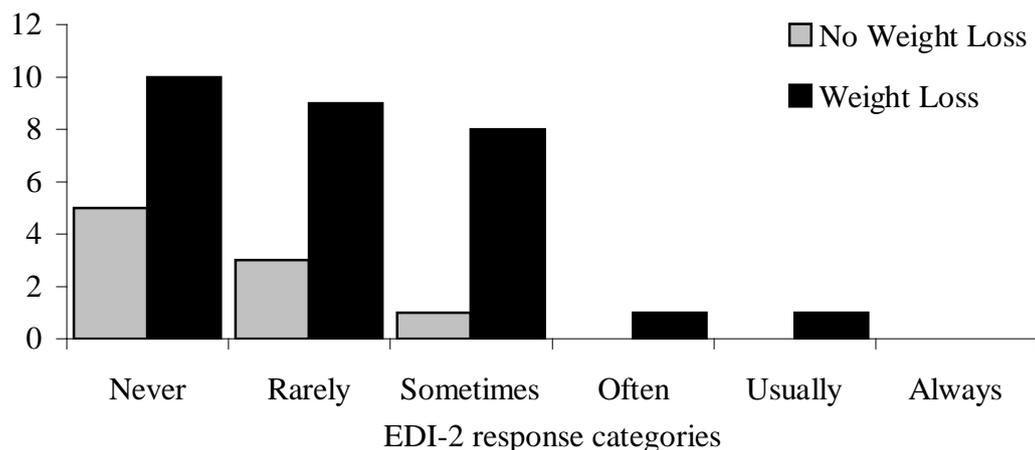


Figure 8. Frequency of responses for jockeys who did ( $n=29$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 85: I experience marked mood shifts.

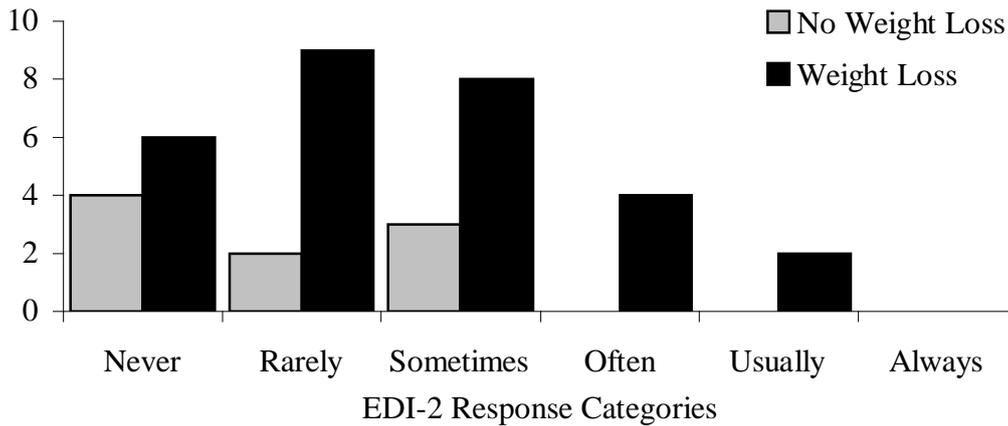


Figure 9. Frequency of responses for jockeys who did ( $n=29$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on EDI-2 Item 83: Others would say I am easily irritated.

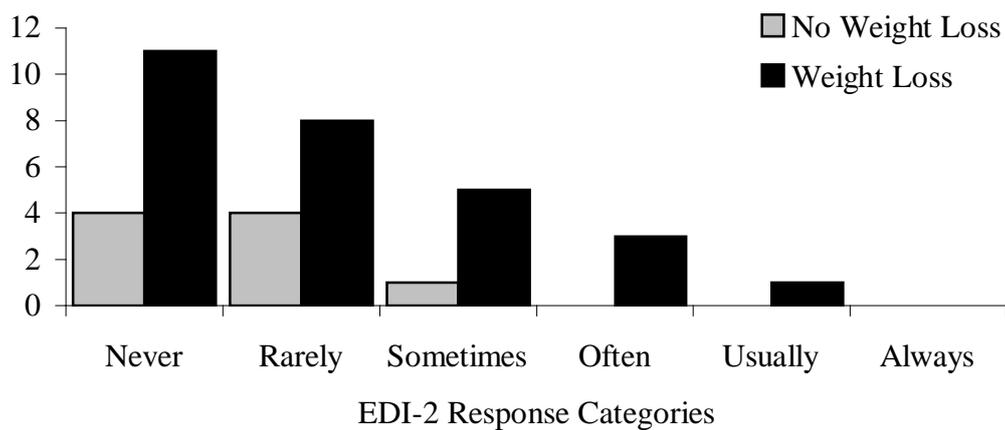
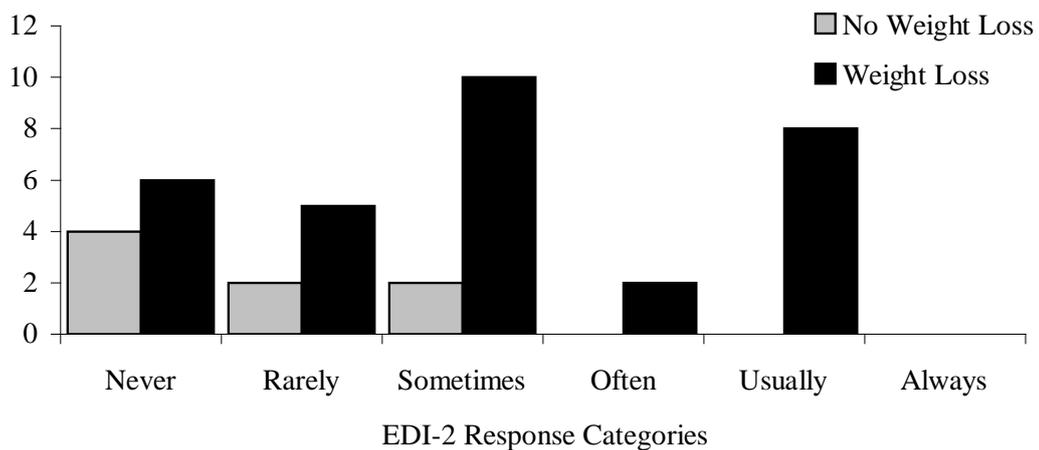


Figure 10. Frequency of responses for jockeys who did ( $n=28$ ) and did not ( $n=9$ ) usually lose weight to meet race weight on Item 79: I am prone to outbursts of anger and rage.

Research by Labadarios et al. (1993) and anecdotal reports (e.g., Beadman, 2005; Thomas, 2006) have indicated that jockeys experience difficulties with social interactions and relationships. When considering EDI-2 items that relate to jockeys' interactions with others, jockeys' responses on Item 87: "I would rather spend time by

myself than with others” was of particular interest. Figure 11 shows that 25.6% of jockeys reported that they frequently (*often* or *usually*) preferred to spend time by themselves than with others. All of these jockeys also reported usually needing to lose weight to meet race weight. It is worth noting that 83.3% of the jockeys who reported frequently wishing to spend time on their own also reported experiencing between four and six negative social effects (see Perceived Social Effects of Weight Management in this section) while wasting.



*Figure 11.* Frequency of responses for jockeys who did ( $n=31$ ) and did not ( $n=8$ ) usually lose weight to meet race weight on EDI-2 Item 87 of the EDI-2: I would rather spend time by myself than with others.

### *Social Effects of Weight Management*

Jockeys’ weight-loss behaviour has been reported to put a strain on jockeys’ social networks and social interactions (Labadarios et al., 1993). In the current study, participants were asked if they experienced any difficulties interacting with their

families or friends and/or engaging in social activities while managing their weight. Seventy-six percent of jockeys reported experiencing some form of negative social effect while wasting. Table 10 shows that many jockeys frequently (*often* or *always*) had difficulty with social activities (39%) and socialising outside of work (31.8%) when they were trying to meet race weight. A small number of jockeys also had frequent (*often* or *always*) problems with their relationships with other family members (e.g., parents, siblings; 9.8%), friends (9.5%), and socialising at work (12.2%). Almost 72% of jockeys also reported having difficulty with their partners at some stage while managing weight.

Table 10 *Percentage of Jockeys Experiencing Negative Social Effects While Wasting*

Social Effects	<i>n</i>	Frequency of Social Effects (%)				Overall
		Rarely	Sometimes	Often	Always	
<b>Relationship Problems</b>						
Partner	39	30.8	28.2	12.8	0.0	71.8
Children <sup>a</sup>	14	35.7	7.1	0.0	0.0	42.8
Other family	41	24.4	17.1	4.9	4.9	51.2
Friends	42	19.0	14.3	9.5	0.0	42.9
<b>Social Difficulties</b>						
At work	41	19.5	14.6	4.9	7.3	46.3
Outside work	41	14.6	9.8	22.0	9.8	56.1
Social activities	41	9.8	9.8	12.2	26.8	58.5

*Note.* Overall percentages indicate the number of jockeys from the whole sample who experience specific social effects while using weight-management methods.

<sup>a</sup> responses from participants with children only.

To examine the relationship between weight loss and social experiences, correlational analyses were conducted between the number of weight-loss methods used, difficulty managing weight, usual weight and the average amount of weight usually lost and frequency of negative social effects experienced by jockeys (see Table 11). Due to the small number of participants in the study with children, a correlation analysis was not conducted on the variable examining jockeys' relationship problems with their children.

The weight-loss variable that revealed the strongest relationships with increased social problems was the number of weight-loss methods used by jockeys. This variable was associated with all of the six social effects examined (relationship with partner:  $r=0.33$ ,  $p=0.038$ , relationship with other family:  $r=0.40$ ,  $p=0.01$ , relationship with friends:  $r=0.48$ ,  $p=0.001$ , socialising at work:  $r=0.60$ ,  $p<0.0005$ , socialising outside work:  $r=0.55$ ,  $p<0.0005$  and social activities:  $r=0.55$ ,  $p<0.0005$ ). Jockeys' difficulty managing weight was positively related to the difficulties they had engaging in social activities ( $r=0.49$ ,  $p=0.001$ ) and socialising outside work ( $r=0.38$ ,  $p=0.017$ ). Difficulty engaging in social activities was the only social variable to be associated with all four weight-loss variables.

Table 11 *Correlations Between Jockeys' Difficulty Managing Race Weight, the Number of Weight-Loss Methods Used, Usual Weight, Average Amount of Weight Usually Lost and Frequency of Negative Social Effects While Wasting*

	<i>n</i>	Difficulty managing race weight	<i>n</i>	Number of weight-loss methods used	<i>n</i>	Usual weight	<i>n</i>	Average weight lost
<b>Relationship Problems</b>								
Partner	38	.22	39	.33*				
Other family	40	.16	41	.40**	40	.21	35	.25
Friends	41	.28	42	.48**	41	.26	36	.46**
<b>Social Difficulties</b>								
At work	40	.28	41	.60**	40	.07	35	.37*
Outside work	40	.38*	41	.55**	40	.28	35	.34*
Social activities	40	.49**	41	.55**	40	.34*	35	.41*

*Note.* The number of weight-loss methods used, difficulty managing weight, usual weight and average amount of weight lost were positively correlated (see Table 4).

\*  $p < 0.05$ . \*\*  $p < 0.01$ .

*Physical Effects of Weight Management*

For some jockeys, weight-loss behaviour can have adverse physical consequences (Baptiste, 2000a, 2000b). Table 12 shows that jockeys reported experiencing a range of physical problems while engaged in weight-loss behaviours. The most commonly experienced effect reported by jockeys was fatigue (78.6% of jockeys), with 45.1% of jockeys frequently (*often* or *always*) feeling fatigued when wasting. Another 16.7% reported *sometimes* experiencing fatigue. Over a fifth (21.4%) of those who experienced fatigue indicated its severity as serious. Jockeys also frequently reported experiencing poor circulation and joint pain (19.5% and 14.3% respectively for *often* and *always*).

Jockeys reported a number of other physical effects while they were using weight-loss methods. Most participants sometimes experienced these effects, with the most notable being muscular cramps (45.2%), dizziness (31%), joint pain (28.6%) and nausea (21.4%). Fourteen percent of the two-thirds of jockeys who reported experiencing muscular cramps felt they were serious in severity.

Correlational analyses were conducted to examine the relationships between the number of weight-loss methods used by jockeys to meet race weight, difficulty managing weight and frequency of reported physical problems (see Table 13). The analysis revealed that the number of weight-loss methods used was positively related to 8 of the 11 physical effects examined. The strongest relationships were observed with muscular cramps  $r=0.59$ ,  $p=0.0005$ , nausea  $r=0.57$ ,  $p=0.0005$ , dizziness  $r=0.54$ ,  $p=0.0005$  and fatigue  $r=0.58$ ,  $p=0.0005$ . Weaker significant positive relationships were also found between some physical effects and the other three weight-related variables. The only physical effect to be correlated to all four weight-related variables

was muscular cramps (difficulty managing weight  $r=0.53$ ,  $p=0.0005$ ; number of weight-loss methods  $r=0.59$ ;  $p=0.0005$ , usual amount of weight lost to meet race weight  $r=0.55$ ,  $p=0.001$ ; usual weight  $r=0.67$ ,  $p=0.0005$ ).

Table 12 *Percentage of Jockeys to Experience Specific Physical Effects While Wasting*

Physical Effects	Frequency of Physical Effects (%)					Overall
	<i>n</i>	Rarely	Sometimes	Often	Always	
Dizziness	42	26.2	31.0	2.4	2.4	61.9
Fainting	42	11.9	0.0	0.0	2.4	14.3
Visual distortion	40	7.1	9.5	4.8	0.0	21.4
Fever	42	4.8	7.1	2.4	0.0	11.3
Nausea	42	21.4	21.4	2.4	0.0	45.2
Upset stomach	42	19.0	26.2	4.8	2.4	52.4
Stomach cramps	42	26.2	14.3	0.0	0.0	40.5
Muscular cramps	41	14.3	45.2	4.8	2.4	66.7
Poor circulation	42	12.2	12.2	14.6	4.9	43.9
Joint pain	42	11.9	28.6	11.9	2.4	54.8
Fatigue	42	16.7	16.7	35.7	9.5	78.6

*Note.* Overall percentages indicate the number of jockeys from the whole sample who experience specific physical effects while using weight-management methods.

Table 13 *Correlations Between Jockeys' Difficulty Managing Race Weight, Number of Weight-Loss Methods Used, Usual Weight, Average Amount of Weight Usually Lost and Frequency of Physical Effects While Wasting*

	<i>n</i>	Difficulty managing race weight	<i>n</i>	Number of weight-loss methods used	<i>n</i>	Usual weight	<i>n</i>	Average weight lost
Dizziness	41	.42**	42	.54**	41	.41**	36	.45**
Fainting	41	.19	42	.11	41	.54**	36	.25
Visual distortion	39	.24	42	.51**	41	.14	34	.09
Fever	41	.10	42	.37*	39	.23	36	.22
Nausea	41	.38*	42	.57**	41	.26	36	.36*
Upset stomach	41	.27	42	.45**	41	.13	36	.29
Stomach cramps	41	.25	42	.32*	41	.32*	36	.34*
Muscular cramps	41	.53**	42	.59**	41	.44**	36	.55**
Poor circulation	40	.30	41	.28	40	.22	35	.01
Joint pain	41	-.11	42	.07	41	-.08	36	.002
Fatigue	41	.38*	42	.58**	41	.20	36	.34*

*Note.* The number of weight-loss methods used, difficulty managing weight, usual weight and average amount of weight lost were positively correlated (see Table 4).

\*  $p < 0.05$ . \*\*  $p < 0.01$ .

The current study could not establish a direct causal link between wasting and health problems, but jockeys were asked to indicate if they had been diagnosed by a medical professional with any health problems. However, few jockeys reported any professionally diagnosed health problems. The most commonly cited problems for jockeys, generally, were dental problems (17.1%) and, for female jockeys, menstrual problems (20%). Other professionally diagnosed problems reported by participants included low blood pressure (7.2%), osteoporosis (2.4%), kidney problems (2.4%), gastric problems (2.4%), reproductive problems (2.4%), low iron levels (2.4%), hemorrhoids (2.4%), mild epilepsy (caused by a race fall; 2.4%) and eye dryness and infections (2.4%).

### *Discussion*

Study 1 investigated the weight-management and weight-loss techniques used by currently licensed and apprenticed jockeys. The study aimed to provide further insight into the weight-loss practices jockeys use to maintain riding weight. It also aimed to explore the effects of weight-loss behaviours on the physical and psychological health and wellbeing of jockeys, paying particular attention to mood, disordered eating and social interactions. Although a number of jockeys in the weight loss group were not affected by weight management practices, the current results support the observation that the struggle to maintain a low body weight has many negative psychological and social consequences on the lives of professional jockeys.

### *Weight Management*

Previous research has stated that for a successful career as a jockey, individuals should be able to maintain body weight at around the 52 kg to 53 kg mark throughout their racing career (Moore et al., 2002; Speed et al., 2001). Jockeys in the current study reported a weight range from 47.5 kg to 66 kg, indicating that not all jockeys stay within the stated ideal weight range. The sample average weight of 53.9 kg was 14.7% greater than the current minimum weight (46 kg) carried by horses in handicap flat races and at least 3.5% (1.9 kg) more than the current minimum weight for Group 1 (50 kg), Group 2 (51 kg) and Group 3 and Listed (52 kg) handicap races for horses four years old and over (Racing Victoria Limited, 2006c).

Further consideration of jockeys' average weight showed that in comparison to previous research (Hill et al., 1998; Labadarios et al., 1993; Leydon & Wall, 2002; Moore et al., 2002), the current sample's mean weight was 1 kg to 3.45 kg heavier than previously reported averages. This disparity could be explained by the corresponding greater height of the current sample. Comparisons showed that the average height of the current sample (1.62 m) was 1 to 3.9 cm taller than the mean heights reported in previous research (Hill et al., 1998; Leydon & Wall, 2002).

The increase in the heights could be a reflection of the increasing height of the Australian population (Norton et al., 1996). Norton et al. (1996) pointed out that people's height in Australia was increasing at a steady rate of 1.23 cm (females) to 1.33 cm (males) each decade. Norton et al. (1996) felt that the continual increase in the body size of the population was decreasing the potential jockey pool, meaning that more individuals who were not physically appropriate (size-wise) for the profession were becoming jockeys.

Hill and O'Connor (1998) echoed the idea that the pool of potential jockeys was getting smaller when considering the physical size of the population. Based on the ABS statistics (Australia Bureau of Statistics, 1995), they pointed out that 3.8% of Australian males weighed less than 60 kg and 0.2% were less than 50 kg. Hill and O'Connor (1998) felt that this would contribute to a declining number of jockeys over the next 10 years.

Contradicting this supposition, however, was the increase in the number of apprentice jockeys in the last several years. At the time of their study, Speed et al. (2001) reported a population of 55 Victorian apprentice jockeys, while the current study's apprentice jockey population was 63. The increase in the number of apprentice jockeys, coupled with the higher average height and weight of the current sample, supports Norton et al.'s (1996) belief that taller and heavier individuals are entering the profession and attempting to meet the low weight requirements.

Even though jockeys are taller and heavier, strong evidence shows that jockeys come from an anthropometric minority of the population. By examining ABS (2002) data on BMI it can be seen that only 2.7% of the Australian population are categorised as underweight while 9.5% of the current sample meet this criterion. Moreover, 28.6% of jockeys fall within the lower part of the normal range (18.5 – 20.0) while only 5.3% of Australians would be classified as having BMI within this limit. This means that 38.1% of the current sample had BMI scores under 20 as compared to 8% of the general population.

At this point it should be noted that although the BMI is an easily accessible, affordable and objective anthropometric measure, it does have limitations (Abernethy, Olds, Eden, Neill, & Baines, 1996; H. Prentice & Jebb, 2001). Prentice and Jebb (2001) were especially concerned with classifying some individuals, particularly

athletes, based on BMI scores. They pointed out that elite athletes often have high levels of muscle mass (rather than body fat) and this can equate to higher body weights, and in turn, inappropriate anthropometric classifications. As previous research has indicated that jockeys are ectomorphic-mesomorphs (increased muscle bulk and low levels of body fat; Hill & O'Connor, 1998; Pruscino et al., 2005) there was some reservation about using the BMI to categorise the current sample, and although the results indicated that jockeys had relatively low BMI scores, this may have been an overestimation and misrepresentation of their anthropometry.

Notwithstanding the inability of the BMI to discriminate between body fat and muscle mass, previous research has also used this measure to assess the anthropometry of jockeys. Comparisons with other studies have shown that the proportion of jockeys with BMI scores under 20 has remained relatively stable over time and across countries. M. B. King and Mezey's (1987) data from almost two decades ago revealed that 40% of English jockeys had a BMI under 20. A year later, research by Apted (1988) on nine Victorian jockeys revealed that 33.3% had a BMI under 20. Later research (Leydon & Wall, 2002; Moore et al. 2002) did not report the range of the sample's BMI scores, but its average scores (20.4 and 20.2 respectively) were very similar to the current sample (20.5).

In addition to examining jockeys' anthropometry, the current study aimed to gather information about the type and number of weight-loss methods jockeys engaged in. The hypothesis that jockeys would engage in multiple weight-management behaviours was supported. Like previous research (e.g., Hill et al., 1998; M. B. King & Mezey, 1987; Moore et al., 2002), the current findings indicated that jockeys use a variety of unhealthy weight-control behaviours to meet race weight. On average, jockeys in the current sample used a combination of approximately six different

methods to lose or manage weight. In addition to regular track work (exercise as a jockey 95%), jockeys reported engaging in food restriction (88.1%), fluid restriction (78.6%), additional exercise (76.2%) and exercising in sweat gear (72.5%).

Many of these dehydrating behaviours (fluid restriction, exercising in sweat gear and/or having a spa or hot bath) were more prevalent the day before race days, and on race days. This indicates that weight-loss techniques aimed at reducing fluid levels were a “last minute” solution for jockeys to meet race weight. This pattern of weight-loss behaviour is not dissimilar to those reported for boxers (Ohhashi et al., 2002) and judoka (Coles, 1999).

Jockeys preference to be dehydrated for the shortest amount of time possible could be for a combination of reasons. First, there is a risk of negative effects on physical wellbeing (e.g., symptoms of heat illness such as, muscular cramps, headaches, dizziness, fainting; Armstrong & Maresh, 1993; Barrow & Clark, 1998; Coris et al., 2004, Wexler, 2002), physical performance (e.g., muscular strength, cardiorespiratory endurance; e.g., Burge et al., 1993; Filaire et al., 2001), cognitive functioning (e.g., memory, decision making; Cian et al., 2000) and mood (e.g., mental fatigue, irritability; Choma et al., 1998; Filaire et al., 2001). Secondly, fluid loss is only a short-term solution to weight loss because consuming fluid immediately increases body weight (Schmidt, 2004).

Understandably, given the associated negative effects, some jockeys may choose to avoid the use of dehydration weight-loss methods altogether. This assumption is given support by the fact that no jockey included in the study used dehydration techniques alone. Jockeys who used weight-loss techniques also used more long-term solutions either exclusively or in addition to dehydration weight-loss methods.

Given that most jockeys reported using a variety of weight-loss techniques, it is not surprising that many struggled to manage weight (80.5% of jockeys reported having experienced some degree of difficulty maintaining race weight). It should be mentioned that in this study, jockeys' self-reported difficulty managing weight was a subjective construct. Despite 19.5% of jockeys reporting that they never had any difficulty managing weight, only one jockey reported not having to use weight-loss techniques. This may mean that despite having to use weight-loss techniques, for some jockeys this was not perceived as a problem. This could be because weight management was part of a jockey's accepted routine and, like regular exposure to heat stress (Sparling, 2000), jockeys could develop a tolerance for weight management. Even so, most jockeys did not feel that weight management was effortless or comfortable. Almost half of the sample (48.8%) *usually* or *often* experienced difficulty when meeting race weight. This is similar to results reported by Atkinson et al. (2001) who found that 46% of jockeys indicated that weight control was "difficult."

Further consideration of jockeys' difficulty managing riding weight requirements showed that several weight-loss factors were fairly strongly inter-correlated. Positive relationships were shown between jockeys' difficulty managing weight, the average amount of weight they usually needed to lose, their usual weight and the number of weight-loss methods they used to manage weight. Surprisingly, the weakest correlation was between jockeys' usual weight and the number of weight-loss methods they used ( $r=0.37$ ,  $p=0.017$ ), with only 13% of the variance between the two variables explained. This could indicate that some "lighter" jockeys needed to use several types of weight management to meet race weight. Lighter jockeys may be

trying to lose similar proportions of weight to heavier jockeys because they could be striving for lower riding weights.

### *Weight Management and Mood*

One of the negative consequences associated with weight-loss behaviour and jockeys' wellbeing was hypothesised to be the negative impact weight loss has on mood. Findings from the current study support the notion that there is a significant association between jockeys' weight-loss behaviour and negative mood. Consistent with research on boxers (Lane, 2001), judoka (Filaire et al., 2001), body builders (Newton et al., 1993), rowers (Terry et al., 1999), wrestlers (Choma et al., 1998; Lander et al., 2001) and jockeys (Caulfield et al., 2003), the majority of jockeys reported experiencing angry thoughts (51.2%), depressed mood (63.4%), mental fatigue (75%) and irritability (77.5%) when managing weight.

To appreciate how high the above figures are, consideration should be given to the frequency of affective problems in the general population. ABS data showed that 4.5% of Australians self-reported experiencing affective problems (Australia Bureau of Statistics, 2003). Even if only frequent (*often* and *always*) responses were considered (e.g., angry thoughts 15%, depressed moods 22%, irritability 25%), it can be seen that the prevalence of affective problems reported by jockeys is much higher than in the general population. Of particular concern is the high occurrence of depressed feelings when considering that people with depression are three times more likely to experience suicidal ideation and attempt suicide (De Leo, Cerin, Spathonis, & Burgis, 2005).

In addition to examining mood, the current study also attempted to gain insight into the psychological effects of wasting that have been reported anecdotally. The data showed that reported incidents of mood swings (Henke, 1999; Hislop, 2002), angry outbursts (Cormick, 2006; Prendergast, 2001), and persistent thoughts of thirst and hunger (Harris et al., 2001) by jockeys during the weight-loss process were not isolated incidents. Over half of the jockeys included in the current sample reported experiencing these consequences at some stage while they were wasting.

Another psychological consequence of weight management that had not previously been examined, despite anecdotal reports (Hillenbrand, 2001; Power, 1999), was suicidal ideation. The current study found that 12.5% of jockeys reported *rarely* or *sometimes* having suicidal thoughts. When examining this data, it may be important to consider the average age of participants (29.6 years). Recent Australian data found that people in the age bracket of 25-34 years were more likely to consider suicide. In fact, the prevalence of suicidal ideation in this age group was 12.7% (De Leo et al., 2005), very similar to the occurrence rate in jockeys.

Positive correlations confirmed the belief that negative psychological effects were associated with weight loss. As the number of weight-loss methods required to make race weight increased, so did the frequency of jockeys' persistent thoughts about thirst and food, reported feelings of depression, anxiety, irritability and mental fatigue, irrational, angry and suicidal thoughts, mood swings and sleep disturbance. These findings lend further support to the fact that weight management plays a significant role in the frequency of negative psychological effects in jockeys.

Examining jockeys responses on EDI-2 items provided further evidence of the relationship between weight loss and mood. Jockeys who usually lost weight were the

only participants who indicated that they *usually* or *often* experienced mood swings and were described as easily irritated and/or were prone to anger and rage.

The results indicated that jockeys frequently experienced negative moods while wasting. Given that almost 78% of the current sample usually lost weight for rides (and rode in an average of 10.5 rides a week), it is possible that most jockeys may experience negative mood most of the time. This raises questions about the quality of life experienced by jockeys and this should be addressed in future research and possibly via mandated changes to practices in the racing industry.

### *Weight Management and Eating Disorders*

In the current study, it was understood that the diagnosis of an eating disorder could not be made on the basis of a self-report measure alone (Byrne & McLean, 2002). The EDI-2 results were approached from an eating disorder symptomatology standpoint. As suggested by Garner (1991) and Landers (2002), traits and psychological themes associated with eating disorders were examined using the data for the 11 different subscales to identify whether the jockeys in the current sample were at risk of developing eating disorders.

To get a clearer indication of the eating behaviours of jockeys, a comparison was made between the scores recorded on the EDI-2 from an eating disorder patient population (Garner, 1991) and those recorded by the jockeys in the current study. At this point it should be noted that, as eating disorders are more likely to occur among females (American Psychiatric Association, 1994, 2000; Baum, 2006; Franko & Keel, 2006), the eating disorder comparison population was a female sample whereas most

of the current sample of jockeys were males. Garner (1991) indicated that it was important to match gender when comparing samples on some of the subscales (i.e., drive for thinness, body dissatisfaction and interoceptive awareness) as males were more likely to have lower scores than females. Unfortunately it was beyond the scope of the current study to include a matched gender eating disorders population.

Despite this the results from the comparing the two samples showed that the mean score of jockeys on the interpersonal distrust subscale did not differ significantly to the eating disorder patient population. That is, both populations recorded elevated scores on this subscale suggesting that jockeys also experienced feelings of alienation from others, an unwillingness to form close relationships and a disinclination to express thoughts and feelings (Garner, 1991).

Given jockeys' preference for secrecy due to the insecure nature of the industry (Schmidt, 2004; Thomas, 2008), it is not surprising that interpersonal distrust was the only subscale that revealed no significant difference between the two groups ( $t(37)=-2.01, p=0.052$ ). Essentially jockeys are independent contractors who compete with other jockeys to gain rides (DeBenedette, 1987). Their business depends upon having an edge over other jockeys so any hint of hardship or struggle can mean the loss of rides and wages (Schmidt, 2004; Speed et al., 2001).

In relation to the remaining subscales, the results from the single-sample *t*-tests (which included the current jockey population and an eating disorder patient population) demonstrated that jockeys scored significantly lower on the 10 subscales (drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interoceptive awareness, maturity fears, asceticism, impulse regulation and social insecurity) than the eating disorder patient population. This indicates that, in general, jockeys are not a population at risk of developing eating disorders. These findings did

not support the hypothesis that because of the nature of the sport, jockeys would be vulnerable to eating disorders. These results are contradictory to several previous studies, which have indicated that athletes in weight restriction sports are at a greater risk of developing eating disorders due to their weight-management behaviours (Haase et al., 1999; Sundgot-Bogen, 1993; Sundgot-Bogen & Klungland, 2002; Swoap & Murphy, 1995; Taylor & Ste-Marie, 2001). Instead the results reinforce findings by M. B. King and Mezey (1987), who found that jockeys did not display evidence of the psychopathology central to clinical eating disorders.

Interestingly, M. B. King and Mezey (1987) theorised that a protective factor for the sample of English jockeys was the off-season. They felt this gave their participants relief from continuous weight loss. The findings from the current study help to disprove this theory as Victorian jockeys have no set off-season (Racing Victoria Limited, 2006b) and find it difficult to have a break from racing (see results from Study 2 and 3). M. B. King and Mezey (1987) also theorised that perhaps jockeys were not prone to eating disorders because they were aiming for a definable weight target within a set time limit. This theory is not supported by research in other weight sports, which has found that athletes who also have definable targets and set time limits have a propensity towards developing eating disorders (Haase et al., 1999). Perhaps for jockeys, a factor protecting them from eating disorders is that their goal weight is continually changing (jockeys can accept different riding weights during and between race meetings; Hawley & Burke, 1998). In addition, jockeys required weight ranges are very narrow (plus or minus half a kilogram) and serious repercussions (monetary fine and/or suspension) can arise if they do not meet these requirements (heavier or lighter). Although jockeys have the option of using lead weights to increase body weight, there is a feeling this is not a preference of owners and trainers (see Study 3).

The higher proportion of male jockeys in the current sample should be taken into account. Although research has found eating disorders were evident in male athletic populations (Stoutjesdyk & Jevne, 1993; G. Torstveit, Rolland, & Sundgot-Borgen, 1998) there seems to be a higher prevalence in female athletic populations (Johnson et al., 1999; Stoutjesdyk & Jevne, 1993; Sundgot-Bogen & Klungland, 2002; Sundgot-Bogen et al., 1999). It has been suggested that while both female and male athletes are exposed to specific sport related pressures to be thin, the pressure on female athletes is two-fold. In addition to the demands of sport to maintain a light weight or slim physique (Taylor & Ste-Marie, 2001), female athletes are also exposed to socio-cultural pressures that promote thinness as an ideal (Beals & Manore, 1994; Byrne & McLean, 2002). Conversely, societal pressure for males promotes a larger muscular frame (Goldfield, Blouin & Woodside, 2006).

Supporting the idea that socio-cultural pressure (Beals & Manore, 1994; Byrne & McLean, 2002) and the demands of sport (Taylor & Ste-Marie, 2001) increased the likelihood of females developing eating disorders are the findings that three female participants in the current study revealed scores higher than or equal to the eating-disordered comparison group on the drive for the thinness and body dissatisfaction subscales. According to Garner et al. (1987) and Malinauskas et al. (2007) high scores on the drive for thinness and body dissatisfaction subscales are associated with an increased likelihood of developing an eating disorder. Therefore, these findings support previous research on athletic populations that has shown female athletes are at a higher risk of developing eating disorders than male athletes (Rouveix et al., 2007; Sundgot-Borgen & Klungland, 2002). In fact, the current findings indicate that the risk of an eating disorder may be slightly higher in female jockeys (30%) than in other athletes such as judo players (25%; Rouveix et al., 2007).

Jockeys' lack of conformity to the intra-individual explanation for eating disorder development could be another factor protecting them from eating disorders (Abood & Black, 2000; Byrne & McLean). This explanation suggested that characteristics of elite athletes, like perfectionism, make them more vulnerable to eating disorders (Abood & Black, 2000; Byrne & McLean; Franco-Paredes et al., 2005; Pollice et al. 1997). The findings of the current study showed that jockeys had very low scores on perfectionism. Single-sample *t*-tests comparing the current sample to a non-clinical male population revealed that jockeys' scores on perfectionism were even lower than this non-clinical comparison ( $t(33)=-3.64, p=0.001$ ) indicating that jockeys do not feel that only outstanding performances are acceptable to themselves and others (Garner, 1991).

Single-sample *t*-test comparisons between jockeys and a non-clinical male population also revealed that jockeys had significantly lower scores on the impulse regulation subscale ( $t(36)=-4.65, p=0.0005$ ). This was not a surprising outcome as high scores on this subscale indicated an impetuous nature (Garner, 1991) which is unlikely to be evident in jockeys as they plan and strategise for their race rides (DeBenedette, 1987; Schmidt, 2004; Sperling, 2002) and consistently meet the most stringent weight requirements of any weight division sport (Hawley & Burke, 1998). Evidence of jockeys' control over their impulses was shown by the high percentage of participants who reported frequent restriction of food (88.1%) and fluid (78.6%) to manage weight.

No significant difference was found between the jockeys and the non-clinical comparison population on any of the eight remaining EDI-2 subscales. Nevertheless, it should be noted that the difference between the two populations on the drive for thinness subscale approached significance ( $t(38)=-4.55, p=0.004$ ; alpha level set at

0.002 after a Bonferroni adjustment), meaning that jockeys would have a greater fear of weight gain than the male comparison group if the sample size were larger.

Although most jockeys included in the research did not reveal characteristics associated with eating disorders, responses to EDI-2 items related to eating behaviour indicated that most jockeys were preoccupied with weight loss. The results showed that a high proportion (55.2%) of jockeys who usually needed to lose weight to meet race weight frequently thought about dieting. In addition, 45.9% of jockeys were terrified of gaining weight and 40.5% worried that if they did gain weight they might not be able to stop.

Another interesting finding from the individual EDI-2 items was jockeys' engagement and cognitive preoccupation with binge eating. Although only two jockeys showed scores similar to, or above, the means of the clinical eating disorder comparison on the bulimia subscale, over half (52.6%) of the sample thought about binge eating at some stage and 41% had engaged in binge eating. Considering Fries' (cited in Beals & Manore, 1994) notion that eating and dieting behaviour occur along a continuum, starting from a healthy concern for weight management and leading to serious eating disorders, these results may be of concern.

Another factor that should be noted when interpreting the results is that participants' responses to eating disorder questionnaires have not always been an indication of the existence of an eating disorder, or lack thereof (Wilmore, 1995). The problem being that eating disorders are often poorly assessed by self-report measures (Fairburn & Beglin, 1990). The influence of the inherent secretiveness of eating disorders (Wilmore, 1995), the tendency of those with eating disorders to deny their illness (G. M. Russell, 1995), the cautious nature of jockeys (Schmidt, 2004; Speed et al., 2001) and a fear of the reaction of others (such as family, other jockeys and

trainers and owners) may have influenced answers. This should be taken into account when considering participants' willingness to respond truthfully to questions.

Galloway and Groeller (1996) also recognised the difficulty in getting participants to respond to questionnaires about weight management. They cited the extreme sensitivity of the topic (despite assurance of anonymity) and the pressures of competition as significant difficulties facing research in weight loss. For jockeys, this is magnified even further as their reputation can limit their ability to gain rides (Schmidt, 2004).

M. B. King and Mezey (1987) suggested another factor that may have influenced the prevalence rates of disordered eating in jockeys. During their research, they discovered anecdotal evidence (reports that trainees had dropped out due to severe and uncontrolled weight loss) that implied that those jockeys who had developed eating disorders had been unable to continue in the profession.

Despite the numerous reasons to treat the eating disorder related data with caution, the results from the current research provide a picture of jockeys' eating behaviour, cognitions and eating disorder symptomatology. Although there was no evidence that jockeys were at risk of eating disorders, concerns were raised about some eating behaviours (bingeing), preoccupation with weight loss and certain groups of the jockey population (i.e. female jockeys).

### *Weight Management and Social Effects*

In previous research, food restriction has been shown to reduce the social interactions of individuals and affect social relationships (Keys et al., 1950). Given

the importance of social support and social interactions on an individual's physical and psychological health (Wilkinson & Marmot, 2003) questions concerning social interactions and relationships were included in the study.

Although research concerning wasting and jockeys and its effect on their social relationships and activities is extremely scarce (a review of the literature revealed one study of South African jockeys), previous research on other weight division sports suggested that weight restrictions can limit social interactions and strain social networks (Fraser, 2001; Manroe, 1996). It was hypothesised that jockeys' weight-management behaviour would be associated with negative effects on their social interactions and relationships. The results from the current study supported this hypothesis. These findings echoed anecdotal reports from jockeys and their families which indicated that wasting can affect their interaction with family and friends and their ability to take part in social occasions such as Christmas (Bartley, 2007a; Beadman, 2005; Eddy, 2007; Reed, 2007; Thomas, 2006).

The findings showed that a majority of the jockeys (76%) experienced some form of negative effect on their social life, with 39% stating they frequently experienced difficulty engaging in social activities. Although the possible causes of these difficulties were not explored (e.g., fear of temptation to eat or drink, fatigue), it appears that the need to achieve and maintain riding weight negatively influences social interaction. When the number of weight-loss methods used by participants to manage weight increased, so too did the frequency of difficulties experienced with relationships, engaging in social activities and socialising outside of work.

Further evidence of the negative consequences of weight loss on jockeys was seen in jockeys' responses on EDI-2 Item 87 (I would rather spend time by myself). The data showed that 83.3% of jockeys who *often* or *usually* reported spending time

on their own, also experienced at least four negative social effects while wasting. Furthermore, all the jockeys who frequently (*often* or *usually*) preferred to spend time on their own usually needed to lose weight to meet race weight. This may imply that many jockeys cope with the negative consequences of wasting by spending time on their own. Further research is needed to determine the reasons behind jockeys' preference to socially isolate themselves while wasting.

Another social concern for jockeys was their elevated scores on the EDI-2 interpersonal distrust subscale. This indicates that jockeys feel isolated and are reluctant to form bonds or express thoughts and feeling to others. This may be a result of jockeys' need to maintain a positive professional image to secure rides (Schmidt, 2004; Speed et al., 2001).

The elevated scores on the interpersonal distrust subscale and the negative effect weight loss has on jockeys' mood, suggests potential problems for jockeys' social wellbeing. The racing season is year long and jockeys ride in an average of 10.5 races per week (with 77.5% of jockeys usually having to lose weight to meet riding requirements), thus jockeys may be sacrificing a healthy social life to meet the weight restrictions imposed by the profession.

From a mental health perspective, if a person is isolated from social support it can result in feelings of anger, loneliness, anxiety and depression (McDougall et al., 2001). This could suggest a complex relationship between mood, social support and weight-management behaviours. From a physical health perspective, social networks help individuals feel valued and cared for and act as a protective factor against illness and disease (Wilkinson & Marmot, 2003). Therefore, the current study yielded important information and raised concerns regarding jockeys' social wellbeing, but its scope was limited to seven questions specifically related to social interaction and

relationships and implications from the EDI-2. Further study into this area is warranted given the importance of social bonds to a person's physical and psychological health (Gould et al., 2002; Pearson, 1990; Sarason et al., 1990; Weinman et al., 1995; Wilkinson & Marmot, 2003).

### *Weight Management and Mental Health Disorders*

Although the current results indicated that the majority of jockeys did not have a propensity toward developing an eating disorder, the results do cause concern when considering the diagnostic criteria for some other mental health disorders. Many of the effects reported by jockeys, in terms of the mood and social disturbances, were consistent with symptoms identified in several *DSM-IV-TR* disorders (American Psychiatric Association, 2000).

When considering the *DSM-IV-TR* diagnostic criteria for a Major Depressive Episode (American Psychiatric Association, 2000) jockeys' reports could be considered to meet several of the diagnostic criteria. These include depressed mood, fatigue, suicidal thoughts and impairment of social and occupational areas of functioning. Depressed mood and fatigue are also identified as diagnostic criteria for Dysthymic Disorder.

Jockeys also reported experiencing feelings of anxiety and irritability. These symptoms, along with sleep disturbances, fatigue, and impairment of social and occupational functioning, are listed as diagnostic criteria for General Anxiety Disorder (American Psychiatric Association, 2000). Although persistent thoughts about food and thirst were not identified by jockeys as causing anxiety or distress,

they were considered to be serious in their severity by 31% and 40% of jockeys respectively, creating a parallel between these persistent thoughts and obsession symptoms of Obsessive-Compulsive Disorder (American Psychiatric Association, 2000).

While the effects reported do not fulfil all the diagnostic criteria for the *DSM-IV-TR* disorders (American Psychiatric Association, 2000), they do indicate that jockeys may be experiencing as yet undetermined mental health issues related to their weight management.

#### *Weight Management and Physical Effects*

Losing weight using food restriction and behaviours that promote dehydration can lead to serious negative physical effects (American Association of Family Physicians, 1998; Opplinger & Bartok, 2002; Wahl, 1999). The current study did not include diagnoses made by medical professionals. Therefore, no direct causal link can be made between the physical symptoms experienced by jockeys and the use of weight-management techniques. Nevertheless, jockeys' self-reports supported the hypothesis that jockeys would experience the negative physical effects associated with dehydration. Food restriction and weight-management behaviours that promote fluid loss have been shown to contribute to dehydration (Hawley & Burke, 1998; Opplinger & Bartok, 2002; Pendergast et al., 1996) and can lead to a rise in body temperature (Hassanien et al., 1992) and an increased risk of heat illness (American Association of Family Physicians, 1998; Coris et al., 2006; Howe & Boden, 2007). The findings from the current study indicated that many jockeys experienced

symptoms related to heat illness when they were managing weight. For instance, over 65% of jockeys reported experiencing cramps, which were characteristic of third stage or above heat illness. In addition, cramps are often associated with decreased sodium levels caused by dehydration (Opplinger & Bartok, 2002; Howe & Boden, 2007; Latzka & Montain, 1999; Mellion & Shelton, 1997; Wexler, 2002).

Almost 62% of participants reported feeling dizzy, while 14.3% had fainted at some stage while wasting. Both of these physical consequences are symptomatic of heat syncope, the second stage of heat illness (Armstrong & Maresh, 1993; Howe & Boden, 2007; Sandor, 1997; Wexler, 2002). Jockeys also reported fourth stage heat illness, or heat exhaustion symptoms while wasting. Forty-five percent of jockeys felt nauseous, 52.4% experienced an upset stomach and 78.6% experienced feeling fatigued at some stage when they were managing weight. In addition, 77.5% of participants reported feeling irritable which is another possible symptom of heat exhaustion (Armstrong & Maresh, 1993; Howe & Boden, 2007; Wexler, 2002). These figures are of some concern given that the long-term consequences of heat exhaustion are unknown (Coris et al., 2004).

At this stage, it should be noted that the symptoms of heat exhaustion are similar to those of heatstroke, but include a body temperature above 40.5 °C, failing or cessation of the sweating mechanism and neurological problems, including ataxia and coma (Coris et al., 2004; Hassanien et al., 1992; Howe & Boden, 2007).

Unfortunately it was beyond the scope of the current research to measure jockeys body temperature and the questionnaires did not address the inability to continue sweating. Even so, due caution should be taken as other symptoms consistent with heatstroke were reported by jockeys and heatstroke is the third leading cause of death in athletic populations (Coris et al., 2006; Lee-Chiong & Stitt, 1995). Even if the

symptoms reported by jockeys are indicative of just heat exhaustion and not heatstroke it seems unlikely, given jockeys' hectic schedules (Racing Victoria Limited, 2006b) and their dehydrated state on non-race days (Pruscino et al., 2005; Warrington et al., 2006), that they are acting appropriately (e.g., rehydration, gradual return to activity) to reduce their future risk of serious heat illness (Armstrong et al., 1990; Armstrong & Lopez, 2007; Coris et al., 2007).

The current findings are similar to those found by Ohhashi et al. (2002) when investigating the effects of weight management on boxers' wellbeing. They found that when boxers engaged in rapid weight loss, like jockeys in the current study, they experienced fatigue and dizziness. Anecdotal reports by jockeys also echo the current findings. Jockeys have reported having difficulty sleeping because of the effects of dehydration (Harris et al., 2001). They have also reported fainting and excruciating cramps (Baptiste, 2000a; Christine, 2001; Hoffer, 2001; Stewart & Habel, 2001).

Another concern for jockeys' physical wellbeing was the amount of body weight lost. Two thirds of jockeys reported usually needing to lose between 1.77% and 7.74% of their body weight ( $M=2.9\%$ ,  $SD=1.97$ ) to meet race weight. This is a high figure given that Walberg-Rankin (2000) identified a 2% loss of body weight as the threshold beyond which there may be serious physical and psychological impairment.

Nevertheless, correlations revealed fairly strong relationships between the number of weight-loss methods used by jockeys to make race weight and the frequency of experiencing several negative physical consequences. The more weight-loss methods jockeys used, the more likely they were to frequently experience muscular cramps, fatigue, nausea and dizziness. These results may indicate that the more weight-loss methods jockeys used, the more dehydrated and/or depleted in

energy they became (as the number of weight-loss methods was correlated to the amount of weight jockeys usually lost to make race weight) and the more they experienced symptoms of dehydration, heat illness and energy deficiency.

Very few jockeys reported any professionally diagnosed illnesses. Unlike Labadarios, et al. (1993) who found that 25% of jockeys experienced musculoskeletal problems, the current study found that only one jockey indicated any health issues related to this area (osteoporosis). Moreover, substantially less of the current jockeys reported experiencing gastrointestinal problems when compared to South African jockeys (2.4% compared to 13%). The most common issue reported by the current sample were dental problems (17%). These disparities may be accounted for by differences in the questionnaires used in each study (e.g., Labadarios et al., 1993). It could be that jockeys in this study did not experience any of the issues listed in the research, simply because they did not seek medical attention for their physical complaints. They may have preferred to avoid diagnosis because they were reluctant to reveal personal information that could be damaging to their careers. Jockeys' reluctance to reveal personal information is a concern when considering it may impact on their likelihood to seek medical attention for any of the physical effects they experience while working.

As the sample included all male jockeys, another medical condition not examined by Labadarios et al. (1993) was menstrual dysfunction. This was a relatively frequently reported issue in the current research (20% of female jockeys). One of the recognised causes of amenorrhea is low body weight or low body fat due to food restriction and excessive exercise (Knight & Robson, 2006). Although no direct causal link was made during the current research, it is not surprising that other researchers have linked menstrual dysfunction to disordered eating in female athletes

(Beals & Hill, 2006; Rouveix et al., 2007; Sherman & Thompson, 2006). If left untreated, amenorrhea can lead to consequences such osteoporosis, fertility problems (Knight & Robson, 2006) and low bone density (Fruth & Worrell, 1995; Myburgh et al., 1990; Punpilai et al., 2005), which can play a role in the development of injuries such as stress fractures (Bennell et al., 1997; Fruth & Worrell, 1995; Peer, 2004). For some athletes who have suffered menstrual dysfunction, even after regular menses has resumed for several years, low bone density can continue to be an ongoing issue (Keen & Drinkwater, 1997).

Even though it was beyond the scope of the current research to medically assess the negative physical consequences jockeys experienced while wasting, the current findings do indicate some cause for alarm. The amounts of weight that jockeys reported losing was of concern, but symptoms related to high levels of heat illness most likely brought on by dehydration are probably of greater concern given the likelihood of serious illness and/or death (American College of Sports Medicine et al., 2000; Armstrong et al., 1990; Coris et al., 2006; Hassanien et al., 1992; Lee-Chiong & Stitt, 1995).

## Chapter 12: Study 2 - Jockey Interviews and Race Day and Non-Race Day Testing

For jockeys, there is a daily preoccupation with weight management that often takes priority over most other aspects of their lives (Bishop & Deans, 1996; M. B. King & Mezey, 1987). The demand to maintain a weight below the physical norms means that many jockeys engage in one or more weight-loss behaviours that can be detrimental to their health (Apted, 1986; Moore et al., 2002).

Results from Study 1 indicate that almost half of jockeys usually or often have difficulty engaging in weight-management techniques. Many jockeys reported that wasting was associated with negative mood disturbances such as mood swings (83.3%), irritability (77.5%), mental fatigue (75%), depression (63.4%), angry outbursts (52.4%) and angry thoughts (51.2%). Physically, jockeys reported feeling fatigued (78.6%), muscular cramps (66.7%), dizzy (61.9%), upset stomach (52.4%), nauseous (45%) and actually fainting (14.3%) when they were wasting. Additionally, 76% of jockeys reported experiencing difficulties with social interaction and/or relationships (e.g., engaging in social activities) while they were wasting.

These results extended on previous research, which showed that when jockeys were wasting they reported increased irritability (M. B. King & Mezey, 1987), anger, depression, confusion and tension (Caulfield et al., 2003) and decreased levels of energy (Caulfield et al., 2003; M. B. King & Mezey, 1987). Anecdotal evidence has also indicated that wasting jockeys experience nausea (Harris et al., 2001), extreme fatigue (Edwards, 2008), cramps (Baptiste, 2000a), dizziness, fainting (Christine, 2001; Hinds, 2006; Hoffer, 2001; Stewart & Habel, 2001; Thomas 2006), strained relationships with family (Bartley, 2004; Beadman, 2005; Eddy, 2007; Henke, 1999;

Power, 1999; Thomas, 2006) and difficulty with social interactions (Bartley, 2007; Hoffer, 2001; Reed 2007).

The evidence suggests that although many jockeys find it difficult to engage in weight-management behaviour and experience negative physical, psychological and social consequences, there are factors at play that encourage them to continue with the risky behaviours that are currently perceived as a necessary part of their profession. In order to understand the decisions made by jockeys it was decided to draw from the theories of *optimistic bias* (Weinstein, 1987, 1989) and the *Health Belief Model* (Rosenstock, Strecher, & Becker, 1988).

Optimistic bias occurs when individuals believe that they are less vulnerable to a risk than other people (Weinstein, 1989). This is a robust concept that is not limited to any particular age, sex, educational, mental health status or occupational group (K. J. Prentice, Gold, & Carpenter, 2005; Weinstein, 1987).

The Health Belief Model (HBM), a highly utilised theory in research, puts forth that individuals calculate the risks of certain behaviours using five fundamental factors (see Figure 12). These include (1) perceived susceptibility: a person's belief that they are susceptible to a negative outcome; (2) perceived severity: a person's belief about the seriousness of the consequences of a negative outcome; (3) perceived benefits: a person's belief in the efficacy of the recommendation(s) suggested to reduce the risk of a negative outcome or the seriousness of the repercussions; (4) perceived barriers: a person's belief about the costs of making changes reduce the risk/consequences of a negative outcome (e.g., pain, embarrassment, cost) and (5) self-efficacy: a person's confidence in his/her ability to change his/her behaviour to reduce the risk/consequences of a negative outcome (Clarke, Lovegrove, & Williams, 2000; Janz & Becker, 1984; Rosenstock, 1974; Rosenstock et al., 1988).

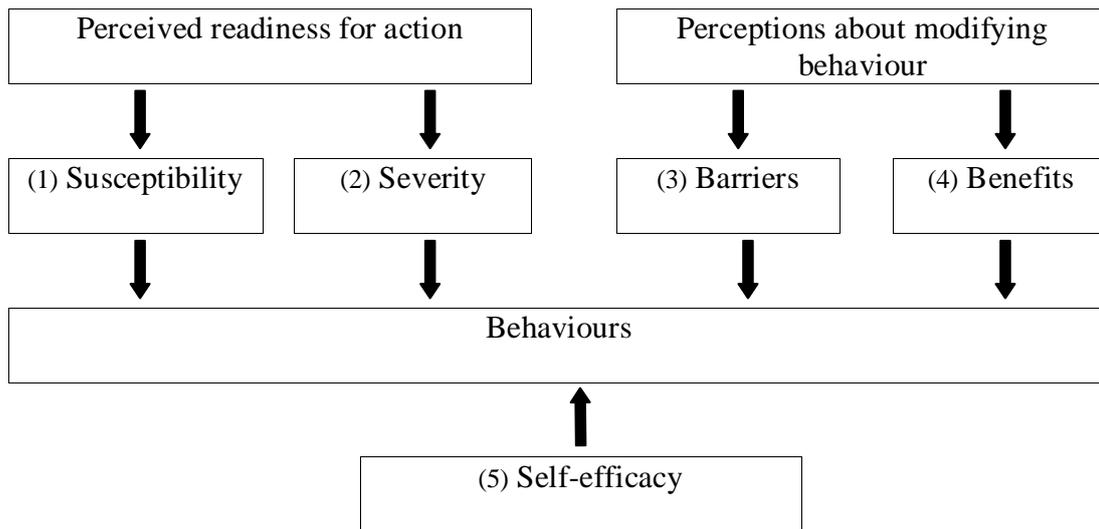


Figure 12. Health Belief Model.

Optimistic bias is often associated with the perceived susceptibility factor of the HBM. Through their research on screening for breast and prostate cancer, Clarke et al., (2000) found that optimistic bias can also be evident when considering perceived severity, perceived benefits and perceived barriers.

The second study reported here explored, in greater detail, the effects of weight management on jockeys' moods, physical health and social interactions. The study aimed to provide further insight into the experiences of jockeys, paying particular attention to the weight-loss practices jockeys use to maintain weight and the effects this behaviour has on physical and psychological health and wellbeing.

Study 2 used qualitative research to further validate, explain and extend upon the quantitative findings reported in Study 1 (Miles & Huberman, 1994). Interviews were used to gain insight into jockeys' experiences with weight management and their perceptions of the effects weight loss has on their psychological and physical wellbeing and social interactions. Jockeys' social interactions were highlighted as a

concern in Study 1, with 76% of participants experiencing some form of negative social consequences due to weight-management behaviours.

### *Method*

#### *Participants*

Jockeys indicated their interest in participating in Study 2 at the end of the questionnaire package they completed in Study 1. Six flat-race jockeys were contacted and they agreed to participate in the longitudinal data collection.

Participants included five male jockeys who were fully registered in Victoria at the time of the study and one male apprentice jockey who was completing his final year. All jockeys were currently riding between 10 and 25 races per week ( $M=18$ ,  $SD=6.27$ ) at the time of the study.

The jockeys were aged between 17 and 42 years with a mean age of 24.5 years ( $SD=8.5$ ). Their average height was 1.66 metres ( $SD=0.02$ ) and weights on non-racing days ranged from 51 kg to 58.7 kg ( $M=53.77$  kg,  $SD=2.96$ ).

#### *Measures*

During testing sessions, participants were requested to complete two questionnaires. The first questionnaire (see Appendix F) was developed specifically for the current study based on findings from Study 1 and previous research by Moore

et al. (2002) and Speed et al. (2001). It sought information on jockeys' demographics (e.g. age, weight, gender) and race day information about weight-loss behaviour and any physical and psychological effects experienced.

To explore jockeys' weight-loss behaviour, the first questionnaire asked participants to indicate how much weight they had lost to meet race weight and the time it had taken to lose this weight. In addition, jockeys were asked about their food and fluid intake, exercise sessions (jockey related exercise such as track work or races and other exercise) and sweating sessions. To extend on information gained in Study 1, jockeys were also asked if they had recently experienced any common physical and psychological difficulties such as fatigue and/or muscle cramps (Caulfield et al., 2003; M. B. King & Mezey, 1987; Pendergast, Horvath, Leddy, & Venkatraman, 1996; Fogelholm, Koskinen, Laakso, Rankinen, & Ruokonen, 1993; Lee, 1997).

The second questionnaire (see Appendix F) used in the study was the Circumplex Mood Inventory – Version 1 (CMI), which was designed to examine mood states (Birrer, 2003). The CMI was adapted from the German mood questionnaire, the *Befindlichkeitsskalen*, which has been used in sport and exercise research since the mid 1980s (Birrer, 2003). The CMI is a circumplex model approach that incorporates two broad dimensions: pleasant/unpleasant and activation/deactivation. The CMI includes 30 adjectives that group to form eight different subscales. The eight subscales include: positive activation (e.g., energetic, active), good mood (e.g., joyful, good humoured), calmness (e.g., relaxed, composed), contemplation (e.g., thoughtful, reflective), fatigue (e.g., sluggish, lacking energy), depressed mood (e.g., sad, unhappy), anger (e.g., peeved, irritated) and agitation (e.g., nervous, fidgety). Jockeys were asked how each adjective applied to them at that time. They responded to each adjective on a 5 point Likert-type scale with response

categories: *not at all* (score = 0), *a little* (score = 1), *moderately* (score = 2), *quite a bit* (score = 3) and *very much so* (score = 4; Birrer & Andersen, 2003).

The construct validity of the CMI was shown to be satisfactory as positive activation, good mood and calmness were positively correlated with positive activation scores on the PANAS. Negative CMI subscales (agitation, anger, depressed mood and fatigue) were positively correlated with the PANAS negative activation scale and negatively correlated with the positive activation scale. In addition, the CMI ambivalent scale (contemplation) showed no distinct relationship with either the negative or positive affect scores on the PANAS. Cronbach alpha scores ranging from .67 to .83 showed acceptable levels of internal consistency for the subscales (Birrer & Andersen, 2003).

For interviews with jockeys, a semi-structured interview guideline was developed based on responses in Study 1 and prior research by M. B. King and Mezey (1987), Speed et al. (2001) and Caulfield et al. (2003; see Appendix G). Interviews aimed to gather further information on weight-loss methods and the psychological and social effects of wasting. A semi-structured interview format was chosen so that information could be gathered on specific areas of interest (e.g., effects of weight management on mood) while still providing jockeys with the opportunity to describe their unique experiences.

Participants were asked about their careers as jockeys (e.g., how they first became a jockey), prior and current weight-loss methods, perceptions of the effects of wasting (physical, psychological and social effects), and any changes that they believed could be made to benefit jockeys' health and wellbeing.

A plain language statement explaining the aims and methods of the research, a consent form and a covering letter were sent to participants prior to participation in the study (see Appendix H).

### *Procedure*

Each participant was sent a letter, accompanied by a plain language statement explaining the aims and methods of the research and a consent form requesting their participation in the study (see Appendix H). This was followed up by telephone calls to give participants a verbal explanation of the study and to ask them to attend an introductory information session at RVL headquarters on a day they were not riding in any races. During the introductory session, testing procedures were explained and demonstrated and jockeys' weights and heights were measured using electronic scales and a height meter. No other data besides height and weight were gathered during these sessions. Completed consent forms were collected at this session. Jockeys under 18 years of age required parental or guardian permission to be involved.

After the introductory information session, data were collected in two stages: (a) on days when participants were riding in a race (and needed to meet a specific riding weight) and, (b) on days they were not riding in races. Race day testing sessions were conducted at four separate race meetings. Participants took part in two race day testing sessions and between one or two non-race day testing sessions (based on their availability and "days off"). Although non-race day testing sessions were conducted on days when participants were not riding at any race meetings, jockeys may have engaged in other professional duties such as track work and/or been

concerned with weight management in preparation for future rides. The times and settings of non-race day testing sessions were scheduled for the jockey's convenience, usually around the middle of the day, and were held either at RVL headquarters, the Victorian Institute of Sport (VIS) or at the jockey's home.

Race day testing occurred in rooms separate from the jockeys' rooms (rooms provided for jockeys to wait and prepare themselves for their rides), or screened off areas within the jockeys' rooms. Participants were tested twice on race days, 1.5 hours before their first race for the day, and again after their last race for the day. The earliest testing session was conducted at 11 a.m. and the latest testing session was conducted at 6 p.m. As jockeys had different riding engagements (jockeys rode in between one and seven races) testing times varied between participants.

During each testing session (including the two sessions on race days and the one testing session on non-race days), participants had their weight measured using electronic scales, and completed the questionnaire package. The two questionnaires took approximately 10 minutes to complete.

While completing questionnaire one on non-race days, participants were asked to consider the past 12 hours when responding. For the first testing session on race days (before race riding), participants were again asked to consider the past 12 hours when responding to questionnaire one. For the second testing session on race days (after race riding), participants were asked to consider the time since their first testing session (that morning). Regardless of the testing session, when responding to the CMI, participants were asked to think about their current mood state.

As the current study was qualitative in nature, the questionnaires were administered to participants verbally to be consistent with the interview section of the research. Verbal administration also gave the researcher opportunity to clarify

jockeys' responses (e.g., time spent in a hot bath) and respond to any questions from participants.

Participants' riding commitments meant that the number of participants in the testing area at any one time varied. Some jockeys were the only participant completing the questionnaires, while at other times up to five jockeys were in the testing area (e.g., two jockeys being verbally administered the questionnaires and three jockeys waiting to complete the questionnaire).

In addition to race day and non-race day testing sessions, jockeys took part in an interview to further investigate the effects of wasting on mood and social interactions. Face-to-face interviews that lasted approximately 1 hour were conducted at convenient locations (e.g., jockeys' homes or at a café) and times for jockeys.

Once their interview was transcribed (from the tape recording), jockeys were sent a copy of the transcript to give them the opportunity to comment or add any details.

### *Data Analysis*

The data were analysed separately and presented as individual case studies. To maintain confidentiality, jockeys were designated a pseudonym. Race day and non-race day CMI results were presented graphically and in text within each jockey's respective case study.

To ensure the trustworthiness of the interview, a researcher with training in counselling and the qualitative research process conducted interviews. The researcher familiarised herself with the available scientific and anecdotal reports about the topic

and gained advice and methodological guidance from a psychologist who had conducted qualitative research on the same population. The researcher also had extensive involvement with a weight-management sport through her roles as a competitor and counsellor. She used knowledge gained in these areas to enhance her understanding of the research topic, and in some instances, to create rapport with the jockeys.

The trustworthiness and reliability of the raw interview data were maintained by using three separate methodological procedures. First, each jockey's interview was recorded using audio taping equipment and then transcribed verbatim. Next, the researcher took notes during interviews to include any relevant non-verbal cues and to assist with data transcription (e.g., quality of the recording compromised by background noise). Finally, jockeys were sent a copy of their transcribed interview and were asked to make any necessary changes and/or add any additional comments.

Content analysis was used to select and focus data gathered from interviews (Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001). Consistent with a deductive approach to content analysis (Scanlan, Ravizza, & Stein, 1989), some themes were already set prior to conducting interviews because of the use of semi-structured interview guidelines that were developed based on prior research (Biddle et al., 2001). Nonetheless, as the study was investigating a relatively sparse area of research, an inductive content analysis approach was also used to identify any additional themes and categories that emerged from the interviews (Scanlan et al., 1989). The researcher paid particular attention to patterns, regularities, irregularities and propositions within the data (Bazeley, 2007; Miles & Huberman, 1994).

To ensure the validity of the themes identified by the researcher, a triangulation approach was used to guarantee the soundness of the data analysis

(Gould, Tuffey, Udrey, & Loehr, 1996). Two other researchers familiar with the research topic verified the soundness of the interpretation of the original data (i.e. transcripts of audio tapes).

When including direct quotations from participants' interviews in case studies, brackets, italics and ellipsis points have been used to assist with the understanding of the text. Brackets have been used to indicate inserted material that helps clarify the context of the quotation and where information such as names has been excluded to maintain confidentiality. Three-spaced ellipsis points (...) have been used to show where material has been omitted from a quotation and italics have been used to indicate non-verbal communication such as laughter (American Psychological Association, 2001). Pauses, umms, and ahhs have been excluded from direct quotations unless they were thought to be relevant to the meaning of the extract and/or have an impact on the tone of the citation.

### *Results*

The current study included six jockeys who consistently accepted rides at 52 to 53 kg or less. Data from their semi-structured interviews was analysed and six major themes were revealed: (1) weight-management strategies, (2) psychological and social effects of weight management, (3) physical effects of weight management, (4) suggested future directions in racing, (5) advice to upcoming jockeys and (6) world of racing. Analysis also revealed that each major theme yielded several sub-themes. These can be seen in Table 14.

Table 14 *Major Themes and Sub-Themes From Jockey Interviews*

Major themes	Sub-themes
Weight-management strategies	<ul style="list-style-type: none"> <li>• Difficulty managing weight</li> <li>• Dehydration techniques</li> <li>• Energy balance adjustment techniques</li> </ul>
Psychological and social effects of weight management	<ul style="list-style-type: none"> <li>• Negative moods</li> <li>• Coping with negative moods</li> <li>• Interacting with others</li> <li>• Special occasions</li> </ul>
Physical effects of weight management	<ul style="list-style-type: none"> <li>• Effects during non-riding times</li> <li>• Effects while riding</li> <li>• Effects immediately after riding</li> <li>• Recovery period</li> </ul>
Suggested future directions in racing	<ul style="list-style-type: none"> <li>• Changes to weight requirements</li> <li>• Services for jockeys</li> <li>• Time off from racing</li> </ul>
Advice to upcoming jockeys	<ul style="list-style-type: none"> <li>• Weight-management strategies early in career</li> <li>• Change from apprentice to fully licensed jockey</li> <li>• Natural growth and weight management</li> </ul>
World of racing	<ul style="list-style-type: none"> <li>• No guarantees of rides</li> <li>• Lack of understanding of jockey requirements</li> </ul>

### *Tristan*

#### *Background.*

At the time of the study, Tristan was a 20-year-old single male who had been a jockey for 4.5 years. He was a fully licensed jockey who had been riding in an average of 20 to 30 races per week for the previous 6 months.

Tristan first became involved in racing because of his small stature. One day, during year nine at school, he was walking on a street with his taller friends when a

horse trainer approached him and asked him if he would like to be a jockey. As Tristan was not allowed to leave school until the end of year 10, he spent a year working in the stables after school. He began his apprenticeship at 16 and moved away from his family to live in a different country town to live with his apprenticeship master and his family. At the completion of his apprenticeship, he moved to the city to pursue his career as a jockey.

Tristan described himself as a "... lightweight ..." jockey who usually rode at 52 kg, but would accept rides under 51 kg during racing carnivals (e.g., Spring Racing Carnival). He reported his normal weight, when he was on holidays, was between 54 kg and 55 kg. At the time of the study, Tristan's average weight was 51.8 kg on race days (race day one 51.9 kg, race day two 51.85 kg).

Figures 13, 14 and 15 show Tristan's mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. Prior to riding in races on race days, Tristan showed elevated levels of positive mood (positive activation, good mood and calmness) and contemplation. After racing, he reported high levels of fatigue and anger and increased scores for depressed mood than before racing or non-race day.

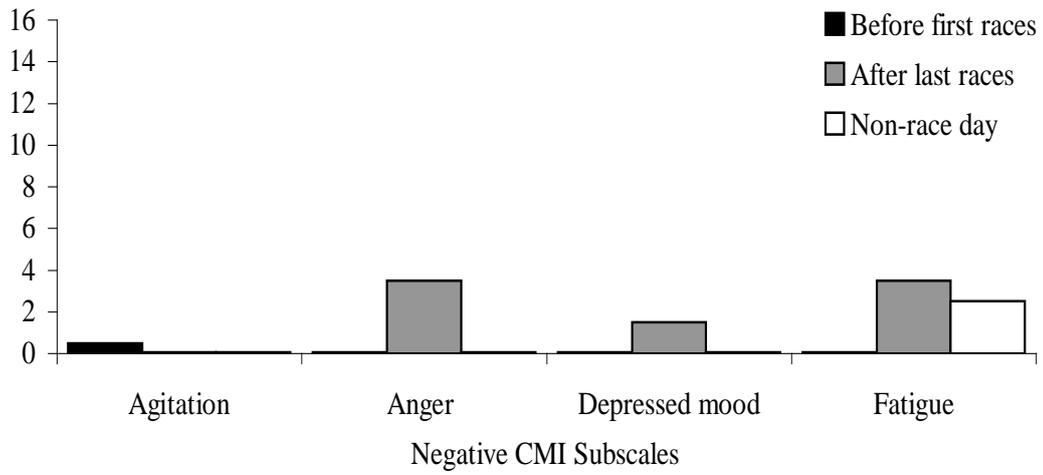


Figure 13. Mean negative CMI subscale scores for Tristan on race days (before and after racing) and non-race days.

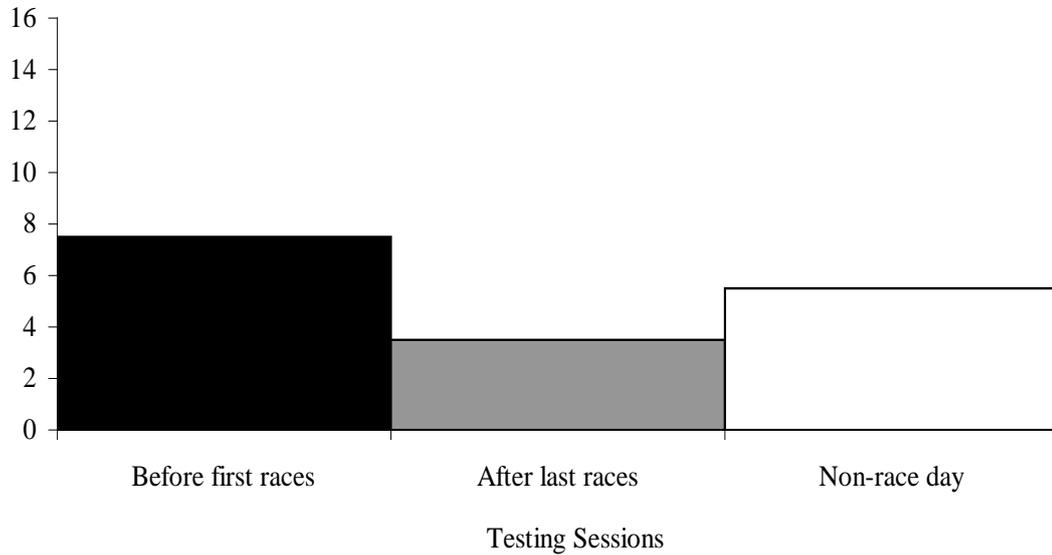
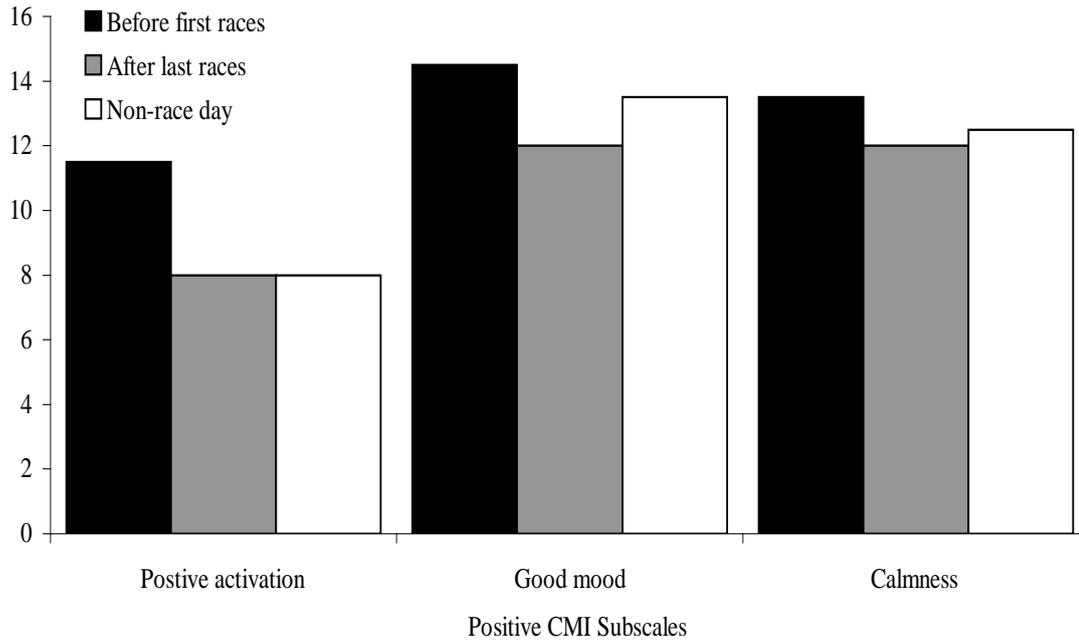


Figure 14. Mean CMI contemplation subscale scores for Tristan on race days (before and after racing) and non-race days.



*Figure 15.* Mean positive CMI subscale scores for Tristan on race days (before and after racing) and non-race days.

#### *Weight management.*

Although Tristan had some advice from other people involved in racing, he generally guided himself through his weight management. He commonly used food restriction, dehydration techniques and exercise to maintain his weight.

Tristan's diet, while not a strict routine, involved skipping breakfast and eating only a small amount for the rest of the day. He followed a dietician's advice during his holidays and found this to be beneficial. The advice from the dietician involved eating six small low fat meals a day.

Although Tristan was aware of the benefit of water for his health, he was also conscious of its effects on his weight. He said that "if you have 500 ml of water, that's like half a kilo." Tristan stated that when he drank a lot of fluids his weight would

increase dramatically. Despite this, as it was fluid, he felt he could lose this weight quickly.

Usually Tristan would use fluid loss, in particular the sauna, to rid himself of the last 0.5 kg on the mornings of the races. He found that he could not stay in the sauna for long periods (e.g., 30 minutes) so would alternate between the sauna and hot spa several times in one sweating session (10 to 15 minutes of each). The hot spa allowed him to have a break from the sauna, but meant he kept sweating. To help himself feel better during sweating sessions, Tristan would refresh himself by having a cold shower and/or hopping into a cold pool. He would also have small amounts of fluid. Although drinking during sweating sessions often meant more time in the sauna, Tristan reported that it also improved his sweating. He felt that some jockeys had difficulty losing weight through sweating since they were already dehydrated, “because they don’t have much fluid in them and they’ve got nothing to sweat out.”

Tristan stated that he did find it hard to lose weight when he had to lose over 0.5 kg. He stated that he was physically fatigued when he had to lose 1 kg to 1.5 kg in the sauna and was unsure how some other jockey could lose 2 kg to 3 kg.

Exercise was a very important part of Tristan’s weight-management routine. In fact, he found it easier to manage his weight when he was riding, as the exercise assisted with his weight management. During holidays or suspensions his weight tended to increase. The heaviest weight he had ever reached was 55 kg.

Tristan believed that some exercise, like the gym, increased muscle size and in turn increased weight. For this reason he preferred to swim and walk on days when he was not riding.

When Tristan was heavy he found his weight would come off quickly, but he believed that he would also regain it quickly. For example, for one race it took him 2

days to lose 6.4% of his body weight to meet a riding weight of 52 kg (a body weight of 51.5 kg). By the night after the races he was back up to 54 kg.

Despite this, Tristan reported that meeting a 52 kg riding commitment was not too difficult when he lost weight over time. Tristan reported that reaching a weight lower than 52 kg, however, was much more difficult. For example, for one race he took 2 weeks to lose 6 kg (55 kg to 49 kg body weight), over 9% of his body weight, to meet a 49.5 kg riding weight. He found that he could get down to 52 kg, but it was extremely difficult after that, "I could get down to 52 kilogram and after that, it nearly killed me."

To reach the required body weight of 49 kg, Tristan exercised in clothing designed to produce sweat to lose weight. For instance, several times he wore a vapour-impermeable suit and a beanie while jogging. He was pleased that this method helped him to lose 0.75 kg in 30 minutes.

Tristan also found it more difficult to manage his weight in winter than he did in summer. He reported that although he drank more fluids in summer, he would also sweat more. In contrast, in winter he tended to eat more and find it more difficult to sweat.

#### *Psychological and social effects of weight management.*

Tristan reported having mood swings, depressed thoughts and feelings and angry thoughts and outbursts. Tristan stated that managing his weight could sometimes be depressing, especially if his weight was fluctuating. He also found it depressing when he was in the sauna with other jockeys and they lost more weight than he did in the same amount of time.

Tristan recognised that when he was wasting he was more irritable than normal. He found that it did not take much to upset him and he was more likely to react in an angry manner, “it doesn’t take much when you’re on weight, it doesn’t take much for people to upset you and you snap and you’re always cranky, really.”

Tristan preferred to spend time alone when he was wasting. He did not feel like talking to anyone or going out places where people were eating and drinking. He said that if he did go out, he would usually end up eating something and then, the next day, he had to use dehydration weight-loss methods to lose the weight. For this reason, he preferred to stay at home and watch the television or play computer games. He said that when he had a day off:

You get people ringing you because you’re not riding and I just don’t answer them because I can’t be bothered talking to anyone. I just go up to my room and sit down. I don’t go out because you go, say shopping, and everyone’s eating and drinking and you can’t do it, so you’d rather go home and play the Play Station or watch TV, so I don’t get out of the house much.

He did admit that his lifestyle could be socially isolating.

Tristan identified being in the jockeys’ rooms on race days when others were eating and drinking as really difficult, particularly when he was wasting. He tried to satisfy his own thirst and hunger by sucking on lollies or taking very small sips of water.

For Tristan, Christmas and Easter were the most difficult social times of the year. As he generally had to ride in races on Boxing Day and Easter Saturday he could not fully join in celebrations because they centred around eating and drinking. It was especially difficult for Tristan if he had a light ride. In fact, at these times he preferred not to be involved in celebrations at all. Usually though, his weight was under control

so he could eat a small amount. He did think that some jockeys with weight problems probably avoided Christmas celebrations altogether.

Tristan found that persistent thoughts about thirst could be a problem when wasting. He reported that it was dehydration, rather than hunger, that consumed him, mentally. This was especially evident when he had to meet a 49.5 kg riding weight, “I was just constantly thirsty and I wasn’t giving my stomach, well it had shrunk that much, and all I was wanting was fluid.” Like the physical effects of dehydration, thoughts about thirst were usually forgotten with the adrenalin rush of race riding. After the race, however, thoughts of thirst returned.

*Physical effects of weight management.*

When Tristan did not have to lose weight on the day of the races he felt physically fitter, while having to lose 1 kg to 1.5 kg could decrease his physical strength and leave him feeling flat.

Needless to say, Tristan experienced the most pronounced physical effects of wasting when he rode at his lowest weight, 49.5 kg. Then, he said, he felt physically weak and very fatigued and wanted to sleep all the time. He said that “even at track work, you know, you’re not as strong ... I rode track work the morning of the race before I went over there, and like I was riding the quietest horse in the stables and it nearly took off on me, so you’re very weak and you, and you’re not as strong, like usually you, you’re no worries.” Tristan did point out, however, that riding in races was different to track work. In races, he usually found that increased motivation and spectators contributed to an adrenalin rush that helped to minimise the effects of dehydration.

Tristan also experienced disturbed sleep when he was wasting. He found that when he was dehydrated he would get up during the night to have small drinks. In fact, on the night before his 49.5 kg ride he went to bed at the correct weight but regained 0.5 kg overnight. The next morning he was bitterly disappointed. "I went to the fridge a couple of times and had to lose half a kilogram that morning, that was, I was nearly in tears," he said.

After he had met a low riding weight, Tristan admitted that he eagerly anticipated eating and drinking only to find that often after he had been wasting, he couldn't eat much. In fact, sometimes he developed a stomachache and it wasn't until the next day that he could eat more than a few bites.

In reality, Tristan said that after wasting to meet the weight requirements for a light ride, it could take him a day or so to recover. He said even if he drank during the course of the race day (after he had finished his light ride) and replenished his fluid he was still extremely fatigued. He usually spent the next day relaxing, eating and drinking. Not surprisingly, this would mean he would regain some of the weight he had lost. "You'll be pretty tired and you just wouldn't do much and laze around, eating and drinking, getting fat again," he admitted.

*Suggested future directions in racing.*

Tristan found that the dietician services offered by the apprentice school were beneficial to him as an apprentice. He thought that this service should be available to all jockeys on a regular basis and that it should be well advertised so that riders knew the service was available. He did, however, recognise the difficulty some jockeys

could have in finding time to see a dietician, given their busy schedules and their need to rest during their time off.

Tristan also thought that the minimum riding weight in Victoria needed to be raised. He pointed out that New South Wales had increased their minimum riding weight to 53 kg. He felt this was reasonable as most people were getting bigger and a lot of jockeys struggled to meet a 52 kg minimum. He thought that although this might mean some jockeys would sit at a higher non-race day weight, it would mean that most jockeys could meet the minimum weight. “Yeah, I think that could happen, yeah, [jockeys sitting at a higher non race day weight] but it’d be a big help. Like, I mean, most people would be able to ride 53. There’s some that can’t, but a lot have to struggle to ride 52.”

Although Tristan was currently comfortable meeting a 52 kg race weight he felt that meeting a 53 kg minimum weight would be easier for him. He thought that he would be able to have a bit more to drink the night before.

### *Summary.*

The six critical themes that became evident from Tristan’s interview were:

- (1) He used a variety of weight-loss techniques, including food restriction, dehydration and exercise to meet race weight;
- (2) He experienced physical weakness and fatigue when meeting weights below 52 kg (e.g., for Spring Racing Carnival) or when losing more than 1 kg to meet a race weight;
- (3) He found that dealing with the need to lose weight could bring about depressed mood (e.g., fluctuating weight, others losing more in the sauna);

- (4) He preferred to spend time alone when he was wasting, knowing that at these times he was easily irritated. For instance, simple everyday occurrences like seeing other people eating and drinking he found difficult to cope with;
- (5) Christmas and Easter were the most difficult times for him because could not join in celebrations that centred around eating and drinking;
- (6) Because it would enable him to drink more the night before races, he believed that raising minimum weights to 53 kg would be easier for him and other jockeys.

### *Joseph*

#### *Background.*

Joseph was a 1.65 metres tall, fully-registered jockey who had been involved in racing for 13 years. His small stature, coupled with a love for animals, first attracted him to horseracing and, although no one in his family had ever even ridden a horse, he applied for an after-school job at the stables just before his 15<sup>th</sup> birthday. Joseph spent a year working in the stables and started his apprenticeship at 16 years of age. While it is not difficult to believe that he found the first year of his apprenticeship difficult due to his lack of familiarity with horses, he says the last 3 years were a good experience. During his apprenticeship, Joseph had two masters, each with a different approach to riding horses. He said he found this diversity to be valuable for his learning.

At the time of the study, Joseph reported his current minimum riding weight as 52 kg, meaning he strove for a race day weight of around 51.5 kg to allow 0.5 kg for his racing colours (boots, pants, shirts) and saddle when weighing on race day.

Joseph's average weight on race days reflected this. At the beginning of race day one, his weight was 51.05 kg, and at the beginning of race day two, 51.5 kg, giving him a mean weight of 51.27 kg. On non-race days, Joseph's average weight increased by 0.65 kg (mean weight 51.93 kg), or by 1.3% of his body weight.

Figures 16, 17 and 18 show Joseph's mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. Joseph reported very little negative mood during the study. He showed some agitation prior to racing, after racing and on non-race days. Joseph's reported positive moods showed a regular pattern, with higher levels on all positive moods prior to racing and lower levels on non-race days.

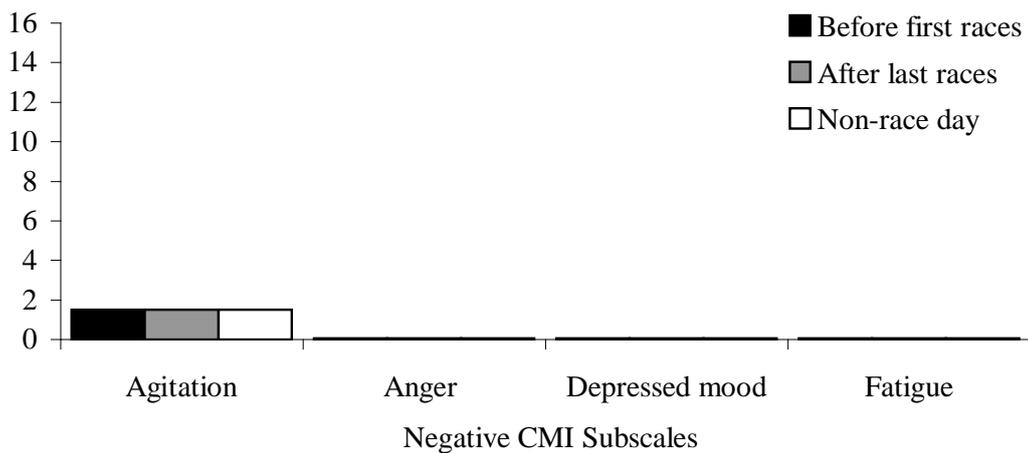


Figure 16. Mean negative CMI subscale scores for Joseph on race days (before and after racing) and non-race days.

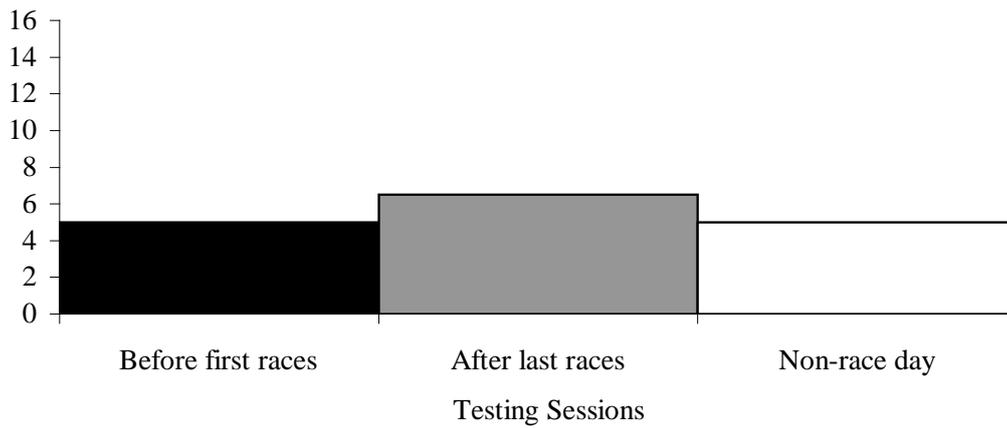


Figure 17. Mean CMI contemplation subscale scores for Joseph on race days (before and after racing) and non-race days.

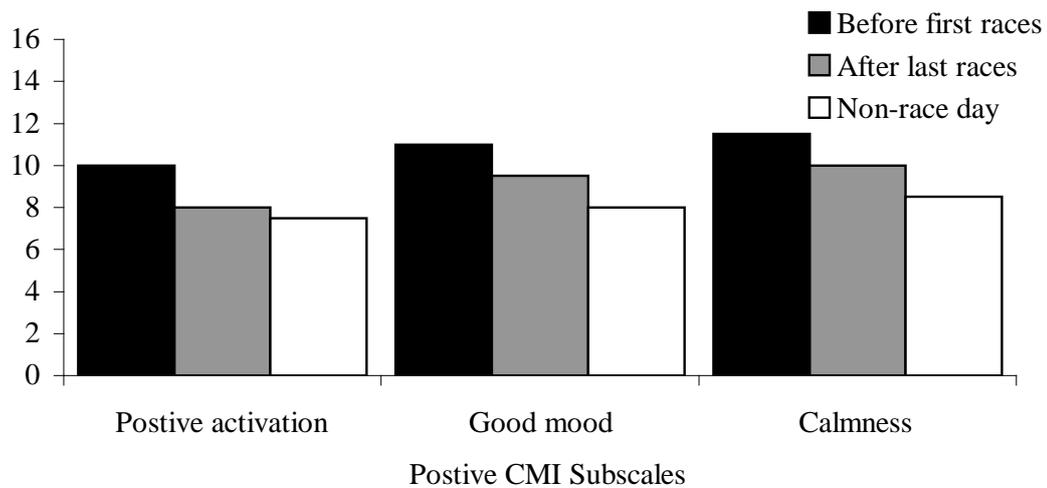


Figure 18. Mean positive CMI subscale scores for Joseph on race days (before and after racing) and non-race days.

*Weight management.*

Joseph learnt about weight management by watching other jockeys and through his own experience. He felt his ability to manage his weight had improved

with age. He said that in the past he had had difficulty maintaining his riding weight, particularly when he was "... getting out and playing up a bit too much." During that time his weight increased and he was using the sauna as a method of weight loss. However, this method of weight management gave him headaches, thus he started to use food restriction and "... miss out on a little bit of food here and a little bit of food there and then I'm happiest."

Joseph reported that his weight at the time of the study was "... pretty much totally under control." He maintained a stable minimum riding weight of 52 kg through healthy eating and exercise. He described himself as "... not a big eater", who tended not to eat a lot during the day. He tried, however, to keep a routine of eating breakfast, even on race days, to help his metabolism. On non-race days, Joseph's diet included a cup of coffee and some toast for breakfast and a "... decent sized meal ..." at night. On race days, he ate power bars to keep his energy levels up. He also supplemented his diet with multi-vitamins, Q10 and vitamin E tablets.

Joseph did not engage in much wasting and described himself as "... lucky..." with his weight. If he needed to lose weight, he preferred to do this slowly by reducing his food intake, believing this to be a more lasting solution. He thought that when jockeys lost weight through fluid loss, the weight was quickly regained once they had a drink.

Although he preferred not to engage in fluid loss, Joseph sometimes used a hot bath to lose extra weight. For example, if he had gone out to dinner the night before, he would have a hot bath for an hour on the morning of the race meeting.

In addition to maintaining a healthy diet, Joseph exercised to maintain his weight. He tried to participate in at least one cardiovascular exercise session a day, 6 days a week. He rode track work once a week (5 hours), rode in races three to four

times a week and ran 2.5 to 3 km two to three times a week. He avoided doing too much muscle-building exercise, such as weights, because it increased his weight. He thought that jockeys who claimed that running increased their muscle size needed only to look at marathon runners, "... I've never seen a fat marathon runner ..." and felt that jockeys needed to find an exercise regime that helped them lose or maintain their weight.

During racing carnivals, such as the Spring Racing Carnival, Joseph would take rides as low as 49 kg (48.5 kg without racing colours and saddle) and had to do more to manage his weight. Throughout this period he walked a "... pretty fine line ..." This was a time when he had to be even more rigorous with his weight than normal, but it was also a time when he received many invitations to social events. Joseph preferred not to take rides at 49 kg, as making the weight often weakened his body. He reported that after making such a low weight, he often thought "... never again, I'm not doing that again ...", especially if the horse he rode did not do well. On the other hand, Joseph was induced to take lightweight rides during the carnival because he had done well on several of these rides in the past.

He believed that he was fortunate that he had only to be this vigilant with his weight 1 month a year and was puzzled as to how jockeys managed to ride at low weights all the time. He thought that their bodies must get used to wasting and coping without much food or water. "... It's something that you don't ever have, so in the end you don't miss it," he suggested.

The heaviest Joseph had ever been was 56 kg after 3 weeks holiday. Despite trainers' disapproval, after this holiday he took heavier rides for 2 weeks while he slowly brought his weight back to his riding weight through food restriction. Joseph felt that if he had tried to lose the weight too quickly he would have constantly

struggled. “If I try to lose three or four kilograms [quickly], well it’s a constant struggle to keep it off,” he explained.

*Psychological and social effects of weight management.*

When wasting, Joseph felt that the need to rehydrate was more than physical, as it also affected him psychologically. He described thirst as a more powerful sensation than hunger and said he would often think about after the races and being able to rehydrate:

You’re dehydrated, and I guess mentally you do think about that, and you probably worry yourself a bit, thinking let’s just get this over with, let’s just get this over with, come on, what time is it? Once it’s done, I can have another scull of water.

Despite their persistence, Joseph felt that the cravings to rehydrate were manageable, not just for him, but for all jockeys. “I’ve never seen anyone go and say stuff it and scull a litre of water and say I’m not riding ... so everyone can push through it.” Joseph believed that persistent thoughts about thirst and cravings were part of his job. He stated that jockeys had the right to accept or reject rides, so they should not be upset about having to waste to make weight. Even so, he did recognise that when he was wasting he experienced negative moods, admitting that he could “get a bit nasty if I’ve got to lose weight.”

Joseph mentioned that life would be difficult for jockeys who frequently engaged in wasting and admitted to noticing a lot of irritable, short-tempered jockeys who were wasting. “Jockeys are known as angry little men ... only 50 kg, but their temper,” he said. Joseph felt that some jockeys had anger management problems and

needed help to manage this through, for instance, mediation or counselling. When he was feeling irritable, Joseph believed that counting to 20 or having a sleep helped.

When Joseph was wasting, he preferred not to socialise at all because, “you can’t eat, you can’t drink” and even though he could be around people eating and drinking, he felt more comfortable not being in that situation. He also found that, as he was easily irritated when he was wasting, being alone was best for him. “Things start annoying you ... I like to be alone, just do my own thing,” he explained. He also believed that being alone helped him to focus on his job.

Most of Joseph’s social circle was involved in racing. He explained that this was because, “from 15 until now, my life’s been racing.” He said that it was more than just being able to converse about racing. He found that people who were not involved in racing did not understand the demands of his job (e.g., hours) so it was difficult to meet up socially.

Although there is no racing on Christmas Day, Joseph found it a difficult time due to Boxing Day race meetings. He was careful not to go overboard with his eating on Christmas Day, seeing restraint as part of the sacrifices he had to make to be a jockey. He was prepared to admit, however, that he did not look forward to the celebration or enjoy it as much as others because of the need for restraint. If he had a family and children he would choose not to ride, or only take rides 2 kg to 3 kg heavier than his normal weight, so he could enjoy the celebration.

Joseph believed that jockeys with young families managed their weight better than single jockeys because they spent more time at home. In his opinion, it was likely that weight restrictions contributed to the high fitness levels of jockeys because they were limited in the amount of alcohol they could drink and the “partying” they could do. In this way, he likened jockeys to other athletes who had to maintain a healthy diet

and a strict schedule to be successful at their sport. Joseph admitted that frequent wasting made socialising difficult.

It is interesting to note that Joseph thought that weight management was strongly linked to psychological wellbeing in other ways. For instance, if jockeys had worries and stress in their lives, such as financial problems, they were more likely to gain weight. For this reason, he thought that counselling would be beneficial for weight loss.

*Physical effects of weight management.*

Joseph reported that losing weight for light rides (e.g., 49 kg during the Spring Racing Carnival) reduced his physical strength. “It knocks you around a bit ... you feel weak, it takes all your strength away.” He thought that the horses sometimes sensed this weakness and took the opportunity to misbehave. He sympathised with jockeys who frequently rode light rides, believing that they must repeatedly feel tired and be too dehydrated to participate in exercise such as running, which could help to maintain their weight.

Joseph also experienced joint and muscle pain when wasting and thought that his masseur could recognise if he had been wasting due to tightness in his muscles. Additionally, he sometimes experienced headaches that would persist into the evening after the races. This was more likely to occur if he used the sauna to dehydrate rather than the hot spa. For this reason, he preferred to lose fluid in the hot spa, with his head away from the heat.

Joseph found that because he was not a big eater, he was more susceptible to colds and other common illnesses. To combat this he took vitamins to supplement his

diet. He also took vitamin E to help lower high cholesterol levels. As his fitness level was in the top 5% in Australia, and he knew this because he had participated in a formal fitness test 2 years ago, Joseph felt his high cholesterol levels could have been heredity rather than related to diet and exercise.

*Suggested future directions in racing.*

Joseph believed jockeys would benefit from having a centre, with a gym, counsellor, dietician, masseur and financial advisor all under the one roof. He thought that all jockeys should be issued a card to use this facility and its many services. In his opinion, this would make the services, especially counselling, more accessible and more private than having to go through the VRC.

Joseph did not agree with other jockeys who believed the minimum weight should be increased. He thought that being a low weight was part of being a jockey and that increases in weight would mean too much of a burden for the horses:

The horses are only 500 kilograms ... especially if you're running over 3,200 metres ... I don't think they can put the weights up anymore and some people just got to realise that they can't. If they're too heavy they can't be jockeys.

Joseph felt that increasing the minimum weight would increase the number of jockeys vying for light rides, as well as increasing the size of top weight jockeys. He did not see either of these situations as desirable.

Joseph felt that one of the reasons there was a decrease in the number of young people entering the jockey profession was because society placed such an emphasis on males being muscular. In his opinion, this made maintaining a low weight an unattractive option for a 14-year-old. In fact, he felt that the pressure for men to be muscular had contributed to a heavier population.

*Advice to up and coming jockeys.*

Joseph's advice to apprentices was that they should focus on managing their weight right from the beginning of their careers. He felt that they should find a healthy eating program and exercise regime that suited them and stay with it. On a cautionary note, he mentioned the difficulties the transition from apprentices to fully licensed jockeys all career riders had to face. He warned that leaving the apprenticeship years behind would lead to a decrease in exercise because there would be a reduction in their stable duties, that is, track work, mucking out stables, etc. In his opinion, young riders should start thinking about engaging in cardiovascular exercise, such as running and bike riding, early in their careers to help keep their weight under control.

*World of racing.*

Joseph felt that the racing industry had very little concern for the welfare of jockeys. He was especially concerned about jockeys who used the heater in the car to lose weight. He commented on the danger and risk associated with this weight-loss behaviour by saying:

I think the most dangerous thing about our sport is watching blokes going off to the races with the heater on full bore, sweating in the car ... you could fall asleep or lose concentration ... it's only a matter of time before someone kills themselves.

Joseph also said that the racing world was very political and because of this, a jockey's life was full of ups and downs. One of the downs, he explained, was that jockeys could be replaced on a ride at any time and it was best not to take this sort of thing personally, but to see it as part of the job.

*Summary.*

The six critical themes that were evident from Joseph's interview were:

- (1) He maintained his weight through food restriction, dehydration and exercise;
- (2) He experienced fatigue, joint pain, muscle pain, muscle weakness and headaches when losing weight to meet low riding weights for racing carnivals (e.g., Spring Racing Carnival);
- (3) He experienced negative moods when wasting;
- (4) He was more comfortable spending time alone when he was wasting because he was easily irritated and preferred to avoid people who were eating and drinking;
- (5) He believed that RVL needed to be more concerned about the welfare of jockeys, especially as some jockeys were losing weight by driving with the heater on in the car to promote fluid loss;
- (6) He recommended that jockeys have access to a centre with services such as counselling (psychological, nutritional and financial), gym and massage that was separate to RVL, thus enabling jockeys to maintain their privacy.

*Mark**Background.*

Mark is a 42 year-old jockey who spent his childhood and teenage years in a country town and moved several times as an adult to pursue great financial rewards from racing. His aspiration to become a jockey was influenced by his father who would have liked to be a jockey, but was too heavy. Instead, his father trained

racehorses and encouraged Mark and his siblings to be involved in pony club. Mark was the only one to take pony club “a step further.” He started working in a thoroughbred racehorse stables before and after school at 15 years of age. He described his work there as exciting because he gained independence from his parents and was able to socialise with boys who were older than him.

Mark left school at 16 years of age to begin his apprenticeship. He felt he had a fortunate apprenticeship with a master who enforced strict discipline as well as providing opportunities for success. In his view, Mark said, that doing “it the right way” during his apprenticeship put him in good stead for the rest of his career. He felt the hard work and dedication he had applied throughout his riding career had paid off, not just financially, but through appreciation from owners, trainers and the media. In his opinion, it was his professional success that had led to high job satisfaction and enjoyment.

Mark’s average riding weight was 52.5 kg to 53 kg but he would ride as light as 51 kg. This was confirmed by Mark’s weight on the mornings of the two race day testing sessions (race day one 52.8 kg, race day two 53.2 kg, mean 53.0 kg). Mark's weight during his non-race day testing sessions (53.85 kg) was between 0.65 kg and 0.95 kg more than his average race day mornings’ weight. This was an increase in body weight of between 1.2% and 1.9%.

Figures 19, 20 and 21 show Mark’s mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. Mark reported slightly higher levels of agitation and anger prior to racing on race days. On the other hand, he experienced greater levels of fatigue after racing. Mark showed relatively high levels of good mood throughout the study with levels at their highest after racing.

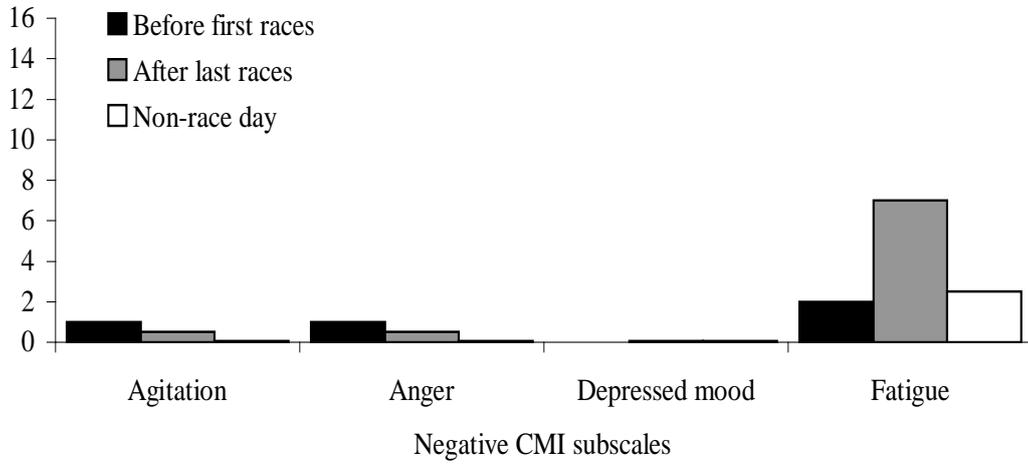


Figure 19. Mean negative CMI subscale scores for Mark on race days (before and after racing) and non-race days.

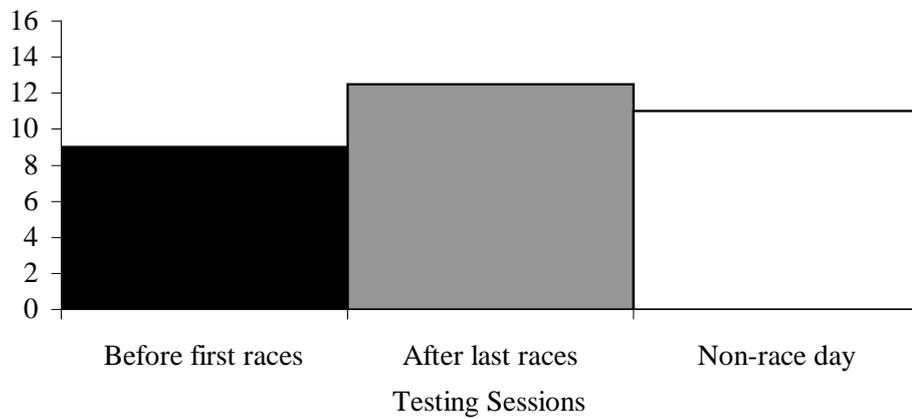


Figure 20. Mean CMI contemplation subscale scores for Mark on race days (before and after racing) and non-race days.

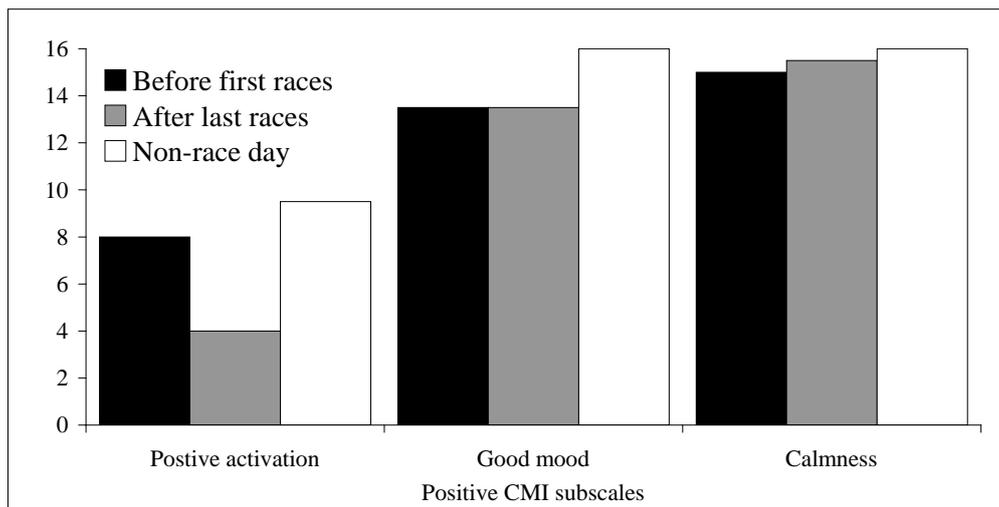


Figure 21. Mean positive CMI subscale scores for Mark on race days (before and after racing) and non-race days.

#### *Weight management.*

Mark thought that jockeys walked a fine line between needing to be physically strong to control the horses and needing to maintain a low weight to meet their riding weight requirements. During his apprenticeship he had learnt to maintain his weight by watching other apprentices and jockeys at the stables. He stated that the only way to lose weight was through diet and exercise and that to maintain his weight at a “comfortable” level of 52.5 kg to 53 kg he had to “eat less and work harder.” “It’s the only way to lose weight, there’s no shortcuts,” he explained.

Mark said he tried not to push himself “... too hard” to meet riding weights. He felt “a little bit of dieting, a little bit of sauna use” worked best for him. Mark reported that on the day before the races he would have a very small lunch and only tea and toast for dinner. On the morning of the races, he often skipped breakfast or just had tea and toast again. In addition to his exercise regime, which included riding track work and general farm work, Mark needed to have a sauna or hot spa bath on the night before the races. He believed that this routine would be similar to all

jockeys. He thought most would restrict their food intake for a day or two before race days and have a sauna and/or hot bath to meet their “average” riding weight requirement. Mark described himself as not having a big weight problem, although without food restriction and dehydration he said, “54 kilograms would be a comfortable weight.” To meet a racing weight of lower than his comfortable level, Mark said he had to start his diet earlier and use the sauna more.

Mark stated that he believed meeting riding weights below a rider’s comfortable level was physically and psychologically draining, “because it ruins your desire, it just takes a lot out of you; it takes a long time to recover.” In his opinion, there were two ways jockeys could “burn themselves out.” Firstly, jockeys who accept rides at weights below their “comfortable” level too often ended up ruining their desire to be jockeys. Secondly, jockeys could push themselves to meet extremely low riding weights, for instance, 4 kg below their comfortable level, and have a very hard struggle to meet weights just 2 kg below.

Mark admitted that occasionally he had pushed himself below his “average” weight to meet a 51 kg riding weight “for those odd good rides.” However, to maintain “the fire in the belly” he had learnt not to push himself below his “comfortable” level too often and he said he had never gone lower than 51 kg.

The highest weight Mark had ever reached was 56 kg. This happened while he was on holidays. He admitted that after his holidays, which were usually taken in winter, he had a bit more difficulty with his weight. He reported that during winter he was usually a little heavier.

*Psychological and social effects of weight management.*

Mark agreed that meeting a weight below his comfortable weight could be tough mentally because he had memories of how difficult it had been on previous occasions. He admitted though that sometimes the more work he put in to meet a riding weight, the more worthwhile riding a winner could be. He felt that his weight-loss behaviour helped make him more aggressive for success.

Mark believed that he took failure harder when he was younger. Now that he was a bit older, he also tried to think of the positives in failure. Instead of lamenting a loss, he preferred to reflect on it and think of ways he could succeed next time:

The harder you work before the big event, and you achieve it. Well, even if you don't achieve it, from my point of view, I get home the next day and I think, "right, when's the fucking next race day? I had a bad day today, but I want to get out there and do it again." That's the way I look at it, and I do come home sometimes now that I'm a bit older, I'll think, "this horse was a bit unlucky here today. We didn't win, but where's a race for it? Here it is, in two weeks time." I'll find a way to look positive. And you just cop it, but you've got to look ... well that's the way I do it. I want to move on. Today was a bad day, let's move on.

Mark also tried to apply a similar philosophy to his mood while he was wasting. He knew that he could be irritable during this time, so he made a conscious effort to "chill out." This led him to believe that his mood and general demeanour when wasting was not that different to his non-wasting times. Generally, Mark admitted that he saw himself as "pretty easy going", someone who preferred to let things work themselves out.

Then again, Mark admitted that people making small talk or asking questions could irritate him when he was wasting. He felt this was usually with people he did not know and said he could often predict when it was going to happen. Mark's first

choice was to avoid situations where he might need to make small talk. If it was unavoidable, he was polite, but tried to end the exchanges quickly and move on:

It can be ... when you're getting close to the race day and you're watching your weight, and small talk with people that you don't know, and they don't know what they're talking about, meaning that they ask just silly questions. I can't think of any at the moment, but you know, you're polite, you just cut it off and you move on. You've got to go and make a phone call or whatever. But yeah, it's irritable. But you don't put yourself in that position. As I said, you see it coming and you divert. Because you know, anyway, you can avoid it. If it's there in front of you, you try and make it as short and sweet as possible, and move on. But to answer your question, yes irritable. But I'm sure that everyone is the same.

Mark reported never having any problems socialising with family or friends due to wasting. He admitted that when he was younger, Christmas was a little more difficult, but the people around him had always understood his job and the reasons he did not eat or socialise much at Christmas.

On Christmas Day, with the races the next day, Mark found that if he ate and drank only small amounts to be sociable he could then have a sauna to maintain his weight. He saw this as part of his job and stated that he probably enjoyed the job more than other jockeys because he was successful and received media attention.

When you were younger, say your early twenties, growing up, Christmas time is a little bit harder. But the people that are around you know that that's your job and therefore you cannot eat and socialise much on Christmas Day. And to me, that was never a big deal anyhow. You know, I enjoyed having to go for a sauna, maybe having a little bit to eat on Christmas Day, and then go and have a sauna. Clean yourself out and get you ready for the next day; the next day is usually a big day's racing. And I've never had a problem socialising, or with family, because they know that's my job. As I said, I enjoyed it. It was always good to ... you can only eat and drink so much. And if you just do it in small portions, just to socialise, then you can go away and have your sauna, and go

and do your job. I guess I like it because I'm successful at my job, and I get a lot of media coverage. There's good things. I like it. I love my job.

With regard to his everyday life, Mark was unsure if his family noticed any differences in his mood when he was losing weight. He certainly made a conscious effort to remain calm and controlled and combat the negative moods he knew were often associated with wasting.

Mark and his wife had also made an effort to incorporate his weight-loss routine into their family life. Rather than keeping the children away while he was wasting, his children knew that on Friday night he had a hot bath instead of a shower so they too had a bath.

*Physical effects of weight management.*

As an apprentice, Mark saw other jockeys grow in size and as a result, they were forced out of the industry because they could not make weight. Because of this, he had made a conscious decision to try to slow down his growth. To reach this aim, he reduced his food intake and would even skip meals when it was not necessary to meet his riding weight. He felt that being hungry was part of being a jockey and that his high level of physical fitness compensated for this:

Well, if I'm going to get heavy I'll try to slow it down, in that I won't have lunch in the middle of the day. And if I did have lunch, then it would only be crackers and fruit. I would try and slow the process down of getting heavy. Because everyone gets heavy, and how heavy nobody knows. So I just personally watched those jockeys sauna and diet and run in sweats around the racetrack, and do it tough. But nobody ever collapsed or fatigued out. But they did get heavy and they were forced out of the game. So, as I said I was mindful of that, so I tried to slow it down by missing out on lunch, and I would

miss out dinner the night before the races, even though I didn't have to. I didn't miss out altogether though. I would eat something; I just wouldn't have that big meal. Because the cook had to cook for all the staff, they would cook the meal, and you either had to say you were having dinner that night or you weren't. And if you weren't, then you weren't having anything except for what you got yourself, which was fruit or yoghurt. And the next morning, on race morning, I might have toast, or I might have nothing. Yeah, sure you were hungry, but you were a jockey. That's what jockeys have got to be, hungry. As long as you weren't weak. My remembering of it was that we were young and fit, and that carried you a long way.

Mark was unsure that reducing his food intake had any effect on his eventual height, but he pointed out that all his siblings were at least 12 inches taller than him. If he had however, stunted his growth during his apprenticeship, he in no way saw this as a negative. He stated, "I'm pleased I did it", adding that he saw this as a distinct advantage for himself as a jockey. He pointed out that current apprentices who were doing well as riders would benefit in the long run as jockeys if they tried to slow their growth. This might increase the longevity of their careers and add to their success in life. On the other hand, he admitted that deliberately eating less to decrease growth may affect apprentices' physical development and leave them more vulnerable to serious injury:

But people might say, "you shouldn't do that, it damages your bones, what if he has an accident." That's true, if he has an accident he might not have much body to hold him together, he might fade away and die. But if he doesn't do it he might be a bum, you know, he might not be a jockey. He has talent as a jockey, but if he gets too big he might be a bum, but then again he might be something else.

Mark described himself as physically "not bad" on race days. During the day, especially when meeting a weight below his comfortable level, he was aware of his

physical limits and had something to drink if he was feeling unwell. He preferred to be physically well when riding in races and just hoped that his weight was on target:

I know how far to push myself. If I start to feel a bit squeamish, I need something, I'll have something, and you've just got to, and hopefully you're still underweight. Experience tells me I've got to have something because I'll be no good for nothing. Some jockeys don't, they have nothing and they'll feel bad and they'll go out and ride. Some will win, some won't. Some will push it but I know I'll have like, a Berocca, during the day, or some sort of fluid to just give me that little bit of oomph cause I'm riding 51 kilograms and I'm just not feeling so good. Some don't.

Although Mark was careful to make sure he felt physically well before he rode, he had seen other jockeys who he believed had pushed themselves too far. Even so, he felt it was not his place to say whether they were unfit to ride. In fact, Mark saw other jockeys physical weakness and fatigue as an advantage for himself. He thought he had more chance of winning close races against physically weak jockeys than physically fit ones. Equally, however, although he had never seen a jockey have a fall because of fatigue, he was concerned about this and the likelihood that it could cause him to fall as well:

I'm just doing my job. I'm self-employed. They do their job. If they're not feeling good, then that's good for me [be]cause then I can go and beat 'em. I'll beat 'em in a tight finish. I'd rather have a weak jockey on than a strong one. There again, I don't want to have jockeys falling off in my face, because then I might fall over them and we're all smashed up. But I've never seen a jockey fall in a race due to fatigue.

Mark reported that he did not usually feel fatigued during a race. Even when he was riding below his comfortable level, adrenalin and the excitement of the race made fatigue minimal. He said that while he did not experience too much difficulty pulling up after a race, he had seen other wasting jockeys, on an irregular basis, have

difficulty pulling up their horses. He explained that occasionally, when he was wasting, if he was “on certain horses that are very heavy in the head”, he would ask the clerk-of-course for help or he would let his horse canter until it was tired rather than “knock himself around” trying to pull up a horse that was hard to slow down. Mark expressed that it was not until the end of day that he experienced any fatigue. He described the feeling as “drained out” but qualified this by saying it was not “too bad” as he knew how far he could push his body.

When meeting his comfortable weight, however, Mark usually experienced only minimal fatigue after the race and did not feel any major loss of energy before, during or after the races. He found that after a large dinner on the night of the races, fluid replacement, and even a few beers, he felt physically well, without any periods of feeling fatigued. In fact, Mark said that he looked forward to losing weight as he did it comfortably, only lost a small amount, and it helped him focus on his upcoming races:

It's not as if I'm not looking forward to doing it. I look forward to doing it again next Friday. I look forward to it. You know, I don't mind losing a bit of weight, I don't mind that honestly because I don't have to lose a lot. It just tunes you down, trims you up, makes you feel, it probably makes you feel you've done it. Righto, let's go!

*Suggested future directions in racing.*

Mark believed that between 51 kg and 52 kg was an attainable minimum weight for most jockeys. For him, the unfeasible minimum weights were set for handicap races such as the Melbourne Cup and Caulfield Cup. Mark thought that asking jockeys to meet minimum weights of 48 kg to 49 kg was unreasonable for

apprentices and fully licensed jockeys. He believed that only undernourished jockeys who had not eaten properly and stunted their growth could meet these weights.

I think they could raise the minimum weights. I just think that by putting too high ... too high demand, I just think that 17 and 18 year old kids can ride 48 kilos is just ridiculous. Or even grown men like myself to ride 48, 49 kilos. Because they are the weights they have for these Melbourne Cups, Caulfield Cups, and other races, handicaps. There are too many races that have a minimum 48 kilos. It's unrealistic that they think that, the only people, the only jockeys who can ride those weights are those poor kids that have been undernourished, or had a tough upbringing. They haven't eaten food properly. They are the only ones who can do it because their growth has been stunted. You can just look at them.

*Advice to up and coming jockeys.*

Mark felt that to be successful as a jockey you had to know how to interact with owners and trainers, participate in track work, and be able to ride light. He believed that being able to ride at light weights left you with the opportunity to earn a living in times when you were not securing rides on more successful horses with higher weights. He also thought that success was dependant on keeping your focus, self-confidence and working hard.

*World of racing.*

Mark believed that horseracing was a glamorous sport that offered him a lifestyle he enjoyed. Now that he was older and could pick and choose his race rides, he enjoyed not being tied to a job with a boss who gave him instructions. He

recognised that to be a successful jockey required constant hard work and saw that as jockeys were self-employed, they were in competition with one another and that weakness in another rider was to his advantage.

*Summary.*

The six critical themes that were evident from Mark's interview were:

- (1) He used food restriction, exercise and dehydration methods (sauna or hot spa) to meet his riding weight requirements;
- (2) He found meeting riding weights lower than his comfortable riding weight (54 kg with food restriction, exercise and dehydration) psychologically and physically draining because it could increase his recovery time and decrease his motivation;
- (3) Conversely, meeting low weights could also increase his motivation to win and make a victory more rewarding;
- (4) He experienced fatigue at the end of a race day after wasting, but while he was riding increased arousal negated any negative physical consequences;
- (5) He was aware that he could be more irritable when he was wasting so he made an effort to be calm and relaxed and to avoid situations where he would be required to engage in small talk;
- (6) He believed that it was unreasonable to expect jockeys to meet minimum weights lower than 51 kg to 52 kg.

*William**Background.*

William was introduced to the racing industry by his father, who himself was a jockey. At 14 years of age William started riding track work before school and at 15 years old he left school to begin his apprenticeship. When he commenced his apprenticeship, William moved interstate, away from his family. He found this move challenging because he had to live alone and care for himself and added that while he was able to spend more time with his friends, even this did not compensate for being away from his family. He said it was especially hard to prepare meals at night after long days completing his apprentice duties.

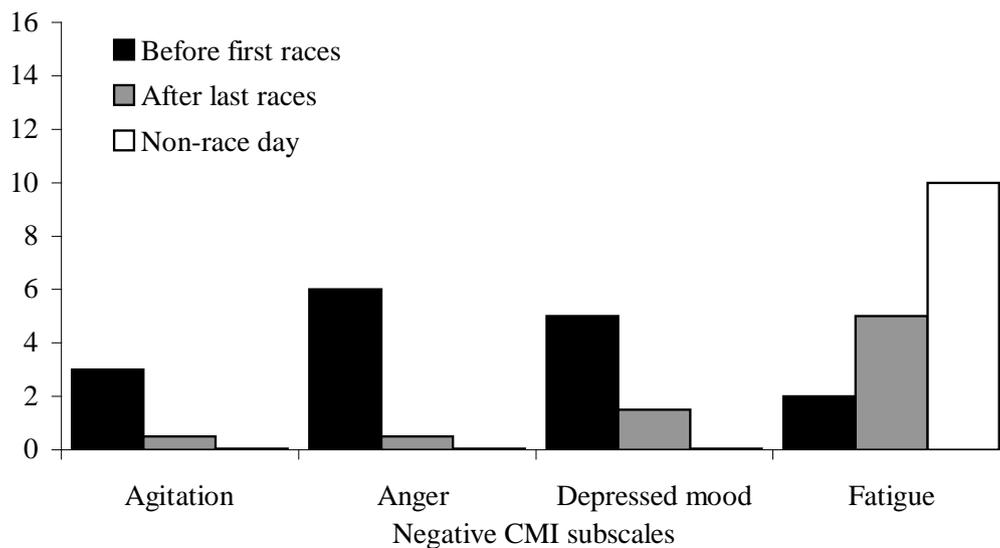
During his apprenticeship, William rode between 6 and 7 days a week at light weights. Fortunately, this continued for another few years after he became a fully licensed jockey so he was able to “really get going” with his career. At present, William is 22 years old, 1.65 m tall and rides at four race meetings a week at weights around 53 kg. His weight on his days off can be up to 56 kg.

On the mornings of race day testings, William’s average body weight was 54.18 kg (race day one 53.65 kg, race day two 54.70 kg). At his non-race day testing session, William had a body weight of 55.65 kg. This is a body weight difference of between 0.95 kg to 2 kg (average 1.48 kg). Percentage-wise, the difference equates to 1.7% to 3.5% (average 2.7%) of William’s body weight.

William completed two race day testing sessions and one non-race day testing session. He was unable to attend the first testing session prior to race riding on race day one, because he needed to engage in weight-loss behaviours to meet his riding weight requirements. He pointed out that it was probably to the researcher’s benefit

that he did not attend this testing session, because he had not been in a good mood due to wasting.

Figures 22, 23 and 24 show William's mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. William reported elevated levels of agitation, anger and depressed mood prior to racing on race days. These negative moods decreased after racing and were not reported on non-race days. William's responses after racing showed elevated levels of good mood and contemplation. Fatigue and calmness were at their peak on non-race days.



*Figure 22.* Mean negative CMI subscale scores for William on race days (before and after racing) and non-race days.

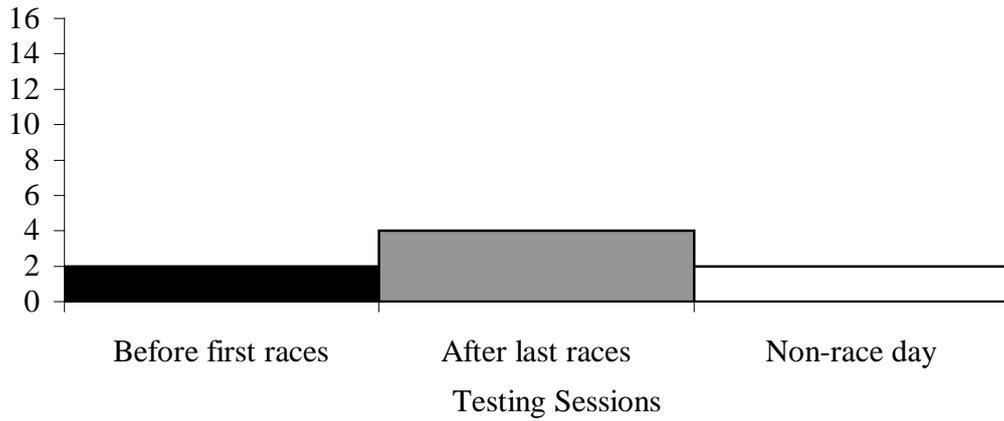


Figure 23. Mean CMI contemplation subscale scores for William on race days (before and after racing) and non-race days.

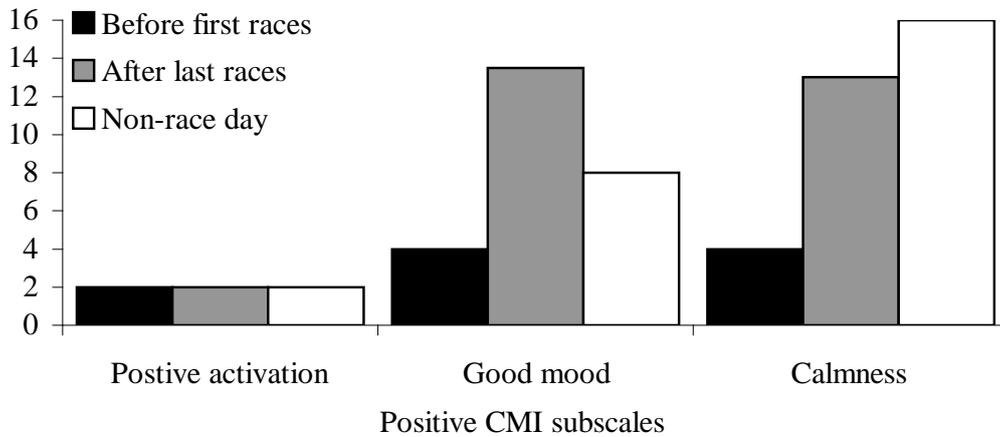


Figure 24. Mean positive CMI subscale scores for William on race days (before and after racing) and non-race days.

*Weight management.*

During most of his apprenticeship, William did not have much difficulty meeting the light weights required of him. It was not until near the end of his

apprenticeship that maintaining his weight became more of a challenge. He reported that maintaining his weight became even more difficult once he became a licensed jockey as he had access to money, no strict set routine, and was more likely to eat and drink the “the wrong things.”

At the time of the research, William classed himself as a middleweight jockey who would ride at light weights. He thought that lightweight jockeys were those that could live a normal life, have a piece of toast and a drink before the races and/or a 30 minute sauna session and ride at minimum weight. William admitted that if he had three meals a day, he would be 56 kg and only able to make riding weights of 55 kg:

I'd say a middleweight sort of jockey. You know, I ride, I probably ride a lot of lightweight horses and people would say, “Oh, you're a lightweight jockey” but I'd class a lightweight jockey as a jockey who can get out of bed, go to the races, he can eat his piece of toast and cup of coffee and ride at minimum weight, which is sort of 52 kilograms. Or he can get up and have a half hour sweat, or do it like that and live a normal life. Whereas for me to just have breakfast, lunch and tea, I'd be walking around at 56 and be able to ride at 55.

William had not sought a lot of advice on how to manage his weight. He had generally tried to find his own routine, but he was open to incorporating some suggestions from others into his weight-management behaviour. When William did get advice from colleagues, he was careful to ask for it from very fit jockeys who he thought managed their weight “the right way.” He was also open to listening to suggestions from professionals, such as dieticians, if people he respected from within the racing industry suggested it. Generally, William thought dieticians and related health professionals lacked an understanding of the extreme weight demands on a jockey:

I think dieticians, and all those sort of people, yeah, fair enough, you can say this and say that, but unless you've actually had to, you're talking about

people that are actually under their healthy body weight. Most diets and dieticians will get you down to a natural or healthy body weight. Jockeys are starving themselves to underweight. There is obviously better or worse ways to do things, but I think unless you've actually been there and done it you'll never actually know what it's like.

William preferred not rushing his weight loss and had tried several different diets in his career. At the time of research, he was on an "herbal life diet." This involved taking tablets three times a day and having two protein milkshakes instead of breakfast and lunch. For dinner, William would have fish as well as "nibbling" throughout the day.

In addition to a strict diet, William also had to lose at least 1 kg of weight through dehydration every race day. At the time of the study, this meant three to four times a week, but during the times he was riding 7 days this meant every day. William's preferred method of dehydration was to have a hot spa or bath. This way he could put on a film, listen to music or read the paper for an hour or two while he lost the weight. William felt that losing weight this way was more relaxing, meaning he did not have to "do it as hard" or "rush it." William reported that this was only a short-term measure because as soon as he drank, he would put the weight back on.

When he had to lose extra weight, William would go for a run in sweat gear and have a sauna. He reported that when he was losing a lot of weight through dehydration, the last bit could be very difficult because his body was already very dehydrated:

I had to lose two kilograms for the races and it was the lightest I'd ridden for a while, ah, so I got up had a spa for an hour and I lost one kilogram, then I went for about an eight kilometre run with sweat gear on and then for a sauna. It took me about two and a half hours to lose that last kilo. But I was really

struggling. You get to a point to where your body just won't sweat, you just have to try different things to get yourself to sweat.

When he was really struggling to lose the last of his weight, William would drink a lot of soda water or water to start sweating and would then force himself to vomit the liquid up. William said that self-induced vomiting, or "flipping" as it is called in the racing industry, was a last resort and something that he did not like doing. He had used self-induced vomiting three or four times during his career, only when he reached the point where he felt he had no alternative. "When you're trying to ride as light as you can, then you'll generally try anything and do anything," he said.

In addition to diet, exercise and sweating, William had used several other methods of weight control. He had experimented with diuretics, but found while they helped him lose weight for race day, he would then put back on more weight than he had lost. He had also tried Duromine (prescription weight-loss drug containing a chemical related to amphetamines) before it was banned and found it to be extremely helpful. Unlike some other jockeys who used Duromine everyday, he would only take it every 2 or 3 days. This gave him extra energy, without any withdrawal or need to use more of the drug to get the same effect.

William found that smoking assisted with his weight control and stopped him snacking. He had tried quitting once but found that instead of smoking he was "nibbling all the time." He recognised that when he was wasting, he also had a tendency to smoke more.

*Psychological and social effects of weight management.*

William found that when he was wasting, having strived hard to meet the weight, he was more determined to win. This also meant that he was more likely to be aggressive when he was riding and he had a propensity to take more risks:

I find that a lot of the time I'm wasting, I'm probably a bit more aggressive. Definitely more aggressive. Not even subconsciously. If you've done so much to get your weight down, well it may as well be worth it. Sometimes you just take that little extra risk because it's been so hard, and it has meant so much to you.

For William, riding winners was a positive experience that he felt enhanced his riding performance. Additionally, he believed that when he was happy he rode well.

Unfortunately, wasting was often associated with negative moods for William. He described himself as miserable and grumpy and as having a quick temper, so he preferred things to run smoothly.

Although William said he was able to go out and not eat, he admitted that he found being around others who were eating tested his willpower to not eat. As a consequence, he had decided that when he was restricting his food intake, it was best to avoid temptation and stay home:

It's not that hard to go and sit down and watch a movie, but you've got people with pop corn and Coke and that, and you'd rather not go. You'd rather sit at home where you don't have those temptations, [be]cause you're tempted, all the time you're tempted to have something to eat.

Socialising with alcohol was also a problem in William's view. He believed it was unrealistic for jockeys to say they were never going to go out. They needed to be able to enjoy themselves from time to time. However, he found that if he went out at night after the races and drank alcohol, he could be up to 4 kg to 5 kg heavier the next

morning. He said this could start a vicious up and down cycle if he needed to lose this weight quickly. In an attempt to minimise this, William tried to go out only at times when he was not riding for the next two or more days.

*Physical effects of weight management.*

William reported feeling like another person when he was wasting. He found that he experienced dizziness and cramps as well as a general feeling of being run down. He described himself as “completely stuffed” and sometimes felt so fatigued he could not even lift his head.

For William, the physical fatigue associated with wasting and the weight-loss behaviour itself were negative aspects of horseracing. He thought that if it was not for these factors, and if he could have a piece of toast and cup of coffee before the races, being a jockey would be “the best job in the world.” Despite this belief, he did admit that the effort to meet a low riding weight could make winning much sweeter. “When I ride a winner and I’ve been wasting, it means ten times more to me than when I could have just got up and gone to the races,” he said.

As well as fatigue, dizziness and cramps, William found that wasting left him with very dry lips and mouth. He tried to combat this by washing his mouth out with water but thought there was not really much that he could do to combat the thirst and hunger associated with wasting. Directly after a race, William liked to have something to drink. In fact, he thought that he drank too much straight after a race because he sometimes threw it up. He also found that he was not really hungry:

As soon as I get off the scales, I’ll go straight back in and grab a drink and just drink it. I usually drink too much, stupidly, have a little bit to eat because once

you've drunk a lot, once you drink enough drink and its fizzy in your stomach, you just don't feel hungry.

William found that his stomach could go from one extreme to another when he was wasting. When he was trying to meet a low riding weight, his stomach contained little to no food or fluid. The day after the races, however, William could feel so bloated that he did not feel as if he could move. If he had wasted particularly hard, it could take him up to 2 days to feel he had recovered.

*Suggested future directions in racing.*

Although William was tentative about making comments concerning changes to the racing industry, he believed that jockeys would benefit from increased riding weights. He also thought that it would be an advantage for jockeys to have coaches or mentors to assist them with riding techniques. He believed that even renowned athletes benefited from professional advice. William commented:

A mentor, ah, yeah, probably. I think jockeys should have a coach, and probably a personal coach. Greg Norman, who has been one of the greatest golfers ever, still has someone when he goes and practises that tells him he's not getting his back swing high enough. How could you tell Greg Norman what to do? But everyone has a coach, and I think jockeys should be the same. That's probably a personal thing.

*Advice to up and coming jockeys.*

William felt there were two periods in apprentices' careers that they should be prepared for. In the first instance, he believed they should be prepared for the time

that they started to grow and put on weight. In his opinion, it was important for apprentices to develop their own exercise routines and diets at the beginning of their careers so they would not arrive at this point unprepared.

Next, William would advise apprentices to be wary of the change from apprentice jockey to fully licensed jockey. This step-up, he warned, could mean a decrease in physical activity. He stressed that it was imperative for apprentices to be conscious of this and to try to remain as active as possible after coming out of an apprenticeship (i.e. no stable duties).

With regard to diet, William said that apprentices should eat a healthy diet but that they should also have some variety in what they eat. If apprentices ate healthily and wisely, he thought that they would be able to have a small chocolate occasionally or go out for a nice meal once a week. It was important, he said, for apprentices to get advice about their diet from trusted sources that understand the jockey lifestyle.

### *Summary.*

The six critical themes that were evident from William's interview were:

- (1) He managed his weight through diet, exercise, dehydration (hot spa or bath and/or exercise in sweat gear), smoking (to reduce snacking on food) and, as a last resort, self-induced vomiting;
- (2) He had an increased determination to win and was more likely to ride aggressively and take risks if he had struggled to meet a riding weight;
- (3) He preferred to spend time alone when he was wasting as he was easily irritated and was tempted to eat if he was around other people who were eating;

- (4) He could gain 4 kg to 5 kg in one night if he went out with friends and drank alcohol;
- (5) He experienced dizziness, cramps, dry mouth and lips, extreme fatigue and an increased recovery period when wasting;
- (6) He believed increased riding weights and having a coach or mentor would benefit jockeys.

### *Neil*

#### *Background.*

At 14 years of age, Neil was introduced to the idea of being a jockey by a horse trainer who saw him playing football. The horse trainer approached Neil, saying that because of his small physical build (he weighed 28 kg) he may be able to have a career as a jockey. Neil continued at school for the next year and spent time in the stables on weekends to see if he was suited to the horseracing industry. He began his apprenticeship at 15 years of age.

When he first began his apprenticeship, Neil knew “nothing” about horses and was too small to ride. He found that he had to take time to build the needed physical strength and size to be a jockey. Although he struggled in the beginning, he believed that developing his body to meet the demands of a jockey’s lifestyle was rewarding.

Neil experienced some difficulty making the transition from apprentice to fully licensed jockey. He felt, however, that this was a common occurrence for many jockeys because they grew accustomed to having the guidance of their masters during their apprenticeship. He was pleased to say that he believed he had progressed through this stage and now managed well on his own.

Neil reported his weight when he was "... riding light" was 52 kg, but that he "... walked around ..." at 54 kg or 55 kg if he had been out to dinner the night before. The heaviest Neil had ever weighed was 56 kg.

On the morning of race days, Neil's average weight was 52.48 kg (race day one 53.01 kg, race day two 51.95 kg). After racing, his average race weight was 53.03 kg (race day one 53.40 kg, race day two 52.65 kg). This was an average difference in body weight of 1% (race day one 0.7%, on race day two 1.3%) between the morning of race day and the conclusion of racing. On non-race days, Neil's weight increased by an average of 1.99 kg or 3.7% (non-race day one 54.00 kg, non-race day two 54.95 kg, mean non-race day 54.47 kg) when compared to his average weight prior to riding on race days.

Figures 25, 26 and 27 show Neil's mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. Neil reported elevated levels of agitation, anger and fatigue after racing on race days. Fatigue and anger were at their lowest on non-race days, while agitation stayed at a level similar to prior racing.

Neil's responses after racing showed decreased levels of positive activation and calmness. Good mood and contemplation stayed relatively stable over time.

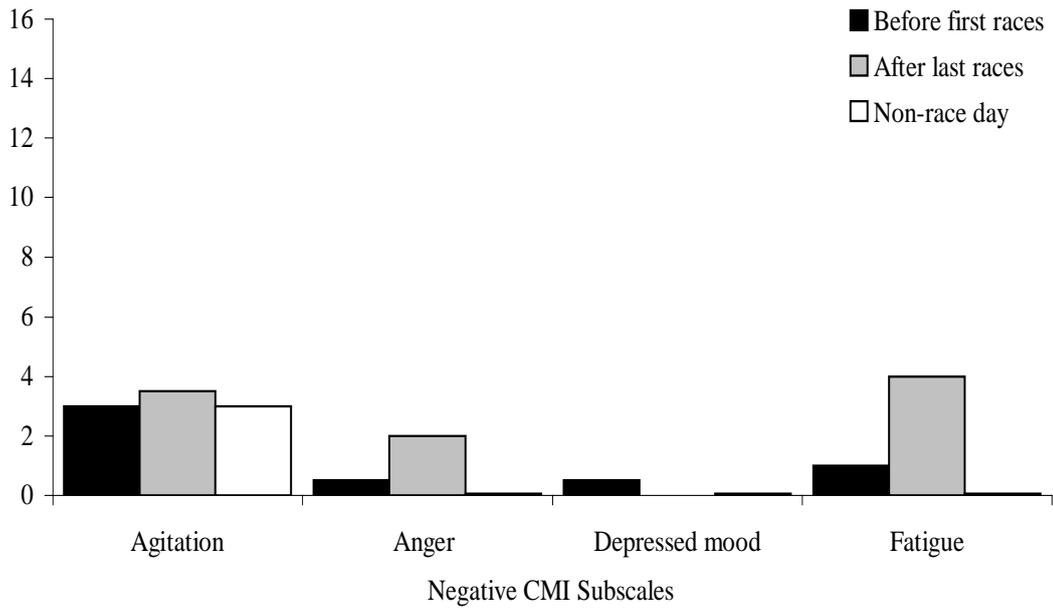


Figure 25. Mean negative CMI subscale scores for Neil on race days (before and after racing) and non-race days.

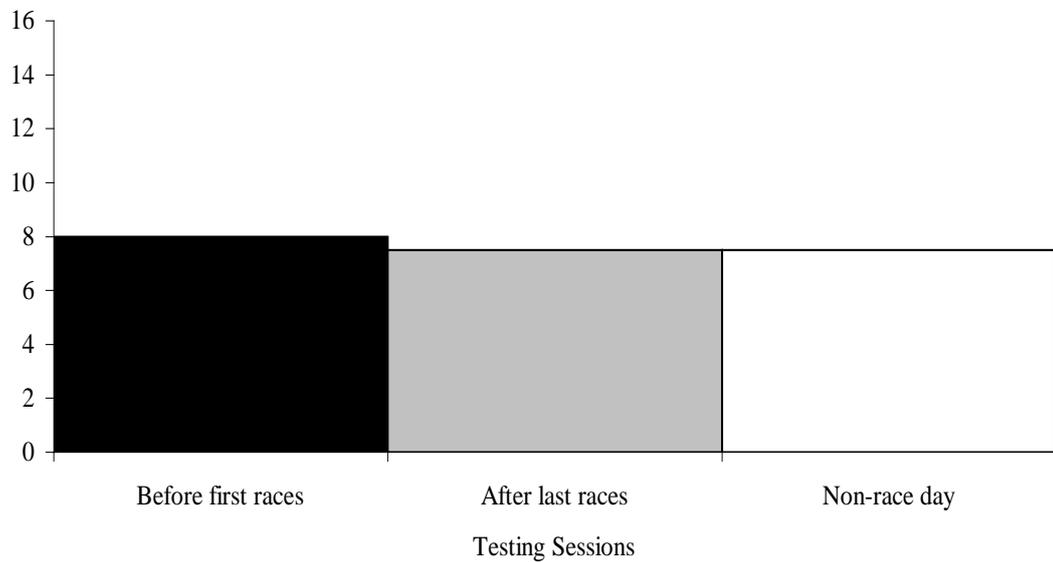


Figure 26. Mean contemplation CMI subscale scores for Neil on race days (before and after racing) and non-race days.

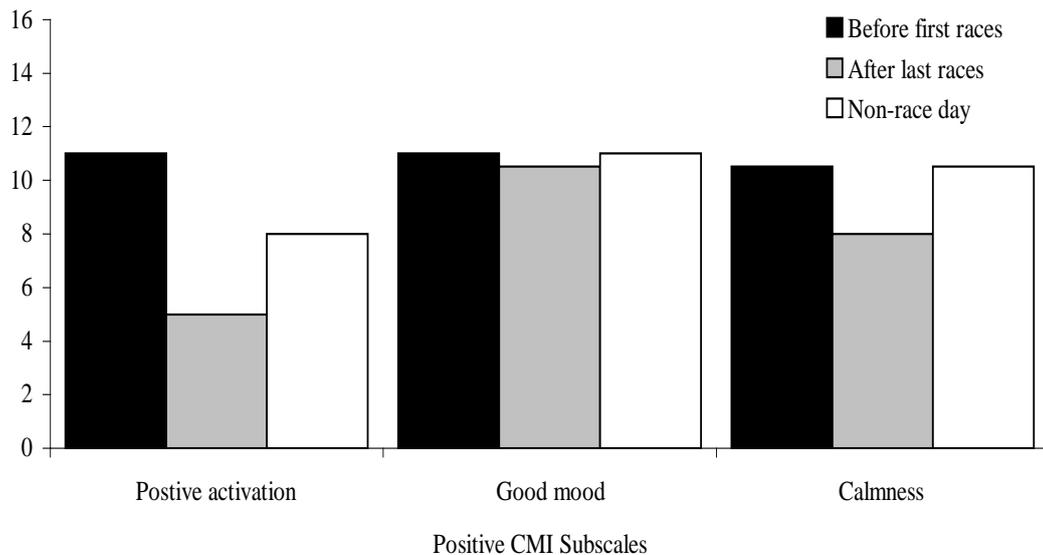


Figure 27. Mean positive CMI subscale scores for Neil on race days (before and after racing) and non-race days.

#### *Weight management.*

At the beginning of his career as a jockey, Neil experienced little difficulty with his weight as he had a small physical build. He did not seek any professional advice (e.g., dietician) about managing his weight and disregarded any information he was given from the apprentice school because he thought that he would continue to be small in stature. Any weight-loss knowledge Neil did learn was self taught and picked up by observing other jockeys. Neil described that he "... just pick[ed] it up, just riding every day, looking at all the boys."

At the time of the study, Neil described himself as "... hopeless ..." with managing his weight and he did not consider himself to be a "... natural light weight ..." He did not follow a specific diet and said that "... I don't really eat healthy ... [I] just eat whatever I want to ..." Neil admitted that even on nights before a race meeting, he would eat pizza until he was "... bloated."

Because he did not like to restrict his food intake, Neil had to use dehydration techniques to meet light riding weight requirements. He stated, "... the night before, oh, stuff it, I'll just, I'd much rather just sit in the bath for longer ..." Even so, Neil admitted that his choice to use dehydration was not the best way to manage his weight and that he could improve his weight-management behaviour.

When he needed to lose fluid to make weight, Neil usually chose to use a hot bath, finding it better than the sauna for weight loss. He could usually lose 1.2 kg to 1.4 kg in the first 45 to 50 minutes in a hot bath, but after this his rate of weight loss would usually decrease to 0.8 kg over 45 minutes. This was because his body was more dehydrated. Neil explained:

Well, if I was sitting there, if I was sitting in my bath for about 50 to 45 minutes, I could lose 1.2 to 1.4, so, and then, probably, if you've got to lose, just say you got to lose two and a half kilos in one morning, it'd be harder to lose that much the next, sort of, 45 minutes. You probably only lose 800 grams or something, like your body just can't keep it up, really.

As well as being better for weight loss, Neil found that the hot bath was more convenient because he could lose weight at home. Moreover, it was more comfortable because, "well, your heads out and you get a bit of fresh air, you know."

Despite the benefits of the hot bath, however, Neil still found losing weight this way to be difficult. He was able to be in the bath for 20 minutes at a time, before he needed to have a break. Neil said that, "... I just find it hard to sit in there for any longer than 20 minutes, really ..."

Neil thought that a better way to lose weight quickly was probably through exercise. He knew other jockeys who went for a run or walk to lose weight but described himself as "... too lazy ..." to use this method.

Although Neil had an aversion to going for a run or a walk, he did enjoy organised sporting activities. He played netball once a week and indoor football twice a week. He explained that as well as helping maintain his weight, these activities were "... fun ...". Neil did not wear sweat gear while he exercised. He had in the past but believed "... it takes too much out of you."

The lowest riding weight Neil usually accepted was 52 kg. He explained that a ride as light as this required him to lose 1 kg to 1.5 kg through dehydration:

... if I've got to ride 52 every day, I would have to probably lose a kilo, a kilo and half in the morning. Just have a bath for, oh, I don't know, half an hour and then get out for 20 and then get back in for an hour ...

After riding, Neil said he quickly regained the weight he had lost through dehydration. If he had another 52 kg ride the next day, he would have to again use the hot bath to lose the fluid he had regained. He explained that although he preferred to have heavier rides and lose less weight, the cycle of dehydration and rehydration was a necessary part of his life as a jockey:

... you pull it off, then you drive to the races, ride, put it all back on and then do the same thing next day. It's good when you don't have to ride light, but you've got to do it when you have to.

During racing carnivals, Neil accepted rides lighter than 52 kg. Six months prior to the study, during the Brisbane Racing Carnival, Neil had met a riding weight requirement of 49 kg. To meet this weight, Neil had to lose 7 kg (12.5% of his body weight) in 10 days. He used what he termed "... more healthy ..." weight-management techniques, to lose the first 5 kg. This meant he ran every day, drank only water and ate small amounts of brown rice, meat and fruit. Then, to lose the last 2 kg, he had to use a fluid-loss technique. He found this extremely difficult because

his body arrived at a point where it "... stopped sweating ..." Neil reported, "I just got there, just got there [49 kg]. It was pretty tough. After the race, I was in a bad way."

In retrospect, Neil felt that he would not accept a 49 kg ride again as it "... was way too light ..." and making the weight "... was too hard ..." In the future, he said that the lightest ride he would accept was 50 kg. He believed that he could meet a 50 kg riding weight requirement because he had ridden at this weight 2 days prior to his 49 kg ride and he had consistently made weight at 51 kg throughout the Spring Racing Carnival.

*Psychological and social effects of weight management.*

Neil found that when he was wasting he experienced negative moods. He was unsure of the cause, but knew that he was unpleasant to be around. He commented that he was, "yeah, no good [to be around]. Yeah, I get real moody when I'm wasting. I don't know why, it's probably, there's probably a reason why, but, yeah." Neil thought that his girlfriend would support his assertion and that her advice would be to "... stay clear ..." during these times.

For Neil, the negative effects of wasting on mood were more pronounced when he had to waste continually over long periods of time. He believed that when he was working towards a specific and potentially rewarding goal, he was less likely to experience negative moods. When asked about the 49 kg riding weight requirement at the Brisbane Racing Carnival, Neil said:

Oh, I wasn't too bad. When, when, when I've got something to work for like that, I'm saying it's a group one race, I'm pretty, I reckon I'm pretty good, but, it's just doing it every day. I reckon, maybe it's the length of time, after a while, yeah.

As there was very little he could do to counteract the negative effects of wasting on mood, Neil advised that it was best for people to avoid jockeys who were wasting. He said, “Yeah, well, we’re not trying to be bastards, but, you know, we’re not really in the right frame of mind. We’re not feeling 100%, so we’re probably not going to be, you know, that great to talk to.”

Usually Neil took the initiative when he was wasting and made an effort to spend time on his own. He was especially wary of people who did not understand about dehydration and its negative effects. He stated, “Yeah, well, I think there’s a stack of people who don’t understand what it’s like to be so dehydrated ...”

Despite his preference to be on his own when wasting, Neil generally enjoyed socialising. He said that he mainly interacted with people outside racing rather than those involved in the industry and commented that although he and his friends had different kinds of lifestyles, “... we still get along great.”

Neil’s practice of, “... nah, stuff it, just eat whatever, do it the next day”, meant that he did not avoid attending social events involving food and drink. He said that on social occasions, such as going out to dinner, he was “not so much drinking alcohol, but probably just having a feed and that ... as I am normally, I just let myself go every night, anyway, so, I’ll eat and drink whatever.”

On occasions when Neil went out to dinner, he would have to lose up to 3 kg, or 5.5% of his body weight, to meet a 52 kg riding weight the next day. He usually only went out to dinner on Thursday evenings as he did not have any riding requirements on Friday, giving him over 24 hours to lose weight.

Neil’s girlfriend was also a jockey. He described her as “... doing all right, you know, with her weight ...” Unlike him, Neil said she chose to manage her weight through exercise, diet and herbal supplements and felt that he should change his

weight-management behaviour. Neil admitted that his method of weight management was probably a bad influence on his girlfriend. He acknowledged that perhaps it should be the other way round, with his girlfriend's weight-management success influencing his behaviour. He said, "Yeah, so, yeah, you think I'd probably just say, she's doing all right, you know, with her weight, and do it that way, but, I don't know ..."

Despite their different approaches to weight management, Neil believed that he and his girlfriend had a relationship that worked well. Occasionally there was conflict because he wanted to go out to dinner when she preferred to stay home because she was monitoring her weight. On those occasions, Neil said, "You just got to run with it ... stay home" or spend time with friends.

Unlike his girlfriend, Neil felt that his family did not completely understand the lifestyle of a jockey. He thought his parents might have some insight because he lived at home during his apprenticeship and they watched him learn about the racing industry and being a jockey. Neil believed that his mother was the most likely to understand about wasting because she was a nurse. As for the rest of his family, Neil commented "... I wouldn't think would know too much about it."

Christmas was a big family occasion for Neil as he had 3 brothers, 2 sisters, 9 aunts and uncles and 40 cousins. Usually the family had a large breakfast, a large lunch and then went to the park. When asked if Boxing Day races meant that he had to be cautious about food intake at Christmas celebrations, Neil said, "No, no, I'd much rather have a good time than worry about my weight like that. Worry about it the next day." He joined in celebrations. Neil did attempt to take heavier rides on Boxing Day to compensate for his indulgences on Christmas Day but found that he

usually had a light ride as "... there's always a couple of races with even lighter than the minimum."

When he was wasting, Neil found that he tended to think about eating and drinking. Sometimes these thoughts meant that he was not as focused on upcoming races as he normally was. Neil described his experiences in the jockeys' room by saying, "You're probably not as focused in the [jockeys'] room as what you normally are, because you are too worried about drinking or eating something."

On the other hand, Neil believed that wasting could be psychologically motivating. He felt that because he had struggled to meet the riding weight, he had to make sure he rode to the best of his ability in the race. Neil asserted "... you've got to make it worth it ..."

*Physical effects of weight management.*

For Neil, the negative physical effects of wasting were especially evident after he had ridden at 49 kg. In the lead up to race day, he reported that he "... wasn't too bad ..." but had a very dry mouth and experienced a cramp in his finger. He found that during the actual race, the elevated arousal, or "... adrenalin ...", associated with an important ride (group 1 race) helped alleviate any negative physical effects. After he had finished riding, however, Neil had difficulty breathing, pains in his chest and trouble speaking. He described his experience by saying:

Oh, during the race I didn't take much notice because it's a Group 1 race, the adrenalin's going, but as soon as I pulled up, I couldn't breathe properly. My chest felt like someone put a nail through it. Just, you just struggle, you know, and when you hop off the horse, you're supposed to talk to the trainer, I couldn't talk, I was in a bad way.

Speaking and presenting well to trainers and owners was a particular concern for Neil because a negative impression could mean the loss of future rides. Neil believed that when he was wasting it was evident to others in his physical presentation. He was concerned that trainers and owners may lose confidence in his ability to ride and not offer him rides in the future. He explained his unease:

Well, I just feel, handling them [trainers and owners] is no problem, but it, when you've wasted so hard, people can see it through your face. Your eyes are in the back of your head. I just, I worry about them saying, oh, gee, he doesn't look too well. You know, just maybe then, losing confidence, putting you on, you know, that's all I probably worry about, you know.

*Suggested future directions in racing.*

Neil felt there was very little the racing industry could do to assist jockeys with their weight management. He believed that a jockey's weight-management behaviour was the responsibility of the individual and that everyone had his/her own preferences in this area. He said, "I don't think there's much they can do, because, everyone's, each, I reckon it's each to their own. However they do it is however they do it. But, yeah, I don't reckon there's much they can do, really."

Neil did not believe that minimum riding weights needed to be raised. In his opinion, higher weights would not reduce incidents of wasting. Jockeys would sit at higher non-race day weights and still need to lose the same amount of weight, in the same manner, to meet their riding commitments. Neil based this opinion on how he thought he would respond to an increase in minimum weights. He commented:

Yeah, no I don't agree with that, because whatever weight they raise it to, there's going to be people sweating, anyway. Like, if they raised it another kilo, to 53, I'd still have to lose a kilo and half the next, the same morning.

You know, all you do is let yourself go more. Instead of walking around at 54, I'd be walking around at 55. So, I don't think raising the weights would do anything, really. I don't agree with that at all, really.

Neil also commented on the restrictions on jockeys' time in on-course saunas. He thought that most jockeys knew their limits and could judge how long they could endure in the sauna. Neil believed that these restrictions meant that jockeys were now driving to race meetings in sweat gear, with heaters on in their cars. He felt that this behaviour was even more dangerous than being in the sauna because they faced the added danger of being involved in a car accident. In Neil's opinion, a car crash involving a jockey in sweat gear, who is using his car as a sauna, would reflect very poorly on the racing industry.

*Advice to up and coming jockeys.*

Despite his own behaviour of eating and drinking what he liked and "... worry about it in the morning", Neil believed that young jockeys would be better off following a healthy diet from the beginning of their careers so that they trained themselves to continue in this manner. He said that if a jockey asked his advice he would say:

Eat and drink healthy, I reckon. I reckon that's, even though that's not my motto, I reckon if I had of done that in the early days and trained myself to eat and drink healthy, yeah, I reckon that's the best way to do it.

Neil thought that if he had followed this advice during his apprenticeship and trained himself to eat healthily, he would have been what he termed a "... natural lightweight ..." and would not have to use dehydration techniques to meet 52 kg weights.

*Summary.*

The six critical themes that were evident from Neil's interview were:

- (1) He preferred to eat what he liked and take part in social occasions, then to use dehydration techniques (hot bath) and exercise to manage his weight;
- (2) He found that negative effects of wasting could motivate him to ride to the best of his ability and "... make it worth it ...";
- (3) He experienced negative moods and was easily irritated while he was wasting so he preferred to spend time alone;
- (4) When wasting, he has experienced cramps, dry mouth, shortness of breath, chest pains, difficulty speaking and a drained physical appearance (e.g., "... your eyes are in the back of your head ...");
- (5) He found that the negative effects of wasting would be alleviated by increased arousal when he was riding in races;
- (6) He was concerned that on-course sauna restrictions were causing more jockeys to use the dangerous dehydration alternative of driving to race meetings in sweat gear, with the heater on in the car to promote fluid loss.

*Peter**Background.*

Peter was a 17-year-old single male in the third year of his apprenticeship. He started his apprenticeship when he was 14, leaving school at the end of Year eight. He described horseracing as being in his blood as his paternal grandfather and father were both jockeys. His mother was also from a horseracing family. Her father was a horse trainer and she worked in the stables when she was younger. As a child, Peter

remembers going to the races on weekends and his father taking him into the jockeys' rooms. He was always sure he was going to be a jockey.

At the time of the study, Peter was riding in an average of 15 to 20 races per week. He was 1.67 m tall, and in the mornings on race days had an average body weight of 50.2 kg (race day one 49.6 kg, race day two 50.7 kg). On non-race days, Peter's mean weight was 51.1 kg (non-race day one 51.0 kg, non-race day two 51.1 kg), which is 0.4 kg to 1.45 kg heavier than on race days. This increase of 0.8% to 2.8% (mean increase 1.7%) in body weight between race days and non-race days is as expected, given that jockeys do not generally need to waste on non-race days.

Figures 28, 29 and 30 show Peter's mean responses on the CMI prior to racing on race days, after racing on race days and on non-race days. Despite reporting higher agitation levels prior to racing on race days, Peter also showed elevated good mood. After racing, he reported higher levels of fatigue and contemplation than prior to racing or non-race days. Peter's scores on fatigue and contemplation were higher after his last race than they were in the morning of the same day, while his scores on positive activation, good mood and calmness were slightly lower after his last race than they were in the morning. Peter did not convey anger or depressed mood at any time during the testing sessions.

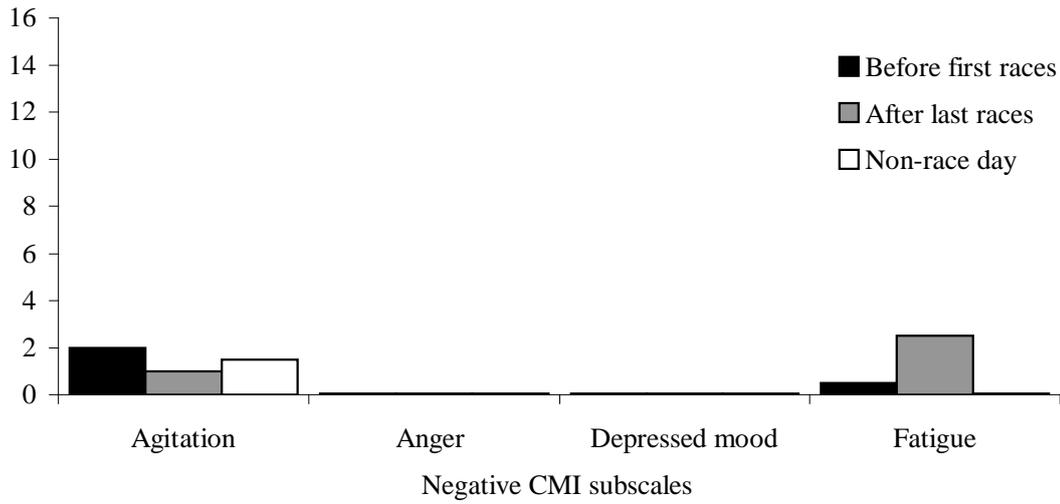


Figure 28. Mean negative CMI subscale scores for Peter on race days (before and after racing) and non-race days.

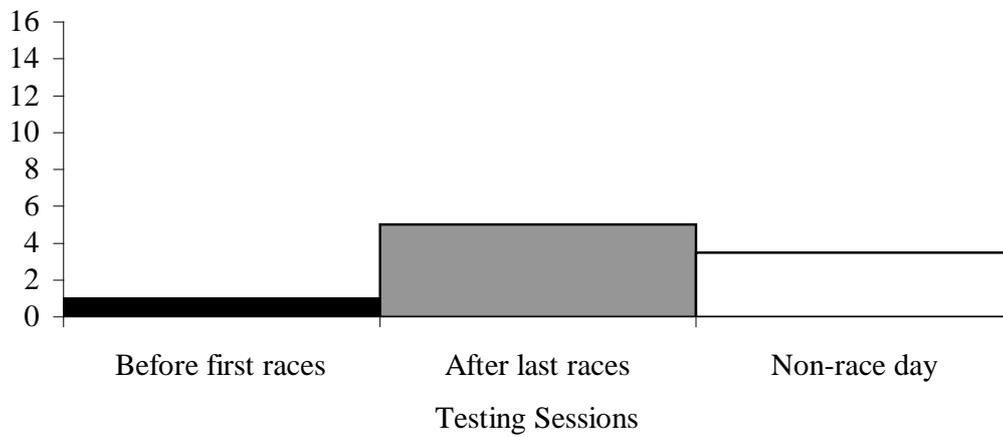


Figure 29. Mean CMI contemplation subscale scores for Peter on race days (before and after racing) and non-race days.

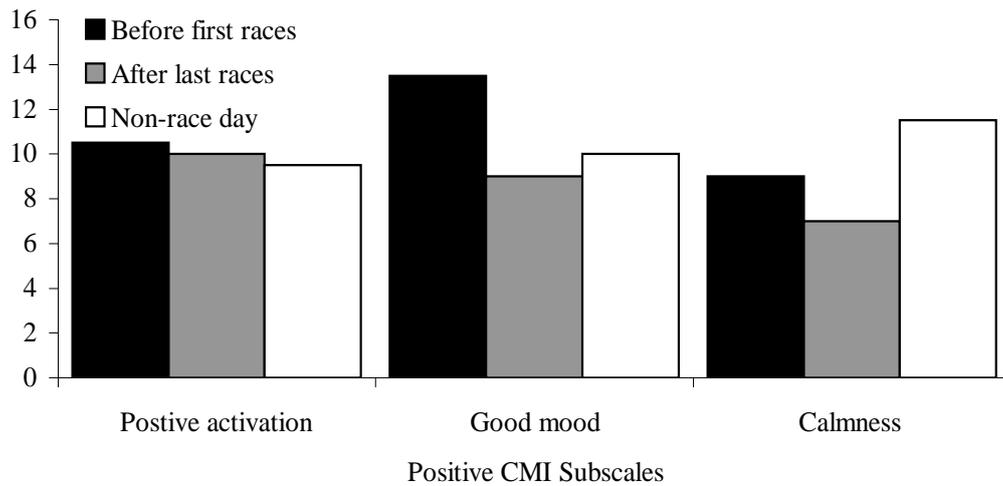


Figure 30. Mean positive CMI subscale scores for Peter on race days (before and after racing) and non-race days.

#### *Weight management.*

Peter had taken a long-term view of his weight even before starting his career as a jockey. When he was 13, a year before beginning his apprenticeship, Peter gained advice from a dietician about eating a healthy diet. When he started racing, he continued with this diet but reduced his food intake. As he grew and his weight gradually increased, he began to use more rigorous weight-loss methods.

When Peter began his apprenticeship, at the age of 14 years, he weighed around 44 kg to 45 kg. At 17 years of age, the lightest ride Peter accepted was 49 kg. He was aware that his weight was likely to keep increasing as he grew, but despite his concern about potential weight-managing difficulties, he took a pragmatic view saying:

... I'm creeping up. I'm growing a bit. It's gradually getting higher so I've got to keep an eye on it, but at the end of the day, I can't do much, what it's going to do, it's going to do.

At the time of the study, Peter had only "... a little bit ..." of difficulty managing his weight and was happy with the weight-management methods he used. For Peter, "... a little bit ..." of difficulty meant carefully monitoring his weight and using at least six different weight-loss methods that included food restriction, exercise as a jockey (e.g., riding track work), other exercise (e.g., swimming), exercising in sweat gear, fluid restriction, hot baths and the sauna.

Food restriction was an important weight-management technique for Peter. Typically his breakfast was fruit or some toast, while he tended not to eat much during the day. On race day, he had an energy bar or sipped an energy drink such as Red Bull or V. His evening meals usually included brown rice and vegetables or steak.

Peter also used exercise to maintain a low body weight. Peter's exercise incorporated riding track work every morning. He attempted to fit additional exercise into his schedule. On his days off, usually once a week, he tried to go swimming. In his opinion, jockeys who complained that some exercise built up too much muscle were "... the lazy ones."

Although he resisted using dehydration weight-loss methods for as long as possible, he eventually had to use fluid reduction to make lighter weight rides. Peter learned about dehydration weight-loss methods by observing other jockeys and then found what worked best for him. His preferred dehydration weight-loss methods were having a hot bath the night before to lose 0.5 kg to 0.75 kg, wearing sweat gear while riding track work and/or using the sauna or steam room at the gym on the morning of the races. Generally, a hot bath rather than a sauna, worked best for him.

Peter had taken rides lower than his limit of 49 kg. The lightest weight he had ever ridden at was 47.5 kg. This was for a race during the Spring Racing Carnival and

required him to have a body weight of 47 kg (to include racing colours and saddle). He struggled to make this weight, living on very small amounts of brown rice, vegetables and fruit for 2 weeks. He believed this was too light for him. He would only accept lightweight rides if the horse had a good chance of winning. He said, "If I'm going to have a light ride, it's got to be worth it."

*Psychological and social effects of weight management.*

When Peter was wasting, he experienced persistent thoughts about thirst and hunger, but found that thirst dominated his thinking. He also revealed that sometimes he felt anxious about making weight, although he attributed some of the feelings of anxiety to performing on race day.

In addition to persistent thoughts about hunger, thirst and anxiety, Peter advised that he was "... a bit grumpy" and sometimes experienced mood swings and angry outbursts. His mood sometimes caused problems within the family despite them being aware that he was easily annoyed at this time. For this reason he found that he preferred to be alone when wasting.

Peter hastened to add, however, that it was not just his family who irritated him when he was wasting. He found associating with strangers difficult as well. For instance, when he used the gym saunas he frequently encountered people who wanted to talk to him. Considering he was only in the sauna to lose weight, he found it most difficult to be polite to them. Experience had taught him, therefore, that this was a time when it was easier to be around other jockeys who were also trying to lose weight.

As well, Peter did not like being around people who were eating and drinking. When he was wasting, food and drink were always on his mind, and the sight of other people enjoying what he could not have tested his willpower. In fact, he found that being “around people who just eat and drink drives you mad.” For this reason, he found attending parties and going out to dinner most difficult. He said that if he was not racing for the next few days, he might be able to eat what he liked and “have a bit of a blow out”, but that if he was racing the next day he preferred to stay home, even if he was not riding light.

As he was usually riding the next day, the Christmas period was one of the times that Peter chose not to join in celebrations. He said that he did not spend much time at any Christmas celebrations; he would attend parties for a short time and then go home to sleep in preparation for the next day’s races.

*Physical effects of weight management.*

Peter advised that he did not normally experience negative effects from wasting because it was rare that he struggled to make weight. However, he said that when he did have to make a low riding weight, he would experience blurred vision, dizziness when standing up, and heat sweats. He described his blurred vision as “not too bad” and said he dealt with dizziness by standing still and waiting for it to pass. He added that he had never lost consciousness.

When wasting, Peter sometimes dreamt of drinking or woke up in the middle of the night with a dry mouth. At these times he sucked on ice to help with the dryness. Dryness in the mouth and throat were also a problem on race day, but more so after a race than during. Peter believed that adrenalin contributed to helping his

performance during the race. He said, however, that “immediately after, when you pull up the horse, you’re real dry inside.” He also reported being physically fatigued after the race, adding that there were times, depending on the horse, when he had struggled to pull up his mount. He was not troubled when this occurred for he believed that the horse would eventually stop, he just needed to steer it. He explained that while he recovered fairly quickly after having something to eat and drink, he was still very tired in the evening.

*Suggested future directions in racing.*

Peter felt that jockeys would benefit from having Sunday racing cancelled. In this way, he explained, all jockeys would be guaranteed one day off a week. He would also like to see the end of night racing, because it put too many demands on jockeys. Many of them got home at 11:30 p.m. and then had to get up at 3:30 a.m. the next morning to ride track work. As well, he felt that the minimum weight should be raised. In his opinion, apprentices were getting taller and it was becoming more difficult for them to meet the minimum weight criteria. He pointed out that in Sydney, the minimum weight was 53 kg.

*Advice to up and coming jockeys.*

Peter believed that new apprentices needed to consider their health when they were wasting. He felt that as young people had very little control over how tall they would eventually grow, apprentices should be careful not waste to the point where they could cause permanent harm to their wellbeing.

*World of racing.*

In Peter's view, people outside the racing industry did not understand what a jockey's life involved. He thought that all they saw was dieting, using the sauna and riding a horse, but jockeys were more than that.

*Summary.*

The six critical themes that were evident from Peter's interview were:

- (1) He reported minimal difficulty managing his weight, but when he needed to meet his riding weight requirements he used food restriction, exercise and dehydration (hot bath and/or sauna);
- (2) He preferred to spend time alone while he was wasting as he experienced negative moods and found it difficult to be around people who were eating and drinking;
- (3) He chose to attend Christmas celebrations for only a short time because he usually rode on Boxing Day;
- (4) He would experience blurred vision, dizziness, dry mouth and throat and fatigue when wasting to meet lower than normal riding weights;
- (5) He would not experience the negative effects of wasting while he was riding in races because of increased arousal;
- (6) He suggested that there be no racing on Sundays so jockeys were guaranteed one day off a week, that night racing be cancelled because it put too much demand on jockeys and that minimum weights be raised because apprentices were now bigger than in previous years.

*Discussion**Weight Management*

The findings of Study 2 support the hypothesis that jockeys engage in a variety of weight-management behaviours to meet their riding weight requirements. Like rowers (Groeller & Galloway, 1996), boxers (Lane, 2001; Ohhashi et al., 2002), judoka (Coles, 1999) and taekwondo players (Lee, 1997), jockeys used a combination of food restriction, passive dehydration (e.g., sauna) and active dehydration (e.g., exercise in sweat gear) to make weight. These results are parallel to previous research on jockeys that also revealed that jockeys engaged in food restriction (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios, et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001), fluid restriction (Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios, et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001), sauna use (Atkinson et al., 2001; M. B. King & Mezey, 1987; Labadarios, et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001), exercise (Atkinson et al., 2001; Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios, et al., 1993; Leydon & Wall, 2002), hot baths (Labadarios, et al., 1993; Leydon & Wall, 2002), self-induced vomiting (M. B. King & Mezey, 1987) and smoking (Labadarios, et al., 1993; Leydon & Wall, 2002).

Unlike other research (e.g., Hill et al., 1998; M. B. King & Mezey, 1987; Labadarios, et al., 1993; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001) no jockey in the current study reported using laxatives, diuretics or appetite suppressants at the time of the research. William explained that in the past he had experimented with diuretics but found the associated increase in weight after use to be a draw back. He

had found Duromine to be more effective as it helped him lose weight and increased his energy levels. William said he had stopped using Duromine after it became a banned substance. This could also be the reason that no other jockeys reported the use of diuretics, laxatives or appetite suppressant. Alternatively, it could have been that some jockeys were reluctant to reveal using these substances because if their identity was revealed (despite assurances of confidentiality) they could be suspended from racing (Racing Victoria Limited, 2002).

In contrast to Study 1 (48.8% *usually* or *often* experienced difficulty when meeting race weight) the current findings indicated that jockeys did not consider managing their weight to be difficult even though jockeys used a myriad of weight-control behaviours. Echoing reports from anecdotal evidence (Bartley, 2007b), jockeys seem to have an acceptance of weight loss as part of their profession. This lends support to the notion highlighted in Study 1, that as weight management was part of a jockey's accepted routine they may be less likely to perceive it as being difficult. Tristan indicated that he never had any difficulty managing his weight during any stage of his career. Yet he reported that he usually had to lose 1 kg to make weight for race day. To manage his weight, Tristan used eight different methods. Between race days, Tristan used food and fluid restriction, exercise as a jockey, other forms of exercise and exercise in clothing to produce sweat. On race days, Tristan made use of the sauna and hot baths.

Peter also indicated that he never had any difficulty managing his weight, yet he used five different weight-loss methods. These methods included food restriction, exercise as a jockey and other forms of exercise, restricted fluid intake and hot baths. To make weight for race days, Peter usually had to lose approximately 1 kg to 1.5 kg which equated to 2% to 3% of his body weight.

Joseph reported his weight was "... pretty much totally under control" and described himself as "... very lucky ..." as his weight remained fairly stable. For Joseph, being fortunate meant he ate very little during the day. On non-race days, his diet included a cup of coffee and some toast for breakfast and a "... decent size meal ..." at night.

William described a normal life for a lightweight jockey as being able to eat a piece of toast and have a drink before racing, or only needing to sweat for half an hour the morning of races. None of the jockeys reported eating three meals a day; all of them had engaged in fluid restriction and active dehydration at some time. They saw these sacrifices as being part of their profession. For instance, even though Joseph experienced persistent thoughts about thirst, he saw dehydrating as part of his job. These reports echoed those of jockeys in anecdotal reports. For several decades newspaper articles indicated that jockeys tendency to eat very little and regularly dehydrate themselves was seen as a necessary part of their profession (Bartley, 2007b; Beadman, 2005; Dunn, 2008; Guinness, 2006; Hillenbrand, 2001; Hoffer, 2001; Scott, 1999; Thomas, 2006).

### *Psychological and Social Effects of Weight Management*

The findings from Study 2 partially supported the hypothesis that the weight-loss methods jockeys engaged in were associated with negative moods. Although the information gathered from the interviews suggested that weight loss (in particular wasting) did lead to negative moods, scores on the CMI did not show high levels of negative moods at any time, even on race days, when all the jockeys had engaged in

weight-reduction behaviours for at least 12 hours prior to testing. This included Tristan, who recorded a lighter non-race day weight than race day weight.

In addition, Peter, Tristan, Joseph and Neil all showed their highest scores on positive activation and good moods before their first race. This did not support the idea that wasting was associated with increased negative moods. This result, however, could have occurred because of the increased arousal associated with performance. This possibility was partially supported by Tristan and Neil, who reported their highest levels of negative moods at the end of the day (scores on negative moods were constant for Joseph). Peter reported that he felt increased agitation before the first race and this again could be related to performance. Tristan and Peter both suggested that the adrenalin experienced prior to a race negated any adverse feelings that weight-reduction caused. Research lends some support to this belief as it has been shown that athletes generally have well-developed stress hormone response (Kinr, 1998). Consideration should then be given to the negative health effects associated with the chronic activation of the stress response as jockeys can have a very hectic racing schedule (S. L. King & Hegadoren, 2002).

Another explanation for jockeys elevated positive moods on race day as compared to negative moods could be related to the effects of exercise on mood. Research has indicated that people who exercise for as little as 10 min experience decreased tension, depression, anger, confusion and fatigue and increased feelings of vigour (Berger & Motl, 2000; Hansen, Stevens, & Coast, 2001). In addition to riding in races jockeys may have engaged in exercise prior to attending the races. Study 1 showed that 57.5% of jockeys engaged in exercise as a jockey (e.g., track work) on race day and 28.6% engaged in other exercise.

Mark's scores on the CMI supported the idea that wasting was associated with negative affect; he reported his most positive moods on non-race days. This could indicate that he has an improvement in mood when he is not wasting. William's results could also support the notion that wasting leads to negative affects because his scores on the CMI indicated that he experienced agitation, anger and depressed mood more before the first race than at any other time. His positive measures were also at their lowest before racing. This may be because William recorded one of the biggest differences in non-race days' and race days' body weights. William engaged in three behaviours designed to reduce body fluid in the 12 hours before racing. He also reported feeling tired, dizzy and light-headed (after the sauna), dry retching (after a run) and having a mild headache throughout the day.

Surprisingly, although Neil reported that he gets "real moody" when he's wasting, this was not shown in the results. Neil lost 1.25 kg on race day one and 2.5 kg on race day two (an average of 3.7% of his body weight), yet he reported high scores on good mood both before and after racing. As expected, his positive activation (fresh, vigourous, energetic and active) scores decreased after his last race. Although his scores on anger, agitation and fatigue increased, they were still lower than expected.

Other research examining the effect of weight-loss behaviour in athletes has also encountered difficulty controlling for competition anxiety. This can be seen in Choma et al.'s (1998) examination of wrestlers. Identifying Choma et al.'s (1998) difficulty, Landers et al. (2001) attempted to control for this factor by including a control group of wrestlers who lost less than 1% of their body weight to make weight in their research. Unfortunately, in thoroughbred horseracing it is almost impossible to undertake a similar comparison from the jockey population as only one jockey from

Study 1 and 2 reported using no weight-management techniques and the amount of weight lost by jockeys in Study 1 ranged from 1.77% to 7.4%. Because of the inability to identify a comparison group from the jockey population, like research on other weight-management sports such as boxing (Lane, 2001), judo (Filaire, 2001), body-building (Newton et al., 1993) and wrestling (Choma et al., 1998; Landers et al., 2001), the current study attempted to gain a base-line measure of jockeys' mood by testing on race days and non-race days. The validity of identifying non-race days as a type of base-line measure should be considered with caution. Unlike other sports such as boxing, judo and rowing, jockeys are consistently managing their weight because of the frequency of racing opportunities (7-day-a-week racing, 363 days a year) and the risk of jeopardising future opportunities by turning down riding offers (Thomas, 2008). While for other sports, testing can take place during a non-competition period or some weeks before competition this is not usually the case when considering jockeys.

Contrasting the mixed results shown by jockeys responses on the CMI, the interviews revealed all the jockeys agreed that their main psychological problems while wasting were irritability and short-temperedness. The findings echoed those of Keys et al. (1950) who found that conscientious objectors were less even-tempered and more irritable and prone to angry outbursts during a semi-starvation period compared to a control period. Jockeys highlighted their change in temperament when wasting. For instance, Tristan said that when trying to make weight, he found that it did not take much to upset him and that he was more likely to react in an angry manner, and Peter said that while he was wasting, he experienced mood swings and angry outbursts. These reports of increased anger and irritability have safety implications for jockeys, especially when considering that Mark and William both

indicated that wasting to make weight increased the likelihood that they would ride aggressively.

Echoing reports from anecdotal evidence (Bartley, 2007a, 2007b; Beadman, 2005; Eddy, 2007; Harris et al., 2001; Thomas, 2006), the findings from Study 2 also suggested that the negative moods associated with weight-loss behaviours affect the social lives and relationships of jockeys in a number of ways. Firstly, the results suggested that one of the common methods used to deal with the feelings of anger and irritability associated with weight loss, was to spend time away from other people. Secondly, all but one of the jockeys interviewed mentioned that they chose not to be around people who were eating and drinking because these people did not fully appreciate the reasons for jockeys' weight-loss behaviours. These findings indicate that weight-loss behaviours and the management of their negative psychological effects tend to reduce the avenues for psychological support that jockeys have available to them during times of stress.

### *Weight Management and Mental Health Disorders*

Although the interviews were not a formal mental health assessment, jockeys' reports supported the notion that a vast majority of jockeys experience psychological symptomatology consistent with several *DSM-IV-TR* disorders (American Psychiatric Association, 2000) when they are wasting.

As in Study 1, jockeys reported experiencing fatigue and loss of energy. Jockeys also reported feeling irritable and having difficulty sleeping. Along with

fatigue these are identified symptoms of General Anxiety Disorder (American Psychiatric Association, 2000).

The interview responses indicated that the jockeys' persistent thoughts about food and thirst represented strong physiological responses to the stressful stimuli of dehydration and food restriction. Neil described how these thoughts could be intrusive and impair his ability to focus on up-coming races and that he tried to suppress or redirect them to motivate him to ride well. These findings further highlight a parallel between jockeys' persistent thoughts about food and thirst and some obsession diagnostic criteria of Obsessive-Compulsive Disorder (American Psychiatric Association, 2000).

Another issue that was not identified in Study 1 was jockeys' preference for spending time alone. Jockeys reported avoiding social situations as they may be tempted to eat or drink and/or be irritated by people and be rude to them. If they had to engage with people they would try to make it as short as possible. This was evident when Mark explained about having to make small talk with people "... it's irritable. But you don't put yourself in that position ... If it's there in front of you, you try and make it as short and sweet as possible, and move on..." Jockeys self-imposed social isolation and the reasons behind it have similarities to symptoms identified in Social Phobia (American Psychological Society, 1994).

The results showed that jockeys experienced universal and frequent psychological symptoms while they were managing their weight. As jockeys do not meet the full diagnostic criteria to be diagnosed with a *DSM-IV-TR* disorder it stands to reason that jockeys may be experiencing a psychological disorder that has yet to be identified. Based on the symptoms evident in Study 1 and 2 and their relationship to jockeys' weight management, the current research defined the syndrome as

Occupational Weight-Loss Disorder (OWLD). The following diagnostic criteria were identified:

- (A) Significant weight loss associated with the demands of occupation (i.e., vocation or sport)
- (B) Three (or more) of the following symptoms are present while the person is engaging in weight-loss behaviour
  - (1) Depressed mood associated with weight loss as indicated by either subjective reports (e.g., feels sad or down) or observations made by others (e.g., appears tearful)
  - (2) Irritability
  - (3) Fatigue or loss of energy
  - (4) Sleep disturbance (e.g., difficulty falling or staying asleep or restless unsatisfying sleep)
  - (5) Recurrent and persistent thoughts that are experienced, at some time while the person is managing their weight, as intrusive and that cause a marked anxiety or distress
  - (6) Repeated attempts to ignore, suppress or neutralise persistent thoughts
  - (7) Fears of behaving in a way that will be socially inappropriate (e.g., angry outburst)
  - (8) Avoidance of social situations or when this is not possible, experienced marked anxiety or distress in relation to social situations
- (C) The symptoms cause significant distress or impairment in social or occupational functioning and/or relationships and/or other areas of functioning.

*Physical Effects of Weight Management*

The hypothesis that jockeys would report experiencing negative physical effects when they were wasting was also supported. All of the jockeys interviewed reported feeling negative physical effects at some stage as a result of weight loss. Blurred vision, dizziness, heat sweats, fatigue, dryness in the mouth and throat, cramps and feelings of physical weakness were mentioned. The stories relayed by jockeys during the current research were similar to those described by jockeys in anecdotal reports (e.g., "... your mouth feels like leather", Harris, 2001, p. 39). For instance, Peter mentioned dryness in the mouth and throat as a problem, and recalled times when he had felt very parched at the finish of a race, "... immediately after, when you pull up the horse, you're real dry inside and you're blowing a lot so your throat and all that is real dry, specially because it's a hot day. It's shocking."

Peter also reported being so physically fatigued after some races that rather than struggle to pull up the horse, he just steered it, confident it would stop. These reports echo previous anecdotal accounts of jockeys being exhausted on race day from dehydration and food restriction (Harris et al., 2001; Prendergast, 2001). They also highlight parallels between the current findings and research on athletes using rapid weight loss and physical performance. Studies examining lightweight rowers, boxers, judoka, taekwondo players and wrestlers have shown that rapid weight loss can decrease oxygen consumption, anaerobic threshold, strength, power, muscular endurance, thermal regulation, flexibility and agility (Burge et al., 1993; Filaire et al., 2001; Lane, 2001; Webster et al., 1990). The physical impact on jockeys could potentially be even worse as unlike the fore mentioned athletes they do not have a chance to eat and drink between weighing and performing.

The physical effects (e.g., dizziness, muscular cramps, fatigue) reported by jockeys when they were wasting also highlight their risk of experiencing heat illness (Armstrong & Maresh, 1993; Howe & Boden, 2007; Wexler, 2002). Tristan, William and Neil's reports of losing more than 3% of their body weight to make weight on race day further supported this. Although not quite 3%, Peter lost 2.8% of his body weight to make weight on one of the race days. A loss of more than 3% in body hydration is considered to be a significant risk factor for heat illness (Hassanien et al., 1992; Sparling, 2000) although caution should be used as this figure was developed through laboratory experiments. Although the current study cannot specify if the weight lost by jockeys was only fluid, previous research by Warrington et al. (2006) and Pruscino et al. (2005) indicated that jockeys were habitually dehydrated on non-race days, and to an even greater extent on race days. Given this and jockeys reported use of dehydration promoting weight-loss techniques (e.g., sauna, fluid restriction, food restriction) it could be assumed that their hydration levels dropped between race day and non-race day or holidays putting them at risk of heat illness.

Another concern when considering heat illness is Neil's and William's reports that at some stage they had had difficulty or were unable to continue sweating. Even though it was beyond the scope of the current research to measure jockeys' body temperature, when added to other reported symptoms such as irritability, cramps, dry mouth, fatigue and dizziness, the inability to continue sweating points towards heatstroke (Coris et al., 2004; Hassanien et al., 1992; Howe & Boden, 2007). As heatstroke has an average mortality rate of 25% (Armstrong et al., 1990; Hassanien et al., 1992) and is the third leading cause of death in athletes (Coris et al., 2006; Lee-Chiong & Stitt, 1995), these results have obvious implications for the safety of jockeys.

Mark and Peter mentioned a more long-term consequence of food restriction. Both felt they could have possibly stunted their growth as a result of the weight-management behaviours they had engaged in when they were young. Considering the risk of work-related injury and health problems that could develop as jockeys age (e.g., bone-related diseases), this suggestion also has implications for jockeys' health and wellbeing. Jockeys did not mention any of the concerns previously raised in anecdotal reports (e.g., liver, kidney or lung conditions; Hillenbrand, 2001; Schmidt, 2004). As the current study did not examine this area in depth, further research following jockeys through their careers and retirements is required to develop a more detailed picture of the long-term consequences of wasting on jockeys' physical wellbeing.

#### *Optimistic Bias and the Health Belief Model*

As discussed earlier, the evidence from the current study suggests that although jockeys experience a myriad of negative physical, psychological and social consequences when they are managing their weight, there are factors at play that permit them to continue to engage in risky health behaviours. The data illustrated that the majority of the jockeys have a low belief in their own susceptibility to harm. They did not appear to consider their own dehydration and food restriction behaviours to be increasing their vulnerability to harm. For instance, when telling the story about having difficulty controlling even the quietest horse during track work because he was so dehydrated, Tristan felt that this weakness was unlikely to affect him while racing as the effects of dehydration were minimised during a race because of the adrenalin

rush involved. Mark also reported that even if he rode beneath his “comfortable” level and lost more weight than usual, he would not feel any ill effects during a race as adrenalin and the excitement of the race negated these consequences. For both these jockeys the possibility of a race fall was therefore considered unlikely despite having experienced dizziness and weakness leading up to the race. The jockeys did not appear to believe that dehydrating could lead to immediate negative physical consequences that are sometimes unfixable. The consequences were seen more as an uncomfortable experience than as a risk to health. For instance, when he did use fluid-loss weight-management techniques, Joseph felt that despite persistent cravings to rehydrate the consequences were manageable and that “... ‘I’ve never seen anyone go and say ‘stuff it’ and scull a litre of water and say ‘I’m not riding’ ... so everyone can push through it.” The inference being that one can “push through” the experience of dehydration and be alright.

Tristan also seemed to believe the consequences of extreme dehydration were short-term. He commented that he recognised that when other jockeys were having difficulty sweating it was because they were already dehydrated. Yet he persisted in dehydrating when he was losing fluid slower than other jockeys.

Mark also provided data that illustrated a lack of belief in his own susceptibility to harm. He felt that part of being a jockey was being “... hungry ...” but that this did not necessarily mean you had to be weak or unfit. Although he felt that occasionally he had seen other jockeys who had been wasting have difficulty pulling up their horses at the end of a race, when explaining a similar experience for himself he felt that if he had difficulty pulling up a horse himself it was because the horse was “... heavy in the head.”

As evidence of optimistic bias, Mark revealed that as a young jockey he had purposely restricted his food intake, even at times when it was not necessary to make weight, to minimise his growth. In his view successful apprentices should consider doing this too (despite consequences such as bone problems, impaired recovery and death) so they had the opportunity for a successful career as a jockey. He felt reducing his growth had given him an advantage in his career and added to his success. Further evidence of optimistic bias can be extracted from the data in the general lack of concern voiced about personal risk of negative health consequence. This was despite a general recognition that dehydration and food restriction were unhealthy behaviours overall.

The attitudes expressed by the participants in the context of their weight-management experiences also showed that they tended to down play the severity of the potential negative health consequences of their behaviour. Despite having to limit food intake to a level well below what a lay person would consider average, the use of a variety of dehydration methods, and increased exercise above that already incorporated into their profession, words such as a “little bit” of difficulty, “comfortable” weight and “not too bad” were used to describe the experience of achieving a low body weight for racing. This is despite the fact that in extreme situations, the combination of restricted food intake and dehydration can lead to collapse and even death (Maughan, 2000).

Reliance on the psychological coping mechanisms of minimisation and denial is evident in the reports of many of the participants. Peter, for instance, said it was rare that he experienced negative outcomes from weight loss as he generally did not need to struggle to meet race weight. Yet he admitted that he restricted his food intake and dehydrated (e.g., exercise in sweat gear, hot bath or sauna, fluid restriction).

Despite the fact that Neil may have been experiencing the fourth level of heat illness (heat exhaustion) during one ride, he said he felt that the effects had not been "... too bad ...". He described having a very dry mouth and a cramp in his finger during the race and at the end of the race he had difficulty breathing and speaking and chest pains.

Peter also used the words "not too bad" to describe his experiences of dehydration and food restriction. Peter explained that when he did experience negative effects from weight management it was when he was attempting to meet a low riding weight. He minimized the consequences although he had experienced blurred vision, dizziness, a dry mouth and throat and fatigue, all symptoms of heat illness (Armstrong & Maresh, 1993; Howe & Boden, 2007; Wexler, 2002). He said that although after some races he had struggled to pull up horses because of fatigue, this was not a serious issue as they would eventually stop. Peter obviously did not consider being too fatigued to control the horse a high risk for having a race fall.

The nutritional risk of restricting food intake also seems to be underestimated by this group. According to Wahl (1999), the weight-loss methods used by athletes in weight category sports puts them at risk of dehydration and at a high "nutritional" risk. Yet Joseph felt that by mainly relying on food restriction and exercise, supplementing his diet with vitamins and minimising his use of fluid loss techniques, he had reduced the negative effects of weight management. This is despite the fact that food restriction is associated with a myriad of negative physical consequences including decreased energy stores, increased fatigue, increased injury, impaired recovery, vitamin and mineral deficiencies (Filaire et al., 2001; Fogelholm et al., 1993; Hawley & Burke, 1998; Horswill et al., 1990; Ivy, 1991; Keys et al., 1950; Pendergast et al., 1996), loss of bone density, body pains, loss of muscle mass,

neuroendocrine disturbances, gastrointestinal discomfort or upset, decreased immune function, hypomatraemia and menstrual dysfunction (American College of Sports Medicine et al., 2000; Kenardy et al., 2001).

For the jockey's in the study, the benefit of engaging in the risky weight-loss behaviours derived from the fact that such behaviours were a prerequisite for being able to accept rides and partake in their livelihood. As mentioned earlier, for Mark the restriction of food had the added benefit of stunting his growth. Although he was informed of the risks of slowing body growth through food and fluid restriction, he believed it was a risk worth taking, given the possible benefits of being a jockey. He felt that if jockeys did not stunt their growth through food restriction there was a risk they may be forced out of the profession and hence lose the opportunity to be successful.

In relation to the perceived barriers to increasing hydration and nutritional health, some jockeys viewed this as an end to their careers as a jockey. For instance, they did not believe that they could follow the advice of health professionals and still make the necessary weight. As an example, Peter gained and followed advice from a dietician a year before entering the profession (13 years of age). After starting his apprenticeship he continued to follow the dietician's advice but after a while he admitted he found he needed to reduce his food intake.

William was also open to listening to dieticians if they were recommended by someone he respected within the industry, but generally, he felt that they had a lack of understanding of the extreme weight demands of a jockey.

In a similar vein, Joseph had recognised that if he did not engage in fluid loss techniques he ran the risk of refusing a ride and upsetting trainers and owners and potentially affecting his riding opportunities in the future. This was despite the fact he

was a successful jockey and therefore at less of a risk of losing rides than other less successful jockeys.

### *Jockeys' Recommendations*

#### *Raising minimum riding weights.*

Tristan, William and Peter all believed that the minimum riding weight in Victoria needed to be raised above 52 kg. Mark expressed concerns about weights below 51 kg (e.g., Melbourne Cup). He felt that it was unreasonable for any jockey, even an apprentice, to be required to ride as low as 48 kg.

#### *Access to professional advice.*

Tristan believed that services made available to apprentices (e.g., dieticians) should be open to all registered jockeys. He felt that these services would need to be well advertised because jockeys would struggle to find time in their busy schedules to attend sessions. Joseph also had suggestions about services for jockeys. He thought that registered jockeys needed a health and fitness centre with counsellors (psychological and financial), dieticians, masseurs and training equipment. He felt it was important to separate the counselling service from RVL (who currently provided referrals) to ensure jockeys' privacy. William had similar ideas to Joseph and Tristan, believing that jockeys needed more assistance with training and lifestyle advice. He thought that jockeys would benefit as much as other athletes from having a coach or mentor.

*Guaranteed time off from racing.*

For Peter, a major concern was time off from racing. He suggested putting an end to night and Sunday race meetings. He felt that night racing was too demanding because most jockeys had very little time to recover before their next riding commitment (e.g., track work may require jockeys to get up at 3:30 a.m.). Peter also thought that by stopping Sunday race meetings, jockeys would be guaranteed at least one day off from racing each week, whereas under the current conditions they could ride 7 days a week.

*Potential danger of sweating in the car.*

Neil believed that the limits on jockeys' time in the sauna needed to be reconsidered. He felt these restrictions had led to an increased use of a more dangerous weight-loss behaviour; driving to race meetings, dressed in sweat gear, with the heater on in the car to promote fluid loss. Joseph agreed, saying that the racing industry needed to be more concerned about the potential danger of jockeys "... sweating in the car ...". Both jockeys felt that if action was not taken to stop this behaviour, it was only a matter of time before a jockey was involved in a car accident.

## Chapter 13: Study 3 - Jockey, Family Member and Industry Stakeholder Interviews

Studies on wrestlers (Choma et al., 1998; Landers et al., 2001), rowers (Terry, 1999), body builders (Newton et al., 1993), judokas (Filaire et al., 2001) and deliberately starved conscientious objectors (Keys et al., 1950) show that extreme weight-loss behaviours can have a negative effect on mood, physical wellbeing and social interactions. While athletes are making weight they have been found to have increased levels of depression, confusion, tension and fatigue (Choma et al., 1998; Filaire et al., 2001; Newton et al., 1993; Terry, 1999). During a semi-starvation period (1570 calories in two meals of cereals, bread, potatoes, turnips, cabbage and small amounts of meat and dairy products), deliberately starved conscientious objectors were found to have elevated levels of depression, mood swings, irritability, apathy and fatigue when compared to a non-starvation period. Moreover, participants exhibited changes in their social interactions with an increase in their preference to be alone, listen to others rather than speak and an impatience with people's questions. They also experienced a decrease in their interests outside the experiment (e.g., weight loss, hunger), a decrease in camaraderie with others in the group, and found it took a concerted effort to maintain socially acceptable behaviour (Keys et al., 1950).

When considering the physical implications of weight loss, especially dehydration, there have been reports of fatalities in a variety of sports (CBC, 2004; International Judo Federation, 2003; Mueller & Diehl, 2006; Oppliger & Bartok, 2002; Walberg-Rakins, 2000). When considering less severe consequences, studies have shown that athletes are at increased risk of injury (Green et al., 2007), headaches, dizziness, nausea, hot flushes, nosebleeds, fever, disorientation and racing heart rate (Alderman et al., 2004).

Although there are a small number of studies examining jockeys and wasting (e.g., Caulfield et al., 2003; Labadarios et al., 1993), most of the evidence pertaining to the effects weight management has on a jockey's physical and psychological wellbeing is anecdotal, coming from newspaper articles (e.g., Baptiste, 2000a; Bartley, 2007b; Christine, 2001; Edwards, 2008; Harris et al., 2001; Hinds, 2006; Hoffer, 2001; Stewart & Habel, 2001; Thomas, 2006) or novels (e.g., Hillenbrand, 2001). This evidence indicates a primarily negative effect on jockeys' moods and physical wellbeing.

There is also a paucity of literature when considering the impact of jockeys' weight management on social wellbeing. One study that did investigate jockeys' social wellbeing was that by Labadarios et al. (1993). They examined 93 South African jockeys' interpersonal relationships and reported that 21% found it difficult to make friends, 14% lost friends easily, 15% mistrusted friends and 18% did not see fellow jockeys as friends. Unfortunately, the researchers made no connection between these effects and weight management. Evidence linking jockeys' weight-management difficulties with their social networks and interactions is primarily anecdotal. Jockeys reported that their weight management played a role in limiting social activities and placed a strain on their relationships with their families (Henke, 1999; Hillenbrand, 2001; Hoffer, 2001; Proietto, 1998).

To extend the findings of Study 1 and 2, Study 3 used a qualitative methodology to illicit the perceptions, understandings and opinions of jockeys, their family members and industry stakeholders regarding the impact of jockeys' weight-loss methods on various dimensions of their wellbeing. The aim of Study 3 was to gain a more in-depth understanding of jockeys' weight-loss methods and how these methods were perceived to impact on their physical and psychological wellbeing

(mood, social interactions and lifestyle) and their families. To facilitate this aim, the researcher sought the perceptions, feelings and experiences of jockeys currently registered to ride in flat races in Victoria, their family members and industry stakeholders.

### *Method*

#### *Participants*

Eight fully-registered jockeys agreed to take part in the research. Six male and two female jockeys indicated their interest in participating in an interview by providing their contact details at the end of the questionnaire package in Study 1. The first female jockey was 23 years old and had not been raised in a family with members involved in the racing industry. Her interest in becoming a jockey began after she took a job as a stablehand during her school holidays. As she had a natural talent for riding and a passion for horses and sport, the stable's trainer and her parents encouraged her to begin an apprenticeship as a jockey. At the time of the study, she had just returned to racing after a 2.5 year break, which she commenced at the end of her apprenticeship. Her time away from racing had been instigated by extreme difficulties with her weight during her apprenticeship. The lightest ride she currently accepted was 53 kg.

The second female jockey was not from a horseracing background either. She had been encouraged to think of a career as a jockey by her horse-riding instructor whose own daughter was a jockey. After completing a Technical and Further

Education (TAFE) course and traineeship, she began her career as a jockey at 17 years of age and was currently completing the third year of her apprenticeship. At the time of the study she had lost almost 6 kg to have a body weight of "... forty-nine and a half, fifty [kg] ..."

The first male jockey had been riding for 10 years, after having started his apprenticeship at 16 years of age. Although his family did not have a racing background, he had started working in a stable at 11 years of age. At the time of the study he was 26 years old and the lightest ride he accepted was 53 kg. The second male jockey was not from a racing background. He decided to become a jockey "... to do something where I can look people in the eye." As was appropriate at the time, he entered the racing industry, completed a six-year apprenticeship and became a fully-registered jockey at the age of 21 years. At the time of the study he had been a jockey for over 30 years and generally rode at 52 kg.

Similarly, the third male jockey had completed his apprenticeship at a time when he was required to be 21 years of age before he could become a fully-registered jockey. He started his apprenticeship at 14 years of age and had initially been attracted to the industry because of his small stature and a family interest in racing, prompted by his uncle who was a jockey. At the time of the study, he had been riding for 35 years and would accept rides as light as 53 kg if "... it's a good enough ride" as he usually needed to lose "... about 5 pounds [2.3 kg] ..." to make this weight.

The fourth male jockey came from a racing background. His father was a retired jockey. He usually rode at a weight of 53 kg but his "resting" weight fluctuated at around 54 kg. At the time of the study, he was 21 years old and was in the fourth year of his apprenticeship.

At the conclusion of the jockeys' interviews (Study 2 and Study 3), six jockeys were randomly selected and asked for permission to approach a member of each of their families to take part in an interview about their perceptions and experiences of jockeys' weight management. Two males, fathers of two of the interviewed jockeys, and three females, spouses of three of the interviewed jockeys, agreed to take part in the research. All five participants were aged over 18 years. One family member, the spouse of a jockey, declined the opportunity to take part in the study.

Industry stakeholder participants included three males and two females working within the thoroughbred horseracing industry. All racing official participants had direct and frequent contact with jockeys through their employment. Their work-related responsibilities included jockey education and training, medical advice and care and involvement with jockeys on race day. To maintain participants' confidentiality, their specific roles within the racing industry could not be revealed. All five participants were over 18 years.

### *Measures*

The semi-structured interview guidelines used to interview participants in Study 2 were also used for jockey interviews in Study 3 (see Appendix G). Like Study 2, jockeys were asked about their careers as jockeys (e.g., how they first became a jockey), their prior and current weight-loss methods, perceptions of the effects of wasting (physical, psychological and social effects), the effects their career has had on

their family and any changes they believed could be made to benefit jockeys' health and wellbeing.

Based on participants' responses in Studies 1 and 2 and on prior research by M. B. King and Mezey (1987) and Speed et al. (2001), a semi-structured interview guideline that aimed to assess family members' and stakeholders' perceptions of jockeys' weight-management methods and the physical, psychological and social effects of wasting was developed (see Appendix G). Participants were asked to consider their experiences and perceptions of jockeys when responding to questions about jockeys' use of weight-loss methods, the psychological, social and physical effects of weight management on jockeys and ideas for changes that could be made to improve the quality of life for jockeys and their families. Industry stakeholders were also asked about their role in racing and how long they had been involved in the industry.

### *Procedure*

Jockeys and family members were first contacted by mail. A letter explaining the aims and methods of the research, and consent forms were sent to those jockeys who had provided their contact details (see Appendix H). The letters were followed by telephone calls to give verbal explanations of the research and to organise interview times and places.

Industry stakeholder participants, some of whom were already aware of the research, were first contacted by telephone. Information letters and consent forms (see Appendix H) were sent to them after gaining their verbal commitment to participate in interviews.

Most interviews with participants were conducted face-to-face and lasted approximately 1 hour. Consent forms were collected at the beginning of interviews. In five cases face-to-face interviews could not be arranged because of the participants' schedules and distance between the participants and the researcher. Telephone interviews were undertaken in these cases and participants were asked to use the reply-paid envelope provided to return their signed consent form.

Once their interviews were transcribed, participants were sent copies of the transcripts to allow them to comment or add any other details if they wished.

### *Data Analysis*

Refer to Study 2 for an explanation of the data analysis. It should be noted that in the current study, based on the comparable themes highlighted in interviews, the researcher pooled participants' data and presented grouped case studies. To maintain participant confidentiality, participants' quotations were attributed to an undisclosed participant (e.g., one jockey reported). Identifying information such as names and roles were also excluded.

### *Results and Discussion*

Jockeys' lives are dominated by interconnected demands and stresses that affect most aspects of their physical, psychological and social functioning. The current study included eight jockeys, two fathers of jockeys, three wives of jockeys

and five racing industry stakeholders. Data from their semi-structured interviews were analysed and five major themes were revealed: (1) life of a jockey; (2) weight-management strategies; (3) psychological and social effects of weight management; (4) physical effects of weight management and (5) suggested future directions in racing. Analysis also revealed that each major theme yielded several sub-themes (see Table 15).

Table 15 *Major Themes and Sub-Themes From Jockey, Family Member and Industry Stakeholder Interviews*

Major themes	Sub-themes
Life of a jockey	<ul style="list-style-type: none"> <li>• High time demands</li> <li>• Difficulty socialising</li> <li>• Difficulty having time off</li> <li>• Maintaining reputation</li> <li>• Apprenticeship</li> <li>• Risk of injury</li> <li>• Opportunities for financial success</li> <li>• Lack of understanding of jockey requirements</li> <li>• Female jockeys</li> </ul>
Weight-management strategies	<ul style="list-style-type: none"> <li>• Energy balance adjustment techniques</li> <li>• Dehydration techniques</li> <li>• Difficulty managing weight</li> <li>• Best-fit approach</li> <li>• Cravings</li> <li>• Weight stabilisation over time</li> <li>• 7-day-a-week racing</li> </ul>

Major themes	Sub-themes
Psychological and social effects of weight management	<ul style="list-style-type: none"> <li>• Negative moods</li> <li>• Coping with negative moods</li> <li>• Interacting with others</li> <li>• Eating in front of jockeys</li> <li>• Special occasions</li> <li>• Interacting with industry stakeholders</li> <li>• Effects on family</li> <li>• Persistent thoughts of food and fluid</li> </ul>
Physical effects of weight management	<ul style="list-style-type: none"> <li>• Short-term effects</li> <li>• Effects while riding</li> <li>• Effects after riding</li> <li>• Recovery period</li> <li>• Travel to and from races</li> <li>• Sleep disturbance</li> <li>• Long-term effects</li> </ul>
Suggested future directions in racing	<ul style="list-style-type: none"> <li>• Changes to weight requirements</li> <li>• Professional identification system</li> <li>• Services for jockeys</li> <li>• Time off from racing</li> </ul>

### *Life of a Jockey*

Being a jockey is a full-time profession that impacts on all areas of jockeys' lives and the lives of their families (Baptiste, 2000a; Harris et al., 2001; Hillenbrand, 2001; Labadarios et al., 1993; Lane, 2001). The family members interviewed described a lifestyle that was hectic, time consuming and risky. They explained it was not just about riding in races, but also about preparation for races and vigilance with weight. Many of those interviewed mentioned that it was possible for jockeys to have

riding commitments 7 days a week. Jockeys normally had early morning starts, either because they rode track work or because they had to travel to a race meeting. There could also be late finishes due to evening racing or because they were travelling home from a race meeting at which they had competed.

One of the wives, who had been in the industry for many years, said that she believed that the hectic lifestyle lived by jockeys today must place a lot of pressure on young families. She felt that with 7-day-a-week racing which included day and twilight meetings, there must be great strain on jockeys' spouses. Their partners would hardly ever be home. Furthermore, when they were at home, jockeys would have to prepare for the next day's racing. She said:

They [jockeys] are up early in the morning. They ride track work, then they come home, shower, get ready and they are off to the races. So they get home from the races and they have got to do gear and get everything ready because there is races again the next day, and yes, I think it would be really hard. Like I said before, I would hate to be starting out now, knowing what I know. You know, I think it would be really, you know, I do feel sorry for them.

One of the wives explained that her husband usually went to bed early and was always conscious of the time and his riding commitments no matter where they were. She described his lifestyle as being ruled by the clock, "Even when we are out it's by the clock and he's constantly aware of, "I have to get up in the morning and I have to do this."

All three wives reported that at some time during their marriage they had been daunted by the long hours their husbands committed to being a jockey (e.g., track work, travel, race meetings, etc.). One wife said she had learned to deal with her husband's schedule because she recognised that he enjoyed being a jockey. Even so,

she admitted that because of 7-day-a-week racing, she found it hard to plan ahead as her husband did not have a concrete routine for the days he rode at race meetings.

Similarly, one of the fathers interviewed expressed concern about the time demands faced by jockeys. When he compared his own experiences as a jockey with his son's, he felt that current jockeys had more pressure placed upon them because of 7-day-a-week racing. During his career, race meetings were only on 2 to 3 days a week so he had 4 or 5 days to exercise and/or relax. He explained that his son was up at 3:30 a.m. to ride track work, then had a sauna to lose weight for the day's races, travelled to a country or city race meeting, travelled home, possibly attended a night race meeting, had dinner if his weight allowed and then prepared his riding gear and strategies for the following day's races. He pointed out that unlike people in most other jobs, his son did not even get to relax on a Saturday night because there were now Sunday race meetings. He went on to explain that if his son did have free time, he usually spent it exercising to help manage his weight. He described being a jockey in the current industry as "... hard work."

Difficulty socialising was another common phenomenon extracted from the data. A jockey's wife said that one of the problems with the time demands placed upon jockeys was that it did not leave a lot of time for a social life. Self reports by one of the jockeys highlighted this aspect of his lifestyle. He said that "... you can't sort of have a normal life ... go out drinking and do everything, partying, birthdays, go out for tea and I sort of just don't because I can't." These sentiments appeared to be a general consensus among jockeys. They explained there was not much time for socialising because of their hectic schedules and their need to manage their weight.

Another aspect of a jockey's lifestyle that was mentioned as problematic by the participants was having time off. The participants revealed that they were always

conscious of the need to secure rides and the negative consequences of refusing rides. One of the jockeys mentioned that it was difficult to find time to take a holiday or rest from racing, simply because it was hard to refuse “good rides.” Even if you planned to have a break “if you don’t ride them someone else will,” he explained. Several jockeys said, “... it’s never the right time ...” to have time off from racing as there was a high risk of being overlooked by trainers and owners in the future if you declined a ride. The only break jockeys usually took was when they were suspended. One of the fathers also earmarked this issue as a concern. He said that his son rarely, if ever, took time off from racing because of the risk to future rides if he refused offers.

The study revealed that the instability of the industry also impacted upon the social systems of the family. One of the wives described the need to censor conversations in racing and non-racing environments because of the risk to her husband’s career. She said that although she enjoyed going to the races with her husband and socialising while he was working, she did have to be cautious about what she discussed. She said there were limits to what she could discuss with certain people in case she revealed or hinted at something that could affect her husband’s career. She felt not only did “... a lot of rides depend on the jockey being fit and stuff. You couldn’t have any rumours about things wrong in their life because they might pass over a jockey ...”

She said that this need to be cautious included people who were not directly involved with the racing industry, as you could not be sure they did not have a connection to someone associated with racing (e.g., thoroughbred racehorse owner). In her opinion, her husband had learned early in his career about these connections and the need to be careful when speaking to other people within and outside the racing

industry. She said she believed her husband's caution and reluctance to speak about himself led people to see him as distant and restrained:

I guess with the way [Jockey] was brought up in his earlier days is that he is very reserved and guarded in what he says to people, which may come off that he is either very aloof or introverted, but only because of that. You can't be seen to be saying too much.

Another of the wives who reported that caution was required when socialising because a jockey's reputation needed to be protected from scandal or inference, echoed this idea. She said "... news travels very quickly on the racing telegraph, that's for sure" and could have a negative impact on offers of rides.

The care taken by jockeys and their families to protect their reputations also affected health decisions made by participants. Jockeys were very aware of the effect rumours and ill health could have on their livelihood. Supporting anecdotal claims (Beadman & Young, 2003; Schmidt 2004; Thomas, 2008), one jockey explained that he had purposely remained quiet about an illness he had because of its potential impact on future rides. He said that his caution may have stemmed from an incident earlier in his career, when after an injury he found it difficult to secure rides because of an assumed loss of confidence. One concern stemming from this story is the possibility that jockeys are not experiencing optimal conditions for recovery from illness and injury. In the social support literature, several studies have suggested that the combination of high stress and low social support is a strong predictor of negative health outcomes and decreased longevity (Kaplan et al., 1997; Minkler, 1990; Singer & Lord, 1984). For instance, previous research has indicated that male industrial workers have an improved chance of recovery from lower back pain if they gain social support from their co-workers (Gheldof et al., 2007).

The perceived delicacy of a jockey's reputation even extended to normal social situations. A jockey mentioned that in her opinion there was extreme pressure associated with trying to gain and maintain future rides because the racing industry was "... a real small world" "... where innocent incidents, such as having a meal out, could lead to rumours of her" "... not trying hard ..."

One of the fathers also mentioned the pressure associated with attaining rides as a disadvantage of a jockey's lifestyle. He was concerned about the uncertainty and pressure his son had to face to gain rides. He admitted that his son had been able to develop a riding agreement with a stable, but these contracts only lasted three months before they were reviewed, leaving his son's future rides in doubt. He described the racing industry by saying "... you're only as good as your last ride, yeah, that's what I mean, it's a cut-throat business."

To illustrate his opinion about the pressures jockeys faced gaining rides, he told a story about one of his son's suspensions. He said that he had been suspended after a steward's protest for trying to "... push out ..." during a race to give his horse a better opportunity to win. In his opinion, if his son had not tried to find a better path for the horse "... he would have been bloody damned ..." and not placed at all. Despite the reasoning behind the "... push out ..." and subsequent suspension, his son had not been offered a ride from that trainer since that race.

Both of the fathers involved in the study also mentioned concerns they had about the lifestyle changes their sons experienced as a result of their apprenticeships. One of the fathers revealed that his son's apprenticeship did not run smoothly. He said that because he was tall, with a high probability of becoming too heavy to be a jockey, his trainer had not put the time and effort into developing his career. He explained that it was not until he came back from time at another stable, "... lean and mean ..." that

his trainer started to recognise his potential as a jockey. The other father said that letting his son become a jockey had meant that he had had to move away from home at a young age. The family had had to face a hard decision; to allow a 16-year-old boy to move away from his family and his hometown to pursue a career as a jockey or to keep him in the family home unable to pursue his preferred goals. After the decision was made to allow him to take up an apprenticeship, he described how quickly his son moved away:

... So I rang him, this was on the Thursday night, and he said, “Yeah, I’ll get back to you, I have to run it past ...”, you know, his wife, because they had a young family and everything, as well. He didn’t ring back, so I rang him Friday night, and he said, “Send him down.” Now this was on Friday night, [Jockey] was gone out of our life on Sunday.

He recalled that in the first year of his apprenticeship his son would vomit each day he went to the stables, “... obviously from nerves ... he’d never been on a bloody horse ...” Now that his son had recently finished his apprenticeship, he had concerns about the difficulties he may face getting rides. His worry stemmed from the fact that he was still only young and that he lacked support as he lived away from his family.

A repeated theme throughout the research was the physical risk involved in being a jockey. This issue was highlighted by racing industry professionals, jockeys and family members. Several industry professionals commented on the “... horrific injuries ...” they had witnessed throughout their involvement in racing and likened the risk associated with horseracing to the risk associated with driving a Formula One racing car:

Well, insurance companies compare these guys with Formula One drivers, in terms of the risk that they’re at. Basically, every time you see them walk into the mounting yard, you’re not sure if you’ll see them come back again...

A father described his son's choice of careers as "... a bit frightening ..." He said he often worried about his son's welfare because "...you think, gosh, how the hell can they sit on a horse, you know, they sit on nothing [light-weight saddles], and how they hang onto the bloody things." He told a story about how anxious he became when listening to the races on the radio when his son had a race fall and was trampled by a horse. He later learnt that his son's injuries were not serious, but he needed three weeks off racing to recover.

Despite the numerous negative aspects experienced by jockeys, some positives were mentioned. One of the advantages of a jockey's lifestyle was the financial rewards to be gained. One wife had found that although there had been difficulties, her husband's profession had meant they were in a sound financial position when they were raising their children.

Data gathered in the present study indicated that it was this notion of the potentially large financial rewards to be gained in the profession that motivated jockeys to begin, and remain jockeys. An industry stakeholder mentioned that he believed it was this opportunity that motivated jockeys to continue in such a hectic and risky profession. He felt that for some jockeys, the ability to earn "... big dollars ..." outweighed the negative aspects associated with riding and wasting. One racing industry professional reported a conversation he had had with a senior jockey regarding the industry's concern about the effects of wasting on a jockey's health. He explained that the jockey said:

I hear what you're saying, but I think of my education, or lack of it, and I think of what I might have earned in the workforce. And then I think of what I'm earning now, riding [horse] and all these other horses. So I say to myself, if what I'm doing now for the family, and for myself and the rest of it, involves a slight risk with wasting, then so be it.

This notion was supported by reports in anecdotal evidence (Bartley, 2007a; Manley, 2008).

It was shown in this study that although financial success was identified as a motivator for jockeys, only a small portion of jockeys were on a high income. One of the wives pointed out that few jockeys made a great deal of money from their profession. She explained, “there’s only a small percentage that get that [great financial success] ...” Speed et al. (2001) highlighted the \$152,092 difference in income between the top 20 twenty jockeys (\$197, 472) and the standard jockey (\$45,380) in the 1998/9 racing season. The present data reinforced this discrepancy. Jockeys and their families highlighted that there was no guarantee of securing rides, let alone potentially winning rides.

The participants discussed securing rides as an intricate process that relied on jockeys’ relationships with trainers and owners. Unfortunately, some jockeys felt there was a lack of understanding among trainers and owners about the issues jockeys face on a daily basis. One jockey felt that although trainers who had been jockeys had more understanding, there was a general lack of insight into the demands of being a jockey. A female rider said even if “... they [trainers and owners] ... scream in your face and you still have to be polite” or risk losing future rides. Another jockey said if he wished to take a holiday he risked future employment, because he would need to turn down offers.

These reports of bullying in the workplace cause grave concern. Worksafe Victoria defines bullying as “repeated, unreasonable behaviour directed toward an employee or group of employees that creates a risk to health and safety” (Victorian

Workcover Authority, 2005)<sup>6</sup>. Further investigation into this area is needed, but the current results indicate that jockeys may be being humiliated (e.g., yelled at) and threatened (e.g., withdrawal of future rides) by trainers and owners. These behaviours are legally unacceptable under the Occupational Health and Safety Act 2004.

Although jockeys are essentially contractors and not employees of RVL, the act includes direct employees and those employed in the workplace (e.g., sub-contractors; Victorian Workcover Authority, 2005).

Female jockeys voiced another concern with the racing industry; gender based discrimination. The present study indicated that female jockeys are not being treated as equals of their male counterparts. Perhaps, as discussed by Anderson and Shirako (2008), stereotypes may be impacting on reputation. One female felt that although the racing industry had "... come ahead in leaps and bounds ..." in terms of opportunities for female jockeys, she still had to "... try harder to get the male trainers to notice you and accept you as a rider ..." As previous research has shown that physically neither gender has an advantage over the other and that, in fact, female jockeys, on average, outperform males in the placings (Bennett, 1989; Ray & Grimes, 1993), the same jockey was justified in believing that she was as good a rider as many of the male jockeys despite the industry perception that females were not as strong or agile as male. Another female jockey had a similar outlook. She felt that regardless of her gender, she had a reputation as a good rider yet she was sometimes treated unfairly.

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<sup>6</sup> unreasonable behaviour is defined as "behaviour that a reasonable person, having regard to all the circumstances, would expect to victimise, humiliate, undermine or threaten"; behaviour is defined as "actions of individuals or a group; and may involve using a system or work as a means of victimising, humiliating, undermining or threatening"; and risk to health and safety includes "risk to the mental or physical health of the employee" (Victorian Workcover Authority, 2005)

As an example of the gender-based discrimination she had experienced she explained that on some occasions, when horses she had ridden were involved in more prestigious races, male jockeys were offered the ride over her clearly because of their gender.

One of the female jockeys admitted that there were some male jockeys who were more skilled than her, but was unsure whether this was because of their natural ability or because they had more riding opportunities, and because of this, more experience than her. Her interpretation of the situation for female jockeys was supported by previous research. Ray and Grimes (1993) found that female jockeys opportunities to ride in races were half that of their male counterparts and pointed out that this would limit female jockeys race-riding experience, independent of their abilities.

Although female jockeys have been competing against male jockeys for over 25 years (Ray and Grimes, 1993) there was a definite belief from female jockeys that it was still a male-dominated industry. One female jockey believed “a bit more changing needs to be done ...” The other stated she was uncertain if female jockeys would ever accomplish equality in the racing industry but felt, “... just at the moment us girls are slowly chipping away at an industry that sort of doesn’t want us there.”

Despite the female jockeys’ belief that more needed to be done to improve the status of female jockeys within the industry and indications from the 2007 Melbourne Cup Carnival that female jockeys were receiving less riding offers and less quality riding offers (Habel & Windmill, 2007; Thomas, 2007a), RVL was recognised for its achievements in equal opportunities. In 2007, RVL was awarded a commendation for the advancement of women in non-traditional areas of employment with regard to their programs for female jockeys and the increase in the proportion of female

apprentices (Racing Victoria Limited, 2007a). This award could indicate that although the governing body of racing is working diligently towards gender equality in the sport, the sentiment is not being taken up by trainers and owners, the people who actually offer jockeys their riding opportunities.

Another concern identified by participants in the study was the perception the public held of jockeys. Although RVL had been working towards improving conditions for all jockeys, most riders felt there was a lack of understanding from people outside the racing industry about what was required of jockeys to meet their riding weight requirements. One of the wives talked about those jockeys who had been hurt and maimed. She felt that this side of racing was hidden from the public and that the public had a perception that a jockey's life "...was a breeze ...". Most family members expressed this concern. They felt the general public lacked understanding of what was required of jockeys. They believed people were unaware that jockeys spent considerable time outside of racing, planning and preparing for race meetings and that they needed to have a body weight less than their set riding weight to allow for their riding colours and saddle. One jockey said that when he explained his lifestyle (e.g., hectic schedule, weight management, etc.) people said, "... you're mad, you're crazy ...". He admitted that when he thought about his lifestyle, he too thought "... it is crazy, isn't it?" Another rider said that people's lack of understanding could be annoying because they often made ill-informed judgements about jockeys. He explained about people's disapproval of jockeys' food and drink choices:

... you know what you can and what you can't [do with regard to weight management]. What irks me a bit is somewhere, you go somewhere, and they say, "Oh, you shouldn't be eating this." People say that and they don't realise that even though you watch your weight, you can still eat. That some people don't understand that even in winter, if I'm working really hard, I can have a pie for lunch, but I'll only have one pie and a cup of coffee and that doesn't

put any extra weight on. As long as you don't have two pies and all that extra, you know. People see you eating and they think, "Oh, these jockeys shouldn't be eating" which is baloney because everyone's got to eat.

He, and other jockeys included in the study, said they felt that riders needed to be able to "... have a let down ..." For example, an occasional ice-cream or dinner out was necessary for their psychological wellbeing. A male jockey said he believed it was futile to even try to explain to members of the general public about jockeys and weight loss, as they could never fully understand what was required. He stated:

No, you can't explain it to them, really. A lot of people realise what jockeys go through, they've just got to realise that no matter what you do, I mean they say "Oh, he sweated to ride this horse, and then he's out on the drink that night", but you've got to put something back in. They've got to realize that a jockey's only human too. And they've got to have a bit of an outlet, they've got to be able to go out and enjoy themselves without being hassled with, "You shouldn't be doing this, you shouldn't be doing that."

When considering public opinion, another jockey mentioned she was particularly concerned after having seen people jeering jockeys who struggled to meet their riding weights. She said apprentice jockeys had been yelled at by punters because they believed the apprentices' inability to claim the full 3 kg entitlement had cost a horse a victory. Previous anecdotal evidence indicated apprentices also felt pressure from owners and trainers to claim their full weight allowance and would be overlooked for rides if they could not (Bartley, 2007a). In the jockey's view, jockeys had enough pressure from themselves, trainers and owners and the industry without having the public add to their burden.

Despite these sentiments, one of the older jockeys believed that attitudes towards jockeys had improved dramatically in the last 10 years. He credited RVL for

working towards, and succeeding, in changing people's opinions of jockeys and increasing the general understanding of what life as a jockey entails.

### *Weight Management*

Lending further support to the findings of Study 1 and 2, reports from jockeys, their family members and stakeholders, supported the hypothesis that jockeys would engage in a variety of weight-management behaviours to meet riding weight requirements. Like athletes from other sports such as rowing (Groeller & Galloway, 1996), boxing (Lane, 2001), judo (Coles, 1999) and taekwondo (Lee, 1997), jockeys reported restricting food and fluid intake, exercising, exercising in sweat gear and saunaing to make weight. The current findings also echoed previous research examining jockeys behaviour which showed that riders used food restriction, fluid restriction, exercise, exercise in sweat gear, sauna and hot baths to manage their weight (Atkinson et al., 2001; M. B. King & Mezey, 1987; Labadarios et al., 1993; Leydon & Wall, 2002, Moore et al., 2002; Speed et al., 2001). In contrast to previous research on jockeys (e.g., M. B. King & Mezey, 1987; Leydon & Wall, 2002; Moore et al., 2002; Speed et al., 2001) and findings in Study 1 and 2, the findings of this study did not indicate jockeys used smoking, self-induced vomiting, diuretics, laxatives and or appetite suppressants to manage weight. Some riders admitted they had used appetite suppressants and diuretics in the past and there was a feeling that although these substances were now banned within the industry other jockeys were still using them. Similar to Study 1 and 2, sweating in the car was revealed as another method used by jockeys to promote fluid loss.

In the present study, it was evident that food restriction was seen as a normal and necessary behaviour in the life of a jockey. All participants discussed food

restriction in a matter of fact manner; eating less than three times a day was considered normal behaviour. All jockeys mentioned dieting as an important factor in weight-management routine. The jockeys described a number of different diets they had tried during their careers, although mainly it seemed to be a policy of "... eat very little ...". One of the diets mentioned was the high protein low carbohydrate diet. One of the jockeys who used this diet explained that he tried to avoid foods such as bread and pasta and made sure he always took fruit with him to snack on if he needed it. Another jockey said that on her high protein, low carbohydrate diet she had two "... fairly good sized meals ..." of two eggs and a cup of coffee at lunch time and piece of chicken or steak with steamed vegetables and gravy or cheese sauce for dinner. She reported that before going on this diet she had struggled with her weight, but now counted herself as a "... more fortunate jockey ..." because she could:

... eat right up until race day, pretty much most of the time. Sometimes I'll have to miss dinner. Just the day before, I'd probably miss my dinner, it just depends where I'm riding. If I'm in the city where I still claim, then yeah, I do have to miss the day before ...

Jockeys also reported using other types of diets to manage their weight. One jockey's diet consisted mainly of power or muesli bars. He said that if he was riding at a race meeting, he usually only ate two power bars or muesli bars throughout the day. When he got home he would have rice with vegetables and chicken or fish for dinner. Other diets mentioned included the "brown rice diet", "soup diet" or the "fruit only diet." The jockey who had been on the fruit diet said that although he lost weight and felt "... fine ..." physically he "... still to this day can't look at fruit."

To highlight jockeys' restraint when it came to diet, one jockey told a story about gaining weight during his apprenticeship. He said that on one occasion when he was suspended he decided to eat what he liked for a week. Despite continuing to ride

track work and complete stable duties, he put on 10 kg in just 6 days. He felt that this showed "... you're depriving your body that much, when you do let the reins go and give it its head, well it takes everything."

One of the fathers also told a story that highlighted the restrictions his son put on his food intake. He revealed that he had noticed that since his son became a jockey, weight was "... the paramount thing in his life ...". He admitted that when his son came to visit he ate very little and would take a form of Chinese medicine that expanded in his stomach. It was supplied to him by a jockey friend who rode in Singapore. Although he understood the necessity for his son to maintain a low body weight, he revealed his concerns about his son's diet:

Yeah, well he's got to. I don't know how hard he wastes, but, you know, he comes home here and won't eat anything, sort of thing. Like I say, it's frightening when he comes home with this Chinese bloody medicine crap that you mix up and drink it down and it expands in your belly and so it makes you feel like you've had a feed and you really haven't had one.

The father reported that his son had not always been a small eater. Coming from a farming background, the family normally had three hot meals a day. He highlighted the difference in his son's current diet by explaining that while his jockey son now had an egg for breakfast, his other son, a station manager, would have eggs, bacon and chops.

Another of the fathers reported that his son would eat mainly protein bars, five to six a day, and very little else. He explained that his son had read the nutritional information on the back of the protein bar and believed they supplied him with needed vitamins and minerals. He said that how much other food his son ate depended on what riding weight he had accepted. His son never ate a big meal at night, but he might have a meal of pasta during the day if he was not riding. In the evening, the

most he would have would be some bread and a piece of steamed fish or chicken or a salad and a protein bar. He explained his son's diet:

... he'll have a pasta sort of a lunch if he's not riding or a, that's about his biggest feed, he doesn't have much at night. He goes crook at me because he reckons I eat too much at night. I say to him, I ain't going to ride tomorrow. He doesn't eat big meals at night. He might eat bread and a, perhaps a light chicken, steamed light chicken or steamed fish or something like that. He doesn't like, at night, he might have salad and a power bar.

Despite reducing their daily caloric intake, the participants of the current study were also maintaining a gruelling physical regime. Jockeys highlighted that in addition to the physical exercise incorporated in their job (track work etc); they saw exercise as an important method of weight loss. They reported that they engaged in additional exercise such as walking, jogging, boxing, skipping and bike riding. Most jockeys mentioned that they were careful to avoid exercise that built up muscles (e.g., weights) because this increased body weight.

Active and passive dehydration methods were also seen as standard practice and discussed openly by the participants in the study. For instance, to increase the amount of weight they lost through exercise, some jockeys would wear sweat gear (e.g., plastic vapour-impermeable suits and/or layers of clothing) while exercising. This increased sweating and promoted weight loss through fluid loss. For one jockey this was such a common practice that he said he would "... feel funny ..." if he did not wear sweat gear while he was riding track work, while two other jockeys specified that they could lose over 1.5 kg in 20 to 30 minutes if they wore sweat gear while doing cardiovascular-related exercise.

Other methods used to promote fluid loss were the sauna and the hot bath. For several jockeys, using the sauna was a common weight-loss method. One jockey

explained that he used the sauna to lose weight each day he was riding. This meant he spent up to 2 hours in the sauna at his local gym, 5 to 6 days a week, losing 1.5 kg to 2 kg. Another jockey described himself as one of the "... pretty good sweaters ...". He could usually lose 1 kg in 30 minutes in the sauna with fairly little trouble. He showed sympathy for other jockeys who had difficulty losing weight in the sauna: "... poor buggers go in there for an hour and take half a kilo off. I couldn't stand that but some [jockeys] can't sweat." He admitted, however, that how well he sweated in the sauna often depended upon how hydrated he was beforehand, how much weight he needed to lose and an elusive factor that meant on "... some days, it's a lot better than other days ...".

The concern this jockey expressed for other jockeys "...who can't sweat..." appeared to be for the discomfort they had to endure while losing weight in the sauna, rather than potential health-related consequences. This attitude seemed to be prevalent throughout the study.

Several jockeys revealed that another common method that promoted fluid loss was wearing sweat gear in their cars, with the heater on, on the way to the races. Prior to Study 1, this method had not previously been identified in research examining jockeys or other weight-loss sports. One jockey, who reported using this weight-loss technique, said that it was not his preferred method because it was not possible to tell how much weight was being lost at the time. Moreover, he felt "... when you get out and the fresh air seems to hit you a little bit, you just feel like you're doing it a little bit harder than what you do in the sauna."

Conversely, for another jockey, sweating in the car while driving to the races was his preferred method to lose fluid. He said that he had been using this method for the last 5 years to lose a minimum of 1.5 kg "... nearly every single day ...".

Just saunaing race day is, it's a bit of a waste of time, but I've always coped better just sweating in the car than I have in the sauna. If I lose two kilos in the sauna, then try and drive two and a half hours to the races, I'm buggered, all dry, whereas if I sweat in the car, I can drink a little bit while I'm driving and I seem to cope with it better.

He went on to say that it was easier to lose weight in the car if it was a sunny day and if he went for a short, fast paced run before he started his journey so he could begin to sweat. He also reported that, to be safe, if he began to "... struggle ..." he would pull over and wash his face with cold water. He explained:

... it's like when you're in the sauna, getting out and going and having a cold shower, get back in the car, all the sudden you're right again, your body's still sweating [be]cause you've still got your plastics on, and yet you're on your limits.

He described one instance of losing weight before the races:

Get me started, to make sure, if you get in the car and you've got a, that's where all the jockeys seem to, they don't, don't get sweating before they start and can take, you know sometimes. You know, if you're heavy you can be sweating maybe in 15, 20 minutes, but, and if the sun's out that's a big help. Yeah, it'd be quicker, but if you, yeah, it takes you 20, 40 minutes sweating when the heaters on. It's uncomfortable for that long and then you, and you haven't even sweated, you haven't even lost anything yet, so you get sweating and then you've still got an hour and a half or whatever to abide. Yeah, it's just, you know, with heat, you're sweating when you start. Nothing for me to, the other day went to Ballarat and you know, beginning of the drive I had five pound again, two and a half kilos, and they've got a sauna there and, knew I was going struggling a bit so I went for a good run and I end up running 6 minutes. But you know, just a little bit longer, sun was out so hopped in the car and drove, and drove me car into, I thought, I'm probably going to need a little bit longer than an hour and ten. I thought an hour and ten's probably not quite enough and I just, I went into Bacchus Marsh and stopped at a public toilet, went in, washed me face down. Generally when you stop like that, you

need to go to the toilet so I just had, you know its not much but, it's out, did a bit of a piss, and then I was right and then go from there again. I got to the races, and got in the sauna there so you just got a little bit, sweating straight away and I took off me gear and I'd lost exactly on 5 pound. That ended up being an hour and 20 minute drive.

On top of active methods of dehydration, jockeys also appeared to view fluid restriction as a reasonable method of controlling their weight. What fluids they did ingest varied from individual to individual. Some chose to drink sports drinks with added vitamins and minerals, several preferred diet soft drinks with bubbles because "... it feels like you've had something to eat ..." while others simply drank water. What was common among the participants was the attention they gave to their fluid intake. A few jockeys revealed that even when they were not limiting their fluid intake they carefully considered the weight repercussions of having a drink. One jockey said, "Yeah, you've got to say to yourself 'if you have this extra drink, you'll have an extra pound to get off in the morning'." Another jockey revealed that he had been on a diet where he was only allowed half a cup of water and half a cup of apple juice all day. He explained that he got extra fluid by eating fruit. Several other jockeys also admitting they limited their fluid intake on a daily basis.

In the present study it was evident that experiencing dehydration was common. In fact, a state of adequate hydration was an uncommon experience for some jockeys. One jockey explained that because his body "... holds onto fluid ..." after he had been wasting he could put on 6.5 kg of fluid in 2 days.

It appeared from the current study that dehydrating is seen as an unpleasant but necessary behaviour rather than a potential health risk. When discussing his habit of limiting his drinking, one jockey described it as "... very hard ...", and another explained that wasting was "... not an easy thing to do and sometimes you think to

yourself ‘what am I doing, what am I doing to my body and that?’ ...” Even though jockeys admitted that employing weight-loss methods that promoted fluid loss was unpleasant, most had a fairly fatalistic view of their use. One jockey explained that although he was “... not really that happy ...”, that he was needing to dehydrate to make weight, he felt that he had little choice because he did not have any other weight to lose besides fluid, “... but you’ve got to do it, I suppose. There’s nothing much else I can do, I don’t think. I haven’t got that much fat on me or anything, it’s just mainly fluid I lose.” A female jockey explained, “... I mean, you know deep down that you’d be better if you didn’t have to do it [dehydrate], but there’s not much you can do about it.”

All the jockeys in the study had experimented with different methods of dehydrating. When asked about their preferred method of dehydration, one jockey was particularly concerned about having to use the sauna. He felt that using the sauna earlier in his career had made it difficult to stabilise his weight. He now made a conscious effort to avoid the sauna, but admitted to losing weight through other methods of dehydration such as exercising in sweat gear. He was not the only jockey who preferred to avoid the sauna. One female jockey said that she only used the sauna to lose weight when it was absolutely necessary. She explained that when she used the sauna, although she lost weight in the short term, it would invariably mean that her body weight would rise by at least 0.5 kg a few days later. Another jockey mentioned that using the sauna also caused his weight to fluctuate.

Fluctuation in resting body weight was also reported as a side effect of diuretic use. Diuretics were seen as a short-term solution to weight loss. One jockey blamed diuretics for a substantial increase in her weight and her eventual need to take a 2.5 year break from racing to stabilise her weight. Initially she would lose 1.5 kg to 2 kg

by taking one fluid tablet, but eventually she needed four to five tablets to lose 1 kg. She felt that her resting body weight began to rise because of her body's reluctance to lose any replenished fluids since it was continually dehydrated.

Some jockeys also mentioned appetite suppressants such as Duromine or Durofet as a means that had been used to manage their weight in the past. One jockey explained that Durofet effectively decreased his appetite meaning he only ate breakfast. However, he did not take it for long periods because it affected his sleeping patterns. Another jockey explained that he had resorted to taking Duromine on around ten occasions throughout his career. He explained that it had been at times when he was having trouble sleeping and having trouble with his weight, he had thought, "... oh, I'm not going to do this, then I've got to take a Duro[mine] ..."

Although no jockeys included in the study reported currently using banned substances such as appetite suppressants and/or diuretics, several jockeys felt that they were still used throughout the industry. One jockey said that even if jockeys included in the study did take banned substances to manage their weight it was unlikely they would admit it. This belief was not unfounded. Anecdotal evidence (Schmidt, 2004) and findings from Study 1, 2 and 3 have shown that jockeys have a preference for secrecy, mostly due to the insecure nature of the industry.

Some of the fathers reported that their sons had used drugs to assist with weight loss. One of the fathers revealed that two and a half years into his apprenticeship his son had started to struggle with his weight and at his father's suggestion, he had seen a doctor for a prescription of Duromine. He said that although Duromine helped suppress the appetite and gave the user more energy, he truly regretted recommending the drug to his son. He said that at the time he had not been fully aware of the negative effects of the drug, such as its addictive nature.

Additionally, he said he was concerned that Duromine had made his son more likely to engage in risk taking behaviour such as driving fast and taking chances while riding. He explained about his son taking Duromine:

... so all jockeys were on it, even then, only as late as a couple of years ago and his stupid old man bloody said he should go and see the doctor and get on this Duromine. They helped, all doctors, you know. That's only because, the reason why, you're not educated to, I don't think know the half of it, when you think about it. They [Duromine] make you do things, they don't make you do things, but they put your mind in a different depth, you drive quicker, your decision making is, you're just more daring with these bloody tablets you've got in you.

He revealed that the catalyst which stopped his son taking Duromine was being suspended for taking an illegal substance. He said that his son's doctor had been unsure if Duromine was a banned substance but, after looking it up and not seeing it on the banned substance list, had agreed to prescribe a low dose to help him make weight on race days. He explained that his son's suspension had come at a terrible time, just after riding his first winner at a metropolitan race meeting.

Several jockeys reported that they had also spoken to professionals about their weight loss. Mostly they had consulted dieticians. Although there was a feeling that a dietician's advice could be beneficial, generally, there was a choice to avoid this source of professional social support (Hogan et al., 2002; Singer & Lord, 1984). One jockey said the dietician he had consulted did not understand that "... we've [jockeys] really got to be below our natural body weight ...". Another jockey said that although dieticians' advice was probably valid, their suggestion to drink more water was futile, as he needed to use the sauna to lose fluid before each race meeting so he could make weight. This meant he could only implement the dietician's suggestions if he took time off from racing so he was not dehydrating himself. He explained that having a

break from race riding would not be beneficial for the future of his career and offers of rides. This was not an unfounded concern as anecdotal evidence identified losing the support of trainers and owners as a risk of having a break from racing (Thomas, 2008).

Instead, the jockeys indicated that through experience, they had developed a thorough understanding of their bodies and how much weight they could lose using different weight-loss methods. One jockey described it as being "... in tune with your body. You know your body that well that you know what you can do, you know your limits ...". Another said that he had "... tried them [weight-loss methods] all" and "... just found what I can stick to ... what suits me probably won't suit someone else ...". Several other jockeys also reported using a trial-and-error type system to find which weight-loss methods worked well for them.

The wives who participated in the study did not express alarm at the weight-loss methods used by their partners; rather they agreed with their partners that they had found the methods that suited them best. The wives in the study believed that jockeys had developed effective weight-loss routines suited specifically to their needs. One of the wives explained that her husband "...doesn't overeat, in fact his weight's pretty good, actually." She believed her partner managed his weight well through monitoring his food intake, exercising and occasionally having to exercise in sweat gear to lose fluid. She commented that her husband had seldom used extreme weight-loss methods during his career, "... I know he used to do this properly, but you know, very rarely would he resort to something drastic ...". She recalled that during the time her husband had used the sauna to assist with fluid loss, she could not recall many times when he used the sauna on race days. She thought that using the sauna on the day of the races was especially difficult because jockeys were attempting to lose fluid

from an already dehydrated body. She expressed her perceptions of her husband's use of the sauna:

... over all the years, he's basically just done the same thing. He'd, he would make sure that, or he'd like to make sure that he didn't have to go to the sauna on race day. Very rarely would he have to go and do that. He'd do the sauna, he might have done it say 3 days or 2 days or the night before, but actually physically going there the day of the race, I think that's when it takes the most effect because that's that last, that's because there's nothing left to come off, you're squeezing the juice of the juice and I think that's when you start to get more disorientated and light-headed, because not only are you not eating, but you're trying to get rid of stuff. I mean, to get rid of weight you have to eat, well when you're not eating, you're just, you know.

Another of the wives said her husband was a "... good heavyweight ..." jockey because he managed his weight "... properly ..." By this she meant that he never used weight-loss methods such as diuretics but would "... always ..." use dehydration techniques to meet riding weight requirements. She reported that her partner would wear sweat gear or layers of clothing and drive to the races with the heater on so he would sweat. She described her husband's weight-management techniques with admiration:

... he is an excellent example of people who can sweat in the car and do things properly. He knows his limits and you know, he knows his body because he trained his body that way and he has never taken fluid tablets or anything like that, so his body is used to that ...

On the other hand, the fathers who were interviewed did express concern in regard to the lengths their sons had to go to, in order to achieve riding weight. One of the fathers explained that his son's usual riding weight was 52 kg, meaning he needed a body weight of 51.5 kg. He felt that, like "... 90% of jockeys ...", his son was not a "... natural ..." jockey and that he would always have to be vigilant with his weight

management. He explained, "... it doesn't matter if they put the weights up another 3 or 4 kilos, he's not a natural ..." He said his son could not rely on weight-loss drugs such as Duromine like him and his colleagues did when they were jockeys. Instead, he reported that currently his son maintained his weight by eating only small amounts, exercising and losing fluid in the sauna and/or exercising in sweat gear. He admitted his son did more exercise, including track work, than he had done during his career and that his son now followed an exercise program designed with the assistance of fitness experts from the VIS.

Despite these concerns, he reported being "... pretty proud ..." that his son had beaten his weight issues. Nevertheless, he said that he hoped his son would not continue his career for an extended period of time because "... he's going to have to live like he lives ...", following a stringent weight-management regime. He admitted he looked forward to a time when his son could eat "... normal[ly] ..." and "... be able to enjoy life." He acknowledged that one positive of his son's stringent weight management was his appreciation of "... small things ..." He compared his son's "... fair dinkum ..." enjoyment of the grilled chicken breast sandwich he prepared for him after the races to most people's pleasure when they had take-away food. Jockeys' enjoyment of what could be considered an average meal had also been highlighted in previous anecdotal evidence when a jockey explained how much he looked forward to a "hearty meal of a Sunday night" (Bartley, 2007a p. 38).

Another of the fathers reported concern for his son because he had accepted rides as light as 49 kg. He said that he thought this was too light and felt the minimum weight his son should ride was 54 kg. He said that even 52 kg was "... still a light weight ..." because it only allowed his son 3 kg more. He admitted he understood that his son had very little choice in the matter, as more successful jockeys were more

likely to be offered heavier rides. He reported that to control his weight, his son had reduced his food while also swimming regularly, riding track work 5 days a week and using a hot bath to lose fluid. He also said he thought that his son could have used the heater in the car to help him sweat out fluid on the way to the races.

This father thought that his son's focus on his weight was extreme. He felt that the biggest indication of his son's preoccupation with his weight was the importance of having scales available to continually check his body weight. He expressed his amazement at how much his son had paid for his scales and described how he brought them home when he came to visit:

... you know, he comes home now, and the first thing, out comes the scales. That's the thing I've noticed, they don't go anywhere without their scales, you know, and it just must be paranoid. They wake up in the morning and they're on the scales to see how much weight they've put on overnight ...

To this end, he felt that his son knew exactly what he could and could not do when trying to make weight. For example, he said he believed his son knew, almost down to the 100<sup>th</sup> gram, how much weight he would lose in a hot bath.

In addition to the difficulties involved in making riding weight and the discussion about the effectiveness of different weight-loss methods, three other factors were elicited from the data as sub-themes of weight-management strategies. These included cravings, the effect of aging on weight management and the demands of 7-days-a-week racing. All the jockeys admitted to suffering from cravings at one time or another. For several jockeys, it was sugar and sweet foods they craved. One jockey said, "... on the way to the sauna, I'll probably have a handful of lollies or something. Just a bit of sugar. It's not good for you, but you sort of crave it ..." He went on to say that he chose to eat lollies when he craved sugar because they were light in weight and did not actually increase his body weight if he was riding that day. Another

jockey craved steak. He felt it took a long time for the body to digest it and did not have it very often. Yet another jockey said that although she had craved sweet food in the past, she now desired salty food. She said she was "... fortunate enough now to sort of have it [weight] at that level where, if I do have a craving, I can give in occasionally and it'll still be all right, sort of."

Another jockey said that he had managed to reach a stage where he no longer craved foods such as chocolate. However, he said he had been through a period where it had been difficult to deny himself. Several jockeys mentioned that they alleviated their cravings by distracting themselves and keeping busy.

There was a consensus among most jockeys that as they had aged their body weight had increased and accordingly, so had the minimum riding weight they would accept. Despite this increase, jockeys felt that their weight had tended to stabilise as they got older. There was a feeling that as they matured, they had become more disciplined and careful about their food intake. One jockey said:

I'm more disciplined now. Instead of saying "I have to have it now" I can say "I'll have it later" and I've had a little bit of time off with injury so my weight has stabilised because the novelty of thinking of food, knowing that I could have it whenever I wanted to, as soon as I saw it, sort of thing.

Another reported:

I've found now, like when I was a kid I was probably not so dedicated to the food part, but I've really now been mature and as a man I know what's good for me and what's not and I sort of stick to the routine a lot better. You know when you're a kid you're sort of, you're a bit green and you don't, it's all new to you, you don't know what you're doing.

In spite of this assertion that his weight had stabilised, the same jockey admitted that his weight could increase nearly 3 kg in one night if he "... went out with some friends and had a few drinks and what have you ..."

The effect of 7-days-a-week racing was the third sub-theme of weight management as it meant there was constant pressure to maintain a low body weight. Two jockeys included in the study explained that at the beginning of their careers, race meetings were held only on Wednesdays and Saturdays. They had been able to “... let yourself go ...” after riding in races on Saturday because they had three days to lose weight before they rode again. One said that not only had he been able to go out with friends on Saturday nights, but that he had been able to enjoy a barbeque or roast on Sundays, before he started “... lightening off ...” and cutting down his drinking and eating to lose 3 kg to 4 kg before the next race meeting. Both jockeys explained that with the current racing schedule of 363 days a year, jockeys did not have the luxury of time to lose weight before the next race meeting. For one jockey, 7-day-a-week racing had a positive side. He felt that the hectic racing schedule made it easier for him to maintain his weight. His wife agreed with this. She made the point that 7-days-a-week racing contributed to her husband’s improved ability to manage his weight because he was required to make weight repeatedly throughout the week rather than just on weekends. She described her husband’s “... very sensible ...” weight-loss routine after the introduction of 7-days-a-week racing:

Where as now it’s a 7-day-a-week thing, and he eats a lot of pasta now and we eat a lot of chicken and things like that, and I really think that has a lot to do with the way he is keeping his weight manageable.

### *Psychological and Social Effects of Weight Management*

The results of the current study supported the hypothesis that jockeys’ weight-loss behaviours would be associated with increased feelings of fatigue, tension, anger

and depressed mood. The current study illustrates that this in turn is associated with negative effects on jockeys social relationships and social interactions. This is a concern because there is convincing evidence that social participation promotes health and wellbeing (Cohen et al., 2000; Gould et al., 2002; Pearson, 1990; Sarason et al., 1990; Weinman et al., 1995).

In accordance with previous research that reported that weight loss had an adverse effect on mood in athletes (Caufield, et al., 2003; Choma, et al., 1998; Filaire et al., 2001; Kennardy et al., 2001; Landers, et al., 2001; Lane, 2001; Newton et al., 1993, Terry, et al., 1999) and conscientious objectors (Keys et al., 1950), jockeys, their families and racing stakeholders reported that jockeys' weight loss was often associated with negative mood, increased irritability and an inability to control emotions. Considering that emotions play an important role in social bonds (Henschen, 2000; Izard, 1991) it is not surprising that participants in the study reported that the weight-loss behaviours undertaken by jockeys have a negative effect on social relationships and social interactions.

The interviews demonstrated that there was an overwhelming view that jockeys' tendency to "... fire up ..." and speak and behave rudely was more prevalent when they were wasting than when they were "... normal weight ..." One jockey, who wasted frequently, said, "I probably lose my patience a bit. I get a bit annoyed, frustrated, agitated, I get shitty all the time." Another jockey described swift and recurrent changes in his mood, "Yeah, it gives you mood swings, and you just feel like you're trapped in a corner ... and you think it's just the same thing week in and week out ..." One jockey described it as being "... a little bit more on edge ..." or "... a little bit stressed out ..." in response to occurrences "... like good rides that don't work out [or] something goes wrong at home ..." When another jockey was asked to

explain her control over her emotions and specific things that could annoy her, she highlighted incidents at work:

Anything. I'm usually quite patient with horses, and if they played up, you know, I'd lose my temper pretty easily. If, you know, someone didn't have something ready when it should've been. You know, it's anything, anything just got up my nose. I just wanted to be in and out as quick as possible and, you know, it wasn't as if I knew that, I knew I was being like it, I just couldn't stop myself. I was just so angry at the world pretty much for having to do it, you know.

Another commonly recognised irritant for jockeys was people asking "... stupid questions ..." or wanting to speak about sensitive or unnecessary topics. A jockey said:

... it's just stupid things, stupid questions when you're light, that seem to eat at you ... when you're light you just think, then think "it's a waste of time answering that." When I'm at me normal weight, you don't even think about it ... I know when I'm riding light, I get shitty with it, it's not that I would then go and blow up, I just get short and sharp ...

These findings echoed Keys et al.'s (1950) research on semi-starved conscientious objectors. When comparing results from the semi-starvation period to the control period, they found that there was a 38% increase in participants who were impatient with people's questions or interruptions. They also noted an increase in observed intolerance and short-temperedness and an increase in the effort it took for participants to control their irritability and maintain socially acceptable behaviour. The findings are also similar to those reported by Filaire et al. (2001), Choma et al. (1998) and Lane (2001), who found judoka, wrestlers and boxers experienced an increase in anger and tension levels when managing their weight. Moreover, the findings lend further support to Caulfield et al.'s (2003) research, which identified an

increase in anger and tension when jockeys went from a relaxed weight to their lightest riding weight.

For some jockeys, even the thought of having to ride light was enough to change their mood for the worse. One jockey explained his emotions after he discovered he had a light ride:

As you hear the phone ring you'd be feeling all right, but as soon as you heard it was a light ride your mind would change straight away, you know. I knew that I was a different person. You start feeling a little bit shitty because you know what you've got to do.

These reports bring to mind Yoshioka et al.'s (2006) research that found female judoka experienced mood disturbance prior to weight loss rather than after losing weight. The current findings differ to Yoshioka et al.'s (2006) research in two ways. Firstly, male jockeys also reported experiencing mood disturbance prior to starting weight management and secondly jockeys reported that negative moods carried on after they started to lose weight. These factors tend to discount Yoshioka et al.'s (2006) speculative reasons (successful progress and/or perceived positive aesthetic changes) for increased anxiety prior to weight loss and decrease after weight loss as explanations for the current participants' mood disturbances. There was a feeling from jockeys that their mood changed as a consequence of anticipating an unpleasant experience.

Jockeys' partners had also noticed that their husbands' mood could change after accepting a light ride, even before they started wasting. Supporting the idea that jockeys' mood changed because they were anticipating negative consequences from wasting, a wife said:

Oh definitely, definitely [change in demeanour], because, I guess, you knew that you couldn't eat or you couldn't do that and depending on never having

been to a sauna and not knowing how it affects the individual, you know. He suffered a lot from headaches so, you know, you could see that probably the ticking over, yes, I'm going to feel this, I'm going to feel that, so, yeah.

Jockeys' families and stakeholders in the racing industry consistently reported that wasting jockeys had low tolerance levels and that their reaction to "... little things ..." could be disproportionate to the event. A family member described jockeys as being "... a bit shitty on the world ...", while a racing official explained that, "the consequences of wasting are that the jockey becomes very moody ... they become unreasonable." Both groups felt that there were cues when jockeys' mood changed. An industry professional commented, "you can notice them, they're cranky as all hell, you know ..."

Data from the current study illustrated that the negative moods experienced by jockeys affected their social interactions in two ways. Firstly, members within their social and professional circles choose to limit contact with them, and secondly, the jockeys themselves choose to limit contact with others. Family members and stakeholders reported that they had come to the conclusion that they had to be sensitive to jockeys' mood changes when they were wasting. They had learnt to avoid sensitive topics and to also avoid the jockeys themselves. For example, industry stakeholders said "... we used to see a jockey coming in, and we'd say, 'Get out of the way, dive quick, he must've been wasting ...'" and "... I don't worry them very much, unless I've got to." Similarly, a jockey's father avoided topics such as his son's finances and usually let his son steer the conversation. He made it clear that he was careful not to persist with a topic when he had received a negative answer:

... I find from experience, that if someone wants to talk about things, you talk about it with them. Whatever makes them feel good. You let them tell you what they want to talk about, let them, you know, sort of run the party because

you don't actually, you tend to, you're putting thoughts in their head, they don't want to think about. They don't want to be thinking about that, they just want to do their own little thing. He mightn't want to talk about anything, he might feel like the situation, like jumping on the couch and put the TV on, don't do anything. You ask, "You want some tea mate?" "No." Oh, don't ask him again, you've been told.

Another family member, who did not reside with his jockey son, went as far as only communicating via text messages when his son was losing weight. He said that if he spoke to his son, "... you can guarantee I'll say something wrong ..." so he would circumvent this possibility by sending messages such as, "... good luck ..." if it was race day. These accounts from stakeholders and family members support Evans et al. (1989) who stated that interpersonal conflict has been linked with social withdrawal.

The decision to limit social interactions was not a position only taken by those interacting with jockeys. Jockeys themselves agreed with their family members and industry stakeholders and felt it was best if they minimised their social interactions. Like many of the semi-starved healthy young males in Keys et al.'s (1950) research, jockeys felt the best way to cope with their propensity towards being aggravated when they were managing their weight was to avoid interacting with people.

Most jockeys advised that when they were wasting they preferred engaging in solitary activities such as watching television or playing computer games. One jockey said, "... you have to walk away from people so that you don't be mean to people. I used to have to either go for long walks so that I wouldn't blow up at people or sleep." When asked what he was like with other people when he was wasting, another jockey reported:

Probably not as social. You're probably just thinking about your rides coming up all the time, and what weight they've got. You sort of get a bit annoyed. You know the next 4 days, you've pretty much got to stay the same weight.

You've got to keep going in the sauna, in there again the next day, and have nothing to eat. I just feel like being on my own a little bit, so I don't really socialise much, or go out or do anything, just sit at home, keep to myself.

One jockey admitted that he was pleased that he had developed a "... reclusive ..." reputation, where people no longer invited him places, because it saved him from continually having to refuse their invitations. He said that generally, people did not understand that he would "... rather be at home, watch a little TV and go to bed and be away from everybody." Although this behaviour is deemed beneficial by jockeys, there is cause for concern as social isolation removes the opportunity for jockeys to benefit from emotional support (feeling cared for and supported and improving self-esteem) and companionship support (Hogan et al., 2002; Weinman et al., 1995). Furthermore, according to the main-effect model of social support, social withdrawal can result in a decrease in social networks and the accompanying reduction in access to sources of information about appropriate health promoting behaviour (Cohen, et al., 2000).

The current data suggested that far from seeing the withdrawal of information support as a problem, it seems that jockeys do not want to be exposed to other people's opinions of appropriate healthy behaviour. They felt that the advice given by people was unrealistic and unhelpful, indicating that perhaps the quality of their social support was not perceived as high in these instances. In addition, most jockeys felt that a benefit of spending time alone was avoiding the inevitably irritating circumstances that developed because social situations usually involved food and drink (Fraser, 2002; Manore, 1996). One of the annoying occurrences that jockeys faced at social gatherings was people urging them to have something to eat or drink. Several jockeys said people's remarks, such as "... one little bit won't hurt you ..." or "... ooh, just drink water ..." showed a lack of understanding about jockeys weight

management. One jockey felt it was something "... you just got to put up with ...". A different jockey said that the urging from others to eat or drink was sometimes accompanied by sympathy. He described feeling aggravated when this occurred:

I'm not saying I felt poor because I couldn't eat. It annoyed me more with what people would, they'd say, "Poor old thing can't eat, surely a little bit can't hurt." I'd say, "Well one bit leads to another little bit and I'd rather not taste and what I don't have I'll never miss." So those sort of things did keep me away from things.

The reports of jockeys' reactions to people's attempts to provide information support (Hogan et al., 2002; Weinman et al., 1995) cause some concern as Cohen et al. (2000) pointed out the provision of support from social relationships can have a negative impact if the support provided is inappropriate and/or accompanied by stress and conflict. So it seems that while on the one hand, jockeys are doing themselves a disservice by avoiding possible emotional, information and companionship support by isolating themselves, on the other hand, as they do not perceive the support as beneficial and find it stressful, they are protecting themselves from possible harmful effects on their health and wellbeing.

Aside from the issue of information support resulting from social interactions, jockeys also highlighted the increased likelihood of eating and drinking more than they should in social situations. A jockey said that, "... instead of having one stubby of a night time, you end up having three or four because you're out, then all these nibbles are around you all the time and you start eating ...". Jockeys' concerns about eating and drinking more in social situations were not unfounded. Research has shown that people are likely to increase their food intake in line with the number of people present at a meal (de Castro & Brewer, 1992) and that the more comfortable they are

with the company, the longer they are likely to linger over their food (de Castro, 1993, 1994).

Jockeys' choice to avoid social situations because of the risk of eating and drinking too much was not unique. Fraser (2001) pointed out that many athletes chose to restrict their social lives to avoid the temptation of eating and drinking.

Some jockeys mentioned that even if they managed to avoid temptation, they would still become annoyed watching others eat and drink. One jockey said that she was unable to control her unreasonable irritation if her friends ate in front of her. She stated:

Most probably I did have a shorter fuse. I would imagine, I used to get really grumpy with people, and I know it wasn't their fault, because I thought I handled it really good. But if ever I was wasting and I was out with some friends or whatever, and they'd all go and eat lunch and stuff and I'd basically be sitting there and I'd get really grumpy on them for eating in front of me. Just certain things like that, pretty silly but, yeah, in that regard, yeah, I had a very short fuse.

Family members also highlighted that eating in front of jockeys was an issue, not just for jockeys, but for them as well. Jockeys' families admitted that on some occasions when they had eaten food in front of their jockey they felt guilty. For some, guilt accompanied their behaviour even though they did not believe their eating bothered the jockey. For most family members, their feelings of discomfort were accompanied by changes in their own behaviour. A father explained:

[people eating in front of jockey] doesn't worry him one iota. That's, no, doesn't worry him at all, because he knows what he's got to do and knows what he can do and that's just part of the deal. No, he's, back to his own standard. If he comes in here and I've got something that he shouldn't eat, steak and eggs or something, something ridiculous, or spaghetti or something, I won't eat it because I'm thinking that's not fair, but he'd be annoyed if he

found out that I was doing that, because it doesn't, it really doesn't worry him. His brother doesn't give a bugger. His brother bloody has toasted sandwiches and ice-creams and, no, it doesn't worry him, but you can understand why it would worry some.

Interestingly, although the jockey's father reported that his son was not affected by people eating in front of him, he admitted concern because his son preferred to spend time on his own and engaged in very few social activities. He was particularly concerned that his son's behaviour would make it difficult for him to meet a partner. When asked to elaborate on this, he said, "... that saddens me a bit because ... he's got a life to go through and he doesn't go out a lot and doesn't meet a lot of people ..." A study by Labadarios et al. (1993) found that 21% of South African jockeys found it difficult to make friends and 14% lost their friends easily. Jockeys preference for solitary behaviour may explain the findings.

The current study highlighted that the effects of jockeys' weight loss also affected the families' experiences of special occasions. One particularly difficult social occasion highlighted by jockeys, family members and industry stakeholders was Christmas. One jockey described Christmas as "... always the worst ..." type of social gathering because, although it was a day off, there was racing on Boxing Day. He and another jockey said "... I hate Christmases ..." A female jockey recognised that she experienced negative mood on Christmas Day. She attributed her irritation to not being able to eat and drink and join in with others. She described Christmases when she was wasting, "... I haven't liked it. I've been very grumpy through Christmas Day, yes grumpy, because I couldn't eat anything. Shitty on the world ..."

Another jockey explained that another factor hindering weight loss for Boxing Day racing was that public saunas being closed on Christmas Day. To compensate for not being able to waste in the sauna, he tried to accept heavier rides on Boxing Day.

Other jockeys also reported that they tried to accept heavier rides on Boxing Day so they could join in Christmas celebrations. One jockey said that although this solution was a valid one "... there was always one there who'd have to ride light."

For some jockeys, another solution that enabled them to make weight for Boxing Day races was avoiding Christmas celebrations altogether or going for as little time as possible. A family member described Christmases when her husband was struggling with his weight, as "... a real bugbear ...", explaining that her husband would choose to spend as little time as possible at celebrations, arriving late and leaving early. Another family member said that his family had changed the venue for their family Christmas to be closer to son who rode track work on Christmas morning and races on Boxing Day. He explained that at Christmas lunch his son would have "... two-fifths of nothing to eat ..." (a slice of roast meat and perhaps a potato) and that his obvious lack of enjoyment and limited drinking and eating affected his own pleasure in the day, "You know, you shouldn't deprive someone of their Christmas lunch, should you? But I know he doesn't eat, and it feels a bit uncomfortable."

Another family member was also upset by jockeys being unable to join in family celebrations on Christmas Day. She reported:

... I actually get quite frustrated with the industry because while everyone else, like the trainers and the big people in the racing industry and all those sorts of things, they're celebrating Christmas with their families, but the jockeys still have to ride the next day. So, they can't have Christmas lunch and Christmas dinner with their families because they've got to waste for the next day's racing ...

She felt that even an elevated minimum riding weight of 53 kg did not give most jockeys the opportunity eat and drink on Christmas day. She explained, "... I think maybe the minimum weights for Boxing Day might be 53 kilos, but it's still

very hard for a jockey to ride 53 kilos after they've had a huge meal with their family, I think."

New Year's Eve was another social situation mentioned by jockeys' family members. One wife said she and her husband would usually miss New Year's Eve celebrations because her partner had to ride the following day. Several jockeys also mentioned the difficulty they faced on New Year's Eve because they rode on New Year's Day. One male jockey explained, "... every public holiday you're riding ...". Other jockeys mentioned that birthdays were difficult. A male jockey said there had been times when he had had to miss his children's birthday celebrations because he had a lightweight ride the next day. Another jockey described her own birthday celebrations:

... birthdays. Well I'm pretty much always riding on my birthday, anyway. Sometimes, last year, I was fortunate enough to go out for my birthday. I think I rode the day of my birthday and went out that night, but most of the time you can't go out and most of the time other people can't go out because they've got to ride.

One jockey pointed out that jockeys were often unable to celebrate their successes (e.g., winning races) by going out because they had to monitor their weight. She said, "... you go out and you win three races, but you can't celebrate it, because you're riding the next day and you've got to ride light, you know. Well, that's typical of a jockey ... the highs are great and the lows are pretty rotten." Another jockey related a story about celebrating winning an award and being unable to make weight the next day and having to renege on rides.

Industry stakeholders also recognised that jockeys had difficulty interacting with other people and attending social activities such as going out to dinner, to a nightclub with friends, Christmas lunch or New Year's Eve celebrations because of

the high likelihood of activities being centred around food and drink and because they often experienced negative mood when losing weight. One industry stakeholder explained, “I think sometimes that, wasting and weight management gets to a lot of them. That they miss out on a lot of the commonplace Australian culture that we have.”

These reports highlight the effects of jockeys’ weight management on not just their social support, but also the social bonds of their families. It seems that jockeys inability to gain benefits from companionship support (e.g., engaging in leisure activity) may also limit their family’s ability to engage socially with one another. As there is limited involvement in social events, families could also be missing out on other social support resources (e.g., emotional support; Hogan, et al., 2002; Weinman et al., 1995).

Stakeholders were also concerned about the requirement for jockeys to interact with a range of industry professionals, other jockeys, trainers, owners and the public when they were wasting. According to some of the stakeholders interviewed, when jockeys were managing their weight they were less likely to interact with horse owners and trainers. Unfortunately for wasting jockeys, interacting with people involved with the horses was considered an essential component in assisting jockeys to get future rides. An industry representative commented:

You know jockeys that are wasting and you know the ones that are struggling that...they’re always last into the mounting yard. And last to get on their horses and they’re putting pressure on themselves. I tried to explain to one of them recently we were going to fine him, and I said look, “They’re all getting sick of it.” And what he didn’t understand was that every time he went out into the mounting yard to meet the owners, they were a different group of people and they’d be complaining, “Where’s the jockey, why won’t he come out and why won’t he talk to us?” So [jockey] was sick of it, he was really wasting,

sick of going out in the mounting yard but, that's all right if you're meeting the same people all the time. You got new people and the horse, the first runner they've got at Flemington and they want to talk to the jockey before the race. They don't want him coming out at the last second, knowing that he's going to get straight out on the horse to avoid them ...

Another industry professional stated:

And you'll see it, towards the end of the carnival, the bell goes and jockeys are still in the mounting yard. Half of them come out and half of them don't because, the only reason they don't come out is because they don't want to communicate with people at the [race] meeting.

Although negative moods were considered common among jockeys, not all participants attributed these moods to weight loss. Some jockeys' wives felt that although weight loss was a major contributor to jockeys' propensity to experience negative moods, other factors such as performance anxiety and pressure from owners and trainers to make weight and ride well played a role. One wife saw her husband as "... moody ..." and uncommunicative because of wasting and because he was "... disciplined ..." with his race preparation. This may indicate a narrowed focus as was evident in Keys et al.'s (1950) research, the participants became increasingly single-minded (weight loss, food and hunger) as the experiment continued. Another of the wives felt that her husband could not help being easily irritated because he was not only having to focus on the present performance but also on his chances of gaining future rides, "he was under pressure to get the weight off ... trainers are going crook if you are not the right weight and the owners are going to get sick of you and they won't put you on ... it's a lot of pressure on them."

Despite the idea that other factors besides weight loss contributed to jockeys' mood swings and short tempers, several jockeys reported experiencing less negative moods once they had decreased their use of dehydration weight-loss techniques (e.g.,

sauna) and changed their diet. One jockey (who had had a break from racing because of difficulties managing her weight) indicated that she was now experiencing positive moods because she was doing something she enjoyed and was having less difficulty with her weight. She highlighted her improved mood when she attended races:

... it's great to go to the races and feel good and you know, feel happy and not have a headache sometimes, or you know, whatever it might be, because you've spent the last, you know, hour and a half, trying to pull some weight off or, you know, it's just wonderful now .... It's different, it certainly is different, the moods, anyway.

The same jockey had noticed an improvement in her relationship with her husband. She felt that since she had reduced her wasting behaviour, her mood had improved and this was having a positive impact on her relationship with her husband:

Oh, look, it's been a great thing for me and it's [weight] stabilised beautifully and I couldn't be a happier girl at the moment. And it certainly works that way on our relationship, because there's no pressure on [husband] so he can sort of go and do what he wants to do and I'm doing what I love to do, and not wasting, so I'm not grumpy.

She went on to say that the change in her weight-management behaviour had also relieved her parents. She felt her mother was "... over the moon ..." with the changes in her weight-management behaviour because "... mum's been there throughout my whole career, mum's seen everything, mum's seen the pressure that I was under ..." and saw the positive differences in her daughter.

One jockey's wife also noticed an improvement in her family member's mood after a reduction in wasting. She explained that periods of depressed mood and short-temper that were related to weight management had forced her husband to have a break from racing, but since returning to racing, and struggling less with his weight, his mood had improved. She explained that this had also meant an improvement in her

life because he now socialised more and experienced less negative mood, “I believe now he’s much easier to live with than he was ... he was hard to live with. He was like, it wasn’t, you know, he wasn’t unbearable but every little thing seem to be, he’d make a mountain out of a molehill ...”

The same wife believed her husband’s weight management and associated negative moods had not affected their children when they were growing up. She did reveal however, that there had been pressure on her make sure the children were considerate of their father’s needs when he was wasting:

Probably earlier on it was, I used to be on, you know, tenterhooks a bit with the kids. You would be saying, now just remember dad’s wasting and don’t lock the bathroom door, he’s got to get in and use the scales and he’s got to do this and do that. You know, you were sort of quite vigilant about it and say now, just remember dad’s trying to get his weight off and, you know. I used to be on their backs a bit but they, they don’t begrudge it or anything, I don’t think.

Another wife said it had been more a case of her husband not being bothered about small jobs when he was wasting. She explained, “... it’s like you [indicating herself] look after it. If it was something with the kids, or, you know, when they were younger, you know, well, you look after it, I’m too busy. You know, I’m trying to lose weight and I’m doing this ...” From this account, it seems that jockeys’ families may be an important source of material social support (Hogan et al., 2002; Weinman et al., 1995).

A major issue, given that family seems to be a main source of social support, is that in the current study, family members appear to be under a great deal of stress themselves. Most jockeys, family members and stakeholders’ accounts echoed anecdotal reports of the negative effects of jockeys’ weight-management behaviour on their families (Bartley, 2004; Harris et al., 2001; Henke, 1999; Hoffer, 2001, Power,

1999). Concurring with other stakeholders, a racing industry professional reported on hearing complaints from a jockey's family about weight management, negative moods and the hectic schedule of jockeys:

I think it does affect their families. I spoke to one of the wives and she wondered why he wasn't given a holiday. He's bad, he's got his own sauna at home. She said to me, "Not much of a family life. When he's wasting, and when he gets holidays, he's cranky. The moment he comes back from his holiday he's got to waste a week on the track to get his weight down to where he can ride again."

Most jockeys recognised that their weight management affected their families. They said they had a tendency to get "... the shits ..." or be "... very snappy ..." with their family members. One jockey described one particular incident with her mother when she was wasting:

Saddest day of my life was when my mum said, "What's happening, and who are you?" I was wasting and probably in a very, very bad mood and she just said, "You are not the [jockey] I know," and this and that, and that upset me a bit. You just take it out on them. Why? I suppose because you can't go off at a trainer, can you? You can't go off or they're not going to give you rides or things like that, so you take it out on your family and your friends, really.

This jockey highlighted the importance of family in the provision of emotional support. When there was a perceived lack of understanding between herself and her mother, she attempted to give her mother insight into the negative effects associated with the experience of wasting. The jockey had urged her mother to have a hot bath and lose weight through dehydration. She'd then asked her mother not to drink for a time afterwards. She felt that her mother had struggled with not drinking even while she was in the bath and so had gained some understanding of what she endured when

losing weight. Despite this need for emotional support, the jockey said that after a time, her whole family had learned to avoid her when she was wasting. She explained:

... they'd just rather walk over broken glass than talk to me for a while. You know, they'd just say, "Oh, she's wasting, don't talk to her" and you know, anyone would really go out of their way not to bug me or talk to me or anything for a couple of days, and things like that.

This was a common theme among the jockeys and their families. A male jockey said that his mother could easily irritate him when he was wasting. He found his brothers understood that it was best to avoid him. He explained that "... without saying it ..." his family would realise he was in a bad mood. These reports indicate that giving emotional support was not always through words or deeds but could be supplied through an understanding that jockeys preferred to be alone.

The same male jockey who gained understanding from his brothers said he could also be ill-tempered with his wife. He said that when he was trying to meet a light riding weight he would experience uncharacteristic feelings and thoughts, such as "... why now? Why do we have to do it now? We didn't do it yesterday, why now? ...". He said that when he was wasting "... it's got to be my way." It seems that while families are a major social support for jockeys, jockeys could be unwilling or unable to reciprocate by giving support to their families. This lack of reciprocity could undermine the wellbeing of jockeys' families, given the critical role of social support in staving off poor physical and psychological health (Berkman & Glass, 2000; Cohen & Willis, 1985; Sarason et al., 2001; Sohlman, 2004).

Jockeys did not seem to be ignorant of the effects of their career on their families. Another male jockey felt that his career as a jockey might have been harder on the children than his wife because he was not always able to go places with the family. He admitted that when he was wasting and "... a bit grumpy ..." he could be

“... short with the kids ...” Even so, he felt they had not been adversely affected and described his family as “... pretty close ...” and thought they enjoyed having a father who was a jockey.

Another issue associated with wasting that was mentioned by several jockeys was persistent thoughts about thirst and hunger. One jockey reported that while he was in the sauna he would often think about when he could have a drink, saying “... you’ve got no idea how nice a glass of water is ...” Another said that people eating and drinking in crowds would catch her attention. She described her view that thirst was worse than hunger, “... you can go without food, I reckon, for a fair while but when you’re thirsty, it’s a pretty much all consuming ...” One jockey’s method of dealing with his thoughts was to focus on the “... good side ...” and not the negatives of his weight-management behaviour as “...that’s when it hurts you ...”

### *Weight Management and Mental Health Disorders*

Despite the fact that the interviews conducted with jockeys, their families and stakeholders were not formal mental health assessments, reports showed that jockeys experienced some of the symptoms of several *DSM-IV-TR* disorders (e.g., Major Depressive Episode, General Anxiety Disorder, Social Phobia; American Psychiatric Association, 2000) when they were wasting. As such, the current findings lent further support to the development of OWLD.

Jockeys in the current study reported that they engaged in a variety of unhealthy weight-management behaviours to meet their riding weight requirements. As mentioned by jockeys in previous anecdotal reports (Bartley, 2007b), there was an

underlying view from participants that weight loss was an expected and accepted part of a jockey's lifestyle. This supported diagnostic criterion A: significant weight loss associated with the demands of occupation (i.e., vocation or sport).

Further support for OWLD was provided by jockeys', their family members' and stakeholders' reports which indicated that while jockeys were wasting they experienced feelings of depression, irritability and fatigue. These findings supported the inclusion of diagnostic criteria B1 (depressed mood associated with weight loss as indicated by either subjective reports, e.g., feels sad or down; or observations made by others, e.g., appears tearful), B2 (irritability) and B3 (fatigue or loss of energy) as symptoms that occur while a person is engaging in weight-loss behaviour.

The current findings also revealed that while they were wasting, several jockeys endured disturbed sleep and persistent thoughts of thirst and/or hunger that they tried to cope with by focusing on other things. These accounts added weight to the inclusion of diagnostic criteria B4 (sleep disturbance; e.g., difficulty falling or staying asleep or restless unsatisfying sleep), B5 (recurrent and persistent thoughts that are experienced at some time while the person is managing his or her weight as intrusive and that cause a marked anxiety or distress) and B6 (the person attempts to ignore, suppress or neutralise persistent thoughts) as symptoms of OWLD.

Adding further weight to the development of OWLD, jockeys, their families and stakeholders reported that jockeys preferred to spend time alone. Their preference to isolate themselves was because of two main reasons. Firstly, they were easily irritated and were concerned that they would act inappropriately towards people (e.g., get angry). Jockeys preferred to be away from potentially volatile situations where people made small talk, asked questions they found annoying or offered advice about their weight loss. The second reason was because they preferred to be away from the

temptation of food and drink when they were wasting. Even if they could have a little food or drink, they were likely to eat or drink more in a social situation. Participants indicated that many jockeys merely endured social situations and left as soon as they could. These findings supported the inclusion of diagnostic criteria B7 (person fears that they will act in a way that will be socially inappropriate; e.g., angry outburst) and B8 (social situations are avoided or endured with anxiety or distress). Moreover, the findings indicated that the symptoms caused significant distress or impairment in social or occupational functioning and/or relationships and/or other areas of functioning as stated in diagnostic criterion C of OWLD.

### *Physical Effects of Weight Management*

The findings of the current study supported the hypothesis that jockeys would report experiencing the negative physical effects associated with weight loss. The short-term effects mentioned by most of the jockeys, their family members and industry professionals were those that occurred as a result of dehydration. These included symptoms associated with heat illness (Coris et al., 2004; Howe & Boden, 2007; Wexler, 2002) such as muscular cramps, increased body temperature, low blood pressure, nausea, stiff joints, dry skin, impaired vision, headaches, dizziness and collapses. These findings are in line with Pruscino et al. (2005) who found that 18% of jockeys experienced three or more symptoms of heat illness on race day. The findings are also similar to research in other sports such as wrestling, where competitors using rapid weight-loss methods have reported experiencing nausea, headaches, dizziness and hot flushes (Alderman et al., 2004).

Several stakeholders commented on the culture of jockeys intentionally dehydrating to lose weight, some until they fainted. One stakeholder said, “the more you dehydrate, the more cramps you get. Some jockeys can waste to the point where they collapse from dehydration.” One jockey explained that “in all fairness I know that you’re probably not at your top when you haven’t, when you have to waste. You know, you’re probably not 100%, no person could be.”

Generally, there was an understanding that cramps were a side effect of being dehydrated or the body being salt deficient. Several jockeys mentioned experiencing cramps at night. One jockey said that on some occasions when she was wasting, her cramps had been so bad that they had made it difficult for her to sleep. Still, she was quite accepting of them:

I just asked, like some people said, take those Slow K things that seem to stop cramps and rub gel and stuff in your legs. We just knew that it was really [be]cause we had no fluid left. Until you get fluids, you’re not going to stop your cramps pretty much.

Family members also identified cramping as an effect of wasting. One of the wives interviewed reported that her husband experienced cramps quite frequently. She also reported that sometimes the cramps were severe enough to wake him from his sleep. She put this down to a lack of salt in her husband’s diet. She said:

Definitely, cramps quite a lot, you know, sometimes in the middle of the night he will be up out of bed with a cramp in the back of his leg or, and that would be just the lack of salt and all that.

Family members also identified a variety of other short-term consequences of dehydration. One of the wives revealed her partner would experience several of the symptoms associated with the fourth level of heat illness (Armstrong & Maresh, 1993; Howe & Boden, 2007; Lee-Chiong & Stitt, 1995; Wexler, 2002). He would often

suffer from headaches after using the sauna and fluid loss made him feel nauseous and fatigued. Other jockeys also described experiencing symptoms of heat exhaustion. Feelings of dizziness and feeling faint were mentioned by jockeys and their families as consequences of wasting. One jockey said that she dealt with dizziness by sitting down and waiting for it to pass. She explained that on one occasion, after she had wasted excessively and failed to make weight, she had been unable to make it back to the jockeys' room from the scales and had collapsed.

Another jockey included in the study reported that he had also collapsed after wasting. He said that he had collapsed while his partner was driving him to the races. He explained that he had not eaten in 4 days, had ridden in race meetings for three consecutive days, went out drinking alcohol the night before and was attempting to lose fluid in the car by wearing sweat gear with the heater on. He described his experience:

... anyway, so I've done that [drank alcohol the night before] and I've wrote myself off, spastic, without eating anything, and I woke up the next morning 56.5 kilograms. I think I was 56, and so I was thinking, oh, beautiful, I haven't got much to lose, this is great, but I was really dry, desperately, you know, and I felt pretty bad, anyway, and [partner] was driving me and I had to stop the car, [be]cause I was sweating in the car. When you're that dry, if you go to the sauna you go for 10 minutes, you just give up. So, anyway, I thought I would sweat in the car. I was absolutely just knackered by all of it, I got no more than 20 minutes up the road, I said, you know, just pull over, I've got to get a bucket of water. I got a bucket of water in the back seat just so I could put me head in it and keep sweating. Yeah, it was funny, you know, because of the water in the car. Anyway, [partner] driving, [partner] putting up with heat, and you know, I'm sweating, it's all good, so got to, where was it, about 50 minutes, been going about 45 minutes. Still about 10 to 20 minutes from the track, nearly there, I like started losing feeling in me hand, started to tighten up in me mouth, started to just, all tingling and stuff and I said, you know, I

couldn't even say it properly, but I said to [partner], "You've got to pull over I'm starting to, I'm starting to lock up." And anyway, finally got to the toilet, and just basically, um, fainted. Like I didn't faint or pass out, but just collapsed. Went and got a drink, just went a bottle of Powerade, and I winked that down, and I ended up ringing up and getting off the ride ...

Of particular concern when considering this story is that although the jockey engaged in the recommended treatment of heat exhaustion (rapid cooling and fluid replacement; Coris et al., 2004) so had 22-year-old wrestler Joseph LaRosa after he had collapsed following wasting, but he suffered cardiorespiratory arrest and died of hyperthermia anyway (Centre for Disease Control and Prevention, 1998; Viscardi, 1998; Walerg-Rankinds, 2000). Moreover, although the jockey indicated that he came out of his experience relatively unscathed, the long-term consequences of this level of heat illness are not known (Coris et al., 2004).

Two other jockeys said that although they had not collapsed themselves, they had witnessed other jockeys lose consciousness. One jockey described a jockey collapsing in the sauna and another fainting while pulling up after a race and falling off his mount. This story shows that jockeys not only risk their own lives through their wasting behaviour but their colleagues lives as well in a racing fall.

For one of the fathers involved in the study, perhaps his greatest fear was that his son might "... black out ..." while he was riding. He said he was especially worried about his son's wellbeing when he rode at extremely light weights such as 49 kg. He described this weight as "... bloody nothing ..." and was concerned by the effects of dehydration. His son complained of dryness in the mouth and episodes of "... dizzy and all that sort of stuff ..." when he was riding light. He revealed that at one race meeting, when his son was riding at 49 kg, the stewards and doctors were so

concerned with his physical wellbeing that they excluded him from further riding after only one race.

One of the female jockeys admitted that at one stage she had reached the point of near collapse because of extreme weight management. According to the jockey, it happened at a time when she was taking "... four or five fluid tablets ..." to lose 1 kg. Moreover, she had been in hospital for treatment of a urinary tract infection. During her stay in hospital she had been put on a drip (to replenish the fluids she had lost through sauna and diuretics use) leading to an increase in her weight. When she left the hospital, she said she had resumed her weight-management methods (taking diuretics and exercising in sweat gear) to lose the weight gained in hospital. She described herself as being so physically exhausted from wasting that she could barely move, "I didn't pass out but I actually was that physically exhausted I couldn't lift my feet up and couldn't go any further ..."

Despite these stories, the jockeys in the study appeared to protect themselves from the idea that they were engaging in behaviour that may have a serious impact on their health with the notion that the adrenalin that accompanies performance somehow restores them to their physical best. Most jockeys reported that the physical effects of wasting, such as fatigue and dizziness, were not evident while they were actually riding. A male jockey explained that he would be "... stuffed ..." and at his "... worst ..." when he arrived at the races because he had been wasting, but after 2 or 3 minutes in a cold shower he was "... as good as gold ..." He would respond to people's concern about his drained appearance by saying, "... don't worry about that mate, I'll be right come race time."

Other jockeys explained that increased "... adrenalin ..." levels while they were riding helped to negate the physical effects of weight management. When asked

about this, a female jockey said that her feelings of extreme fatigue would only last until she got to the race meeting. Once she arrived, she would experience increased arousal levels that would decrease the side effects of wasting. She explained:

I think sometimes you've got a lack of energy. Sometimes even to pick up a piece of paper was kinda heavy, like that. What else can I let you know what it does to you? It gives you headaches sometimes, really light-headed, dizziness. I never had any of these troubles when I stepped onto a horse. Basically when I got onto the racetrack, out of the car, you get out of your car, like someone's driven you to the races or you've driven yourself, and you can be feeling like shit on the way to the races. Excuse me being blunt, you can be feeling terrible on the way to the races, but then you'll get out of the car and grab your gear out and you sort of wake up. I never really felt anything at the races, never felt any weakness or anything on the back of a horse.

As mentioned in Study 2 the idea that jockeys have a well-developed, stress-hormone system is not unlikely as they are well-trained athletes (Kinr, 1998). The concern with this notion stems from the adverse physical and psychological effects of a chronically activated stress response (S. L. King & Hegadoren, 2002).

According to the jockeys, it was not until immediately after a race that they experienced any physical problems. Several jockeys reported that on some occasions after a race, they found it difficult to pull up their horses so "... had to let the horses pull up themselves ..." because they were too fatigued. One jockey explained, "Yeah, sometimes you're spent, you just can't do it, you just, everything wobbles, everything shakes and that's it, you've got no strength left." Again, these reports cause concern for the safety of jockeys, and their colleagues, as they are riding 500 kg racehorses and should be physically and mentally fit to safeguard against injury (DeBenedette, 1987; Presnell, 2008; Schmidt, 2004; Sperling, 2002).

Not all stakeholders, however, held the optimistic view that adrenalin restored a jockey to a state where they were safe to ride. When asked about jockeys' reports that increased adrenalin levels helped them to overcome the negative effects of weight-loss behaviour when they were riding, one of the industry professionals replied:

Ask a drunk if he's a good driver. He's the worst driver in the world, isn't he? I don't think we can see it in ourselves. Other people can see, but you can't see what's happening with yourself. I think we are pretty good liars to ourselves. We think we are all a lot better than we are, especially under certain conditions.

Yet another common theme to emerge from the data about the physical effects of weight management was the fatigue experienced by jockeys as a result of food restriction. The spouses of the jockeys interviewed explained that not only were their husbands fatigued leading up to race day, they were also fatigued after attending a race meeting. A wife said that when her husband came home, "he is usually very tired, sits down and has a glass of wine and his dinner and then it's off to bed." Another of the wives interviewed reported that the effects of wasting were at their worst the day after racing. She believed that jockeys came "... down ..." after being on a "... high ..." and that this could manifest itself in feelings of fatigue and lethargy and a drained appearance. She described her partner's appearance after an extremely light ride:

... put it this way, the day we got married, the day before he rode 49 kg, so he had to waste hard that day, so by the next day he looked like, the skeletal eyes and everything, so it's actually the effect the days after, so it's when you let yourself down ...

This idea was supported by one of the jockeys who reported that he needed an extended recovery time after riding in races. He said it could take him between 1 and

2 days to fully recover after wasting and if he was not riding he would "... sleep a lot ..." the next day. This is not surprising given that one of the consequences associated with dietary restraint is impaired recovery (Beals & Manore, 1994; Filaire et al., 2001; Hawley & Burke, 1998, Keys et al., 1950; Pendergast et al., 1996).

This was a concern to one of the wives as she believed that the 7-days-a-week racing schedule gave jockeys very little opportunity to recover between races and meant that they were constantly in a state of increased arousal to overcome the effects of weight loss. She described her experiences of jockeys' increased arousal levels on race day:

Yes, because that night they are still on a high, they are still on a high, but it's the next day when the body is trying to recover. So today, if a jockey is consistently doing that, you've got to say, well, when are they going to come down because all they're doing is going higher and higher and higher...

The danger involved in driving a car while fatigued was another sub-theme that emerged from the study. This concern was understandable as an increase in sleepiness and fatigue has been shown to increase driving impairment and the number of incidents drivers are involved in that could lead to a collision (Phillip, 2003, 2005). One of the wives mentioned her concern that the fatigue experienced by jockeys increased the likelihood of jockeys being involved in car accidents. Especially, she commented, as many jockeys had to drive long distances to race meetings. In her opinion, jockeys should be limited to 4 or 5 days a week of racing and still be able to make enough money to support their families. She believed most jockeys were sensible and knew their limits but there were still risks that some jockeys could push themselves too far at the expense of their health. She said, "so if they are tired and you know, and a bit run down and that, it could become quite dangerous for them."

One of the fathers interviewed had a similar concern. He reported his worry that his son would go to sleep while he was driving to the races. As a consequence, he would often accompany his son to race meetings so he could drive.

Despite experiencing greater levels of fatigue, a few jockeys mentioned that another consequence of wasting was that they had trouble sleeping. To combat this, one male jockey would have "... half a can of UDL [premixed alcoholic drink] ..." as the alcohol had a diuretic effect and helped him sleep. A female jockey would put a "... wet flannel ..." on her forehead and wait until her exhaustion helped her to doze off.

An older jockey explained that he had experienced severe difficulties sleeping when he was taking Durofet. He explained that although it assisted him to reduce his food intake (he ate only breakfast), he could not continue to take them because he would "... be climbing the walls at night, couldn't sleep and then it was time to get up and have to take them again."

Another effect some jockeys experienced after riding, if they had been wasting, was difficulty communicating with others. A male jockey reported that he could find it difficult to speak to trainers and owners because he was breathing heavily and had difficulty hearing. Rather than being concerned about his health at this time, he was concerned that his laboured breathing might give the impression he was unfit. These findings parallel other reports (Beadman & Young, 2003; Schmidt, 2004) that show that concerns for future rides can overshadow concerns about health. It also illustrates that jockeys believe that industry stakeholders are more concerned with performance than the health and wellbeing of jockeys.

Other jockeys had similar stories about how their weight-management techniques affected them physically to the extent that they found it difficult to speak.

For one jockey, this was because she had an extremely dry mouth and a swollen tongue:

I used to come back after a race and not be able to talk to an owner because I had no saliva left in my mouth and it was too blown up to talk. Pretty much like the tongue was blown up on me and I could barely speak.

Another jockey found that her dry mouth was at its worst in the mornings. She described her experiences while riding track work by saying:

... it was pretty much in the mornings, at track work, my mouth would be very dry. There were a few times where my actual tongue, I was that light [weight], would stick to the top of my throat and that was very uncomfortable.

Generally, jockeys agreed that the more weight they lost, the more it "... knocks you round ..." Several jockeys believed that wasting left them more susceptible to colds and flu. A jockey explained:

... and I've just got the flu again, second time. It makes it tough when you're trying to stay competitive, in peak condition, but that's what comes with being 8 to 10 kilos underweight. You know, walking around about 6% body fat.

The jockey's connection between his low body weight and his vulnerability to illness was a valid one. Research has indicated that dietary restraint and dehydration are associated with decreased immune function (Kowatari et al., 2001; Shirreffs et al., 2004).

Several racing industry professionals expressed concern for the long-term health of jockeys. One predicted, "I really think that long-term wasting, especially for the ones that waste heavily, they are going to have problems in the future." Arthritis, cardiovascular problems, hip and other joint injuries (wrists, necks, and shoulders) were mentioned as possible long-term health effects resulting from a career of weight-

management behaviour. During the course of the interview, a racing industry professional commented on the weight difficulties of a jockey he knew:

He [jockey] was 9 stone 6 in the old when he was 16. But he rode all his life at ... well he would get as low as 8 stone 5 or 6 if there was something special. He made 8 stone 10 for the Derby, which is 55 and, but he did it very, very hard to ride under 57. And of course he was dead at 51. He had one leg off, then the other leg off, and then dead. I started to note from that day on that jockeys didn't make old bones.

Jockeys themselves were unsure if there would be any long-term physical consequences from wasting. When asked about his future health, one jockey said, "not sure really. Dad is not too bad off and he had to waste pretty hard his whole life. He looks all right, a few broken bones and that." An older jockey admitted that his concerns for his long-term health also came from injuries he had received. Although he described himself as "... in pretty good health ..." and "... pretty lucky ...", he said that he had suffered broken bones and now endured arthritis and tendonitis.

On the other hand, two of the wives were concerned about the negative long-term effects of weight management on their husbands' health. One of the wives said although her husband wasted "... correctly ...", her own experience of having to take a break from racing because of weight issues, had shown her how long it took for the body to recover from extreme weight management. She commented that her main concern was her husband's use of laxatives earlier in his career. She revealed that when her husband had used laxatives, he had suffered from acute stomach pains, and admitted to being concerned because he was once again suffering the same symptom. She said she recognised that there may have been no connection between the two incidents of stomach pains, but explained her unease when asked her opinion of the long-term consequences of weight loss:

Yes he's had, he's had stomach attacks or whether you call them, whether they're ulcers forming or whatever, he's had, umm, whether they're anxieties or whatever, but he's had attacks where he's gripped his stomach or his chest or his whatever ...

Another of the wives was also concerned about the long-term consequences of her partner's use of the sauna for fluid loss. When asked about the effects of this method, she commented, "... but no, if he rides now he wouldn't go in the sauna now, but I think that's taken a toll on him as in physically ..."

Similarly one of the fathers acknowledged that he felt that his son's weight-management behaviour probably had a negative effect on his body. He took comfort from the thought that there was a possibility that there would not be any long-term effects as he knew retired jockeys that were in good health and because:

... I take the view that, well, you have a look at, you know, some of the people in third world countries. They can live a week on what we'd eat in a meal and seem to come out of it alright.

Although the long-term consequences of weight management appear unclear, even to jockeys themselves, it would not be unexpected for there to be some repercussions. The complaints mentioned by jockeys and their families, such as gastrointestinal upset and joint pain, have been linked to the prolonged denial of sufficient nutrients and fluid to the body. Other consequences include decreased ability to build and repair tissue, loss of bone density, neuroendocrine disturbances, hypomatraemia, and disturbed immune functioning (American College of Sports Medicine et al., 2000; Beals & Manore, 1994; Fogelholm & Hilloskorpi, 1999; Hawley & Burke, 1998; Kowatari et al., 2001; Shephard & Shek, 1999; Wang et al., 2001).

Gender appeared to be a consideration when discussing the long-term consequences of weight-loss behaviour because of the increased risk of developing menstrual dysfunction (Beals & Manore, 1994; Fogelholm & Hillokorpi, 1999). Both female jockeys included in the study reported that they had problems with their menstrual cycle when they were using wasting techniques to meet their riding weight requirements. One jockey said she had assumed "... it was pretty much normal amongst female jockeys ..." as she knew several other women who rarely menstruated. For the other female jockey, problems with her menstrual cycle had prompted her to seek medical advice. Several doctors linked her amenorrhea to low body weight and fat and warned her that this may affect her ability to have children. She described her response to these warnings:

A couple of doctors as good as said, "Look, you won't be able to have children, you know, unless you basically stop" and, but look, that didn't deter me at all because I was never a really kiddie sort of person, anyway, and I thought, oh, bugger it, you know, screw you people, I'm going to ride anyway. But they never really said to stop riding, they just said to be careful.

Female jockeys' disregard of the medical implications of menstrual dysfunction could be for several reasons. Firstly, even if they have sought medical advice, they may not fully understand the serious, long-term implications (e.g., osteoporosis, low bone density, fertility problems, increase risk of injury) of the problem (Bennell et al., 1997; Fruth & Worrell, 1995; Keen & Drinkwater, 1997; Knight & Robson, 2006; Myburgh et al., 1990; Peer, 2004; Punpilai et al., 2005). On the other hand, the potential problems associated with menstrual dysfunction may be seen as another acceptable risk of their profession.

On the whole, very few jockeys reported seeking medical advice about the negative physical consequences they experienced while they were wasting. One

jockey said that although he had experienced effects such as painful cramps, tingling sensations throughout his body, stiff joints and seeing coloured spots, he had chosen to "... suffer in silence ...". He reported that as he knew there were consequences of being dehydrated from wasting, there was no need to seek medical attention.

### *Optimistic Bias and the Health Belief Model*

A repeated theme throughout the research was the physical risk involved in being a jockey. This issue was highlighted by racing industry professionals, jockeys and family members. Several industry professionals commented on the "... horrific injuries ..." they had witnessed throughout their involvement in racing. As a consequence, jockeys need to be physically fit and strong to manage the horses they are riding. Despite this, jockeys continue to engage in weight-loss behaviours that leave them physically depleted. The data illustrated that although jockeys appear aware of the risks involved in dehydration in general, they do not identify themselves to be at risk of physical harm.

For instance, the consequences of dehydration were discussed more as being physically uncomfortable rather than as a risk to health. This was also evident when considering the practice of dehydrating while driving. The reasons jockeys gave for not using this method of weight loss was that it was hard to estimate how much weight was being lost, and that it seemed to make them feel worse than when they use the sauna. Despite admissions that there were times where they needed to pull over because of feeling physically ill, jockeys were less likely to cite the risk of having a car accident or the risks involved in dehydrating.

The same can be said for the practice of food restriction. Evidence from the current study indicated that food restriction was an accepted part of the life of a jockey. Being able to eat two meals a day e.g., two eggs and a cup of coffee at lunch time and piece of chicken with steamed vegetables and gravy for dinner, was considered fortunate for a jockey. The data from the study showed that many jockeys eat much less. Yet there was not an expression of concern about the impact of food restriction on health. This suggested that jockeys may be under the impression that they are not susceptible to negative effects from food restriction.

In a similar vein, jockeys did not appear to consider the consequences that routinely occurred as a result of their weight management to be serious in nature. The signs of heat illness did not appear to be linked to a belief that these conditions are precursors to serious health repercussions and even death. For instance, one jockey admitting that his ability to sweat in the sauna depended on his hydration levels, yet he still felt that some jockeys, and even himself, had some elusive quality that intermittently made it difficult to lose fluid through sweating. Another jockey resumed her dehydration behaviour immediately after leaving hospital where she had been on a drip to replace fluids. Family members also appeared to underestimate the consequences of weight-management practices on jockeys' health. For instance, one of the wives recognised that her husband wasted, but she felt that he did it correctly while one of the fathers saw the fact that there were retired jockeys who were in good health as evidence that his son would not suffer long-term effects from wasting.

The perceived benefit of engaging in weight-loss behaviours was clear. Jockeys did not believe they could reach the low weights necessary without engaging in these behaviours. When they did engage in these behaviours, they could ride in races and make a living. According to one stakeholder, the opportunity for high

financial rewards outweighed the risks associated with weight loss. The study also illustrated however, that jockeys were also prepared to engage in these behaviours for modest financial rewards.

Conversely, the barriers to engaging in a healthy diet and exercise routine would mean a jockey would be unable to obtain the necessary low body weight to gain rides. There was also a notion that the cost of this would either be unemployment or extreme hardship in finding another form of income.

This indicated that jockeys did not believe they could make successful changes to their weight-management behaviours. According to an industry stakeholder a lack of education was of particular concern. This belief was supported by Speed et al. (2001) who discovered that although 70% of retired jockeys found alternative employment after racing most felt that their limited education and employment history had restricted their employment opportunities. The researchers found that for some jockeys a lack of education and/or limited work skills negatively affected their self-esteem adding to their concerns about finances and job satisfaction.

#### *Recommendations of Jockeys, Stakeholders and Family Members*

Participants in the current study made numerous suggestions about possible improvements to the industry for the benefit of the jockeys. These suggestions included:

*Raising minimum riding weights.*

Jockeys, their families and industry stakeholders recommended that the minimum riding weight be raised as a way of improving the lifestyle of jockeys and decreasing the risks involved with rapid weight-loss behaviours.

Most jockeys thought that minimum weights needed to be raised because of the increasing physical size of the population. One jockey felt that there were already problems attracting people to the profession because they could not meet the minimum weight requirements.

When discussing raising the minimum weight, a jockey who mostly rode at 52 kg said that an increase might affect her income as she was offered mainly minimum weight rides. Despite that, having struggled with her own weight at the beginning of her career, she felt it was "... terrible knowing what they [jockeys who struggle with their weight] go through" and that an increase in the minimum weight would "... be a good thing."

Another jockey explained that she knew a lot of current jockeys who could not meet a 52 kg riding weight requirement and, what is more, in her opinion many who accepted minimum weight rides struggled to meet the weights. She acknowledged that some people believed that higher minimum weights would mean jockeys entering the profession would just be heavier, but she predicted that this would not occur.

An older jockey believed that the industry had lost excellent jockeys because they could not meet the weight requirements. He said that he saw a rise in minimum weights as inevitable and was amazed that a lot of the young jockeys, who were taller than him and his cohort of jockeys, were able to ride at light weights.

The data gathered from interviews with jockeys' family members suggested that the demands placed on jockeys had increased since the introduction of 7-days-a-

week racing. Due to the impact of weight control on the lives of jockeys and their families, some family members would like to see the minimum riding weight raised over the whole racing calendar. They also suggested a raise in minimum weight on Boxing Day.

This sentiment was echoed by one jockey who suggested that it would help if the weights were raised, even if only for certain meetings, (for instance Boxing Day, Sundays and night meetings). As it stood at present, he felt that his constant need to maintain a low body weight impacted negatively on his family's social life. For example, his family was not able to enjoy the Christmas celebrations because he had to monitor his weight for racing the following day.

*Physical testing to determine suitability for profession.*

To address the issue of attrition from apprenticeships because of weight issues, some of the stakeholders thought the recruitment of new jockeys would be improved if a professional medically-based identification system was introduced. That is, a system that assessed a person's physical suitability to maintaining a low body weight.

*Physical testing to determine individual minimum weight.*

One of the stakeholders recommended that one way to address the issue of unsafe weight-loss practices was to have increased monitoring of jockeys by medical professionals to decide the optimal minimum riding weight for each individual jockey.

*Improved access to services.*

Although it was considered to be a good thing that apprentices now had access to professional advice concerning their weight management (e.g., nutritionists), it was suggested that it was up to the individual as to whether he/she listened to, and used, that advice. Some of the stakeholders recommended improved marketing of the services available to jockeys and improved education and training in “safe weight management” for both apprentices and senior jockeys. One of the jockeys also suggested that apprentices would benefit from gaining advice from heavyweight jockeys who successfully managed their weight.

*Guaranteed time off from racing.*

Being able to take a break without risking future riding offers was another issue raised in the interviews. One jockey felt that time off without negative consequences would improve the lifestyle of jockeys. Family members concurred with this idea. One of the fathers and two of the wives recommended a reduction in the amount of races included in the yearly calendar. In a similar vein, one of the fathers suggested that jockeys should be required to take time off each year to rest and recover. He felt that the industry should ensure that jockeys are able to afford to take a holiday by introducing a scheme that retained a portion of their riding fees for the mandatory break.

*Improved food options available to jockeys.*

One of the stakeholders recommended an increase in the freshness, quality and variety of food that is available to jockeys in the rooms.

## Chapter 14: Studies 1, 2 and 3 Discussion

The low rate of people willing to participate in the current research was not surprising given jockeys' limited amount of spare time, the secretive nature of the horseracing industry (Beadman & Young, 2003; Schmidt, 2004) and the sensitivity of weight-loss behaviours as a topic (Galloway & Groeller, 1996; Sundgot-Borgen, 1993). Galloway and Groeller (1996) stated that despite assurances of anonymity, athletes were reluctant to take part in research around weight-loss behaviours. They also suggested that because of the sensitivity of the topic, information gained from athletes about their weight-loss practices should be viewed as conservative in nature. Sundgot-Borgen (1993) echoed this idea, saying that athletes were likely to under-report weight-loss behaviours to safeguard their careers. The findings from the current study indicated that this could be the case with its sample of jockeys. Some jockeys and their family members reported that to ensure future riding offers, jockeys needed to maintain a reputation free from rumours of injury or weight problems.

Another indication that the findings from the current research may be conservative in nature came from jockeys' elevated scores on the interpersonal distrust subscale of the EDI-2. These findings indicated that jockeys are reluctant to form bonds or express their thoughts and feelings. This was further supported by comments in interviews. An industry stakeholder and a jockey mentioned that jockeys would be unlikely to disclose their use of banned weight-loss substances, while another jockey was surprised that the researcher was aware that some jockeys sweated in the car to lose weight.

The findings of Study 1 may also indicate that jockeys have a propensity to under-report their weight-loss behaviours. Jockeys reported that the average amount

of weight they usually needed to lose to meet their riding weight requirements was 1.7 kg (2.6% of their body weight), while the average amount of weight they had lost in the preceding 7 days to make weight was 2 kg (2.9% of their body weight). Although this discrepancy of 300 g may seem insignificant, it should be remembered that jockeys' livelihoods depend on their careful monitoring of their weight. If they weigh more than half a kilogram over the allocated riding weight, they may be punished financially and/or with a suspension from racing (Racing Victoria Limited, 2007b).

### *Weight Management*

The findings from the current research uniformly suggest that jockeys are involved in a career with high physical demands and this can affect psychological health and social wellbeing. The major source of these high demands appears to be the effort necessary to meet low riding weight requirements. The findings of Study 1 showed that 80.5% of jockeys reported having some difficulty with their weight and that, on average, jockeys lost 2.6% of their body weight to meet their riding weight requirements. As stated previously, these results may be conservative in nature. There are indications from interviews with jockeys, their family members and industry stakeholders that jockeys are maintaining a continual regime of food and fluid restriction. The weight loss reported by jockeys to meet riding weight requirements seems to be on top of their continual weight-management efforts. This could mean that they are losing weight from an already dehydrated and malnourished body.

The current study is the first to report that jockeys lose weight by wearing sweat gear in the car, with the heater on, on the way to the races. This may be because

previous research was undertaken prior to restrictions being placed on on-course sauna use for jockeys. Racing industry professionals and jockeys suggested that sweating in the car had become more prevalent since these changes. Although the findings in the current study suggest this weight-loss method may not be a common practice among jockeys (one jockey in Study 1 and two jockeys in Study 3 reported using this method), it may be closer to the truth to say that this weight-loss method is not commonly reported by jockeys. This could be because it was not included as a weight loss option in the questionnaire in Study 1 (the participant who indicated using this method included it under the “other” option) and/or because jockeys are reluctant to report its use (as indicated by a jockey’s surprise when asked about this method in Study 2). Certainly interview data from jockeys and stakeholders indicated that sweating in the car was a relatively common practice, and a major concern given that the negative effects of dehydration increase the risk of jockeys causing harm to themselves, or others, in a car accident.

The interview data seems to suggest jockeys have a fatalistic attitude towards weight loss. Only one jockey included in the research reported using no weight-loss methods to meet his riding weight requirements. For the other jockeys, weight management was usually seen as a highly individualised process requiring them to find the weight-management regime that worked best for them. Jockeys, their families, and industry stakeholders, indicated that most jockeys used a combination of weight-management techniques, not just to meet lightweight rides, but to reach their “comfortable” riding weights as well. As had previously been indicated in anecdotal evidence (Bartley, 2007a; Guinness, 2006), most jockeys seemed to accept the use of weight-loss methods as a requirement of their profession.

Nevertheless, the current study highlighted the pressures that jockeys face as a consequence of the demands of their profession and the need for them to achieve a body weight lower than 92% of Australians. Throughout the interviews, it was often mentioned that despite an increase in the size of the general population, there had not been a complementary increase in the minimum riding weights. This belief was supported by the work of Hill and O'Connor (1998). They stated that in spite of the fact that the average size of Australians is increasing, jockeys' riding weights had remained fairly static. There does, however, appear to have been a complementary increase in the size of jockeys entering the profession. The current sample of jockeys was, on average, 1 kg to 3.45 kg heavier and 1 cm to 3.9 cm taller than the jockeys who were involved in research conducted by Labadarios et al. (1993) and Leydon and Wall (2002).

At this point it should be noted that on 1 January 2007, RVL (2006a) implemented a 1 kg weight increase to the current minimum weights (see Appendix A). These changes mean that when considering handicap races, Group 1 minimum weight will increase to 51 kg (except the Melbourne Cup and Caulfield Cup, 50 kg), Group 2 to 52 kg and all other handicap races to 53 kg. Top weights, or the weight that the heaviest ride must not be less than, will not be changed: Group 1 races 57 kg, all other handicap races 58 kg (Racing Victoria Limited, 2006a).

Although the changes to minimum weights seem positive, it is possible they do not go far enough. Hill et al. (1998), whose research was based in New South Wales where the minimum weight was already 52 kg to 53 kg, reported that jockeys were engaging in dangerous and unhealthy weight-management behaviours because of the difficulty involved in making weight at 52 kg to 53 kg. Hill et al. (1998) concluded that this problem existed because the weight restrictions in NSW did not

match the anthropometric attributes of the Australian population. Added to this was an indication from many jockeys' interviews that their weight, while having a break from racing, was 56 kg. A 3 kg reduction in weight equates to 5.4% reduction in their weight.

### *Weight Management and Mood*

The findings from Study 1 and the interview data from Studies 2 and 3 showed a strong association between jockeys' negative moods and weight management. These findings were in accordance with the findings of Keys et al. (1950), who reported that individuals who restricted their food intake had an increased chance of experiencing negative moods. They were also similar to the results of Caulfield et al. (2003), who found that British jockeys were more likely to have elevated negative moods when they were meeting a light riding weight requirement than when they were at their relaxed, out of competition, weight.

One particular concern when considering the results associated with mood was that 12.5% of jockeys reported having suicidal thoughts while they were managing their weight. Although this prevalence was no higher than the general population (De Leo et al., 2005), suicidal ideation is a serious mental health issue that should not be ignored.

Further consideration of the comparison between jockeys and the general population shows that the prevalence of affective problems is much higher among jockeys than ordinary Australians. Self-report questions indicated that 4.5% of Australians experienced affective problems (Australian Bureau of Statistics, 2003).

While the current findings from Study 1 revealed that 83.3% of jockeys experienced mood swings, 77.5% irritability and 63.4% depressed mood, at some time while they were managing their weight. In addition, all jockeys who took part in interviews indicated they experienced negative moods such as irritability and moods swings while managing their weight.

The findings that jockeys frequently experienced negative mood while wasting have serious implications for jockeys' quality of life. Jockeys spend a significant proportion of their time managing their weight (78% of jockeys in Study 1 usually had to lose weight for rides; jockeys rode in an average of 10.5 rides a week, all jockeys in study 2 and 3 reported losing weight to meet riding requirements), and as a consequence, may be experiencing significant periods of negative mood.

#### *Weight Management and Social Interactions*

The findings of the current research show that jockeys have a tendency to limit their social interactions while they are managing their weight. These results are consistent with previous research. Keys et al. (1950) reported that food restriction caused individuals to withdraw from social contact and reduced their willingness to converse with others, while Fraser (2001) reported that using various weight-restriction methods was associated with strained and limited social interactions. Anecdotal evidence also indicated that wasting affected jockeys' social relationships with their families and friends and their ability to take part in social occasions (Bartley, 2007; Beadman, 2005; Eddy, 2007; Harris et al., 2001; Hoffer, 2001; Redd, 2007; Thomas, 2006).

There appears to be two reasons for jockeys' social withdrawal. Initially, weight management is often associated with increased negative moods and a tendency to be easily irritated, so jockeys prefer to spend time alone rather than put themselves in a position where they may offend other people or experience unpleasant emotions themselves.

The next reason related to the fact that most social occasions involve eating and drinking (Fraser, 2001). Some jockeys found it hard to be around food and drink when they were restricting their intake of both. For some riders, being around food was too much of a temptation, and for others it was the urging of friends and/or family to have something to eat or drink that could take its toll.

Confirming anecdotal reports (Reed, 2007) in interviews, most jockeys and their families mentioned that Christmas was one of the hardest social occasions for jockeys because of the temptation to eat and drink. Even though jockeys had a day off from racing on Christmas Day, many experienced difficulties because they had to manage their weight for Boxing Day racing. Several jockeys chose to deal with their aversion to Christmas celebrations in the same way as they dealt with their aversion to other social occasions, they simply did not attend. Some jockeys and family members felt that if the racing industry increased minimum weights on Boxing Day, jockeys would, perhaps, feel more like joining in the festivities with their families and friends.

The current findings suggested that if jockeys did socialise, most socialised with others who were involved in the racing industry. Jockeys indicated that people who were involved in the industry usually understood a jockey's lifestyle (e.g., limiting eating and drinking, early mornings). Despite the understanding of others in the racing industry, however, the wives and several jockeys interviewed expressed some trepidation about socialising in the racing community. Jockeys' partners

explained that within this circle, they had to censor their conversations for fear of damaging their husbands' reputations, and therefore their careers. Jockeys spoke about an insular community where rumours quickly circulated. This is a concern as Wills and Fegan (2001) state that one of the key components of social support is that it provides an opportunity for individuals to receive help coping with problems.

At normal gatherings where workers and their families come together to socialise, it would not be unusual for people to discuss their work environment and its problems, along with other issues of the day, and to offer mutual support to each other when and where it was needed. In this environment, colleagues could gain emotional support, which assists with stress reduction and improving self-esteem; information support to improve coping skills and reduce anxiety; companionship support to reduce social isolation; and even possibly material support to gain physical or financial assistance (Hogan et al., 2002; Weinman et al., 1995). It appears that this might not be the case when jockeys and their families come together socially. Jockeys and their families are at high risk of missing out on the physical and psychological benefits of social support (Berkman & Glass, 2000; Cohen & Willis, 1985; Sarason et al., 2001; Sohlman, 2004).

When considering the work place and social interactions, another issue for jockeys should be raised. Some jockeys and industry professionals in the current study highlighted the fact that the negative moods jockeys experienced while they were engaged in weight-management behaviours could impact on a jockey's ability and/or desire to interact with key stakeholders. This means that jockeys are not only risking their physical, psychological and social health when managing their weight, but that they are also endangering their financial and professional wellbeing. Some jockeys reported not feeling up to interacting and being sociable when they were dehydrated,

fatigued and experiencing negative moods, but nevertheless, owners and trainers wanted to, and expected to talk to jockeys they had engaged to ride their horses (e.g., before races).

Some industry professionals were particularly concerned for jockeys with regard to this issue. They advised that jockeys' negative moods or failure to interact with owners and trainers could have a significant impact on their ability to build rapport with these people and could lead to a decrease in the stakeholders' confidence in the jockey. Industry representatives advised that they had attempted to educate jockeys on the importance of interacting with industry stakeholders. However, they admitted that when jockeys were dehydrated and fatigued they were not always capable of interacting on a social level. This was supported by jockeys and their family members' descriptions of jockeys' negative moods and decreased social enthusiasm while managing their weight.

A number of participants in the current research mentioned another concern about the racing industry that impacted upon their social lives. Supporting anecdotal evidence (Thomas, 2008), they discussed the fear of taking a holiday, or even a day off, in case the time away from racing resulted in a decrease in ride offers. Although this is a major social concern, it also raises safety issue within the racing industry (e.g., jockey fatigue).

### *Weight Management and Eating Disorders*

Even though all jockeys included in the study, except one participant in Study 1, reported that they used a varied range of weight-loss techniques to meet race weight

requirements, most did not exhibit the psychopathology that indicated they were at potential risk of developing eating disorders (Garner, 1991; Garner, Olmsted, Polivy, & Garfinkel, 1984). The three participants who did reveal scores higher than or equal to the eating-disordered comparison group on the drive for the thinness and body dissatisfaction subscales, and hence were potentially at risk of an eating disorder (Garner et al., 1987; Malinauskas et al., 2007), were all women. Previous research (e.g., Rouveix, et al., 2007) and the current findings indicate that if, as predicted (Hill & O'Connor, 1998; Norton et al., 2002), the number of female jockeys increased, they may be a population at risk of developing eating disorders.

### *Weight Management and Mental Health Disorders*

Although the questionnaire package and interviews were not a formal mental health assessment, evidence from Studies 1, 2, and 3 indicated that a majority of jockeys experienced psychological symptomatology consistent with several *DSM-IV-TR* disorders (e.g., Dysthymic Disorder, General Anxiety Disorder, Social Phobia; American Psychiatric Association, 2000) when they are managing their weight. While there was no indication that jockeys met the full diagnostic criteria of a *DSM-IV-TR* disorder, results showed that jockeys experienced universal and frequent psychological symptoms while they were wasting. As was stated earlier, the research indicates that jockeys are experiencing a previously unidentified disorder (OWLD) related to their weight-loss behaviours and the circumstances surrounding these actions.

Given the similarities between jockeys' reports of the negative consequences of weight management and other athletes' (e.g., boxers, judoka, wrestlers) experiences, it would not be surprising if evidence of this disorder could be found by examining other populations. There is also the possibility that as jockeys' weight-loss requirements are among the most extreme (e.g., racing 7 days a week, 363 days a year) of any sport OWLD may not be as prevalent or severe in other populations.

Consideration should also be given to OWLD occurring outside the sports arena. Similar to jockeys, other professions (e.g., models) have weight-related pressures governing their employment. People involved in these areas may also be at risk of experiencing psychological issues similar to jockeys.

At this point it is useful to highlight the benefits behind developing and diagnosing disorders and draw attention to the purpose of the development of OWLD for jockeys. While there are criticisms of diagnosis, the benefits can be numerous (American Psychiatric Association, 1994; Huibers & Wessely, 2006; Sharpe, 2005; Wehowsky, 2000). On the part of the treating professional, a diagnosis can assist with communication between treating clinicians and researchers, prognostic information and the development and implementation of treatment (American Psychiatric Association, 1994; Huibers & Wessely, 2006; Kendell, 1975). For people experiencing the disorder, a diagnosis can indicate that there is a credible explanation for what they are going through, provide emotional relief and empowerment and give an indication of the availability of an effective treatment (Huibers & Wessely, 2006; Stone et al., 2002).

The risk with diagnosing jockeys lies in the possibility of damaging their reputation. As stated previously, a jockey's reputation can be fragile with even alleged hints of weakness having the ability to hinder future rides. A jockey in Study 3

highlighted his concerns about revealing that he was suffering from an illness. He believed that an injury early in his career had hindered him professionally.

### *Weight Management and Physical Effects*

The current results uniformly indicated that jockeys experience negative physical consequences associated with dehydration and food restriction. Many jockeys reported experiencing symptoms commonly associated with heat illness and dehydration. Family members and industry stakeholders provided further evidence of this, with most indicating that they believed that jockeys experienced negative physical effects when managing their weight.

Wasting-related symptoms reported by jockeys included dizziness (61.9%) and muscular cramps (66.7%), both of which can be associated with level two (heat syncope) and level three heat illness (heat cramps). Other reported symptoms such as a dry mouth, nausea and extreme fatigue, can be associated with the fourth level of heat illness (Armstrong & Maresh 1993; Howe & Boden, 2007; Wexler, 2002). Heat exhaustion is only one step from heatstroke, and involves similar symptoms (Coris et al., 2004; Hassanien et al., 1992; Howe & Boden, 2007). Alarming, heatstroke can lead to organ damage and even death (Coris et al., 2004; Coris et al., 2006; Lee-Chiong & Stitt, 1995). The tendency of jockeys to use food restriction and dehydration techniques to lose weight was disturbing in light of the knowledge that these techniques, either alone or together, can lead to collapse (as revealed in Study 3) and even death (Christine, 2001; Finely, 2000; Maughan, 2000; Schmidt, 2004).

### *Key Recommendations*

The current findings indicated that the more weight jockeys had to lose to make weight, the more weight-loss behaviours they used and the more likely they were to experience negative physical, psychological and social consequences. Based on these findings, and the opinions of jockeys, their families and industry stakeholders, the following recommendations are advised as possible changes to the racing industry to improve the wellbeing of jockeys:

#### *Raising Minimum Weights*

##### *Overall Minimum Weight*

The majority of jockeys, family members and racing officials interviewed agreed that raising the minimum riding weight would decrease the pressure jockeys are under to engage in short-term weight-loss practices. Pruscino et al. (2005) provided evidence that some jockeys were perpetually dehydrated (markers of dehydration were found on race days, and to a lesser degree, on non-race days), meaning that they could be experiencing the negative physical, psychological and social impacts of these behaviours for a significant portion of their lives. Despite the recent increase in minimum weights in Victoria, research by Hill et al. (1998) on New South Wales jockeys (where minimum weights were 52 kg to 53 kg), indicated that jockeys still used food restriction, dehydration, weight-loss drugs and exercise to manage their weight. A close examination of the physical characteristics of jockeys needs to be undertaken so that a realistic and achievable minimum weight is

established that does not require jockeys to engage in extreme food deprivation and/or fluid loss.

#### *Individual Minimum Weight*

As riding weight allocations vary between horses and races, jockeys determine their “comfortable” weight and accept or reject rides based on the likelihood that they can make weight. The findings from the current research indicate that for most jockeys, even their “comfortable” weight requires them to restrict their food intake and use weight-loss methods that promote fluid loss.

After the deaths of the three collegiate wrestlers in 1997, resulting from unsafe weight-loss methods, the National Collegiate Athletic Association (NCAA) of America made changes to the rules of collegiate wrestling to reduce excessive weight-loss behaviours. In the 1998-1999 season, the NCAA introduced a Weight Management Program that aimed at changing the current weight divisions to better reflect the athletic population. These changes included adding 6lbs (approximately 2.7 kg) to each weight division and assigning a minimum weight class for each athlete. The minimum weight class assessment involved measuring body composition, weight, and hydration levels (with a urine sample) before the start of the season. A minimum weight class was then allotted to each athlete. For those athletes with an excess fat composition, a weight-loss plan and a second pre-season weigh-in were scheduled. The athletes’ hydrated weight was assessed at the second weigh-in and minimum weight was set for the season (Bartok, Schoeller, & Clark, 2004; National Collegiate Athletic Association, 2005).

Oppliger, Steen and Scott (2003) examined the effectiveness of the Weight Management Plan by surveying 741 American collegiate wrestlers about their primary method of weight loss, their physical characteristics and performance history. They then compared these weight-management behaviours to those reported in studies conducted prior to the Weight Management Plan. Oppliger et al. (2003) reported that the new rules appeared to have improved the weight-management practices of the wrestlers. Over 40% of the wrestlers reported that the new rules curbed the use of inappropriate weight-loss practices.

The racing industry should implement a similar program aimed at identifying each jockey's healthy minimum weight. Medical professionals should conduct these assessments annually, until it is deemed that the jockey's physical body composition has stabilised. Data collected on individual healthy minimum weights should be used to periodically reassess the appropriateness of the overall minimum weight.

#### *Public Holiday Minimum Weights*

A major concern of jockeys and their families was the need for jockeys to manage their weight on and around public holidays such as Christmas Day and New Year's Day. Many jockeys indicated that they had difficulty joining in and enjoying festivities because these festivities mainly centred around food and drink. Minimum weight on and after public holidays, such as Christmas Day, could be set higher than normal to allow jockeys some leeway with their weight.

*Apprentice Claims*

The father of one jockey was particularly concerned about the 3 kg claim for apprentices. He felt this meant young jockeys were having to meet riding weights that were too light. Most jockeys who were asked about “stunting their growth” because of their weight management were unsure. However, one jockey was fairly certain that he had. The weight management reported by apprentice jockeys (e.g., food restriction and dehydration) causes concern for their normal growth and development. This area requires further investigation to develop a solution that will encourage trainers and owners to offer apprentices rides, but will also allow young jockeys to have a healthy dietary intake.

*Guaranteed Time Off from Racing*

The following recommendations are based on improving jockeys social and psychological wellbeing and their physical health and safety.

*One day off a week.*

The current findings showed that a major concern for many jockeys and their families was the economic risk involved in refusing a riding offer by taking time off from race riding. Several jockeys indicated that their racing schedules could be unpredictable and could change quite suddenly (e.g., an offer for a ride the next day). Moreover, there was the potential to ride 7 days a week. This type of schedule made it difficult for jockeys to make plans or engage in organised activities outside of their

profession. Jockeys could benefit from having a day each week with no racing scheduled (e.g., Mondays). This would guarantee jockeys a day off from racing so that they could take part in activities outside racing.

Less ideally, jockeys should be limited by racing regulations to a maximum of six consecutive days of race riding. This would help ensure their health and safety because it would give them the opportunity to rest and recover from weight management and riding while making it possible for them to take part in activities outside racing. However, this process would need careful administration and policing.

#### *Four weeks off a year.*

Jockeys reported having difficulty taking time off from racing without risking future business. This could mean that some jockeys may not have had an extended period of time off from racing in years. This has physical, psychological, social and safety implications. Jockeys could benefit from a mandatory 4 weeks per year holiday from racing duties (e.g., track work, race riding), to be taken in minimum 1 week blocks. One family member mentioned that jockeys struggle financially if they have 4 weeks with no income. Plans should be implemented so jockeys can afford to take the needed time off each year. Further investigations into this area are needed.

#### *Access to Professional Advice*

##### *Confidentiality of available services.*

Several jockeys and family members mentioned that jockeys needed to maintain a reputation free from any rumour of physical injury, psychological issues or

weight-management problems. Any slur on a jockey's reputation could potentially cost future rides. For some jockeys, the connection of services such as counsellors to RVL (who provide referrals for jockeys) was perceived as too much of a risk to their reputation. The racing industry needs to explore this issue further.

*Marketing of available services.*

At the time of the study, RVL offered jockeys access to services such as financial planners, counsellors and dieticians. Racing industry officials indicated that there could be a greater number of jockeys accessing these services. Marketing tools such as brochures had already been used without much success. Based on stakeholder suggestions, and jockeys' self-reported modelling of more experienced jockeys' weight-management behaviour, RVL could have a marketing strategy aimed at older jockeys with the idea that younger jockeys will follow their role models.

*Professional development.*

Due to the safety concerns raised by the current study, it is important that jockeys have up-to-date knowledge of the risks associated with riding and weight loss. It is also important that jockeys learn about any preventative measure they can take to protect their wellbeing. For this reason, it could be beneficial for jockeys to take part in mandatory professional development sessions each year. As in other professions (e.g., teaching), attendance at these sessions could count towards the renewal of their registration as a jockey.

*Mood management.*

The current findings indicate that weight-loss behaviours are associated with negative moods, such as mood swings, irritability and depressed mood. This leads to the suggestion that jockeys may benefit from learning mood management strategies, which they could use while they were managing their weight and other life stressors. Some of the strategies that could be useful to jockeys' wellbeing are relaxation, time-management skills, anger management and stress reduction. Once again, it could be beneficial for jockeys to take part in mandatory professional development sessions dealing with these strategies each year. Attendance at these sessions could count towards the renewal of their riding licences.

*Education of trainers and owners.*

The current findings indicate that an extremely unequal power relationship exists between jockeys and trainers and owners because of the inherently insecure system for jockeys to gain future rides. A jockey's livelihood is literally in the hands of trainers and owners. Jockeys report being treated unfairly, abused and discriminated against (preferring male jockeys) by some trainers and owners. Some reports indicate the presence of workplace bullying and discrimination. This leads to the suggestion that trainers and owners need to be educated about their treatment of jockeys and the requirements of a fair workplace under the Occupational Health and Safety Act 2004 (Victorian Workcover Authority, 2005).

*Health Promotion Using the Health Belief Model*

Making recommendations for the promotion of healthy weight-management behaviours in the jockey population using the Health Belief Model is complicated by factors outside the personal control of jockeys. Most jockeys appear to believe that they would not be able to make the low body weight required without engaging in these behaviours. The study illustrated that even jockeys with extremely low body fat had trouble achieving the low weights required. Therefore, the first recommendation to be made is to raise the minimum racing weight to a weight that the majority of jockeys would be able to achieve without engaging in unhealthy weight-management behaviours.

Operating from the premise that it is possible for jockeys to engage in healthy weight-management behaviours and still make riding weights, there is a requirement to educate jockeys and their families about the negative consequences (including social, physical and psychological) of engaging in unhealthy weight-management behaviours. The principles underpinning the Health Belief Model could be implemented to increase the willingness of jockeys to adhere to lifestyle changes geared towards health and wellbeing.

*Perceived susceptibility.*

Increase jockeys awareness of personal consequences of unhealthy weight-management behaviours and emphasizing that they are vulnerable to harm. This may involve activities such as:

- (1) complete confidential personal risk assessment;

- (2) provide educational material (e.g., pamphlets, posters, websites) on the risks of dehydration and poor nutrition in jockeys' rooms, VJA newsletter and RVL website;
- (3) utilise guest speakers (e.g., retired jockeys, athletes from other weight sports or other people who are held in high regard by jockeys).

*Perceived severity.*

Jockeys need to be aware that the consequences of heat illness and food deprivation are significant enough to avoid. This may involve providing activities such as:

- (1) case studies of jockeys who have experienced negative outcomes from weight management in educational material (e.g., pamphlets, posters, website);
- (2) compelling statistics in educational material (e.g., pamphlets, posters, website);
- (3) guest speakers who discuss their personal experiences of the negative consequences associated with weight management.

*Perceived benefits.*

Jockeys need to consider the benefits to their health, wellbeing and performance if they do not accept rides that require them to be dehydrated and nutritionally deprived. This may involve the use of activities such as:

- (1) educational material (e.g., pamphlets; posters, websites) on the physical, psychological, social and performance benefits in jockeys' rooms, VJA newsletter and RVL website;
- (2) guest speakers who discuss their personal success in deciding to accept only those rides that do not require dehydration and nutritional deprivation.

*Perceived barriers.*

The racing industry needs to be encouraged to explore ways to eliminate the barriers that stop jockeys from being fully hydrated and nourished. This would require changing the culture of the racing industry and may involve activities such as:

- (1) raising minimum weights
- (2) educational material (e.g., pamphlets; posters, websites) on the importance of improving the physical, psychological and social wellbeing of jockeys to be distributed to owners, trainers and other stakeholders in the industry
- (3) guest speakers for industry stakeholders who discuss their personal experiences of dehydration and food deprivation within the racing industry.

*Self-efficacy.*

Jockeys need to be confident that following nutritional advice will result in the desired outcome. They also need to feel that they can successfully change professions if necessary. To support these objectives, jockeys need:

- (1) access to professional advice on nutrition
- (2) access to professional advice on vocational options
- (3) mentor program (e.g., with retired jockeys who encourage a healthy, balanced lifestyle);
- (4) guest speakers who discuss their personal success in managing their weight in a healthy manner or changing their profession.

*Further Research*

When considering the current research there are several methodological limitations that could be addressed in future research. Although similar to previous research (Speed et al., 2001), the low response rate (18.5%) in Study 1 was of concern. Moreover, the current research relied on jockeys from Study 1 to volunteer for Study 2 and give permission to contact their families in study 3. Although it is difficult to predict the effects of non-response bias it should be a consideration when interpreting the current research and conducting future research.

*Mood.*

The current research indicated that the negative moods associated with weight management can have a significant impact on jockeys' lives. Due to the paucity of

investigation in this area further research is needed to explore this topic. The current research was limited by one-off questionnaires and interviews. Future studies could use a diary for food and fluid intake, weight management, exercise, racing schedule and mood. This would allow researchers to ascertain if there is a threshold of weight loss for changes in mood, examine the contribution of different types of weight-management behaviour to negative mood and control for the effects of competition anxiety.

*Social support.*

There has been an increasing trend for industries and employers to recognise the importance of providing a work environment that promotes good psychosocial working conditions (Theorell, 2000). Despite this area attracting considerable attention, there are few studies examining the effects of weight management on jockeys' social networks and social interactions. The current research indicated that weight management can have a significant impact on jockeys' social interactions and networks. Given the lack of empirical research in this area a broad, exploratory approach was taken in the current research. Further research would benefit from taking a more specific method to determine the quality and quantity of social support available to jockeys is required as social bonds play an important role in physical, psychological and professional wellbeing and provide an avenue for individuals to cope with problems (Gould et al., 2002; Pearson, 1990; Sarason et al., 1990; Theorell, 2000; Weinman et al., 1995; Wills & Fegan, 2001).

*Eating disorders.*

The racing industry should be aware of the potential for disordered eating in their female jockeys. Unfortunately, although the number of females included in the study was representative of the jockey population, there were not enough to allow for statistically significant conclusions to be drawn. Future research focusing on female jockeys, and using a more comprehensive eating disorders measure (e.g., clinical interview), could provide useful and important information in this area. There has been an increase in the number of female apprentices so this issue is particularly relevant. As it was beyond the scope of the current research further research may also benefit from including matched gender comparison populations from the general, eating disorder and/or athletic population. Garner (1991) highlighted that it was important to match comparison populations on gender.

*Occupational Weight-Loss Disorder.*

The findings from the current research indicate that jockeys are experiencing some symptoms consistent with several disorders from the *DSM-IV-TR* (American Psychiatric Association, 2000). Based on the consistent data from Studies 1, 2 and 3 Occupational Weight-Loss Disorder was developed. Future research among jockeys, other weight-loss sports (e.g., wrestlers, boxers) and other weight-related professions (e.g., models) focusing on this area could provide useful and important information to further develop and address OWLD. Research could focus on a screening tool (e.g., a questionnaire) to identify OWLD and differentiate between high and low-risk groups.

*Physical wellbeing.*

The current results showed that many jockeys experienced negative physical consequences associated with dehydration while they were managing their weight. Unfortunately, the current research relied on self-report measures from jockeys. Further research to medically assess the short-term and long-term physical consequences (e.g., body temperature, bone density) of jockeys' weight-management behaviour is required. Jockeys should be assessed not only on race days and non-race days, but while they are working as well (e.g., core body temperature during exercise in sweat gear). Research is also needed to examine the effects of weight-management behaviour on the growth and development of apprentices.

*Status of female jockeys.*

The current results indicated that although RVL had been awarded a commendation for the advancement of women in non-traditional areas of employment, female jockeys still felt that it was a male-dominated industry that needed to make further advancements to achieve equality. Currently Ray and Grimes conducted the only research comparing male and female jockeys' riding offers and earnings in 1993 in the USA. Given the increase in females entering the industry and the lack of research in an Australian population it is suggested that research is needed to ascertain the status of female jockeys within the industry. Research in this area would assist the industry to develop appropriate plans and strategies for gender equality within racing.

*Conclusion*

The current study aimed to provide insight into a relatively overlooked area of research: the weight-loss experiences of jockeys and their families. This study has shown that wasting has detrimental effects on jockeys' physical, psychological and social wellbeing and impacts on the lives of their families. Most jockeys consistently use several unhealthy weight-loss techniques to lose a considerable proportion of their body weight, even though they experience negative effects as a consequence.

Overall, the results from the current research provide a rare insight into the struggles jockeys have managing their weight. Weight restrictions symbolise a range of other restrictions that characterise jockeys' lives. Reports that jockeys engage in track work; travel to race meetings; speak to trainers, owners, racing officials and other jockeys; ride in races; and interact with family and friends, while struggling with the negative effects of wasting are troubling. Adding to this is the concern that many jockeys could be engaging in weight-loss behaviour year-round purely because they find it difficult to take time away from racing for fear of damaging their prospects of future rides.

Most jockeys, their family members and racing industry stakeholders recognise the need for change within the Victorian racing industry for the benefit of jockeys. The recommendations generated by the current findings aim to contribute to efforts to improve the physical, psychological and social wellbeing of jockeys and their families.

The current study breaks new ground for applied sports psychology research. It examines a population that is rarely included in the sports psychology field and it also provides researchers, racing industry officials, jockeys and their families with

information about the physical, psychological and social effects of weight management for jockeys. Finally, it offers insight into a relatively unexplored area of research, namely, the social consequences of athletes' weight-loss behaviours.

## Glossary of Terms

Claim	Dependant on performance (wins reduces claim weight)  apprentice jockeys can claim a weigh allowance of 1.5 kg to 3kg under the allocated race weight (e.g., allocated weight 52 kg – apprentice jockeys with a 3 kg claim can ride at 49 kg)
In-season	Period over which competitions are held
Minimum weight	Jockeys: The lowest race weight allocated for jockeys (with 0.05 kg leeway on either side on race day)  Other athletes: The lowest weight category competitors can choose compete in.
Off-season	Period when no competitions are held
Race weight	The allocated weight that must be met for the athlete to take part in the event
Wasting	Use of short-term weight loss methods
Weigh out	Jockeys: Supervised weighing at least 30 min before the start of a race to confirm jockeys are meeting their allocated race weight (0.5 kg leeway over allocated weight)
Weigh-in	Jockeys: Supervised weighing of place getters and those directed by the stewards after a race to confirm jockeys are meeting their allocated race weight (0.5 kg leeway over allocated weight)  Other athletes: Supervised weighing prior to competition (e.g., day before or on same day) to ensure that athletes are under their allocated weight category

Weight categories      Other athletes: Dependant upon the sport athletes can choose to compete in a particular weight class (e.g., female judo weight categories, under 48 kg, under 52 kg, under 57 kg etc) and must weigh-in under the class weight to be eligible to compete. Unlike jockeys there is no penalty for being too far under the weight category as long as you weigh more than the allocated weight of the weight category below.

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*Appendix A: Amendments to Weight Allocations as of January 1 2007*



**Racing Victoria Limited**  
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## **AMENDMENTS TO RULES OF RACING**

**Issued 1 November 2006 (Amendment No 40)**

### **AMENDMENTS TO AUSTRALIAN RULES OF RACING**

The Australian Racing Board has made the following amendments to the Australian Rules of Racing, to take effect on the dates set out.

#### **AR. 103 - Rule replaced – effective 1 January, 2007**

**AR. 103** (1) The top weight allocated for handicap flat races must not be less than 58 kilograms, except for Group 1 handicap races for which the allocated top weight must not be less than 57 kilograms.

(2) Notwithstanding the provisions of subrule (1), if at the declaration of acceptances for a handicap flat race the weight allocated to the highest weighted acceptor (including any extra weight by way of re-handicap or penalty) is less than 57 kilograms, then all allocated weights for the race must be increased until the highest-weighted acceptor is weighted at 57 kilograms.

(3) the minimum weight allocated for handicap flat races must not be less than

- (a) 50 kilograms for the Melbourne Cup and Caulfield Cup;
- (b) 51 kilograms for Group 1 handicap races other than the Melbourne Cup and Caulfield Cup;
- (c) 52 kilograms for Group 2 handicap flat races;
- (d) 53 kilograms for all other handicap flat races.

Provided that the Principal Racing Authority concerned may approve applications made by racing clubs for 2-year-old and/or 3-year-old horses in open-age handicap races to be allocated lower minimum weights than those prescribed by paragraphs (a), (b), (c) and (d) of this subrule.

#### **AR. 104 – Rule replaced – effective 1 January, 2007**

The Standard Weight-for-Age, expressed in kilograms, for flat races shall be from 1<sup>st</sup> January, 2007, in accordance with the following schedule.

STANDARD WEIGHT-FOR-AGE FOR FLAT RACES - SCHEDULE													
Month	Age	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1000m to 1200m	2	---	---	---	---	---	46	46	47	48	49	50	51
	3	51.5	52	53	53.5	54.5	55	56.5	56	56.5	57	57.5	58
	4	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5
Over 1200m to 1400m	2	---	---	---	---	---	44	45	46	47	48	49	50
	3	50.5	51	52	53	54	54.5	55.5	54	54.5	57	57.5	58
	4	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5
Over 1400m to 1600m	2	---	---	---	---	---	42.5	43.5	44.5	45.5	46.5	47.5	48.5
	3	50	50.5	51	52	53	54	55	56	56.5	57	57.5	58
	4	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5
Over 1600m to 2000m	2	---	---	---	---	---	42.5	43.5	44.5	45.5	46.5	47.5	48.5
	3	49	49.5	50	51	52	53	54	54.5	56.5	56.5	57	57.5
	4	56	56	56	56.5	56.5	56.5	56.5	56.5	56.5	56.5	56.5	56.5
Over 2000m to 2400m	2	---	---	---	---	---	42	43	44	45	46	47	48
	3	48.5	49	49.5	50.5	51	52	53	54	54.5	56.5	56.5	57
	4	57.5	57.5	57.5	58	58	58	58.5	58.5	58.5	58.5	58.5	58.5
Over 2400m to 2700m	2	---	---	---	---	---	40	41	42	43	44	45	46
	3	46	46.5	47	50	50.5	51.5	52.5	53.5	54	55	56.5	57
	4	57.5	57.5	57.5	58	58	58	58.5	58.5	58.5	58.5	58.5	58.5
Over 2700m to 3200m	2	---	---	---	---	---	38	39	40	41	42	43	44
	3	44	44.5	45	48	48.5	49.5	50.5	51.5	52	53	54	55
	4	56.5	56.5	56.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5
Over 3200m to 3700m	2	---	---	---	---	---	36	37	38	39	40	41	42
	3	42	42.5	43	46	46.5	47.5	48.5	49.5	50	51	52	53
	4	54.5	54.5	54.5	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.5

Fillies and Mares to be allowed 2.5kg from 1st August to 31st July

*Appendix B: Requirements of an Apprentice and Licensed Jockeys**Apprentice Jockeys*

In the past, young people who pursued careers as jockeys usually came from families with an involvement in the racing industry. They were often the sons and daughters of jockeys and trainers. These days, however, many successful apprentice jockeys have had limited or no previous association with horses. In fact, many aspiring jockeys come from an urban environment and few have ridden a horse prior to their apprenticeship (personal communication, Chris Watson, Training Manager - Racing Victoria's Education and Training Centre, May 2001 cited in Speed et al., 2001).

Increasingly, apprentice jockeys are highly motivated, competitive young athletes who choose to participate in the sport of horseracing. The motivations behind choosing a career in race riding are diverse. The perceived glamour of the industry, love of horses and riding, and financial gain are some of the reasons mentioned by aspiring jockeys (Speed et al., 2001).

*Apprentice jockeys: course structure and skills development.*

Successful applicants are enrolled in a nationally accredited Certificate IV in the Racing (Thoroughbred) Jockey program. The training program is taken from the Racing Industry Training Package and is approved by the Australian National Training Authority (ANTA) as part of the Australian Qualifications Framework. The course, which is conducted over 3 years, requires apprentices to complete 14 units (F. Muratore, personal communication November 11, 2006).

Compulsory units include:

- Apply occupational health and safety procedures;
- Handle horses safely;
- Perform basic riding tasks;
- Ride horses at track work;
- Ride horses in an Industry regulated competition;
- Handle horses safely;
- Work effectively in the thoroughbred racing industry;
- Care for horses;
- Oversee safe handling of horses;
- Maintain horses in a healthy state and safe environment;
- Manage personal and business affairs;
- Apply principles of sports science to jockeys.

As well as being of interest to jockeys, the units are designed to give them the skills to cope with the many facets of their chosen career. Included in the elective units for jockeys are (F. Muratore, personal communication November 11, 2006):

- Plan training and racing program for thoroughbreds;
- Implement and evaluate a time management plan.

After indentures are signed, and following a careful screening process to ascertain suitability and compatibility, apprentices are assigned to licensed racehorse trainers who then become the apprentices' masters. From this time, until the apprentices complete their training, these trainers are responsible for the apprentices' on-job training. Throughout the course, the Education and Training Centre monitors the apprentices' workplaces and their progress, and provides advice and support to the masters (Speed et al., 2001).

Before becoming fully qualified jockeys, apprentices have many goals that they must achieve. First, qualified equestrian instructors teach apprentices basic riding skills. They then graduate to track riding and riding in unofficial trials. The next step requires that they demonstrate their riding abilities to the stewards in 10 official race trials (Speed et al., 2001).

Most apprentices, in the second year of their apprenticeship, earn the right to ride at country and provincial meetings. Success at this level leads to the apprentice accepting rides at metropolitan racetracks. An apprentice, however, must have a minimum of 5 winning rides before being eligible to ride in the metropolitan area (Racing Victoria Limited, 2006c).

Except with the permission of the stewards, apprentices must *claim* a reduction in weight to be carried by horses ridden by them. If they fail to do so, they commit an offence that may lead to them being stood down from riding. In the Victoria metropolitan area, apprentices who have ridden less than 20 winners claim 3 kg; apprentices who have ridden more than 20 winners but less than 40, claim 2 kg; and those who have ridden more than 40 winners but less than 60, claim 1.5 kg. In the metropolitan area, apprentices who have ridden more than 60 winners are not permitted to claim. This applies to metropolitan, group and listed races only (Racing Victoria Limited, 2006c).

In the country, apprentices who have ridden less than 20 winners claim 3 kg; apprentices who have ridden more than 20 winners but less than 50, claim 2 kg, and those who have ridden more than 50 winners but less than 80, claim 1.5 kg. Apprentices who have ridden more than 80 winners are not permitted to claim in the country. This applies to all races (Racing Victoria Limited, 2006c).

While apprentices' wages are governed by the Horse Industry Award, they also receive pay for services each time they ride in a race, as well as receiving an additional 5% of any prize money earned in those races. In this way, apprentices are treated the same as fully licensed jockeys. These earnings are held in trust until apprentices complete their time (Speed et al., 2001).

Other than from their wages, apprentices must remit 25% of all earnings to their masters as a condition of their apprenticeship. Some also commit a further 10% of their earnings to retain the services of an agent to manage their affairs. However, apprentices do not usually retain agents until they have reached the stage in their careers where they are receiving regular riding engagements (Speed et al., 2001).

*Day in the life of an apprentice jockey.*

Apprentices live a regimented life. Their workdays are organised and full. On a typical day, they:

- Commence their duties at about 4 a.m. when they prepare horses for track work;
- From approximately 4.30 a.m. to 8.30 a.m., they ride track work for their stable, although, to broaden their experience and increase their opportunities, they may also ride track work for trainers from other stables;
- At 9 a.m., back at their stables, they attend to everyday duties such as feeding the horses, cleaning the yards and stalls and cleaning tack;
- On race days, apprentices are given an hour or so to rest or sleep in order to recuperate from the rigours of a lifestyle that puts heavy demands on them, both physically and mentally;

- They are, however, expected to be at the races at least 1 hour before their first ride;
- On the day, in addition to riding in the races obtained through their masters or other trainers, apprentices may also be involved in stewards' inquiries and reporting back to owners and trainers on the performances of the horses they've ridden in races;
- For most apprentices, the day ends about 8.30 p.m. when they retire for the night (Speed et al., 2001).

Apprentices are given one day a fortnight to pursue other interests in their lives, but their leisure time does not commence until they've completed their normal morning stable duties. It is important to note though, that since Sunday racing became the norm, racing stables find it difficult to roster their apprentices the free time they deserve. Fortunately, Racing Victoria has introduced an initiative that ensures all jockeys, including apprentices, have at least 10 hours break after race riding and before they commence stable duties or track work (Speed et al., 2001).

#### *Apprenticeship completion.*

Completing the Certificate IV in Racing (Thoroughbred) takes 3 years, after which, for another 12 months the apprentice must ride under control of the master. Hence it is that most apprentices become fully-registered jockeys after 4 years training. There are, however, exceptions to this rule and the 4-year training period can be either reduced or extended. For instance, apprentices who reduce their weight claim to zero are entitled to apply to the stewards to finish their apprenticeships earlier, just as those who require more time to gain experience may apply to have their apprenticeships extended (Speed et al., 2001).

Previously, it was found that about 25% of apprentices failed to complete their training for reasons such as weight gain, social pressures, disciplinary reasons and/or lack of riding ability. However, with changes to the recruitment process and the introduction of the structured training program in 1992, the industry now only loses about 10% or 2 apprentices each year (Speed et al., 2001).

### *Licensed Jockeys*

#### *Licensed jockeys: categories.*

In accordance with the governance of the industry, the Victorian Racing Industry grants licences to jockeys under four main categories:

- Jockey 'A' (from 1 March 2006) - Licensed to ride in any flat races conducted by registered clubs except races restricted to apprentices.
- Jockey 'B' (granted prior to 1 March 2006) - Licensed to ride in any flat race at country race meetings except races restricted to apprentices.
- Jockey 'A' Cross Country (2005-06 season) - Licensed to ride in all jumping races at any registered club and/or any flat race at country race meetings except races restricted to apprentices (with approval of the Stewards).
- Jockey 'B' Cross Country (2002-03 season) – Licensed to ride in jumping races at country race meetings except races restricted to apprentices (with approval of the Stewards; Racing Victoria Limited, 2006c).

#### *Licensed jockeys: skills and requirements.*

Jockeys contract their services to owners and trainers for a set fee per race ride but a significant portion of their earnings comes from percentages of stake money. As

a consequence, it is in the best interests of jockeys to obtain rides on horses that have a good chance of finishing in the winner's circle. To do this, they must know the racing industry inside out, have great knowledge of the current horses running around and be able to communicate and market their ability with the skill and aplomb of a successful entrepreneur (Speed, 2001).

Jockeys are athletes who participate in a highly competitive and dangerous sport, and as a result, it is essential that they be fit, both physically and mentally, not just to give themselves every possible chance of winning races but to give themselves every possible chance of staying injury free (DeBenedette, 1987; Sperling, 2002). Apter in 1988; DeBenedette in 1987; Hillenbrand in 2001 and Kron in 1998 noted that for many Australians, thoroughbred horseracing is a popular sport. For the jockeys who perch themselves on the pitching backs of thoroughbred racehorses, riding is more than an occupation, it is an integral part of their lives. While DeBenedette in 1987 and Hillenbrand in 2001 found that often there is the misconception that jockeys are simply along for the ride, controlling a 2000-pound thoroughbred racehorse requires strength, balance and the ability to gauge position, pace, strategy and the condition of the horse. According to these authors, jockeys are no mere lightweights, these athletes are in excellent physical condition.

In general, when the attributes of a good jockey are considered; co-ordination, lightning-fast reflexes, balance, courage, strength and the will to win (DeBenedette, 1987; Presnell, 2008; Schmidt, 2004; Sperling, 2002); there would be few who would disagree with the Jockeys Association of Great Britain when it said: "In many ways, jockeys are the ultimate endurance athletes" (JAGB official website, cited in Speed et al., 2001).

Professional riders need to know their industry. They need to know the horses going around, they need the ability to appraise an animal's form and to decide, when more than one mount is on offer, which to take. They need a good understanding of horses in general; they need to understand horse anatomy and physiology, they need to understand horse temperament and how different animals react to different situations and circumstances, and they need the ability to communicate this knowledge to owners and trainers. This indeed is an important part of a jockey's job (Speed et al., 2001).

Horseracing is a highly organised and controlled sport and jockeys need a clear understanding of the rules governing their livelihood because the penalties for breaching the rules, or undisciplined riding, range from monetary fines or suspension from riding for various periods to, in exceptional circumstances, disqualification for life. Jockeys must know the Rules of Racing and they must understand associated legal procedures in case, at some stage in their careers, they are called upon to face a stewards' inquiry (Racing Victoria Limited, 2006c).

Jockeys are involved in a dangerous occupation, and although research has shown that injury arising from riding accidents is less common than some other sports, the extent and severity of injury is far greater than most, if not all, other sporting codes (Press et al., 1995). Every time a jockey climbs upon a horse, whether it be for track, trial or race riding, he/she runs the risk of injury and riding accidents that often result in serious injuries requiring long periods out of the saddle, paralysis or even death (DeBenedette, 1987). In an attempt to minimise risk, the Rules of Racing stipulate that any jockey mounted on a horse must wear a skull cap and body protector that comply with industry standards for quality assurance (Racing Victoria Limited, 2006c).

As is the case in most sports today, drugs and alcohol are classified as banned substances in racing and random drug testing is part of every jockey's life. As well, the Rules of Racing state that, "Any jockey, apprentice or rider who: presents himself to fulfill a riding engagement in a race or trial or for riding track work and is found to be under the influence of any alcohol or any drug, may be stood down from riding on that day and such persons may be punished" (Racing Victoria Limited, 2006c, AR.81A).

*Day in the life of a licensed jockey.*

The transition from apprentice to fully licensed jockey barely, if at all, lessens the professional rider's workload, although the nature of that work load may alter slightly. On any given day of a jockey's life, he/she will follow a program similar to this:

- A 4 a.m. rise to ride to track work;
- Riding track work for trainers until about 8.30 a.m.;
- The rest of the morning will be devoted to taking care of personal needs such as having a sauna to make weight for that afternoon's rides, a time for relaxation and rest, and, of course, travel time to the race meeting;
- In the afternoon, he/she will fulfill his/her riding obligations;
- Catch up with trainers, owners and his/her agent to consider prospective rides;
- In the evening, he/she may need to attend social and/or industry events with a view to marketing self and/or the industry;
- Deal with family concerns, eat wisely, and then study the next day's rides;
- Bed (Speed et al., 2001).

*Appendix C: Study 1 Plain Language Statement and Study 1 Questionnaire Package*

Victoria University

## INVITATION TO PARTICIPATE IN A RESEARCH STUDY

**“The Psychological Effects of Wasting in Jockeys”**

During the past decade, researchers have reported that athletes who must lose weight consistently and rapidly can experience difficulties associated with their weight loss, including physical, emotional, psychological, and social problems. The existing research on rapid short-term weight loss (wasting) has focused on athletes from sports with weight divisions, such as Olympic wrestling, rowing and boxing, while surprisingly little research has investigated the experiences of jockeys. This is despite the fact that horseracing has arguably the most demanding weight requirements of all sports.

The physical complications associated with wasting are numerous and have been well documented. Unfortunately, very little is known about the psychological effects of wasting. A recent study of US wrestlers found that athletes who wasted reported increases in tension, anger and depression, and problems with short-term memory and decision making. Other studies have indicated that an athlete's ability to concentrate may also be adversely affected by wasting, and that athletes who adopt unhealthy weight restrictive practices can develop negative attitudes towards eating and their own body. We wish to invite you, as a registered Victorian jockey or Apprentice, to participate in our investigation of the effects of weight restriction and wasting on jockeys. The key focus of this study is to explore the current weight-management practices of jockeys, and to gather information about the effects of these practices on mood, thought processes and behaviour. Your participation will involve completing a questionnaire of approximately 30 minutes duration, which asks for information in several key areas: your riding career, weight-management methods, medical complaints, psychological and social problems associated with wasting, and attitudes to eating and your body. There are no "right" or "wrong" answers, and the information you provide will be invaluable in assisting us to develop recommendations for safe weight management, thereby improving the health and wellbeing of all jockeys. It is hoped that the study will help improve both the quality and length of jockeys' careers.

Please note that participation is voluntary and you are free to discontinue at any time, without explanation. No information gained from the questionnaire will enable you to be identified to anyone other than the research team and your responses will only be reported as group information. Participants will be assigned a code that will be kept separately from the questionnaire data, to enable the research team to follow up a small number of willing jockeys for further study. All of the codes and your responses will be kept confidential and stored securely in the office of Dr Harriet Speed at Victoria University.

If you are willing to participate, please tear off this information page for your own reference, complete the attached questionnaire booklet and return it by mail to Victoria University in the reply-paid envelope. Please note that the return of the questionnaire to the researchers indicates your consent to participate in the study.

We thank you in advance for assisting us in our research. Should you have any questions about the research project, please do not hesitate to contact the researchers at the addresses below. If at any stage you have concerns about the conduct of the research project, please contact the University Human Research Ethics Committee, Victoria University, P.O. Box 14428 MCMC, Melbourne, 8001 (Ph 9688 4710).

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**SURVEY OF THE WEIGHT MANAGEMENT EXPERIENCES OF  
VICTORIAN JOCKEYS**



**VICTORIA UNIVERSITY  
& THE VICTORIAN JOCKEYS ASSOCIATION**

Please complete the following questionnaire as honestly as you can, after reading the instructions carefully. Remember, your privacy is assured.

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**SECTION 1: PERSONAL AND CAREER INFORMATION**

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*The following questions relate to you & your riding career. Please ✓ tick the most appropriate answer.*

1) Gender: Male  Female

2) Age: \_\_\_\_\_ years

3) Marital Status: Single

Married

De-facto

Widowed

Divorced

Other  (please specify  
\_\_\_\_\_)

4) Do you have any children? No

Yes  (how many \_\_\_\_\_ )

5) Height: \_\_\_\_\_ metres/cms or feet/inches

4) Usual Weight: \_\_\_\_\_ kg

6) Are you an apprentice jockey? No  (go to Q 6)

Yes  (please tick a box below)

If you answered *Yes* above, what is your current year level: 1<sup>st</sup>  2<sup>nd</sup>  3<sup>rd</sup>

7) Duration of riding career/apprenticeship so far: \_\_\_\_\_ years

8) The average number of races you ride per week (over the last 6 months): \_\_\_\_\_ rides

9) The average number of hours you spend per week working as a jockey/apprentice (including all duties): \_\_\_\_\_ hours

10) Are you currently not riding for any reason? No

Yes

Reason:

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## SECTION 2: WEIGHT MANAGEMENT

1) Do you have difficulty managing your racing weight?

1. Never                       2. Sometimes                       3. Usually                       4. Always

2) Do you **usually** have to lose weight to 'make weight' for race day?

No                       Yes  (on average how much weight \_\_\_\_\_ kg)

3) **During the past 7 days**, have you at any time, had to lose weight to 'make weight' for race day?

No                       Yes  (how much weight \_\_\_\_\_ kg)

4) **At any time in the past** have you had any difficulty managing your racing weight?

No                       Yes

5) Please consider the following **Weight Management Methods**. Circle the most appropriate response(s) for when you use each weight-loss method. *You can circle more than one response*. Also indicate in the last columns why you use the method (e.g., to maintain a constant weight and/or to lose weight rapidly) by ticking  the appropriate boxes (if you answer *never* for frequency, leave the last column blank).

Example: if you use food restriction *leading up to and on race day* to lose weight rapidly, you would circle 3 and 4, & place a tick  in the last column (lose weight rapidly).

METHODS	WHEN DO YOU USE IT?				REASON FOR USE	
	Never	Between race days	Day before race day	On race day	maintain constant weight	lose weight rapidly
1. Food restriction	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
2. Fluid restriction	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
3. Sauna	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
4. Self-induced vomiting	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
5. Diuretics	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
6. Amphetamines (e.g., cocaine, speed)	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
7. Laxatives	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
8. Appetite suppressants	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
9. Exercise as jockey for weight control (e.g., track work, stable work).	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
9. Other exercise for weight control (e.g., jogging, gym, other sport)	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
10. Exercising in hot environment	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
11. Exercising in clothing to produce sweat	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
12. Hot salt bath	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
13. Smoking Cigarettes	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>
13. Other (please specify _____ )	1	2	3	4	<input type="checkbox"/>	<input type="checkbox"/>

Any Comments:

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6) The following table refers to the **Physical Effects** you have experienced when wasting. Please indicate how often you experience the effects by circling the appropriate response. Also indicate the *severity* of your experience by ticking ✓ either **minor** or **serious** in the last columns. If you *never* experience any of the following leave the last columns blank.

Example: if you *often* experience muscular cramps and feel that it is serious, you would circle number 4 (often), and also place a tick ✓ in the last column (serious).

PHYSICAL EFFECTS	FREQUENCY					SEVERITY	
	Never	Rarely	Some-times	Often	Always	Minor	Serious
1 Muscular cramps	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
2 Fever	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
3 Nausea	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
4 Dizziness	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
5 Fainting	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
6 Upset stomach	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
7 Stomach cramps	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
8 Poor circulation	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
9 Fatigue	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
10 Visual distortion/impairment	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
11 Joint Pain	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
12 Other (please specify _____ )	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>

7) Have you been diagnosed with any of the following illnesses *by a doctor/health professional*?

- |                                  |                             |                              |                           |                             |                              |
|----------------------------------|-----------------------------|------------------------------|---------------------------|-----------------------------|------------------------------|
| 1. Cardiovascular disease        | No <input type="checkbox"/> | Yes <input type="checkbox"/> | 7. Kidney problems        | No <input type="checkbox"/> | Yes <input type="checkbox"/> |
| 2. Diabetes                      | No <input type="checkbox"/> | Yes <input type="checkbox"/> | 8. Dental problems        | No <input type="checkbox"/> | Yes <input type="checkbox"/> |
| 3. High blood pressure           | No <input type="checkbox"/> | Yes <input type="checkbox"/> | 9. Gastric problems       | No <input type="checkbox"/> | Yes <input type="checkbox"/> |
| 4. Low blood pressure            | No <input type="checkbox"/> | Yes <input type="checkbox"/> | 10. Reproductive problems | No <input type="checkbox"/> | Yes <input type="checkbox"/> |
| 5. Osteoporosis                  | No <input type="checkbox"/> | Yes <input type="checkbox"/> | 11. Menstrual problems    | No <input type="checkbox"/> | Yes <input type="checkbox"/> |
| 6. Other (please specify _____ ) | No <input type="checkbox"/> | Yes <input type="checkbox"/> |                           | No <input type="checkbox"/> | Yes <input type="checkbox"/> |

Any Comments:

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8) The following table relates to any **Social Effects** you have experienced when wasting. Please indicate how often you experience the effects by circling the appropriate response. Also indicate the *severity* of your experience by ticking ✓ either **minor** or **serious** in the last columns. If you *never* experience any of the following leave the last columns blank. If any of the questions do not apply to your circumstances (e.g., no children, no partner), leave it blank.

Example: if wasting *often* interferes with you socialising at work, and you feel that it is serious, you would circle number 4 (often), and also place a tick ✓ in the last column (serious).

SOCIAL EXPERIENCES	FREQUENCY					SEVERITY	
	Never	Rarely	Some-times	Often	Always	Minor	Serious
1 Relationship problems with partner	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
2 Relationship problems with children	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
3 Relationship problems with other family members (parents, siblings)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
4 Relationship problems with friends	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
5 Difficulty socialising at work (with other jockeys, trainers, etc.)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
6 Difficulty socialising outside of work	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
7 Difficulty with social activities (parties, going out to dinner, etc.)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
8 Other (please specify _____ )	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>

Any Comments:

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9) The following table refers to the **Psychological Effects** you have experienced when wasting. Please indicate how often you experience the effects by circling the appropriate response. Also indicate the *severity* of your experience by ticking ✓ either **minor** or **serious** in the last columns. If you *never* experience any of the following leave the last columns blank.

Example: if you *often* have persistent thoughts about thirst, and feel that it is serious, you would circle number 4 (often), and also place a tick ✓ in the last column.

PSYCHOLOGICAL EFFECTS	FREQUENCY					SEVERITY	
	Never	Rarely	Some-times	Often	Always	Minor	Serious
1 Persistent thoughts about thirst	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
2 Persistent thoughts about food	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
3 Short term Memory loss (forgetting things that have just happened)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
4 Long-term Memory loss (forgetting things that you know well)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
5 Mood swings	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
6 Anxiety	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
7 Depressed thoughts & feelings	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
8 Wandering thoughts	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
9 Irritability	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
10 Angry thoughts	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
11 Angry outbursts (behaviour)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
12 Irrational thoughts	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
13 Sleep disturbance	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
14 Mental fatigue	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
15 Suicidal thoughts	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
16 Slow to make decisions	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
17 Making poor decisions (mistakes)	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
18 Difficulty maintaining concentration for long periods	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
19 Difficulty concentrating on more than 1 thing at a time	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
20 Slow reactions/response times	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>
21 Other (please specify _____ )	1	2	3	4	5	<input type="checkbox"/>	<input type="checkbox"/>

Any Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### SECTION 3: GENERAL EATING BEHAVIOUR

The following items ask about your attitudes, feelings and behaviour. Some of the items relate to food or eating. Other items ask about your feelings about yourself.

For each item, decide if the item is true about you NEVER (1), RARELY (2), SOMETIMES (3), OFTEN (4), USUALLY (5) or ALWAYS (6). Circle the correct number that corresponds to your rating. If you need to change the answer put an "X" through the incorrect number and then circle the correct one.

Example: if you *often* think that your stomach is too big, you would circle number 4.

	Never	Rarely	Some- times	Often	Usually	Always
1. I eat sweets and carbohydrates without feeling nervous.	1	2	3	4	5	6
2. I think that my stomach is too big.	1	2	3	4	5	6
3. I wish that I could return to the security of childhood.	1	2	3	4	5	6
4. I eat when I am upset.	1	2	3	4	5	6
5. I stuff myself with food.	1	2	3	4	5	6
6. I wish I could be younger.	1	2	3	4	5	6
7. I think about dieting.	1	2	3	4	5	6
8. I get frightened when my feelings are too strong.	1	2	3	4	5	6
9. I think that my thighs are too large.	1	2	3	4	5	6
10. I feel ineffective as a person.	1	2	3	4	5	6
11. I feel extremely guilty after overeating.	1	2	3	4	5	6
12. I think that my stomach is just the right size.	1	2	3	4	5	6
13. Only outstanding performance is good enough in my family.	1	2	3	4	5	6
14. The happiest time in life is when you are a child.	1	2	3	4	5	6
15. I am open about my feelings.	1	2	3	4	5	6
16. I am terrified of gaining weight.	1	2	3	4	5	6
17. I trust others.	1	2	3	4	5	6
18. I feel alone in the world.	1	2	3	4	5	6
19. I feel satisfied with the shape of my body.	1	2	3	4	5	6
20. I feel generally in control of things in my life.	1	2	3	4	5	6
21. I get confused about what emotion I am feeling.	1	2	3	4	5	6
22. I would rather be an adult than a child.	1	2	3	4	5	6
23. I can communicate with others easily.	1	2	3	4	5	6
24. I wish I were someone else.	1	2	3	4	5	6
25. I exaggerate or magnify the importance of weight.	1	2	3	4	5	6
26. I can clearly identify what emotion I am feeling.	1	2	3	4	5	6
27. I feel inadequate.	1	2	3	4	5	6
28. I have gone on eating binges where I felt that I could not stop.	1	2	3	4	5	6

	Never	Rarely	Sometimes	Often	Usually	Always
29. As a child, I tried very hard to avoid disappointing my parents and teachers.	1	2	3	4	5	6
30. I have close relationships.	1	2	3	4	5	6
31. I like the shape of my buttocks.	1	2	3	4	5	6
32. I am preoccupied with the desire to be thinner.	1	2	3	4	5	6
33. I don't know what's going on inside me.	1	2	3	4	5	6
34. I have trouble expressing my emotions to others.	1	2	3	4	5	6
35. The demands of adulthood are too great.	1	2	3	4	5	6
36. I hate being less than best at things.	1	2	3	4	5	6
37. I feel secure about myself.	1	2	3	4	5	6
38. I think about bingeing (overeating).	1	2	3	4	5	6
39. I feel happy that I am not a child any more.	1	2	3	4	5	6
40. I get confused at to whether I am hungry or not.	1	2	3	4	5	6
41. I have a low opinion of myself.	1	2	3	4	5	6
42. I feel that I can achieve my standards.	1	2	3	4	5	6
43. My parents have expected excellence of me.	1	2	3	4	5	6
44. I worry that my feelings will get out of control.	1	2	3	4	5	6
45. I think my hips are too big.	1	2	3	4	5	6
46. I eat moderately in front of others and stuff myself when they are gone.	1	2	3	4	5	6
47. I feel bloated after eating a normal meal.	1	2	3	4	5	6
48. I feel that people are happiest when they are children.	1	2	3	4	5	6
49. If I gain a pound, I worry that I will keep gaining	1	2	3	4	5	6
50. I feel that I am a worthwhile person.	1	2	3	4	5	6
51. When I am upset, I don't know if I am sad, frightened or angry.	1	2	3	4	5	6
52. I feel that I must do things perfectly or not do them at all.	1	2	3	4	5	6
53. I have the thought of trying to vomit in order to lose weight.	1	2	3	4	5	6
54. I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close).	1	2	3	4	5	6
55. I think that my thighs are just the right size.	1	2	3	4	5	6
56. I feel empty inside (emotionally).	1	2	3	4	5	6
57. I can talk about personal thoughts or feelings.	1	2	3	4	5	6
58. The best years of your life are when you become an adult.	1	2	3	4	5	6
59. I think my buttocks are too large.	1	2	3	4	5	6
60. I have feelings I can't quite identify.	1	2	3	4	5	6
61. I eat or drink in secrecy.	1	2	3	4	5	6
62. I think that my hips are just the right size.	1	2	3	4	5	6
63. I have extremely high goals.	1	2	3	4	5	6
64. When I am upset, I worry that I will start eating.	1	2	3	4	5	6
65. People I really like end up disappointing me.	1	2	3	4	5	6

	Never	Rarely	Some- times	Often	Usually	Always
66. I am ashamed of my human weaknesses.	1	2	3	4	5	6
67. Other people would say that I am emotionally unstable.	1	2	3	4	5	6
68. I would like to be in total control of my bodily urges.	1	2	3	4	5	6
69. I feel relaxed in most group situations.	1	2	3	4	5	6
70. I say things impulsively that I regret having said.	1	2	3	4	5	6
71. I go out of my way to experience pleasure.	1	2	3	4	5	6
72. I have to be careful of my tendency to abuse drugs.	1	2	3	4	5	6
73. I am outgoing with most people.	1	2	3	4	5	6
74. I feel trapped in relationships.	1	2	3	4	5	6
75. Self-denial makes me feel stronger spiritually.	1	2	3	4	5	6
76. People understand my real problems.	1	2	3	4	5	6
77. I can't get strange thought out of my head.	1	2	3	4	5	6
78. Eating for pleasure is a sign of moral weakness.	1	2	3	4	5	6
79. I am prone to outbursts of anger or rage.	1	2	3	4	5	6
80. I feel that people give me the credit I deserve.	1	2	3	4	5	6
81. I have to be careful of my tendency to abuse alcohol.	1	2	3	4	5	6
82. I believe that relaxing is simply a waste of time.	1	2	3	4	5	6
83. Others would say that I get easily irritated.	1	2	3	4	5	6
84. I feel like I am losing out everywhere.	1	2	3	4	5	6
85. I experience marked mood shifts.	1	2	3	4	5	6
86. I am embarrassed by my bodily urges.	1	2	3	4	5	6
87. I would rather spend time by myself than with others.	1	2	3	4	5	6
88. Suffering makes you a better person.	1	2	3	4	5	6
89. I know that people love me.	1	2	3	4	5	6
90. I feel like I must hurt myself or others.	1	2	3	4	5	6
91. I feel that I really know who I am.	1	2	3	4	5	6

**Would you be interested in participating in an interview/follow up to further explore the weight management experiences of jockeys?**

No

Yes

**If you answered yes please supply:**

**Name:** \_\_\_\_\_

**Contact Ph No:** \_\_\_\_\_

Thank you for your cooperation, your help is greatly appreciated. Please return this questionnaire in the reply-paid envelope provided as soon as possible

*Appendix D: EDI-2 Subscale Items*

Subscale	Items
1. Drive for thinness	1, 7, 11, 16, 25, 32, 49
2. Bulimia	4, 5, 28, 38, 46, 53, 61
3. Body dissatisfaction	2, 9, 12, 38, 46, 53, 61
4. Ineffectiveness	10, 18, 20, 24, 27, 37, 41, 42, 50, 56
5. Perfectionism	13, 29, 36, 43, 52, 63
6. Interpersonal distrust	15, 17, 23, 30, 34, 54, 57
7. Interoceptive awareness	8, 21, 26, 33, 40, 44, 47, 51, 60, 64
8. Maturity fears	3, 6, 14, 22, 35, 39, 48, 58
9. Asceticism	66, 68, 71, 75, 78, 82, 86, 88
10. Impulse regulation	65, 67, 70, 72, 74, 77, 79, 81, 83, 85, 90
11. Social insecurity	69, 73, 76, 80, 84, 87, 89, 91

*Appendix E: Study 1 Questionnaire Reminder Notice*

**Jockey's Weight Management Study**  
**Help improve the health and welfare**  
**of all jockeys**



**To have your  
say about  
weight control:**

**call Vivienne Sullivan: 9419 2909**  
**(PhD student @Victoria University)**  
**or Ned Wallish (9866 3457).**

## Appendix F: Study 2 Questionnaires

## Study 2: Questionnaire 1

JOCKEY QUESTIONNAIRE Name: \_\_\_\_\_

IN THE LAST 12 HOURS...

Date: \_\_\_\_\_ Time: \_\_\_\_\_

1. How much time have you spent exercising? a) Track work: _____ b) Racing: _____ # of races c) Other exercise: _____ hrs _____ (specify activity)			
2. How many hours sleep have you had? _____			
3. If you smoke, how many cigarettes have you smoked? _____			
4. How many sweating sessions have you had? _____ Please circle type and indicate duration (hrs/min): a) Sauna _____ b) Bath _____ c) Car _____ d) Exercise/sweat gear _____ e) Other (type: _____) _____			
5. How long has it been since you last... DRANK _____ (hrs/mins) What/how much? _____ ATE _____ (hrs/mins) What/how much? _____			
6. Have you experienced any of the following (please tick)?			
a.	Muscle cramps	Yes <input type="checkbox"/>	No <input type="checkbox"/>
b.	Tiredness	Yes <input type="checkbox"/>	No <input type="checkbox"/>
c.	Weakness	Yes <input type="checkbox"/>	No <input type="checkbox"/>
d.	Difficulty sleeping	Yes <input type="checkbox"/>	No <input type="checkbox"/>
e.	Tunnel vision	Yes <input type="checkbox"/>	No <input type="checkbox"/>
f.	Blurred vision	Yes <input type="checkbox"/>	No <input type="checkbox"/>
g.	Other visual disturbance (e.g., white light/stars)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
h.	Dizzy/light-headed	Yes <input type="checkbox"/>	No <input type="checkbox"/>
i.	Loss of consciousness	Yes <input type="checkbox"/>	No <input type="checkbox"/>
j.	Confusion	Yes <input type="checkbox"/>	No <input type="checkbox"/>
k.	Headache	Yes <input type="checkbox"/>	No <input type="checkbox"/>
l.	Nausea	Yes <input type="checkbox"/>	No <input type="checkbox"/>
m.	Vomiting	Yes <input type="checkbox"/>	No <input type="checkbox"/>
n.	Diarrhoea	Yes <input type="checkbox"/>	No <input type="checkbox"/>
o.	Intestinal (stomach) cramps	Yes <input type="checkbox"/>	No <input type="checkbox"/>
p.	Chills	Yes <input type="checkbox"/>	No <input type="checkbox"/>
q.	Aggressive	Yes <input type="checkbox"/>	No <input type="checkbox"/>
r.	Irritable	Yes <input type="checkbox"/>	No <input type="checkbox"/>
7. How much weight have you lost for this race meet? _____			
8. Over what period of time have you lost this weight? _____			

*Study 2: Circumplex Mood Scale***Mood States**

This list consists of a number of adjectives that can describe how people feel.

Please read each word below and indicate how that word applies to you right now **by circling or crossing the number which describes your present mood state.**

For example, if the adjective is "happy" and you are definitely feeling happy, then you would circle "4" (very much so). Or if the word is sad and you are not sad at all, then you would circle 0 (not at all).

**Important:** Circle the number that crosses your mind first.

If the adjective is difficult for you, circle the number that is closest to your present state.

Please complete all items.

		not at all	a little	moderately	quite a bit	very much so
1.	Depressed	1	2	3	4	5
2.	Restless	1	2	3	4	5
3.	Sad	1	2	3	4	5
4.	Thoughtful	1	2	3	4	5
5.	Fresh	1	2	3	4	5
6.	Discontented	1	2	3	4	5
7.	Reflective	1	2	3	4	5
8.	Angry	1	2	3	4	5
9.	Musing	1	2	3	4	5
10.	At ease	1	2	3	4	5
11.	Nervous	1	2	3	4	5
12.	Dejected	1	2	3	4	5
13.	Comfortable	1	2	3	4	5
14.	Lacking energy	1	2	3	4	5
15.	Fatigued	1	2	3	4	5
16.	Unhappy	1	2	3	4	5
17.	Peeved	1	2	3	4	5
18.	Irritated	1	2	3	4	5
19.	Excellent	1	2	3	4	5
20.	Relaxed	1	2	3	4	5
21.	Vigourous	1	2	3	4	5
22.	Contemplative	1	2	3	4	5
23.	Calm	1	2	3	4	5
24.	Energetic	1	2	3	4	5
25.	Active	1	2	3	4	5
26.	Fidgety	1	2	3	4	5
27.	Good humoured	1	2	3	4	5
28.	Composed	1	2	3	4	5
29.	Joyful	1	2	3	4	5
30.	Sluggish	1	2	3	4	5

*Appendix G: Jockey, Family and Stakeholder Interview Guidelines*

*Jockey Interview Guidelines*

Background

1. How old were you when you first became involved in racing?
2. Why did you decide to become a jockey?
3. How did you find the transition from apprentice to registered jockey?

Weight Practices

1. Can you tell us what you're doing now to manage your weight?
2. What's your normal riding weight?
3. Do you find it easy to maintain?
4. How much weight loss?
5. Do you maintain or rapid?
6. Can you take us through a typical week when your racing
7. Past versus present, does it differ to beginning of career?
8. Are you happy with current weight-loss methods
9. Are there any weight-loss methods that you use that you're not comfortable talking about here?

Physical and Psychological Effects of Weight Loss

1. What physical or psychological side effects have you noticed associated with your wasting?
2. How does it affect your riding?
3. Have you sought medical advice?
4. Do you think there'll be any long-term consequences from your weight-loss methods?

5. Effect on daily functioning? (e.g., exercise, chores)

#### Social Effects of Weight Loss

1. What effects does this have with your interacting with others?
  - Family
  - Friends
2. Do you have friends outside racing (how does it affect those relationship)?
3. Do you have any difficulties being involved on social activities?
4. Do you have any difficulties attending special occasions?
5. What do you see the long-term repercussions on your social life?

#### Eating Behaviour

1. How does wasting affect how you see yourself?
2. Are you happy with your body size or shape?

#### Closing Questions

1. What advice would you give a young jockey regarding weight management?
2. Are you happy being a jockey?
3. Do you see yourself continuing on using the same patterns of weight loss?  
Can they change for the better?
4. How do you think things can realistically change for the benefit of jockeys?
5. Where do you see yourself after racing?

*Family Member Interview Guidelines*

Background

1. How long have you known \_\_\_\_\_?
2. How did you meet?
3. How long have you been married?
4. Has \_\_\_\_\_ been a jockey the whole time you've known them?
5. Was being a jockey one of the things that attracted you?

Information about Jockey

1. What sort of routine does \_\_\_\_\_ have on a day to basis?
2. How long would \_\_\_\_\_ spend a week with their jockey duties?

Weight

1. What sort of weight-loss methods have you seen \_\_\_\_\_ use?
2. Does \_\_\_\_\_ discuss his/her weight issues?
3. Do any of the methods \_\_\_\_\_ uses concern you?
4. Have there been any times when you have been concerned for \_\_\_\_\_ when they're losing weight?
5. Do you think the focus on weight for jockeys has affected you in any way?

Physical Effects

1. Has \_\_\_\_\_ talked about or have you noticed any physical effects like nausea, cramps, fainting from wasting?
2. Can you give me an example of a time when \_\_\_\_\_ has been wasting especially hard?
3. Do you think there will be long-term effects?

Psychological effects

1. Has \_\_\_\_\_ talked about or have you noticed any psychological effects like difficulty concentrating, memory from wasting?
2. Do you think wasting affects \_\_\_\_\_ mood?
3. Have you noticed any difference between wasting and non-wasting times in \_\_\_\_\_?
4. Do you think the focus on weight has affected how \_\_\_\_\_ views him/herself?
5. Has it affected how you see yourself?

Social effects

1. What is \_\_\_\_\_ like to be around when their wasting?
2. Does \_\_\_\_\_ weight-loss regime affect your relationship? What way?
3. Does it affect your
  - family
  - social life?
  - friends?
  - special occasions?
  - social activities?
4. Can you think of any times in particular?

Closing Questions

1. How do you see your lives changing after \_\_\_\_\_ has retired?
2. What advice would you have for someone who was going to be involved in a racing family?
3. Do you think there are any changes that could be made to make it easier for jockey's and their families?

### *Stakeholder Interview Guidelines*

#### Background

1. What is your current role in racing?
2. How did you first get involved in racing?
3. What were your early experiences in racing like?

#### Weight Practices

1. In your opinion, how well do jockeys manage their weight in general?
2. Are there any methods that worry you? Why?
3. Are there any limits or thresholds to how much weight a jockey can lose safely or how quickly they can lose it?
4. During your time in racing have you seen any changes in the way jockeys manage their weight?
5. What effects do you think changes to racing (e.g., increased weight, banned weight-loss drugs) have had over weight management?

#### Physical Effects

1. What physical side effects have you noticed that are associated with wasting?
2. What physical effects do jockeys complain of?
3. Have you ever had concerns about a jockey taking a ride on race day due to concerns about his/her physical condition?

#### Psychological Effects

1. In your opinion, how do jockeys function mentally when they are wasting?
2. Are there any effects on their mood?
3. Does this affect the way they interact with others?

4. Have you noticed any association between the degree of weight loss and their ability to think quickly? Make decisions? Remember instructions? Do they make more errors?

Social Effects

1. What is it like to be working with jockeys when they are wasting?
2. Do you have to make adjustments to the way you interact with them to accommodate?

Eating Behaviour/Body Image

1. How concerned do you think jockeys are about the shape of their bodies?
2. Do you think they worry about how other people see them?

Closing Questions

1. What advice would you give to a young jockey about managing their weight?
2. What can the industry do to make weight management easier for jockeys?
3. If there was one key message you would like people outside racing to understand about weight management, what would it be?
4. Is there anything you could tell us that we have not covered?

*Appendix H: Jockey, Family and Stakeholder Interview Consent Forms, Plain Language Statements and Interview Invitation Letters*

*Jockey Interview Race Day and Non-Race Day Testing Consent Form*

**Victoria University  
School of Human Movement, Recreation and Performance**



**Statement of Informed Consent**

I, \_\_\_\_\_ of

hereby consent to participate in research on the psychological effects of ‘wasting’ in jockeys being conducted at Victoria University by Dr. Harriet Speed and Vivienne Sullivan. I have read the plain language statement that outlines the research and understand that the purpose of the research is to gain a better understanding of the weight-management experiences of jockeys.

Procedures

Participants will be asked to complete a questionnaire on mood and weight management on race day (before and after taking part in races) and on a non-race day. They will also be asked to take part in an interview that will take approximately one hour. The interviewer will ask for information about jockey’s weight control methods and their psychological and social experiences while using weight-management practices. Participation in the research is completely voluntary and participants are free to withdraw at any time without giving an explanation. If you have any questions please do not hesitate to ask the interviewer or Dr. Harriet Speed on (03) 9919 5412.

I voluntarily agree to provide information on jockey’s weight-management experiences in the knowledge that all information will be treated in a confidential manner and only summary results will be reported and individual responses will not be released to any person or organisations. I am aware that I may withdraw from the research project at any time and that any information that has been collected at the time of my withdrawal will not be used.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

*Any queries about your participation in this project may be directed to the Principle Research, Dr. Harriet Speed (phone: 9689 8637). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University, PO Box 14428 MC, Melbourne 8001 (Phone: (03) 9919 4710)*

*Jockey Interview and Race Day and Non-Race Day Testing Plain Language Statement***INVITATION TO PARTICIPATE IN A RESEARCH STUDY****“The Psychological Effects of Wasting in Jockeys”**

During the past decade, researchers have reported that athletes who must lose weight consistently and rapidly can experience difficulties associated with their weight loss, including physical, emotional, psychological, and social problems. The existing research on rapid short-term weight loss (wasting) has focused on athletes from sports with weight divisions, such as Olympic wrestling, rowing and boxing, while surprisingly little research has investigated the experiences of jockeys. This is despite the fact that horseracing has arguably the most demanding weight requirements of all sports.

The physical complications associated with wasting are numerous and have been well documented. Unfortunately, very little is known about the psychological effects of wasting. A recent study of US wrestlers found that athletes who wasted reported increases in tension, anger and depression, and problems with short-term memory and decision making. Other studies have indicated that an athlete's ability to concentrate may also be adversely affected by wasting, and that athletes who adopt unhealthy weight restrictive practices can develop negative attitudes towards eating and their own body.

We wish to invite you, as a registered Victorian jockey or Apprentice, to participate in our investigation of the effects of weight restriction and wasting on jockeys. The key focus of this study is to explore the current weight-management practices of jockeys, and to gather information about the effects of these practices on mood, social interactions and behaviour. Your participation will involve completing a short questionnaire on mood and weight management on race day (before and after you have taken part in races) and on a day you are not riding in races. You are also invited to participate in a one on one interview about your weight-management experiences. The information you provide will be invaluable in assisting to develop recommendations for safe weight management, thereby improving the health and wellbeing of all jockeys. It is hoped that the study will help improve both the quality and length of jockeys' careers.

Please note that participation is voluntary and you are free to discontinue at any time, without explanation. No information gained during the study will enable you to be identified to anyone other than the research team, and no personally identifying information will be published or communicated to anyone outside the team. Your responses will be kept confidential and stored securely at Victoria University.

If you are willing to participate, please read and complete the attached consent form and return it by mail to Victoria University in the reply-paid envelope. Please note that the return of the form to the researchers indicates your consent to participate in the study.

We thank you in advance for assisting us in our research. Should you have any questions about the research project, please do not hesitate to contact the researchers at the addresses below. If at any stage you have concerns about the conduct of the research project, please contact the University Human Research Ethics Committee, Victoria University, P.O. Box 14428 MCMC, Melbourne, 8001 (Ph 9919 4710).

Dr Harriet Speed  
Principal Investigator  
Victoria University  
ph: (03) 9919 5412

Vivienne Sullivan  
PhD Student  
Victoria University  
ph(03) 9419 2909

*Jockey Interview and Race Day and Non-Race Day Testing Invitation Letter*

«First\_Name» «Surname» (on Victoria University letterhead)

«Address»

Date

Dear «First\_Name»,

My name is Vivienne Sullivan and I am a PhD (Sport Psychology) student at Victoria University, being supervised by Dr. Harriet Speed.

Firstly, I would like to thank you for completing and returning the questionnaire we sent you. The information that you provided has been invaluable.

As part of the next phase of my research, I would like you to complete a short questionnaire (approximately 10 minutes) on mood and weight management on race day (before and after racing) and non-race day (when you are not riding in races). I am also inviting you to take part in an interview examining the weight-management experiences of jockeys. The interviewer will ask for your experiences as a jockey with particular interest in your weight control methods, and your psychological and social experiences when ‘wasting’. The interview will take approximately 1 hour to complete.

I am aware of the numerous demands on your time so I am flexible about the time and place of the interview and the race meetings where you decide to complete the questionnaire research. I will call you in the next two weeks to organise these details. I am happy to conduct the interview over the phone if we cannot organise a face-to-face meeting.

If you would like to participate, please complete the enclosed consent form and return it to me at the introductory session about the research.

Your participation will provide much need information on the weight-management experiences of jockeys. Please refer to the plain language statement included in the package for further information on the research project and the way in which your wellbeing will be safeguarded during this research. All information gained during the research will be treated in a *strictly confidential manner* and no personally identifying information about yourself, or other people you mention, will be reported.

Thank you in advance.

Vivienne Sullivan

*Jockey Interview Consent Form*

**Victoria University  
School of Human Movement, Recreation and Performance**

**Statement of Informed Consent**



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\_\_\_\_\_ hereby consent to participate in research on the psychological effects of ‘wasting’ in jockeys being conducted at Victoria University by Dr. Harriet Speed and Vivienne Sullivan. I have read the plain language statement that outlines the research and understand that the purpose of the research is to gain a better understanding of the weight-management experiences of jockeys.

Procedures

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Please note that participation is voluntary and you are free to discontinue at any time, without explanation. No information gained during the study will enable you to be identified to anyone other than the research team, and no personally identifying information will be published or communicated to anyone outside the team. Your responses will be kept confidential and stored securely at Victoria University.

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Dr Harriet Speed  
Principal Investigator  
Victoria University  
ph: (03) 9919 5412

Vivienne Sullivan  
PhD Student  
Victoria University  
ph(03) 9419 2909

*Jockey Interview Invitation Letter*

(on Victoria University letterhead)

«First\_Name» «Surname»

«Address»

Date

Dear «First\_Name»,

My name is Vivienne Sullivan and I am a PhD (Sport Psychology) student at Victoria University, being supervised by Dr. Harriet Speed.

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As part of the next phase of my research, I would like to invite you to take part in an interview examining the weight-management experiences of jockeys. The interviewer will ask for your experiences as a jockey with particular interest in your weight control methods, and your psychological and social experiences when 'wasting'. The interview will take approximately 1 hour to complete.

I am aware of the numerous demands on your time so I am flexible about the time and place of the interview and the race meetings where you decide to complete the questionnaire research. I will call you in the next two weeks to organise these details. I am happy to conduct the interview over the phone if we cannot organise a face-to-face meeting.

If you would like to participate, please complete the enclosed consent forms and return it to the interviewer at the beginning of your interview.

Your participation will provide much need information on the weight-management experiences of jockeys. Please refer to the plain language statement included in the package for further information on the research project and the way in which your wellbeing will be safeguarded during this research. All information gained during interviews will be treated in a *strictly confidential manner* and no personally identifying information about yourself, or other people you mention, will be reported.

Thank you in advance.

Vivienne Sullivan

*Family and Stakeholder Consent Form***Victoria University****School of Human Movement, Recreation and Performance**

<b>Statement of Informed Consent</b>
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I, \_\_\_\_\_ of

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hereby consent to participate in research on the psychological effects of 'Wasting' in Jockeys being conducted at Victoria University by Dr. Harriet Speed and Vivienne Sullivan. I have read the plain language statement that outlines the research and understand that the purpose of the research is to gain a better understanding of the weight-management experiences of jockeys.

Procedures

Participants will be asked to take part in an interview that will take approximately one hour. The interviewer will ask for information about your perceptions of jockey's weight-control methods and their psychological and social experiences while using weight-management practices. Participation in the research is completely voluntary and participants are free to withdraw at any time without giving an explanation. If you have any questions please do not hesitate to ask the interviewer or Dr. Harriet Speed on (03) 9919 5412.

I voluntarily agree to provide information on my perceptions of jockey's weight-management experiences in the knowledge that all information will be treated in a confidential manner and only summary results will be reported and individual responses will not be released to any person or organisations. I am aware that I may withdraw from the research project at any time and that any information that has been collected at the time of my withdrawal will not be used.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Witnessed: \_\_\_\_\_ Date: \_\_\_\_\_

*Any queries about your participation in this project may be directed to the Principle Research, Dr. Harriet Speed (phone: 9919 5412). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University, PO Box 14428 MC, Melbourne 8001 (Phone: (03) 9919 4710).*

*Family Plain Language Statement***INVITATION TO PARTICIPATE IN A RESEARCH STUDY****“The Psychological Effects of Wasting in Jockeys”**

During the past decade, researchers have reported that athletes who must lose weight consistently and rapidly can experience difficulties associated with their weight loss, including physical, emotional, psychological, and social problems. The existing research on rapid short-term weight loss (wasting) has focused on athletes from sports with weight divisions, such as Olympic wrestling, rowing and boxing, while surprisingly little research has investigated the experiences of jockeys. This is despite the fact that horseracing has arguably the most demanding weight requirements of all sports.

The physical complications associated with wasting are numerous and have been well documented. Unfortunately, very little is known about the psychological effects of wasting. A recent study of US wrestlers found that athletes who wasted reported increases in tension, anger and depression, and problems with short-term memory and decision making. Other studies have indicated that an athlete's ability to concentrate may also be adversely affected by wasting, and that athletes who adopt unhealthy weight restrictive practices can develop negative attitudes towards eating and their own body.

We wish to invite you, as a family member of a registered Victorian jockey or Apprentice, to participate in our investigation of the effects of weight restriction and wasting on jockeys. The key focus of this study is to explore the current weight-management practices of jockeys, and to gather information about the effects of these practices on mood, thought processes and behaviour. You are invited to participate in a one on one interview of about 1 hour, discussing your opinions of the weight-management experiences of your relative. The information you provide will be invaluable in assisting us to develop recommendations for safe weight management, thereby improving the health and wellbeing of all jockeys. It is hoped that the study will help improve both the quality and length of jockeys' careers.

Please note that participation is voluntary and you are free to discontinue at any time, without explanation. No information gained during the study will enable you or your relative to be identified to anyone other than the research team, and no personally identifying information will be published or communicated to anyone outside the team. Your responses will be kept confidential and stored securely in the office of Dr Harriet Speed at Victoria University.

If you are willing to participate, please read and complete the attached consent form and return it by mail to Victoria University in the reply-paid envelope. Please note that the return of the form to the researchers indicates your consent to participate in the study.

We thank you in advance for assisting us in our research. Should you have any questions about the research project, please do not hesitate to contact the researchers at the addresses below. If at any stage you have concerns about the conduct of the research project, please contact the University Human Research Ethics Committee, Victoria University, P.O. Box 14428 MCMC, Melbourne, 8001 (Ph 9919 4710).

Dr Harriet Speed  
Principal Investigator  
Victoria University  
ph: (03) 9919 5412

Vivienne Sullivan  
PhD Student  
Victoria University  
ph: (03) 9419 2909

*Family Interview Invitation Letter*

(On Victoria University letterhead)

Address

Date

Dear,

My name Vivienne Sullivan and I am a PhD (Sports Psychology) student at Victoria University, being supervised by Dr. Harriet Speed.

Recently *Jockey* took part in an interview focusing on his/her weight-management methods and experiences as a jockey. The information he/she provided was invaluable. After interviewing *Jockey* I indicated that the next phase of the study focuses on the effects jockeys' weight-management methods have on their families. He/she said that you might be interested in assisting me with this research.

I would like to invite you to take part in an interview examining the weight-management experiences of jockeys and the effects it has on their families. The interviewer will concentrate on your perception of the jockey's weight-loss practices and the effect his/her behaviour has on his/her psychological health. In addition, you will be asked to talk about the effect the jockey's weight-management practices have on your family. The interview will take approximately 1 hour to complete.

I am aware of the numerous demands on your time, so I am flexible about the time and place of the interview. I will call you over the next few weeks to organise these details. I am happy to conduct the interview over the phone if we cannot organise a face-to-face meeting.

If you would like to participate, please complete the enclosed consent form and return it to the interviewer at the beginning of your interview.

Your participation will provide much needed information on the weight-management experiences of jockeys and its effects on their families. Please refer to the plain language statement included in the package for further information on the research project and how your wellbeing will be safeguarded during this research. All information gained during interviews will be treated in a *strictly confidential manner* and no personally identifying information about yourself, or other people you mention, will be reported.

Thank you in advance.

Vivienne Sullivan

*Stakeholder Plain Language Statement*

**INVITATION TO PARTICIPATE IN A RESEARCH STUDY**  
 “The Psychological Effects of Wasting in Jockeys”



During the past decade, researchers have reported that athletes who must lose weight consistently and rapidly can experience difficulties associated with their weight loss, including physical, emotional, psychological, and social problems. The existing research on rapid short-term weight loss (wasting) has focused on athletes from sports with weight divisions, such as Olympic wrestling, rowing and boxing, while surprisingly little research has investigated the experiences of jockeys. This is despite the fact that horseracing has arguably the most demanding weight requirements of all sports.

The physical complications associated with wasting are numerous and have been well documented. Unfortunately, very little is known about the psychological effects of wasting. A recent study of US wrestlers found that athletes who wasted reported increases in tension, anger and depression, and problems with short-term memory and decision making. Other studies have indicated that an athlete's ability to concentrate may also be adversely affected by wasting, and that athletes who adopt unhealthy weight restrictive practices can develop negative attitudes towards eating and their own body.

We wish to invite you, as a racing or allied industry representative, to participate in our investigation of the effects of weight restriction and wasting on jockeys. The key focus of this study is to explore the current weight-management practices of jockeys, and to gather information about the effects of these practices on mood, thought processes and behaviour. You are invited to participate in a one on one interview of about 1 hour, discussing your opinions of the weight-management experiences of your jockeys. The information you provide will be invaluable in assisting us to develop recommendations for safe weight management, thereby improving the health and wellbeing of all jockeys. It is hoped that the study will help improve both the quality and length of jockeys' careers.

Please note that participation is voluntary and you are free to discontinue at any time, without explanation. No information gained during the study will enable you or your relative to be identified to anyone other than the research team, and no personally identifying information will be published or communicated to anyone outside the team. Your responses will be kept confidential and stored securely in the office of Dr Harriet Speed at Victoria University.

If you are willing to participate, please read and complete the attached consent form and return it by mail to Victoria University in the reply-paid envelope. Please note that the return of the form to the researchers indicates your consent to participate in the study.

We thank you in advance for assisting us in our research. Should you have any questions about the research project, please do not hesitate to contact the researchers at the addresses below. If at any stage you have concerns about the conduct of the research project, please contact the University Human Research Ethics Committee, Victoria University, P.O. Box 14428 MCMC, Melbourne, 8001 (Ph 9919 4710).

Dr Harriet Speed  
 Principal Investigator  
 Victoria University  
 ph: (03) 9919 5412

Vivienne Sullivan  
 PhD Student  
 Victoria University  
 ph: (03) 9419 2909

*Stakeholder Invitation Letter*

(On Victoria University letterhead)

Address

Date

Dear,

My name is Vivienne Sullivan and I am a PhD (Sports Psychology) students at Victoria University, being supervised by Dr. Harriet Speed.

I would like to invite you to take part in an interview examining the weight-management experiences of jockeys and the effects it has on their psychological and social wellbeing. The interviewer will concentrate on your perception of jockeys' weight-loss practices and the effect their behaviour has on their psychological health. In addition, you will be asked to talk about your experiences with jockeys during your time with the racing industry. The interview will take approximately 1 hour to complete.

I am aware of the numerous demands on your time, so I am flexible about the time and place of the interview. I will call you over the next few weeks to organise these details. I am happy to conduct the interview over the phone if we cannot organise a face-to-face meeting.

If you would like to participate, please complete the enclosed consent form and return it to the interviewer at the beginning of your interview.

Your participation will provide much needed information on the weight-management experiences of jockeys and its effects on their families. Please refer to the plain language statement included in the package for further information on the research project and how your wellbeing will be safeguarded during this research. All information gained during interviews will be treated in a strictly confidential manner and no personally identifying information about yourself, or other people you mention, will be reported.

Thank you in advance.

Vivienne Sullivan