

**An Investigation of Trainers' Views of Behavioural Problems  
in Thoroughbred Racehorses in Training and Racing**

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## **Abstract**

Pressures to optimise resources in the thoroughbred horseracing industry result in high wastage rates. Typically wastage has been viewed in terms of physical or veterinary causes, while the potential influence of behavioural and temperamental aspects has largely been ignored. There is evidence that behavioural problems and temperamental unsuitability can affect performance. The current study explored the views of Australian thoroughbred racehorse trainers with regards to behaviour-related problems and temperament and their impact in training and racing.

A random sample of thoroughbred racehorse trainers from metropolitan and provincial New South Wales, Australia participated in a structured interview. Topics covered included behaviour-related problems in the thoroughbred racehorse; their impact; approaches to management; the importance of temperament in performance; and the extent to which behaviour-related problems contributed to decisions to discontinue horses from racing (wastage).

Thirty-seven trainers were interviewed. 'Nervous/not relaxed' unwelcome behaviours were the most commonly identified (34.3% of trainers), followed by adjustment to the stable routine (28.6%) and stereotypies (22.9%). Although commonly reported, the stereotypic behaviour crib-biting/wind-sucking (identified by 89.2% of trainers), was considered to have a severe impact by only one trainer (2.7%). In contrast, while being accident-prone was less commonly identified (56.8%), its impact was more often considered severe (27.0%). Temperament was considered very important in racehorse performance, a focus of and amenable to management, and not considered a significant contributor to wastage.

Trainers are an important source of information, reporting behaviour- and temperament-related problems in thoroughbred racehorses along with a confidence in their management ability. These problems can be main factors in horse discontinuation, but infrequently. While behaviour-related problems have largely been neglected in wastage studies, they warrant further study. There is a need to examine the epidemiology and risk factors, with a focus on identifying the 'at-risk' horse, as well as management methods, their effectiveness and any implications for the thoroughbred racehorse industry.

## Declaration of Candidate

I, Elaine Barrett, candidate for the degree of Doctorate of Psychology (Clinical) at Macquarie University, do hereby certify that:

- i. the work in this thesis is an original piece of research and it has been written by the candidate; any help and assistance that I have received has been appropriately acknowledged;
- ii. the work in this thesis has not previously been submitted as part of the requirements for a degree to any other university or institution other than Macquarie University;
- iii. all information sources and literature used are indicated in the thesis;
- iv. the thesis is less than 40 000 words in length, excluding tables, references and appendices;
- v. ethics approval for the research presented in this thesis was granted by the Macquarie University Human Research Ethics Review Committee, reference numbers HE30MAY2008-D05862 on the 6<sup>th</sup> June 2008 and HE28AUG2009-D00111 on the 21<sup>ST</sup> November 2009.

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Elaine Barrett

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## Chapter 1: Literature Review

## 1.1 Introduction

High rates of wastage have been reported in the thoroughbred racehorse population (Bailey, 1998a; Hayek, 2004; Jeffcott, Rossdale, Freestone, Frank, & Towers-Clark, 1982; Rossdale, Hopes, & Digby, 1985). Wastage refers to losses, such as reproductive failures, days lost to training and discontinuation of the horse from racing. Wastage can occur across all stages of the life of the thoroughbred including training and racing (Jeffcott, et al., 1982; Verheyen & Wood, 2004). The thoroughbred racehorse has been selectively bred over hundreds of years for characteristics believed to promote successful racing performance (Budiansky, 1997; Lynn, 2001). Despite this, poor performance in racehorses prepared for the discipline of flat racing is common (Murphy, 2010). Some of these breed characteristics, whilst useful in aiding aspects of flat racing performance, may also create a vulnerability to problem behaviour and stress, such as high level reactivity (McGreevy & McLean, 2010). In addition, a horse being prepared for the discipline of flat racing must cope with stressors arising from the demands and pressures associated with athletic training and performance (Bailey, 1998b; Boston & Nunamaker, 2000; Young & Wood, 2000), and also from management under intensive conditions (Casey, 2002; McGreevy, Cripps, French, Green, & Nicol, 1995).

Horses competing in flat racing frequently demonstrate behaviour-related problems. High rates of abnormal and unwelcome behaviours have been reported in the thoroughbred racehorse when compared to other breeds (Bachmann, Audige, & Stauffacher, 2003; Luescher, McKeown, & Dean, 1998; Redbo, Redbo-Torstensson, Ödberg, Hedendahl, & Holm, 1998). How are these problems managed in an industry context where the “safety” of the horse would seem to depend on it demonstrating a successful level of racing performance? A central question which motivated the current investigation was whether behaviour-related problems contribute to the high wastage rates reported in the industry. Wastage studies have emphasised the investigation of medical or “veterinary” causes with little systematic investigation of behaviour-related problems and how these might contribute.

Consideration of various possible sources of information about the role of behaviour in the loss of racehorses from training and racing suggested a focus on trainers. The

thoroughbred racehorse trainer<sup>1</sup> is the industry professional responsible for the management of the thoroughbred racehorse in training and racing. It is the trainer who will be responsible for the identification and management of behaviour-related problems and, in association with the racehorse owner(s), make recommendations about the value of intervention and persistence relative to potential financial returns. Because of the importance of the racehorse trainer as both an agent and a source of information, this study investigated trainers' views of behavioural problems in thoroughbred racehorses in training and racing.

As well as being of interest in terms of the general study of behaviour, the behaviour of thoroughbred racehorses is of particular interest because unwelcome or abnormal behaviours may reflect deficiencies either in the understanding of, or provision for, horses trained for the discipline of flat racing. There is a growing interest in equine behaviour and learning and an increased acknowledgement of the need for evidence-based research. Furthermore, concern regarding methods of management of the horse has increased amongst both the general and the research communities. Against this background, study of behaviour and temperament in the thoroughbred horse, and how behaviour-related problems are managed, is timely.

## 1.2 The Thoroughbred Racing Industry

In Australia, the sport of thoroughbred racing is part of a major industry. The horse is both a "product" and asset in an industry that is a major contributor to the economy (Gordon, 2001). It has been estimated that the thoroughbred racing industry contributes over \$5 billion to GDP and provides employment for some 50,000 people (Australian Racing Board, 2011). Key industry stakeholders include thoroughbred racehorse breeders, owners, trainers, jockeys, punters, racing clubs, veterinarians and government.

The business model of racing means that the industry faces the challenging task of balancing measures aimed at promoting industry viability and profitability with efforts aimed at ensuring the health and welfare of the horse (Rural Industries Research and

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<sup>1</sup> Trainer means a person licensed or granted permit by a Principal Racing Authority to train horses (Australian Rules of Racing, 2010, p. 7).

Development Corporation, 2006). In recent years thoroughbred racing has become the focus of increasing community concern in response to issues relating to the welfare of the horse, such as high wastage rates (Bailey, 1998a; Hayek, Jones, Evans, Thomson, & McGreevy, 2005) and whip use (McGreevy & McLean, 2010; A. McLean & P McGreevy, 2010). The potential for these concerns to reduce overall participation levels in the industry has been recognised (Rural Industries Research and Development Corporation, 2006) and current racing industry strategic objectives emphasise efforts aimed at improvement in the area of horse welfare and reduction in current levels of wastage (Racing NSW, 2010b). The Australian Racing Board (ARB) provides governance at the national level and sets down the Rules of Racing. The national body is assisted by principal racing authorities that operate at the state level and in New South Wales (NSW) this body is Racing NSW.<sup>2</sup> Thoroughbred racehorse trainers are required to be licensed by their state authority.

It is in this context that the thoroughbred racehorse trainer must operate. The thoroughbred racehorse trainer of today is also a businessman. The motivation of the racehorse trainer to persist with a problem horse is likely therefore to be influenced by a wide range of factors. These will include the ability level of the horse, time, costs, potential returns, owner agreement and the ready supply of other horses.

### 1.3 Typical Progression of the Thoroughbred Racehorse

A thoroughbred racehorse in Australia will follow a typical path that will see it pass through several stages of preparation before it enters the stable of a licensed trainer for training and racing. Racehorses are bred on stud farms (these can vary considerably in size) and are weaned on average between 5 and 7 months of age, several months earlier than would occur without intervention (Duncan, Harvey, & Wells, 1984; Parker, Goodwin, & Redhead, 2008; Thomas, 2010). From this point the majority of horses will undergo preparation for sale (Australian Racing Board, 2011). At the younger end of the age range there are sales specifically for weanlings, yearlings and 2 year olds. A horse being prepared for sale will undergo a preparation that goes

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<sup>2</sup> Racing NSW is a statutory body established under the provisions of the NSW Thoroughbred Racing Act 1996 to control and regulate the NSW thoroughbred racing industry (Racing NSW, 2010a, p. 5).

beyond standard care, which may include regular handling, being taught to be led,<sup>3</sup> exposure to treatment and handling by unfamiliar persons, for example by veterinarians and farriers (specialists in equine foot care), and progression to hard feed. Horses being prepared for a yearling sale will also be boxed for at least part of the day for several months or up to a year, be exposed to increased handling and a level of physical work and conditioning, often not greater than 15-20 minutes at any one time (Thomas, 2010). After sale the horse may go to the horse breaker to receive a basic education for the discipline of flat racing (referred to as “breaking-in”) or be given time at a stud or agistment farm.<sup>4</sup> The horse not being prepared for sale will be paddocked with other weanlings, often of the same sex (Thomas, 2010).

Although the education of the young horse is a continual process, breaking-in is recognised as a more formal, structured educational stage with set outcomes. Typically (although not exclusively) this will take place when the horse is a yearling and before it reaches 18 months of age. Breaking-in is completed by a horse breaker, a skilled horse educator or teacher (some racehorse trainers are also horse breakers). The breaking-in stage aims to teach the horse to accept the bit, bridle and saddle, the rider, basic foundation commands from the rider and barrier work (Coleman, 2003). Breaking-in is a racing industry term and is similar to what has been termed foundation training, the latter defined as “training of a young horse to respond to aids and cues that control its rhythm and tempo, direction and posture for whatever purpose it may be required” (McGreevy, McLean, Warren-Smith, Waran, & Goodwin, 2005, p. 18). The length of the breaking-in stage is reported to be up to 6 weeks, but typically in the racing industry the breaking-in stage is completed across 3 to 4 weeks. Industry pressures have been cited for this reduction and a concern expressed about the reduced education being a factor in discipline-specific problems such as barrier difficulties. For McLean and McGreevy (2010) the use of animals in sport can be associated with “a foreshortening of training in many instances to the detriment of the animal’s welfare” (p. 187).

After being broken-in the horse may again be given time in the paddock, enter pre-training (this is usually away from the stable) or come into the stable directly. Pre-

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<sup>3</sup> The horse is taught to walk off and to stop in response to commands.

<sup>4</sup> Agistment farm: a property that specialises in grazing broodmares, foals, young horses and/or racehorses.



training will include exposure to stable life, not necessarily at the horse's final destination.

The thoroughbred enters the stable for training and racing and it is at this stage that the trainer's involvement commences. Prior to this, the education of the horse and its learning has taken place in controlled environments without the additional stress of more intensive training and racing. These increased physical and mental demands and pressures may see behaviour problems emerge. The horse will also be exposed to intensive management conditions including individual stabling (usually with visual contact with other horses), controlled exercise and intensive training, a diet of highly concentrated feed, reduced levels of forage and regular transportation (Waran & Casey, 2005). Intensive management conditions have been shown to impact significantly on both the physical health and behaviour of the thoroughbred (Casey, 2002; McGreevy, et al., 1995; Redbo, et al., 1998). High rates of illness conditions such as gastric ulcers (Begg & O'Sullivan, 2003), respiratory disease (Christley et al., 2001) and tying-up<sup>5</sup> (MacLeay et al., 1999) have been reported in thoroughbred racehorses. Intensive management conditions in training and racing have also been associated with the development of abnormal behaviours such as stereotypies (unvarying, repetitive behaviour patterns with no obvious goal or function) (Redbo et al., 1998). The association between horse behaviour and environmental factors is discussed in detail in section 1.9 (Behavioural Problems).

### **1.3.1 Early Experience and Handling**

The racehorse trainer is focussed on providing training for racing performance. The thoroughbred racehorse has undergone a level of preparation and education before it enters the stable and comes under the care of the trainer. How adequately this industry management prepares the racehorse for training and racing is not known. While certain aspects of this preparation may work to promote adjustment and coping in the individual horse, it is also possible that they may result in reduced coping and increased vulnerability to development of problem behaviours.

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<sup>5</sup> Tying-up syndrome is a disease in which horses become stiff in their limbs while performing exercise or soon afterwards. Also called transient or recurrent exertional rhabdomyolysis (RER) (Blood, Studdert, & Gay, 2007).

Research has explored the importance of early handling to horse development and suggests it has the potential to confer advantages to the horse in terms of later coping and trainability (Waran, Clarke, & Farnworth, 2008). However, the literature has not been able to provide more precise guidelines as to type and amount of handling and timing to achieve best outcomes in terms of the foal's response to humans in later life. Intensive handling of foals has been claimed (Miller, 1998), via imprinting or “imprint training”, to enhance the ability of the horse to cope with training and management in later life. This, however, particularly in relation to trainability has not been supported by the evidence (Diehl, Egan, & Toser, 2002; Williams et al., 2003; Williams et al., 2002). Non-intensive early handling has been reported to be associated with young horses being easier to handle and less reactive (Heird, Whitaker, Bell, Ramsey, & Lokey, 1986; Lansade, Bertrand, Boivin, & Bouissou, 2004) and showing reduced levels of aggressive behaviour towards humans (Polito, Minero, Canali, & Verga, 2007). Handling techniques of a lesser intensity have been associated with long term positive results (Henry, Hemery, Richard, & Hausberger, 2005; Lansade, et al., 2004).

Houpt (2002) argued that disruption of the mare-foal bond may produce stress during what might be a crucial early stage. In terms of a stress-vulnerability model (Zubin & Spring, 1977) an external stressor such as the disrupted mare-foal bond could combine with an individual vulnerability or predisposition and alter stress responsivity. The link between stress during critical developmental periods and central nervous system (CNS) dysfunction which alters stress responsivity has not been reliably established in horses (McBride & Hemmings, 2005).

More broadly, it has been reported that optimal behavioural development is timely promotion of required skills during appropriate developmental stages. Mills and Nankervis (1999) speak to the potential usefulness of designing exercises that aim on the one hand to prepare the horse for a domestic existence in addition to those aimed at preparing the horse for the specific discipline that it will be undertaking. This kind of preparation, it is argued, would be associated with reduced stress and improved coping. Exposure of the foal to situations likely to be part of their adult life has been shown to reduce the fear eliciting properties of those activities later in life (Waran & Casey, 2002). Preparation, according to Mills and Nankervis (1999) would have the goal of producing “a confident and well-mannered horse with the fundamental skills

which it will require later in life” (p. 60).

In summary, because of the potential impact of early preparation and handling on manageability, trainability and temperament, trainers’ views of problems upon entry to the stables were considered important in the current study. Of equal interest was their view on the importance of the quality of breaking-in to the horse and its adjustment.

#### 1.4 Discipline Specific Demands of Flat Racing

In addition to the stress that may be associated with intensive management practices there is stress associated with the discipline-specific requirements of flat racing per se. Flat racing is thoroughbred horse racing over a specified distance on a level track. It is performed at the gallop, a diagonal gait that requires maximal effort (Fraser, 2010). The discipline requires a high level of athleticism and carries associated learning and training performance demands. When compared to other equine disciplines such as dressage (which require constant rein control), flat racing has been described as requiring “more guidance and less subjugation” (Ashton-Moore, 2011). Although it is based on natural physiological responses of the horse, these are performed with an intensity and duration that would not typically be seen in the horse's normal behaviour (McCall, Hall, McElhenney, & Cummins, 2006). Given the physical demands of flat racing it is not surprising that musculoskeletal injuries are common and identified as a main source of wastage (Jeffcott, et al., 1982).

Other skills are associated with successful performance in flat racing. These include those associated with the barrier stalls, where the horse is required to enter a confined space and learn to stand calmly before jumping out on cue, management of the horses natural flight response so that acceleration and deceleration come under cues from the rider (this would avoid the horse over-racing) and the management of arousal levels to allow for the most efficient use of available energy. Murphy and Arkins (2007) refer to “negotiating entry into dark or narrow areas such as stocks, starting stalls or trailers” as evolutionary adaptive behaviour, but ones that require the horse to suppress many of its natural instincts (p. 10).

## 1.5 Australian Racing Conditions

In Australia, racing takes place all year round. Horses must be 2 years of age before they can race ("Australian Rules of Racing," 2010), and are required to trial before they are eligible to race (Racing NSW, 2010a). Failure to trial to the satisfaction of stewards can result in a horse being discontinued from racing.<sup>6</sup>

Typically training stables are located on or near the racecourse, and training takes place on training tracks located within the course proper. This structure can see reduced transport demands for horses but also means that training will be completed within restricted hours and in a busy environment.

In the metropolitan and provincial basin of NSW, eight racetracks are used for training horses (Racing NSW, 2010b). Given the premium on stable space for those horses currently in training and racing, horses are spelled at venues away from the racetrack for up to 6 months of the year. A spell is a period where the horse is away racing, the length of a spell can vary (no official definition is available). This contrasts with other racing countries where, in the United Kingdom, for example, the flat racing season runs from April to October, horses are kept in stables away from the track and are spelled only occasionally (N. Lander, British Horse Racing Authority, personal communication, December 8, 2011).

One feature of Australian racing is an emphasis on the racing of 2 year old horses. Significant prize-money is offered for 2 year old race events, including the \$3.5 million Golden Slipper, reported to be the world's richest race for 2 year olds and serves as an incentive to race young horses (and the possibility of quick financial return) and an

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<sup>6</sup>The investigator met with NSW Racing stewards to obtain data about the number of horses that were discontinued due to failure to trial satisfactorily and the official reasons for this. The stewards reported that this information was not able to be easily accessed and records kept would not provide sufficient details of the reason to allow determination of precise causes such as behaviour-related reasons (R. Murrihy, Racing NSW, Chairman of Stewards, personal communication, June 7, 2011). It was hoped that these data may have provided information about behaviour-related problems that may have prevented horses from satisfying basic discipline specific requirements, and provide an independent source of data to compare to the information gathered directly from the trainers.

opportunity to enhance a horse's breeding prospects (More, 1999). It has been argued that the industry requires horses to race too early, before they are sufficiently physically mature, a factor believed to be reflected in reports of high wastage rates ("From foalhood to the maturity of performance," 2005). While concerns have focussed on physical maturity (T. A. Mason & Bourke, 1973), it is likely that there are also similar concerns to be raised regarding the mental maturity of the horse and its readiness to cope with the pressures associated with training and racing. While on the one hand it has been reported that young horses, especially 2 year olds, may be particularly affected by stressors (Mills, Alston, Rogers, & Longford, 2002), other studies have suggested that early exposure to training and racing might confer advantages in terms of promoting both physical/musculoskeletal strength (Rogers et al., 2008a, 2008b), and psychological/mental coping (Waran, McGreevy, & Casey, 2002).

## 1.6 The Thoroughbred Racehorse Trainer

The thoroughbred racehorse trainer is responsible for the conditioning and training of the racehorse. The Australian Racing Board has published guidelines in relation to training methods (2012). These are broad in their focus and include statements such as "breaking and training methods which unreasonably influence normal behaviour of racehorses should not be used" and "horses should only be given training schedules which are suited to their physical capabilities and level of maturity". The trainer's task has been described as difficult, including the following diverse responsibilities: "make judgements concerning the racing or performance potential of a young horse, then prepare the horse to perform, to realise its full potential, keep the horse healthy, sound and without disease in body systems, keen to compete and unlikely to behave in a way that will limit performance" (Evans, 2000, p. 8).

Training will involve physical conditioning for race fitness but will also involve mental preparation aimed at assisting the horse "to behave in a way that will maximise, or at least not limit its performance" (Evans, 2000, p. 34). An individualised approach is recommended that considers the horse's temperament and exercise capacity (Evans, 2000, p. 34). Training will also focus on developing the skills that are required for the discipline of flat racing, including barrier skills (Evans, 2000, p. 46).

The racehorse trainer needs to manage economic and owner pressures (within the industry it is the owner(s) and not the trainer that has the final decision-making power). When faced with a horse with limited ability or poor performance (regardless of cause), there will be the need to consider the time and costs involved in management relative to potential benefit. Trainers are dealing with horses when they are at the training and racing end of their careers and the opportunity for early intervention in the management of some problem behaviours will have passed. This might impact negatively on motivation to persist with efforts aimed at addressing the problem.

## 1.7 The Thoroughbred Racehorse

The thoroughbred racehorse is the product of a selective breeding process that commenced several hundred years ago (Budiansky, 1997). Breeding has selected for speed, endurance and conformation (degree of correctness of bone structure), features believed to promote suitability for racing performance ("From foalhood to the maturity of performance," 2005). The application of selective breeding practices in what is a restricted population has resulted in the intensification of breed characteristics (Grandin, 1998).

In terms of conformation the thoroughbred racehorse is described as having the following defining features: a chiselled head, long neck, high withers, deep girth, strong hindquarters, lean body and long legs (Montgomery, 1971). When compared to other breeds, the thoroughbred is described as having a temperament that is more flighty and reactive, often described as "highly strung" (Lloyd, Martin, Bornett-Gauci, & Wilkinson, 2008). The thoroughbred is classified as "hot blooded", a term that refers amongst other things to heightened reactivity and athleticism (McGreevy & McLean, 2005).

These breed characteristics can be considered in combination with what is known and understood about the basic nature of the horse. The horse, in its natural environment is a social, grazing, prey species (Waring, 2003). The horse lived on open plains in herds (with well developed social skills aimed at co-operation rather than domination) and is reported to have ranged up to 80kms a day, grazing for up to 16 hours a day,

with short periods of rest (Keiper, 1986). As a prey species, the horse has evolved as a flight response animal, ready to react immediately to any perceived danger or threat. In this context, the development of hyper-reactivity is understandable, and aggression or 'fight' responses are typically seen only when flight is prevented. When knowledge of the horses' natural behaviour is considered, it becomes clear that many modern management practices are associated with compromise and restriction. Thus we have a situation where the horse is selectively bred and then pitched into an environment that presents many challenges given what is understood of the nature of the horse.

Aspects of the nature of the thoroughbred may be associated with high performance but may also create a vulnerability to problem behaviours. For McGreevy (2010), racehorses have been bred for even higher levels of reactivity than those present in the non-racehorse. This feature might assist the horse "to respond rapidly to pivotal stimuli such as opening of the starting gates and the impact of the whip" (McGreevy, 2004, p. 2), but may also leave the horse vulnerable to reduced coping in a training environment and problem behaviour. A highly reactive nature has been associated with an increased vulnerability to stress (McGreevy & McLean, 2005) and lower levels of reactivity have been suggested to be associated with better adaptation. This suggestion is consistent with what is known about gene-environment interactions where genes will influence both exposure and susceptibility to environmental risk factors (Caspi & Moffitt, 2006).

Successful racehorse performance will reflect both genetics and environment. Current research is focussed on the identification of genetic factors that contribute to racing performance in thoroughbreds (Hill, Gu, McGivney, & MacHugh, 2010). Studies have reported heritability estimates of racing performance using handicap ratings of between 30 and 35% (Gaffney & Cunningham, 1988) and for racing times between 10-20% and based on lifetime earnings and lifetime ranking in a large sample of thoroughbred racehorses at between 11% (linear model) and 25% (linear model) (Tozaki et al., 2011). Researchers in this field suggest the need for caution, stating that many candidate gene studies focus on the physiological aspects of performance. Racing performance of the thoroughbred will also be influenced by factors that include soundness, resistance to disease, ability to thrive in a training environment and temperament.

## 1.8 Wastage Studies

Several studies have investigated what has been termed “wastage” in thoroughbred racehorses. The term wastage has been variously defined but is broadly a measure of loss, and may be measured by reference to time loss (i.e. days lost to training and racing) or discontinuation (Dyson, Jackson, Pfeiffer, & Price, 2008; Hayek, 2004; Rossdale, et al., 1985). High rates of wastage have been reported in the thoroughbred racehorse population and across the life of the thoroughbred from conception, in the early management phase, and in training and racing (Jeffcott, et al., 1982; Lindner & Dingerkus, 1993; More, 1999; Rossdale, et al., 1985; Verheyen & Wood, 2004).

Wastage is a significant issue that is associated with economic losses and raises serious concerns related to the welfare of the horse. It has been suggested that efforts aimed at reducing wastage should be an industry priority (Hayek, 2004; Rural Industries Research and Development Corporation, 2006). The potential for high rates of wastage to contribute to negative public perceptions of the industry and to reduce interest and participation levels has been recognised (Murphy, 2010; Racing NSW, 2010b). The high rates of wastage reported during training and racing clearly suggest that there is scope to review and improve aspects of management and training.

It is noted that some of the highest rates of wastage in the thoroughbred racehorse population have been associated with reproductive losses (failure either to conceive or carry pregnancy to term; Jeffcott et al 1982), these studies, however, will not be reviewed here. Rather, the current review will focus on those studies that have investigated wastage in thoroughbred racehorses in training and racing, with an additional emphasis on those that have been conducted in Australian racing conditions. Further, wastage studies have consistently emphasised physical or what has been termed “veterinary causes” of wastage (Jeffcott, et al., 1982). Within this framework, studies have been consistent in identifying orthopaedic disorders and respiratory disease as the two most common causes of wastage in horses in training and racing (Jeffcott, et al., 1982; Rossdale, et al., 1985). There has been little systematic investigation of the potential contribution of behavioural factors in wastage.

An early and influential study by Jeffcott et al. (1982) investigated wastage in the UK



population of thoroughbred racehorses. The overall estimate of wastage was 72.8%, which included losses from the time of conception to 4 years of age. The most significant contributors to this figure were breeding losses (i.e. covered mares that failed to produce a foal) at 32.6%. Of the remaining 67.4% of the baseline population, i.e. those available “to develop into yearlings and receive names for the purposes of entering training” (p. 196), causes of wastage included live foals who were not named (13.9%), named horses who were not trained (20.1%) and horses that were trained but not raced (6.2%). The economic impact of this level of wastage was estimated at £15.2 million.

Jeffcott et al. (1982) also investigated “veterinary” causes for wastage in a sample of 314 flat racehorses in training in UK Newmarket-based racing stables. Wastage was defined differently for each of the veterinary conditions. Veterinary wastage reasons and the associated wastage definitions were:

- (1) *lameness* (wastage defined as losses from training resulting in permanent disability, a reduction in performance potential, interruption to the training program or number of race starts),
- (2) *respiratory problems* (wastage defined as interruption of training program or surgical treatment),
- (3) *horses retired from training or sold* because of (a) limited ability in training, (b) excellent racing performance and sold for breeding,
- (4) *convalescence or “spelling”* (wastage defined as animals with signs of over-training or poor performance that were turned out to grass for a period of rest),
- (5) *colic* (signs usually had only a temporary effect on the training program) and
- (6) *dermatological conditions* (preventing animals from attending race meetings).

Data were collected using a questionnaire measure in combination with regular stable visits. The major causes identified for lost racing performance were lameness and respiratory infection. Of the two conditions, lameness was the most significant contributor to wastage in young horses, where 53% of animals that raced experienced lameness and of these 20% did not race again. The impact of respiratory problems was different. Even if present, respiratory problems did not usually prevent the horse from racing but could lead to poor performance and see the horse sent for a spell.

Jeffcott et al. (1982) also investigated wastage in horses in training in a random sample

of 762 horses over a maximum of three seasons. Performance consistency was measured, where the most consistent group were defined as those that raced across all three seasons (n=105, 13.8%), and these horses recorded an average number of races of 17.5. Trainers and owners were surveyed regarding the causes of wastage among the less consistent performers (with high response rates between 60-72%). The main reason given for horses failing to race or racing less than five times (this was categorised as unsatisfactory) as 2 and 3 year olds was "little or no ability". It is noted that amongst the other reasons provided for wastage were "bad in stalls/refused to enter stalls" (n=4/233) and what was reported as "unsuitable temperament" (n=5/233). Although the number of horses for whom behaviour and temperament was given as a reason for wastage is low, it is interesting that when a methodology was used that allowed respondents to generate their own causes rather than respond to predetermined "medical" categories, these factors were reported.

Rossdale et al. (1985) looked to extend the findings of Jeffcott et al. (1982) in a prospective study investigating the veterinary reasons for horses not completing standard training requirements. This study gathered data using a questionnaire that was completed by either the trainer or "other staff member" from six UK training stables (five were located at Newmarket). In this study wastage referred to lost training days, defined as "a day on which the horse failed to take part in a cantering exercise as a result of injury or disease" (p. 66). Wastage categories were restricted to injury and disease conditions, with lameness (67.6%) and respiratory disease (20.5%) identified as the main causes, confirming the findings of Jeffcott et al. (1982). Together these conditions resulted in the loss of 5.8% of days available for training.

More recent studies have confirmed lameness as the most common ailment in racehorses in training and reason for lost days to training in the UK flat racing population (Dyson, et al., 2008; Wilsher, Allen, & Wood, 2006). The study by Dyson et al. (2008) is noteworthy in that of the seven categories of "medical conditions" one was labelled "psychological and behavioural problems". In the 3 year old age group, psychological and behavioural problems were reported as the most important cause of days lost to training, accounting for 57% of total days lost to medical conditions; the corresponding figure for the 2 year old group was 3%. However, the authors suggest the need for cautious interpretation due to the small number of cases: one case in the 2

year old group and two cases in the 3 year old group. No details of the nature of the psychological and behaviour problems were provided.

It has been argued that defining wastage as days lost to training provides a measure of how important injuries are in terms of impact on the industry (Dyson et al., 2008). However, this does not take into account the possibility that days where the horse is not exposed to training may actually confer benefits beyond recovery from injury per se. Removal from intensive management and training may actually reflect good management practice where a break to “keep the horse fresh” could prevent loss or decline in performance, i.e. be good proactive management rather than a response to injury. Giving the horse time out from training to recover fully and restore physical and mental health is likely to be important in assisting the longevity of the horse and its racing career.

Verheyen and Wood (2004) investigated wastage specifically during training, in addition to racing, and confirmed the findings of previous studies in terms of the primacy of musculoskeletal injuries. The identification of training regimes as a modifiable risk factor, with the potential to reduce incidence of injuries in training was emphasised. The authors note the need for further studies of physical injury during training. The absence in the literature regarding the relationship between training regimes, associated pressures and behavioural issues again suggests the need for greater consideration of possible factors contributing to, and the review of definitions of wastage.

### **1.8.1 Wastage Studies in Australian Racing Conditions**

Several studies have been published that have investigated wastage in thoroughbred racehorses under Australian racing conditions (Bailey, 1998a; Bourke, 1990, 1995; Hayek, 2004). These studies have also emphasised veterinary causes for wastage, with the exception of one more recent study in which the issue of behavioural causes was explicitly raised (Hayek, 2004). Bourke (1990) reported on veterinary reasons for failure to race in the Victorian Racing Industry. Lack of ability and retirement due to injury were reported as main reasons for horses failing to train and race. Although lack of ability was the most common cause of wastage, Bourke (1995) noted the difficulties that can be associated with establishing “how often unsatisfactory

performance can be related to an exercise-induced injury” (p. 117).

In a more recent study, Bailey (1998a), using a face-to-face interview, surveyed 40 randomly selected Sydney based racehorse trainers to gather their views about major causes of wastage in the Australian Thoroughbred Racing. Trainers were asked to rate the frequency and impact of 36 disease and injury conditions. Wastage was defined as “any injury or disease that involved an interference with the training schedule of a horse, resulting in lost days in work, a prolonged spell or retirement from racing” (p. 28). Of five injury and disease categories, one was labelled miscellaneous conditions (9 items), within which seven items referred to behaviour; these comprised five stereotypic behaviours<sup>7</sup> (weaving, wind-sucking, stall-walking, crib-biting, self-biting), aggression and masturbation. Trainers listed the three most common causes of wastage as coughs, colds and viral respiratory problems. Bailey (1998a) reported the rankings of the frequency of behaviours as follows: wind-sucking, masturbation, crib-biting, aggression, weaving, stall-walking and biting self; none of these conditions were in the top quartile of trainer reported frequency of conditions.

Bailey (1998a) also investigated wastage in a sample of 169 thoroughbreds placed under the care of 24 different metropolitan and provincial based trainers. A case of injury or disease was only recorded if there was an impact on training, defined as a reduction in level of training, prevention of or modification to training or rest at pasture. Consistent with the findings of other studies (Jeffcott, et al., 1982; Rossdale, et al., 1985) lameness (56.2% of total days modified) followed by respiratory disease (15.8%) were the most common causes of lost or modified training days.

Hayek (2004) surveyed 378 Australian thoroughbred trainers using a mailed questionnaire (a 30% response rate). In this study wastage rates were defined as the percentage of horses leaving stables in the total population over the previous official racing year. A wastage rate of 37.5% was reported for the thoroughbred stables during the racing year 2002/2003. This definition of wastage is different to that used in previous studies and referred to the horse leaving the stable. When thoroughbred racehorse trainers were asked to provide details of the last five horses that left their

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<sup>7</sup> see Section 1.10.2 for detail on stereotypic behaviours

stable, the most common reasons were poor performance/slow (36.5% of horses), illness/injury (31.0%), to breed (9.4%), unsuitable temperament/behaviour (6.4%), and 'other' (16.8%). Hayek (2004) discussed the potential for misclassification when investigating the primary reason for a horse leaving. While respondents were asked to provide the principal reason, this may not always have been straightforward. For example, Hayek (2004) suggests illness or injuries may be the cause of poor performance, or unsuitable temperament/behaviour may be the cause of what is reported as illness/injury.

Wastage studies have emphasised medical or veterinary causes. Given that racehorse performance is recognised to be influenced by a range of factors beyond physiology, including temperament and behaviour, investigation of the possible contribution of behavioural factors in wastage seems appropriate. It is not clear as to why studies have tended to be framed within a medical model and this does not seem to be consistent theoretically or practically with what is known about thoroughbred racehorse performance, training and management.

### **1.8.2 Poor Performance**

Poor performance refers to "a lower level of performance than expected in an individual horse" in training or racing. Poor performance may be measured against what is typical for the thoroughbred breed where "any thoroughbred should be able to canter at 600m/min and an inability of an individual to do so would be cause alone for categorisation of poor performance" (Marlin & Nankervis, 2002, p. 251). A possible cause of poor performance is lack of innate athletic ability. In contrast, in loss of performance, where current performance level is lower than previously demonstrated, lack of innate athletic ability can be ruled out, making an underlying medical condition more likely (Marlin & Nankervis, 2002). With poor performance, if medical causes are excluded and fitness levels are deemed adequate, the possible role of behavioural factors should be considered (Marlin & Nankervis, 2002).

## 1.9 Behavioural Problems

Normal behaviours in the horse are evolved behaviours that are observed in natural conditions and developed to assist the horse to adapt and survive. There is evidence that horse behaviour has remained relatively unchanged with domestication (Mills & Nankervis, 1999). However, conditions associated with general domestication and intensive management in the context of racehorse training and racing may conflict with these natural behaviours (Goodwin, Davidson, & Harris, 2002; Kiley-Worthington, 1997). In the literature on behaviour problems in horses, broad classifications include abnormal behaviours such as stereotypies and unwelcome behaviours such as aggressive, evasive or avoidant behaviours. The term abnormal behaviour has been used to describe behaviours that have not been observed in feral horse populations (Boy & Duncan, 1979; Owen, 1982; Tyler, 1972). Abnormal or unwelcome behaviours have been well documented in the domestic and the thoroughbred horse (McGreevy, et al., 1995; Waters, Nicol, & French, 2002).

### 1.9.1 Stereotypic Behaviours

Stereotypies are “repetitive, invariant behaviour patterns with no obvious goal or function” (G. Mason, 1991, p. 1015). More recently this definition was revised by Mason and Rushen (2006) to move beyond phenotypic description and make reference to possible causal factors: “repetitive behaviours induced by frustration, repeated attempts to cope and or CNS dysfunction” (p. 326). Stereotypies are generally grouped into either locomotory (e.g., box-walking, weaving) or oral behaviours (e.g., crib-biting, wind-sucking). For Mason and Rushen (2006) stereotypies might be classified as “*adaptive* if they effectively serve a coping function, *maladaptive* if they reflect normally adaptive responses occurring inappropriately, within an ‘abnormal’ environment; or *pathological*, if they are caused by dysfunction, e.g., within the nervous system” (p. 16). However, there are no reports of stereotypic behaviours in feral horses (McGreevy, 2004; Minero & Canali, 2009).

The most common stereotypic behaviours described in horses are crib-biting: “grasping of a fixed object with the incisor teeth and engulfing air with an audible grunt” (McGreevy, et al., 1995, p. 86), and wind-sucking, a similar behaviour in which no object is grasped before the characteristic grunt is made; weaving: “an obvious, lateral swaying movement of the head, neck, forequarters and sometimes

hindquarters" (McGreevy, et al., 1995, p. 86), and box-walking: "circular route tracing within the stable" (McGreevy, et al., 1995, p. 86). Nicol (1999) reviewed 13 studies and reported a mean prevalence rate of 4.1% for crib-biting, 3.3% for weaving and 2.2% for box-walking, and prevalence estimates of these behaviours are variable and range between 0.4% and 6% (Bachmann, et al., 2003; McBride & Long, 2001; Mills, et al., 2002; Prince, 1987). When other more infrequent stereotypic behaviours are included, such as wood-chewing and head nodding, prevalence estimates increase to between 20 and 35% (McGreevy et al., 1995a; Waters et al., 2002). The reported prevalence of stereotypies in thoroughbreds ranges between 5.7% and 10.8% (Canali & Borroni, 1993; McGreevy, 1995). The thoroughbred racehorse has consistently been shown to have a higher incidence of stereotypic behaviour compared to other breeds (Albright, Mohammed, Heleski, Wickens, & Houpt, 2009; Bachmann, et al., 2003; Luescher, et al., 1998; Redbo, et al., 1998) and higher prevalence than riding school, pleasure and endurance horses (Mc Bride & Long, 2001).

Several theories have been advanced to explain the development of stereotypic behaviours, including these behaviours serving as a coping mechanism to reduce stress or promote control over aspects of the environment (Cooper & Albentosa, 2005; G. Mason, 1991). However, this theory has not been proven and results are inconsistent. Studies that have looked at stress markers (such as heart rate, plasma cortisol and plasma beta endorphins) in horses that do and do not show stereotypic behaviour have found no difference (Clegg, Buckley, Friend, & McGreevy, 2008; Lebelt, Zanella, & Unshelm, 1998; Pell & McGreevy, 1999b); higher (McGreevy & Nicol, 1998) or lower levels (Gillham, Dodman, Shuster, Kream, & Rand, 1994). Mills and Nankervis (1999) argue that the degree to which any conflict between domestic management and natural behaviour might result in stress will depend on the difference between the need for the behaviour and the need for the goal. For example, in the wild, horses have been reported to spend up to 100% of their time grazing. Whether reduced time spent feeding represents a stress depends on whether there is a need for the grazing behaviour *per se* or only for the goal. If there is no need for the behaviour, the horse may derive benefits from a reduced alternative feeding arrangement such as is provided in a stable for a racehorse in training. On this view the stable environment will only provide a stressor if it fails to satisfy the essential needs of the thoroughbred (Mills & Nankervis, 1999). However, it is also possible that the need to search for food

may confer other benefits which are not immediately obvious.

Another development theory for stereotypic behaviour is observational learning (Kiley-Worthington, 1983; McGreevy, 1995). However, current evidence does not support observational learning in horses (Baer, Potter, Friend, & Beaver, 1983). An indirect path has been suggested as more likely: the presence of a neighbour displaying stereotypic behaviour may lead to increased arousal levels that might predispose an at-risk horse to develop a stereotypic behaviour (Nagy, Schrott, & Kabai, 2008). An association between crib-biting and the production of saliva has led to the suggestion that gastrointestinal irritation may be a cause for the development of this stereotypy (Cooper & Albentosa, 2005; Nicol, Davidson, Harris, Waters, & Wilson, 2002). The similarity between stereotypic behaviour in animals and certain human psychiatric disorders has been noted. In terms of underlying causal mechanisms, it is suggested that stereotypies might involve abnormal brain function, such as “sensitization of neuronal pathways” (Cooper & Nicol, 1994; Dantzer, 1986) and neurochemical alterations of the basal ganglia (Saka, Goodrich, Harlan, Madras, & Graybiel, 2004).

Stereotypic behaviours and their prevalence have been associated with a range of environmental and management factors. Weaning has been reported to be associated with the initial onset of stereotypic behaviour (Waters et al., 2002) and according to Kiley-Worthington (1987) weaning may be the most important factor in the development of stereotypies. Increased prevalence of stereotypies has been associated with early weaning (in feral or free ranging horses, weaning is initiated by the dam at around 40 weeks; (Crowell-Davis, 1986; Duncan, et al., 1984), abrupt weaning (Heleski, Shelle, Nielsen, & Zanella, 2002), the feeding of concentrates following weaning (Waters, et al., 2002) and stall or stable weaning compared to paddock weaning (Houpt, Hintz, & Butler, 1984; McCall, Potter, & Kreider, 1985; Waters, et al., 2002). More extensive (as opposed to intensive) management practices and the provision of low energy forage in higher quantities have been associated with reduced risk of abnormal behaviour development in foals (Parker, et al., 2008).

A range of other risk factors for stereotypies have been identified in thoroughbred horses in training. Reduced prevalence has been associated with diet and feed,



specifically increased amounts of forage (McGreevy, et al., 1995) and reduced amounts of concentrate (Houpt & McDonnell, 1993; Kiley-Worthington, 1987; McGreevy, et al., 1995; Redbo, et al., 1998). Similarly, availability of visual contact between horses when stabled (McGreevy, et al., 1995), and the provision of straw bedding (McGreevy, et al., 1995) have been associated with a reduction in prevalence. While some have reported lowered prevalence with greater amounts of exercise and turn out time (McGreevy, 1995, Redbo et al., 1998), in a study by Pell and McGreevy (1999) prevalence rates did not vary in response to amount of time spent out of the stable. Horses at pasture have been observed to display fewer stereotypies compared to when stabled (Pell & McGreevy, 1999), as have those in stables with larger horse numbers (Redbo et al., 1998).

Although research has identified a number of individual factors associated with prevalence, it is unlikely that a single causative factor will be responsible. While studies have been consistent in reporting associations between prevalence of stereotypies and a range of environmental and management issues, the methodology used does not allow for causal interpretations. In general, studies have not been able to prove that individual horses had in fact been exposed to the identified risk factors. However, this can be overcome by longitudinal or prospective epidemiological studies, such as that by Waters et al. (2002).

Because not all horses in the same environment develop stereotypies and a breed-specific component has been established (McGreevy et al., 1995; McBride & Long, 2001), authors have suggested that genetic factors might be important (Albright, et al., 2009; Hosoda, 1950; Luescher, et al., 1998; Vecchiotti & Galanti, 1986). In the study by Vecchiotti and Galanti (1986), a thoroughbred population incidence of 2.5% was reported, but also a frequency as high as 30% in particular families. For Luescher et al. (1998) it is not the stereotypy per se that is inherited but rather a tendency to develop a stereotypy or a transmission of “susceptibility”. Whether the “at risk” horse (one with the inherited tendency) goes on to develop a stereotypy, will likely be determined by the environment and its appropriateness.

Management strategies for stereotypic behaviours have aimed at enrichment of aspects of the environment held to be sub-optimal and associated with stress.

Reductions in stereotypic behaviour have been shown to be associated with enrichment of forage (Goodwin, et al., 2002; Henderson & Waran, 2001) and of the stable environment by improving social contact opportunities (McBride & Cuddeford, 2001; McBride & Long, 2001). The placement of mirrors in stalls has been reported to be associated with reduced rates of weaving (McAfee, Mills, & Cooper, 2002). Increased turn out time has also been reported to reduce stereotypic behaviour (Marsden, 2002), a strategy that potentially allows not only for increased social contact and also for increased time engaged in eating behaviour. McBride and Long (2001) conducted telephone interviews of 100 UK based racing stables (included flat racing and National Hunt) and reported that only 35% made management changes in response to the onset of a stereotypic behaviour.

Concern has been expressed in response to current management approaches that aim at preventing the horse from performing the stereotypic behaviour. Prevention strategies include the use of isolation (the horse is isolated from other horses due to the belief that the behaviour can be copied), devices such as anti-cribbing collars and anti-weave bars (McBride & Long, 2001; Minero & Canali, 2009) and infrequently, surgical and pharmacological methods (Nicol, 1999). Given evidence that stereotypic behaviours may serve a stress coping function, prevention may result in exposure to increased stress and reduced welfare (Marsden, 2002; McBride & Cuddeford, 2001). Notwithstanding inconsistent evidence around the coping hypothesis, it has been demonstrated that use of the prevention devices themselves induce a stress response in horses (McBride & Cuddeford, 2001). The consensus view regarding management is in favour of a focus on the identification and addressing of causal factors in the individual case rather than on physical prevention.

Few studies have looked at time of onset of stereotypic behaviours. This may be important, as management of a recent onset stereotypic behaviour may need to be different to that employed for an established or chronic behaviour. Mills et al. (2002) linked the onset of stereotypic behaviours in a sample of 2 year old thoroughbreds to the breaking-in stage, a finding that led the authors to suggest that handling and riding be considered along with other management factors in investigations of problem behaviours. In the study by Visser, Ellis and Van Reenan (2008), completed in a sample of Dutch warm blood horses, it was shown that stereotypies associated with housing

and social isolation remained reversible up to 12 weeks, a finding that for Wickens and Heleski (2010) highlights the importance of early identification and intervention to prevent chronicity.

McGreevy (1995) discusses that stereotypes may persist in the absence of any environmental deficiencies. This reminds us that the presence of a stereotypic behaviour does not necessarily imply deficiency in the current environmental conditions, as these behaviours may persist in response to maintaining factors independent of the initial cause. Further, temporary stereotypes or displacement behaviours have been reported to be associated with acute stress (Hughes & Duncan, 1988), while these behaviours may be considered mild they have been identified as potential early indicators of abnormal stereotypic behaviour (Waters, et al., 2002).

### **1.9.2 Unwelcome Behaviours**

Problem behaviours can also include those that are “unwelcome” in a particular environment. These behaviours may not be abnormal or dysfunctional but may be experienced as unwelcome due to their impact, the problem they cause for the trainer (Askew, 1996).

Aggressive or uncooperative unwelcome behaviours can be directed towards either other horses or towards humans, and include: biting (and bite threats), kicking (and kick threats), rearing, lunging and striking . Both sex and age of the horse will influence the type of aggressive behaviours shown (Wells & Goldschmidt-Rothschild, 1979). Compared to studies investigating stereotypic behaviours and their prevalence in the thoroughbred racehorse, there is very little published data reporting on aggressive behaviour in the thoroughbred. It has been reported that overt aggression in feral horse groups is relatively rare compared to horses in the domestic environment (Houpt & Keiper, 1982). The prevalence of aggressive behaviour towards humans has been reported in a survey of Australian thoroughbred racehorse trainers to be in 2.3% while stabled and 2.2% when at pasture (Pell & McGreevy, 1999a). It is recognised that measures of aggression may include play and normal dominance behaviours (Boyd & Keiper, 2005).

Aggressive behaviours may be an indicator of welfare problems, especially if they

develop in a horse that is normally calm and relaxed. Persistent levels of aggression may be the result of frustration, pain, fear (aggression may be a defence), increased physical activity, inappropriate training and riding, and a need to assert dominance (Hall, Goodwin, Heleski, Randle, & Waran, 2008; McGreevy & McLean, 2005; Mills & Clarke, 2002). It has been suggested that “the occurrence of pain is the single most likely cause of ... aggressive behaviours in the domestic horse population” (Goodwin, 2007, p. 26). If danger is perceived and flight is not possible, defensive aggression may be used to manage the threat (Goodwin, 1999).

Aggressive behaviours can be reinforced by learning; when the horse experiences avoidance of an unpleasant outcome, the behaviour may be reinforced (McGreevy & McLean, 2005). High concentrate feeds have also been associated with increased levels of aggressive behaviours. The basis of aggression is often established in the young horse during early development. Early handling has been associated with reduced likelihood of horses showing aggression to humans, and reduced reactivity (Lansade, et al., 2004).

Management will depend on assessment and the motivation or cause. Behaviour modification, such as shaping techniques<sup>8</sup> can be effective (McGreevy & McLean, 2005). Punishment following the aggressive behaviour can be effective but care needs to be taken to ensure that the punishment is linked to the undesirable behaviour (McGreevy, 2004) and does not lead to the development of more generalised fear and does not use excessive force. For McGreevy, if the horse presents as dangerous the use of prescribed chemical restraint is to be preferred over “physical restraint or punishment” (McGreevy, 2004, p. 144). Reduced concentrates and increased turnout time are also likely to offer benefits (McGreevy, 2004). Aggressive behaviour in the stable environment can present risks to the safety of both humans and other horses. Given these risks and issues of occupational health and safety and resultant high insurance premiums there may be a reduced tolerance for horses showing severe level aggressive behaviour in the racing stable.

Normal behaviour of the horse, as a prey species, involves moving away from threat

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<sup>8</sup> Shaping refers to reinforcing successive approximations to a desired final response.

situations 'bodily or posturally', i.e. evasive behaviours (McGreevy, 2004, p. 332). The definition of what constitutes *problematic* evasive or avoidant behaviours is imprecise as these behaviours are normal, and serve as standard responses. However, they can become problematic in certain circumstances, for instance when the horse is under saddle or is stabled. Evasions and avoidant behaviours include:

- (i) "inappropriate obstacle avoidance" which in flat racing may be seen in the avoidance of lateral confinement (e.g. barrier problems, consistent failure to enter, leave barrier or fractious/panic behaviour in the barrier);
- (ii) hyper-reactivity responses, e.g. flight responses, which include shying and spinning away (leaping laterally or turning away from stimuli), bolting (galloping from perceived threat with no response to rein pressure), pulling/over-racing (undesirable speed often accompanied by persistent extension of neck to pull rein through rider's hands); and
- (iii) agonistic responses to conflict for example, rearing and bucking (responses used to fight conspecifics<sup>9</sup> and dislodge predators), baulking/jacking-up (motivation to return to home range or group is greater than motivation to move forward; refusing to go forward), resistance (changes in speed/direction not desired by rider), and refusal to run (McGreevy, 2002). Another evasive or avoidant behaviour observed in flat racing includes refusal to pass other runners in a race.

Fear responses range from hyperactivity to bolting, bucking, rearing and shying and have been shown to be less prone to erasure than other behaviours (LeDoux, 1994). Resistance can be met with the use of force and this may increase fear levels associated with the situation. Avoidance behaviours can result from fear conditioning and can be learnt from as little as one aversive event.

Unwelcome responses are common in training (Kiley-Worthington, 1990) and have been associated with trainers and handlers providing conflicting signals (McLean, 2003). It has been reported that breaking-in or foundation training can result in confusions and escalate problem behaviours such as aggression, bolting, bucking (McLean, 2003). It is argued that problems arise due to the basic principles of learning theory and behaviour modification being applied inconsistently or with inappropriate

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<sup>9</sup> Conspecifics are animals belonging to the same species.

timing (Murphy & Arkins, 2007). According to Warren-Smith and McGreevy (2008), “inappropriate behaviour is a serious cause of wastage” (p. 153). However, this link has not been thoroughly investigated and data on the relationship in racehorses are not available.

### **1.9.3 Impact and Significance of Problem Behaviours**

Behaviour problems have been recognised as providing a measure of the welfare of the horse (Cooper & Mason, 1998; Mills, 2005). Their presence can suggest an underlying physical problem and changes in behaviour are often early warning signs of injury or disease in the horse (McDonnell, 2005). A behaviour may be regarded by a racehorse trainer as problematic if it interferes with getting the horse fit, obstructs the necessary learning/skills acquisition and limits performance and may result in a decision to cease training and/or racing of the horse.

It is likely that stereotypic behaviours may present at different levels of severity and have variable impacts. Stereotypic behaviour in horses has been shown to be associated with lower learning abilities (Hausberger, Gautier, Müller, & Jegou, 2007), a range of health problems (McBride & Long, 2001) reduced performance (Kiley-Worthington, 1987), and to have potential negative economic consequences. In Australia, wind-sucking is considered to represent a basic unsoundness in the horse and is required to be disclosed prior to the sale of the horse at Auction (William Inglis and Sons Ltd). Failure to do so may see the purchaser cancel the sale. Crib-biting has been associated with tooth wear, weight loss, weak condition, failure to thrive and a possible causal factor for gastric ulceration and colic (McBride & Long, 2001; Nicol, et al., 2002; Owen, 1982). Consequences of weaving may include reduced and insufficient rest, loss of condition, useless fatigue of the muscles and in some cases seeing the horse unable to be trained (Hayes, 1968; McGreevy, 2004). Crib-biting was not associated with trainability in a sample of riding school horses used either for competition or leisure (Nagy, Bodó, Bárdos, Bánszky, & Kabai, 2010). Prince (1987) asked trainers if horses with stereotypic behaviours were more difficult to train and reported that 40% of respondents said they were “no more difficult”, while the remaining 60% said yes but “not much more difficult”.

There are both direct and indirect impacts of behavioural problems. For example, the

direct effect of fractious behaviour may be that the horse is unable to be loaded into the starting barriers and consequently does not take part in the race. However, even if able to be loaded, high levels of fear and arousal could result in the inefficient use of available energy and a performance level below that expected. Hutson and Haskell (1997) in a study of Australian thoroughbreds found that horses that lose races tend to be more aroused and require greater control in the parade ring or mounting yard than winners. Conversely, those horses observed to be calm before the race were more likely to perform to their potential. In another example of the contribution of the underlying factor in addition to that of the behaviour per se, McGreevy (2004) observed that horses that crib-bite may be less able to digest feed and thus have less energy available for racing.

## 1.10 Equitation Science

“During the second International Equitation Science Symposium held in Italy on (sic) 2006 ... many researchers stressed the importance that trainers apply the appropriate use of learning theory in order to reduce the risk of wastage in horses.”

Minero and Canali (2009, p. 225)

The need for training methods to be informed by the learning abilities and nature of the horse has long been recognised (McCall, 1990) and evident in early descriptions of breaking-in methods (Blackshaw, Kirk, & Cregier, 1983). Equitation science emerged as a discipline in 2005 with the aim of developing “scientific methods to study, measure and interpret interactions between horse and rider” (McGreevy, 2007, p. 497). Equine learning has important implications for horse training and management. Recent research into equine learning has provided evidence to suggest that the horse learns in the same way as other species (Creighton, 2007; McCall, 1990) and that the basic principles of learning are within the cognitive capacity of the horse (McGreevy, 2004).

Equitation science calls for the application of the principles of learning theory, developed within the tradition of behavioural psychology to the horse and horse training techniques. Training methods based on the principles of learning theory and

applied correctly have the potential to “accelerate success, reduce behavioural wastage of horses and improve safety for both humans and horses” (McGreevy & McLean, 2007, p. 108). A set of principles for horse training based in learning theory have been outlined by McGreevy and McLean (2007) and include “train and subsequently elicit responses singularly” and “avoid and disassociate flight responses” (p. 108).

Negative reinforcement is the dominant type of learning underpinning horse training methods and is the basis of what has been termed “pressure-release” (McGreevy & McLean, 2007). Pressure is most usually applied using rein or rider leg pressure. Negative reinforcement has been defined as the removal of something aversive (such as pressure) to reward the desired response and thus lower the motivational drive state (Skinner, 1953). Incorrect application of negative reinforcement, for instance when the release of pressure is poorly timed or an unsuitable amount of pressure applied, has been associated with behavioural problems in the ridden and led horse (McGreevy & McLean, 2005). These behavioural problems may include conflict behaviours such as “bucking, shying, rearing, swerving, leaping and bolting” (McGreevy & McLean, 2007, p. 113) which may be fear based, less prone to extinction (LeDoux, 1994) and likely to contribute to behavioural wastage. Other failures to apply the principles of learning theory in ways that allow for optimal learning, such as training two responses to be elicited from one signal, may also cause confusion. This again can produce conflict behaviours in the horse and have the potential to contribute to behavioural wastage (McLean, 2003). There is also potential for undesirable traits to be unintentionally reinforced and thereby maintained.

The reliance on negative reinforcement in traditional horse training methods is interesting given the known advantages associated with positive reinforcement. More recently the use of positive reinforcement either as a replacement for or in addition to negative reinforcement has been investigated (Heleski, Bauson, & Bello, 2008). Results suggest individual differences, with some horses performing better in learning tests in response to negative rather than positive reinforcement (Visser, van Reenen, Schilder, Barneveld, & Blokhuis, 2003). Heleski et al. (2008) found no difference in learning times with a novel fear inducing task, but an advantage of positive reinforcement was a more relaxed horse. The potential for increased use of positive reinforcement, given that it may be associated with reduced levels of stress, suggests that further research



may be valuable. In practice positive reinforcement may be difficult to deliver. A way to overcome this would be the training of a secondary reinforcement, a reward that does not affect primary physiological needs but can become associated with the primary reinforcer via classical conditioning (Houpt, 1998).

While equitation science highlights the potential benefits of learning theory and its principles in horse training, it is suggested that there is little evidence of knowledge and application of these principles by horse trainers (McLean & McGreevy, 2004). According to McLean and McGreevy (2004) some horse handlers misunderstand negative reinforcement, viewing it as a punishment aimed at decreasing behaviours rather than the removal of an aversive stimulus to reinforce or increase behaviours.

For the individual horse, learning and training responses will be influenced by the basic nature of the horse, breed characteristics and numerous other individual differences, early experiences (e.g. maternal behaviour, weaning protocols and handling), environmental factors (e.g. nutrition, housing) and training experiences. The complexity of the unique background that emerges for each horse as a result of these influences explains why, despite the fact that learning theory can be optimally applied to all horses, an identical formula and time frame of training can never be imposed on all horses effectively. Good trainers will recognise the importance of individualised assessment and management.

### 1.11 Temperament

Temperament is defined as a set of individual differences in behavioural tendencies, called traits or dimensions, that appear early in life, and which are relatively stable across situations and over the course of time (Bates, 1989; Goldsmith et al., 1987). Use of the term temperament is understood to imply the presence of significant heritability (Buss & Plomin, 1984). Temperament dimensions will influence personality characteristics, and help to explain individual differences in coping and performance.

The research literature in the area of equine temperament presents challenges in terms of ease of interpretation. Terms used are often diverse and poorly defined and a range of different terms are used to describe potentially similar constructs. Even at a

more basic level the terms personality and temperament are used interchangeably, which is not consistent with the human literature. Further, 'learning' and 'learning ability' are often measured as dimensions of equine temperament. There are generally three categories of temperament measurement, referred to by Visser, Van Reenen, Zetterqvist Blokhuis, Morgan, Hassmén, Rundgren, and Blokhuis (2008) as 'emotionality', 'learning ability' and 'reactions to human handling'.

There has been increased research interest in equine temperament and its measurement however there is no assessment method that is considered standard. There are two main methodologies: objective observation of the horse and surveying perceptions of persons familiar with the horse. Behavioural tests involve scoring the horses reactions to certain stimuli and recording behaviour and physiological measures such as heart and respiration rate and blood concentrations of stress hormones (Le Scolan, Hausberger, & Wolff, 1997; Seaman, Davidson, & Waran, 2002; Visser et al., 2001a; Wolff, Hausberger, & Le Scolan, 1997). This may be objective, but behaviours under test conditions may not represent those observed under normal handling. Furthermore, the validity of determining temperament based on a single observation period is questionable given the defining features of temperament, namely stability over time and across different situations. The other main method has involved the use of a questionnaire or survey completed by persons familiar with the horse such as a trainer, handler or rider (Anderson, Friend, Evans, & Bushong, 1999; Creighton, 2003; Momozawa, Kusunose, Kikusui, Takeuchi, & Mori, 2005; Momozawa et al., 2003). Although ratings are subjective and thus reliability of these measures may be of concern, they are often based on knowledge of the horse over the long term (Seaman, et al., 2002).

Despite differences in these methodological approaches, a high level of consistency has been reported in some studies between the subjective data (results of questionnaire survey; ratings of temperament traits by experts) and those obtained from behavioural tests (Momozawa, et al., 2003; Visser, Karlas, Van Deurzen, Workel, & Van Reenen, 2010). Temperament traits identified in horses using behavioural tests include 'reactivity to humans' and 'fearfulness' (Lansade, Bouissou, & Erhard, 2008), 'gregariousness' (Le Scolan, et al., 1997), 'flightiness' and 'willingness to perform' (Visser et al., 2001b). Factor analysis of responses to temperament questionnaires

completed by people working with horses have identified dimensions such as 'anxiety', 'trainability' and 'affability' (Momozawa, et al., 2005), 'novelty seeking' and 'understanding' (Momozawa, et al., 2003).

"Selection is based almost exclusively on genetics, physical traits and on the animal's performances during competitions. Although of importance, the horse's temperament is almost always neglected."

Lansade, (2004, p. 132)

"Overall, the things I think about when buying a yearling are the horse's head, eye, feet, its soundness, temperament and athleticism.

Temperament's important and a horse that is relaxed and easy going, copes with all things that it has to face at the sales. It'll cope with continual handling, noise and the unfamiliar environment without being stressed. And this is important for its future as a racehorse".

Gerald Ryan, Racehorse Trainer (Jacobs, 2004)

Development of objective and reliable assessments of equine temperament offers the potential for improvement in key aspects of domestic horse management. These areas include better informed breeding decisions and improved matching of the individual horse to specific usages (Mills, 1998; Visser, et al., 2001a; Visser, van Reenen, Schilder, et al., 2003). More valid and reliable assessment could further current understanding of equine temperament types as possible vulnerability factors in stress-related disorders and in the development of abnormal behaviours. Management and training could be tailored to the individual temperament type to allow for best outcomes (Lansade & Simon, 2010; Mills, 1998). Overall there is potential for greater understanding of equine temperament to improve horse welfare and reduce levels of wastage (Flentje & Creighton, 2010). However, currently temperament tests are not sufficiently developed to allow for standard application.

Explaining the poor performance of the racehorse Pre Eminence in the Autumn Classic at Caulfield:

"He just got fizzed up today. I don't think it's an ability problem, it's more of

a temperament issue.”

Mick Price, Racehorse Trainer, (Presnell, 2009)

Although there has been increased research in the area of equine temperament there has been little research focussed on temperament in the thoroughbred racehorse. Thoroughbred racehorse performance will depend not only on physical ability but also on temperament which has long been emphasised as an important factor (Oki et al., 2007). According to Visser et al. (2001b) “for sport horses to become a winning athlete, the combination of excellent physical abilities and a winning temperament is indispensable” (p. 241). Temperament may influence both the ability of the individual thoroughbred racehorse to thrive in the training and racing environment and performance in the discipline of flat racing itself. Visser et al. (2003) showed that it was “possible to predict a substantial part of the show jumping performance of an individual horse later in life by personality traits early in life” (p. 279).

The thoroughbred racehorse is described as possessing certain breed typical temperament traits both anecdotally and by the Thoroughbred Breeders Australian association. The thoroughbred racehorse is classified as a ‘hot blood’, a term that refers to amount of nervous tension/reactivity. Selective breeding has produced not only increased levels of reactivity, the latter associated with aspects of performance (McGreevy & Thomson, 2006), but also increased sensitivity and vulnerability to experiencing conflict (Goodwin, McGreevy, Heleski, Randle, & Waran, 2008). Studies that have investigated breed differences have shown that, compared to other horse breeds the thoroughbred shows more behaviours that are consistent with high levels of “anxiousness”, “excitability” and “reactivity” (Hausberger, Bruderer, Le Scolan, & Pierre, 2004; Lloyd, et al., 2008). These findings are held to be consistent with the documented use of Arab stallions in the breeding history (Bowling & Ruvinsky, 2000). Houpt and Kusunose (2000) observed that offspring of the same stallion had similar tractability or manageability scores. Oki et al. (2007) reported genetic heritabilities of behavioural responses (i.e. temperament) to three procedures in quarantine at the Miho training centre in Japan to be at a range found in other livestock (0.23-0.28).

“temperament is a tremendous asset; it makes a horse a pleasure to handle in every way and it must help with performance”

George Smith, Thoroughbred Buyer, (Jacobs, 2003)

The high levels of reactivity or emotionality that characterise the thoroughbred are reflected in the dimension of fearfulness, which has been shown to demonstrate stability both over time and across situations (Lansade, et al., 2008). Reactivity / emotionality has been described as a heightened state of arousal (McCall, et al., 2006) and “may be associated with the Excitability and Anxiousness components of horse personality” (Lloyd, et al., 2008, p. 371). In terms of learning tasks, fearfulness in horses has been shown to be associated with both reduced performance (Heird, et al., 1986; Lansade & Simon, 2010; Visser, van Reenen, Schilder, et al., 2003) and enhanced performance (Lansade & Simon, 2010). Lansade and Simon (2010) proposed that temperament may not influence learning performance directly but rather confer a “predisposition to react to stimuli involved in learning situations” (p. 36). Trainability is considered to influence performance indirectly and is related to emotionality (McCall, 1990; Visser, Van Reenen, Engel, et al., 2003). Further research is needed, but it has been suggested that level of fearfulness, type of learning task and type of reinforcement are likely influential factors in learning performance (Lansade & Simon, 2010). As well as affecting performance, fearfulness can be associated with excessive fear reactions that may render the horse dangerous (Lansade, et al., 2008).

Temperament will exert a consistent influence across situations and this may result in behaviour that is problematic and interferes with both training and performance. For this reason, management of temperament is important, however given the genetic influence, the extent to which these traits can be modified is uncertain. Training may include attempts to lower levels of excitability, promote concentration, reduce distractibility and allow the individual horse to maximise its race performance. There is no literature available that examines management of temperament types in the thoroughbred racehorse in training and racing.

It is possible that some temperament types result in a horse that is not suited to the discipline specific demands and its associated environmental challenges. This may

result in poor adaptation and potentially contribute to wastage. There are reports from racehorse trainers suggesting that relaxed or quiet horses are better racehorses (Hutson & Haskell, 1997) and a consensus around the importance of a relaxed temperament in yearling selection (Jacobs, 2004). Temperament has not been a main focus of wastage studies to date, however when considered directly in the study by Hayek (2004) it was identified as a factor by thoroughbred racehorse trainers.

### 1.12 Summary

The thoroughbred horse racing industry is large, both in financial and employment terms. Due to the competitive nature and imperative of the industry, there are pressures to optimise resources, resulting in wastage. Typically wastage has been viewed in terms of physical or veterinary causes. Research into equine learning and the application of learning theory to various aspects of thoroughbred horse preparation, whether this is from early stages such as weaning or the final stage of training for racing, is still in its infancy. There is evidence that behaviour and temperament can affect horse performance, and anecdotally temperament is viewed as important in the thoroughbred race horse. However, the potential influence of behaviour and temperament on wastage has largely been ignored in the literature.

### 1.13 Aims of the Study

The current study aimed to explore the views of Australian thoroughbred racehorse trainers with regard to behaviour-related problems and temperament and the impact of these on horse preparation, training and racing. Five research questions were framed around this general aim and they are detailed below:

1. Do thoroughbred racehorse trainers report behaviour-related problems in thoroughbred racehorses in training and racing?
2. How do thoroughbred racehorse trainers view any/the impact of behaviour-related problems in horses in training and racing?
3. What strategies do thoroughbred racehorse trainers use in their management of the horse with behaviour-related problems?

4. Do thoroughbred racehorse trainers identify behaviour-related problems as factors that contribute to wastage, poor performance and loss of performance?
5. Do thoroughbred racehorse trainers consider temperament to be an important factor in racehorse training and performance and does it contribute to wastage?

The objectives of this study were to explore trainers' views about the purpose and importance of the breaking-in stage; gather information about whether problems are observed when horses enter the stable for the first time; gather estimates about the frequency and impact of unwelcome behaviours across the last racing season; seek views about factors that might influence the development or maintenance of behaviour-related problems; determine whether trainers consider temperament to be an important factor in racehorse training and performance; gather information about the approaches used in the management of unwelcome behaviours; obtain information about whether behaviour-related problems contribute to wastage, poor performance, loss of performance and any decision to discontinue the horse from racing; establish whether trainers report feeling confident in their ability to identify and manage behaviour-related problems; and finally, to obtain views about discipline and industry related factors that impact on behaviour-related problems in the thoroughbred racehorse.

## Chapter 2:       Methods



The objective of this study was to gather the views and information from licensed thoroughbred racehorse trainers with regard to the prevalence and nature of behaviour-related problems or unwelcome behaviours in thoroughbred racehorses in training and racing. The aims and objectives of the study are outlined at the end of the previous section.

## 2.1 Structured Interview

Data were collected using a structured interview which explored the views of, and gathered information and knowledge from, individual trainers. Structured interviews use standardised questions that are presented to all respondents “with the same wording and in the same sequence” (Corbetta, 2003, p. 269) which keeps the data which are collected concise and allows for reliable comparison of responses across all interviewees (Gray, 2004, p. 337). The procedure is further enhanced if the tone of voice in which the questions are read and presented is also the same for all respondents (Gray, 2004, p. 215). In this way potential sources of error are minimised, with differences in responses reflecting true variation rather than inconsistencies in the conduct of the interview. Other advantages of structured interviews are that focus on a particular topic can be maintained throughout the interview and objectivity can be enhanced, thus reducing researcher bias.

While all questions are presented in the same order and the wording of the questions is identical in all interviews, open-ended questions may also be included. The structured interview in the current study utilised both closed- and open-ended questions. Closed questions were used to collect specific and easily comparable data, whereas open-ended questions (followed by the use of probes) allowed for and encouraged the free expression of views and opinions and for the discovery of new information (Hoepfl, 1997). Individual, in-depth interviews have been recognised as a data collection method with the potential to capture a person’s views and perspectives of a particular situation or event (Creswell, 1994; Denzin & Lincoln, 2003; Marshall & Rossman, 2006).

The main weakness of the structured interview method is the inflexibility with regards to relating the interview to a particular individual and their circumstances (Corbetta,

2003). Important themes that may not have been considered by the researcher can be overlooked with structured interviews. However, probing in combination with open-ended questions, and opportunities to spontaneously comment during the interview together with an interview style that encouraged rapport were all used to overcome any reduced flexibility in responding to the unique perspective (Cohen & Manion, 2000; David & Sutton, 2004; Gray, 2004). The interviewer showed a genuine and keen interest in hearing from trainers and they were encouraged to express their views freely.

### **2.1.1 Interview Format: Face-to-Face versus Telephone Interview**

The structured interviews were conducted face-to-face which is a method with several advantages. Face-to-face interviews overcome barriers that may arise due to sensitivities associated with the topic under investigation. Because the investigator was able to speak directly to the trainers, she could introduce the study and its aims and provide assurances of confidentiality and quickly dispel any suspicions about the nature and purpose of the study, immediately dealing with any questions or concerns expressed by the trainer. This has been shown to maximise both the accuracy of the responses and the response rate (Opdenakker, 2006). It is possible however that the presence of the interviewer can see the interviewee less inclined to express themselves truthfully, especially in sensitive areas as they are more aware of the interviewer's reactions than they would be in, for example, a telephone interview. In the present study, the interviewers' knowledge of the industry along with assurances regarding confidentiality were used to encourage open responding. The face-to-face interview mode allows for the observation of non-verbal cues that can add further information to that given in the verbal response (Opdenakker, 2006). Given the interest in the individual trainers' responses and, as above, some potential for sensitivity around topic areas this was considered to be highly advantageous. In the face-to-face interview written materials can be used or shown to assist the respondent to remember the question or the response categories, this is not available in the telephone interview, which can make the response task more challenging (Jackle, Roberts, & Lynn, 2006).

A potential disadvantage of the face-to-face interview method is the possibility that respondents may feel uneasy about the anonymity of their responses or may be more

prone to social desirability bias. However, development of rapport is believed to counter social desirability (Holbrook, Green, & Krosnick, 2003).

The alternative method of talking directly to the participant is telephone interview. This has the advantages of avoiding non-verbal cues from the interviewer and avoiding the cost of travel. However it limits the development of rapport and the interviewer cannot detect non-verbal cues of interviewee confusion or fatigue. There is evidence that respondents may be more distracted and make less effort when interviewed by telephone (Holbrook, et al., 2003).

### **2.1.2 Interview versus Self-completed Survey**

One alternative to interview is the self-completed survey. Such surveys do not offer the flexibility that is required when a study has an exploratory nature, and it was thought that racehorse trainers might be disinclined to either complete or complete accurately a questionnaire that asked about rates of behaviour-related problems in their stable. Low response rates have been reported for postal questionnaire surveys generally (Austin, Criqui, Barrett-Connor, & Holdbrook, 1981) but also within this target population (Speed & Andersen, 2007: 24% response rate, Pell & McGreevy, 1999: 31.3% useable response rate). Sixty to seventy percent has been suggested as an acceptable response rate for self complete questionnaires (Mangione, 1995) Consideration of these factors suggested that the postal survey method of data collection was not well suited to the gathering of valid and reliable data given the aims and objectives of this study.

The face-to-face interview method allows for the use of probing that is not possible in the self-completed survey. A probe has been defined as a “question or comment designed to keep the person talking or to obtain clarification” (Sommer & Sommer, 1997, p. 117). During the interview, standardised probing was used to obtain more complete information and to clarify any unclear responses or to understand the meaning of any unfamiliar terms used. Probing thus helps to ensure the reliability of the data set (Hutchinson & Skodal-Wilson, 1992) and also helps to establish rapport, and allows for follow-up beyond any initially offered socially desirable responses (Patton, 1990). There was also the opportunity for the interviewer to observe non-verbal cues in the respondent. Some of the advantages of the self-completed

questionnaire such as reduced costs and ease of administration to widely dispersed and larger populations were not primary considerations in the current study (Applied Quantitative Methods, 2004). The self-completed questionnaire, although often shorter, which can be an advantage, will also tend to have fewer open-ended and complex questions.

A not immediately obvious advantage of the face-to-face interview over the postal survey is that it provides a guarantee that the views obtained are those of the trainer (the target population) and not those of someone else. In postal surveys it is not always possible ascertain exactly who has completed the questionnaire, and in this study other stable staff rather than the trainer might have done so. A further advantage of the face-to-face interview method lay in its suitability for the target population whose members were reported to have variable levels of education and literacy, and whose knowledge has been described as “instinctual” (Goodwin, McGreevy, Waran, & McLean, 2009; Speed & Andersen, 2007). Through anticipation of these issues and the selection of a survey method best placed to address them it was hoped that the risks of missing data and overall low response rate would be reduced (Applied Quantitative Methods, 2004). This is consistent with Patton (1990) who identifies “methodological appropriateness” as the primary criterion for judging methodological quality (p. 39).

### **2.1.3 Other Interview Types**

Interviewing is a way to collect data and to gain knowledge from target individuals. There are many types of interview and these include structured, semi-structured, unstructured and non directive. This study used the structured interview format. This is the interview format that has the highest degree of control over both the topics and format and relies on the development and use of an interview guide or schedule. This interview type is best suited when specific research questions are under investigation. The semi-structured interview by comparison is non-standardised, the order of questions and the wording can be changed and additional questions can be asked. This can allow for more in depth investigation but is less directive. The unstructured interview is more unstructured again and each interview is different and in non-directive interviews there are no preset topics to pursue (Kajornboon, 2005). Overall, “the further one moves from a structured procedure, the greater the risk of

interviewer bias” (Sommer & Sommer, 1997, p. 109). Given the aims of the current study the structured interview was identified as the most appropriate.

#### **2.1.4 Tape Recording**

Consideration was given to the tape recording of interviews. This method has a clear advantage in providing an exact and complete record of the interview when compared to written notes. In this study however, there was concern that this methodology might increase refusal rates and impact on the reliability of responses and views expressed. This was especially relevant given the reliance on mixed methods and the fact that “good qualitative research requires the establishment of rapport between the researcher and the participant” (National Health and Medical Research Council, 2007). It was also relevant because of the known sensitivity around the topic under investigation. Given the potential for detrimental effects it was decided that interviews would not be tape recorded.

### **2.2 Development of the Interview**

A structured interview was developed for use in this study.

The content of the interview was informed by a number of sources. These included published literature investigating behaviour and behaviour “problems” in the thoroughbred racehorse (Bailey, Rose, Reid, & Hodgson, 1997; Casey, 2007; Hayek, et al., 2005; Marsden, 2002; McGreevy, 2004) information gathered following consultation with a range of industry participants (equine veterinarians, thoroughbred racehorse trainers, horse breakers and senior horsemen) and the investigators personal knowledge.

In the early stages of planning for this study it was proposed that the first stage would involve a survey to gather the views of equine veterinarians. Some of the questions that were of particular interest in this group were the proportion of requests for consultation that, on assessment, related to a behaviour problem and how often a request for consultation for a physical problem proved to be a primary behavioural problem. The investigator met with a senior veterinarian associated with one of the main veterinary centres that provides services to the Thoroughbred Racing Industry, and had telephone discussions with two other equine veterinarians. The outcome from these discussions was that there appeared to be little to be gained from undertaking a

systematic survey of equine veterinarians and their views. This was primarily because the feedback gained suggested that this was not an area either of expertise or interest for the majority of veterinarians and that they worked predominantly within a medical model. Although this idea was advanced to the stage of obtaining ethics approval a decision was taken to discontinue this proposed path of investigation.

The trainer interview addressed the following 11 areas, using 31 questions:

- Demographics and background information (minimal information about the respondent was collected so as to minimise the chance of identifying the individual and to encourage honest responding). (7 questions)
- Views about the breaking-in stage, its purpose and importance (2 questions)
- Observations of the horse and its behaviour when entering the racing stables for the first time (1 question)
- Estimates of the frequency of unwelcome behaviours, and their impact across the last racing season (6 questions)
- Views about factors that influence the development and/or maintenance of behaviour problems (1 question)
- Views about the importance of temperament and traits associated with behaviour-related problems and poor performance (5 questions)
- Current approaches to the management of unwelcome behaviours (1 question)
- Estimates of the contribution of behaviour-related problems to poor performance, loss of performance and any decisions to recommend that a horse be discontinued from racing (3 questions)
- Views about what makes a good trainer (1 question)
- Level of confidence in the trainer's own abilities to assess and manage behaviour-related problems (1 question)
- Any recommendations or suggestions for changes that would further assist in the management of unwelcome behaviours (2 questions)
- Final comments (1 question)

### **2.2.1 Pilot Testing Phase**

The interview schedule was pilot-tested on four licensed racehorse trainers. The trainers were purposively selected because they were typical of the target group but also in a position to give good and constructive feedback. For Locke, Spirduso and

Silverman (2000) “the modest pilot study is the best possible basis for making wise decisions in designing research” (p. 74).

The main aims of the pilot testing phase were to learn how informants responded to the questionnaire and its subject matter. The purpose behind each question was outlined and a check was made that the trainers' understanding of the question was consistent with this (“this question aims to elicit information about X, does this question in its current form achieve this?”). The wording of the questions, the language and terms used were also checked to ensure they were appropriate to the target group and likely to increase the chances of eliciting the desired information. The interview was checked to ensure that the ordering of questions flowed logically from the respondents' point of view and that the overall demands on the respondents were reasonable.

Feedback was sought on the method proposed to contact trainers and on the way that the study would be introduced. This was considered especially important in order to minimise non-response. Trainers are known to maintain busy routines, and the investigator was also mindful of the increased negative attention that the racing industry in Australia (but also internationally) was receiving from animal welfare groups. This, together with the focus of the study being on behaviour-related problems, meant that there was a real potential for trainers to be concerned about the investigation having a negative welfare agenda that may have led to a refusal to participate.

### **2.2.2 Changes Made Following the Pilot Testing Phase**

Several changes were made following completion of the pilot stage. These changes related to content (one question was removed due to concern about the lack of uniform meaning and one question was added following feedback that suggested the importance of the issue), terminology (language was revised to ensure maximum use of common industry terms and to reduce the use of “jargon” terms whose meanings tended to be very discipline-specific) and changes in procedure to facilitate responding when ratings were required. As an example, temperament was used to indicate typical behaviour of the horse over time and across situations. This meant that in the current study terms like “highly strung” were referred to as temperament traits. Where

“jargon” terms were to be retained for use, a standard definition was generated and a check made that this clarified the meaning of the question. The logical order of questioning was confirmed, along with the length of time it took to complete the interview. The members of the pilot sample reported that they did not consider that it would be difficult for trainers to recall data from across the last racing season. The proposed method of contact for trainers was confirmed.

Feedback confirmed that the introduction should emphasise the purely academic nature of the research, and the absence of any other interested parties, and provide clear assurances about confidentiality.

The pilot stage also provided the interviewer with an opportunity to train in the use of the questionnaire in the study population.

The interview schedule used in the study is presented in Appendix 5.

## 2.3 Procedure

### 2.3.1 The Investigator/Interviewer

All interviews were conducted by the investigator, who had developed the interview, had established competency in the conduct of research interviews (as a registered clinical psychologist with many years experience with interview in the research context), and knowledge of the racing industry. Knowledge of the characteristics of the population to be studied has been identified as a factor likely to contribute to the success of an interview (Sommer & Sommer, 1997, p. 114). Tone of voice and interviewer style were therefore able to be kept constant. The wording and order of presentation of questions was the same and no questions were omitted. Standard probes were developed and used. Most commonly, probing would be used to check the meaning of answers given and/or to ask trainers to give an example.

For questions involving recall, the investigator reminded the respondent of the relevant time frame for answering. When large numbers of ratings or estimates were



being sought, a copy of the relevant section of the interview was given to the respondent to promote accuracy and ease of responding.

The interviewer wore the same style of clothing, which was jeans and shirt with boots similar to that of the respondents and suited to the stable environment for all interviews.

### **2.3.2 The Introduction to the Interview**

Careful consideration was given to the introduction. It has been shown that more open and candid responses can be obtained when respondents are adequately reassured about confidentiality and a non judgemental attitude (Sommer & Sommer, 1997, p. 114).

The introduction was standardised and included the following components: the purpose of the interview and its content; the fact that this was academic research being undertaken through Macquarie University; that there were no other interested parties; that the aim was to interview 40 trainers; that participation was voluntary and confidential; and that it would involve a face-to-face interview conducted by the investigator that would take an estimated 45 minutes to complete.

A willingness to arrange a time and location that was convenient for the trainers to complete the interview was conveyed. This same content was repeated at the time of the actual face-to-face interview, when the investigator also re-introduced herself and thanked the respondent for their participation. Assurances of confidentiality have been shown to increase confidence and reduce the possibility of respondent bias (Arksey & Knight, 1999; Zikmund, 1994).

## **2.4 Selection of Participants**

Trainers considered eligible for participation were those whose stables were located on the racetrack. This eligibility criterion promoted consistency of the training and racing environment. Listings of licensed trainers were obtained from the *Racing NSW Magazine* (September 2009 issue), the official monthly publication of Racing NSW. When these listings were reviewed, there were 116 eligible trainers. Forty licensed thoroughbred racehorse trainers were randomly selected (using a random number

generator <http://randomizer.org>) from four New South Wales racetracks, three metropolitan (Randwick, Rosehill, Warwick Farm) and one provincial (Newcastle).

The number of participants was chosen so as to strike a balance between the practicality of travelling to and interviewing each participant individually, and the accuracy of the information obtained with regard to the population which was surveyed. A simple random sample was drawn so that no correction for clustering had to be applied, and there was no systematic sampling error (due to non-response or refusal, for example) which, if present, can have a dramatic but often unacknowledged effect on the accuracy of estimates.

### **2.4.1 Procedure**

Initial contact was made with randomly-selected trainers in one of two ways. The trainer was sent an “Expression of Interest” email (see Appendix 3) which outlined the nature and purpose of the research, what it would involve, including time to complete, who was conducting it and giving an assurance about confidentiality. This was followed up with a phone call with the purpose of providing any further information required and formally inviting the trainer to participate. This was not possible for all trainers as some did not have an email address available. Alternatively the trainer was approached personally by the investigator and the same information was presented. The investigator communicated her willingness to meet with them at a time and location convenient to them to minimise burden. Any questions were answered and, if the trainer agreed to participate, a time and location for the interview was fixed. A copy of the Expression of Interest form was given to the trainer; this ensured that the contact details for the investigator were available to the trainer.

### **2.4.2 Consent and Confidentiality**

Written informed consent was sought<sup>10</sup>. Consent forms and procedures followed the guidelines set out by Macquarie University for Information and Consent Forms.

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<sup>10</sup> One trainer indicated an interest in participating but explained that he would need to have the study reviewed by the stable's legal team. A copy of the questionnaire and consent forms was provided for this purpose. Following review the trainer advised that he was happy to participate.

Permission was sought and given to include an additional question that asked trainers whether they would be happy to be contacted by the investigator for any possible follow-up component of this study over and not beyond the next 6 months. A copy of the consent form is provided in Appendix 4.

Trainers were informed that they would be sent a summary report of the main findings at completion of the study. A copy of the summary report (Trainers Newsletter) is presented in Appendix 6.

### **2.4.3 Participants**

Forty randomly-selected licensed thoroughbred racehorse trainers were approached. Three trainers (7.5%) declined to participate. In all three cases the reason given by the trainer for their refusal was that they did not have the time. This meant that 37 trainers agreed to participate, a response rate of 92.5%.

The majority of interviews were conducted at the stables of the participant trainer. The remaining interviews were conducted at the racetrack, either between races on race-day, or between barrier trials as arranged with the trainer. One interview was conducted in a coffee shop close to the trainer's stable premises.

The ethical aspects of this study were approved by the Macquarie University Ethics Review Committee (Human Research). Copies of the Ethics Approvals are included in Appendices 1 and 2.

## **2.5 Data Analysis**

Results of the interview were analysed using descriptive statistics of quantitative data and descriptive summaries of qualitative data from open-ended questions.

### **2.5.1 Analysing Quantitative Data**

Descriptive statistics for categorical data (such as type of training licence) are presented as proportions. For continuous data, the one-sample Kolmogorov-Smirnov test was conducted to determine if there was a significant deviation in data distribution from normality. Where data were normally distributed, descriptive

statistics were the mean and standard deviation (SD) and where data were significantly skewed, descriptive statistics were the median and interquartile range (IQR).

Some inferential statistics were also generated, more specifically examining whether responses were related to the trainer years of experience, and secondly whether there were correlations in responses in terms of identification of the frequency of different behaviours. The independent samples *t*-test was used to compare two independent samples (e.g. those trainers who did or did not report problems upon first entry to the stable environment) on the normally distributed continuous variable 'years of trainer experience'. Correlations between trainer years of experience and ordinal data (such as the frequency of repetitive type movement behaviours, or the impact of these behaviours) were conducted using the Spearman's correlation coefficient (denoted by  $r_s$ ). Spearman's correlations were also conducted to look at the relationship between the reported frequencies of different types of behavioural problems.

All quantitative analyses were performed using SPSS v19.0.0.1 for windows (IBM SPSS Statistics, 2010) and *p* values less than 0.05 were considered to indicate statistical significance.

### **2.5.2 Analysing Qualitative Data**

A systematic approach was used to analyse and interpret trainers' responses to the open-ended questions. Responses here included single words, brief phrases, sentences and more lengthy comments. There are a number of different approaches that can be taken for the analysis of qualitative data (Ratcliff, 2002), but no agreed single or best way.

The approach used here has been referred to as "content analysis" (e.g., reference). Responses to each of the open-ended questions were typed into a document question by question. All responses were reviewed and consistent themes or ideas were identified and organised into categories. The categories were determined from the data - referred to as *emergent* categories - rather than being preset. This process has also been called "coding" where "lengthy answers are reduced into specific response categories" (Sommer & Sommer, 1997, p. 121). Coding was completed by the

investigator who also designed the questionnaire; the use of persons familiar with the research has been reported to have the potential to minimise problems of unreliability (Taylor-Powell & Renner, 2003). To further increase confidence in the interpretation and categorisation, a psychologist who was not involved in the study but familiar with it was given a copy of the questions and asked to view the data independently to identify themes and categories. This method of coding open-ended responses followed the recommendations set out by Sommer and Sommer (1997, p. 123).

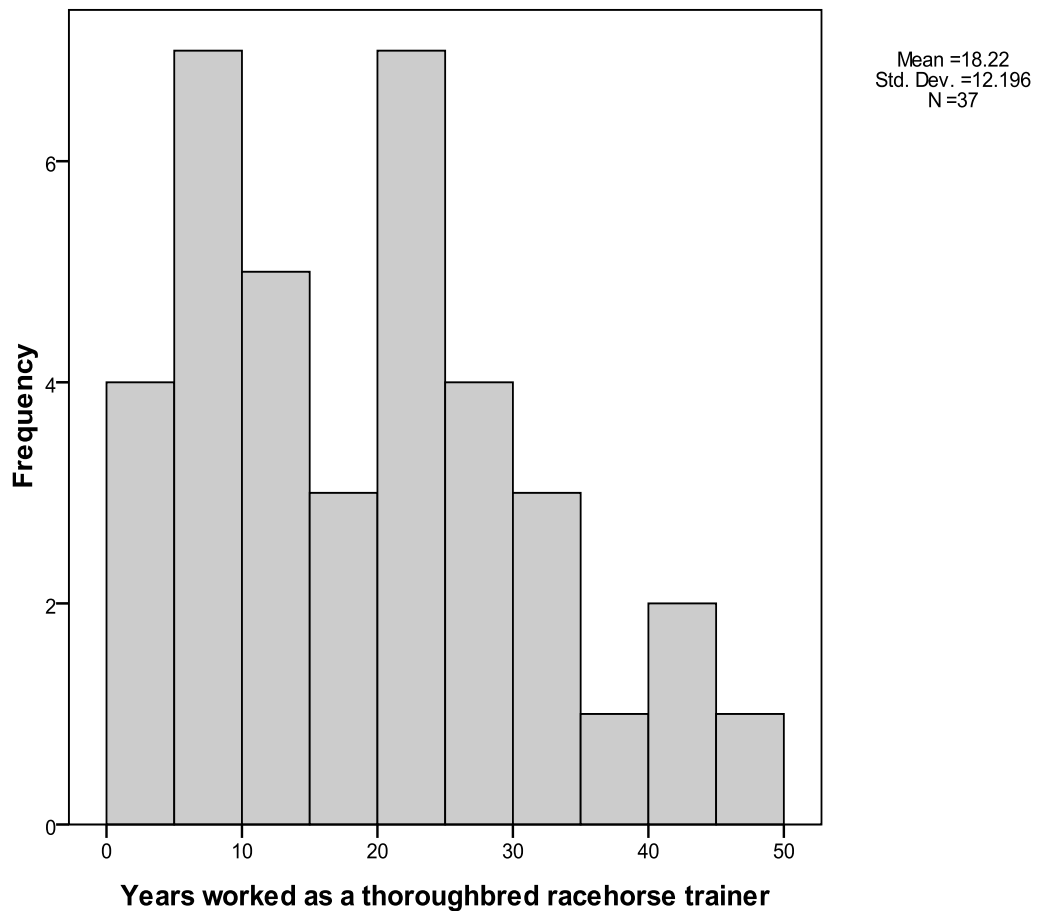
In reporting responses to open-ended questions frequencies of the different coding categories are presented as percentages of respondents. This is because many respondents offered more than one response to each open-ended question.

## Chapter 3: Results

### 3.1 Sample Characteristics

All of the 37 trainers interviewed were male and were holders of a thoroughbred trainers' license (29 metropolitan, 8 provincial) issued by Racing NSW.

The number of years worked as a thoroughbred racehorse trainer was 18 on average (SD 12 years; range 3 to 48 years; see Figure 1 and Table 1). The majority of trainers ( $n = 33$ , 89.2%) reported that they had a background working with horses, only four (10.8%) trainers reported coming from a non-horse background.



**Figure 1. Number of years worked as a thoroughbred racehorse trainer**

Stats note: trainer years was not significantly skewed (one sample Kolmogorov-Smirnov  $Z = 0.78$ ,  $p = 0.576$ ).

The median number of horses on the trainers "books" (defined as horses both in the stable and at pasture) was 40 (range 3 to 350), and the median number in the stable across the last racing season was 30 (range 6 to 350).

All trainers (100%) reported that they retained their own track work riders. In terms of stable practice, approximately two-thirds of the trainers (70.3%,  $n = 26/37$ )

reported that horses would spend on average between 2 and 3 hours out of their boxes each day (median 2.5 hours, range 1.5 to 5 hours).

**Table 1**  
***Demographics (N = 37)***

	<b>Mean</b>	<b>SD</b>
Years worked as a thoroughbred racehorse trainer	18.2	12.2
	<b>Median</b>	<b>IQR</b>
Number of horses currently on the books (in stable and at pasture)	40.0	20.0 - 90.0
Number of horses in the stable across the last racing season	30.0	13.0 - 62.5
Average time each horse would spend out of its box per day <sup>11</sup>	2.5	2.0 - 3.25
	<b>N</b>	<b>%</b>
Type of training licence		
Metropolitan	29	78.4
Provincial	8	21.6
Background working with horses		
Yes	33	89.2
No	4	10.8
Retain their own track work riders		
Yes	37	100.0
No	0	0.0
Average time each horse would spend out of its box per day		
1.5 h	2	5.4
2 h	9	24.3
2.5 h	8	21.6
3 h	9	24.3
3.5 h	3	8.1
4 h	3	8.1
4.5 h	2	5.4
5 h	1	2.7

IQR, interquartile range; SD, standard deviation

## 3.2 The Breaking-in Stage

Trainers were asked to rate the importance of the quality of the breaking-in stage to the horse and its adjustment to racing on a four point scale from “not important” to “very important”.

<sup>11</sup> Provision in the questionnaire was made for answers to be provided categorically. However, all respondents gave estimates of actual hours, without referring to the categories. This made it possible to treat the variable quantitatively as well as categorically.



Trainers rated the quality of the breaking-in stage to the horse and its adjustment to racing as very important (94.6%,  $n = 35$ ) or important (5.4%,  $n = 2$ ).

Trainers' responses to the question about what breaking-in teaches the horse were categorised with respect to four themes: 'education and preparation to cope with life as a racehorse', 'confidence', 'acceptance of the rider/human' and 'mouthing'. Examples of responses under these theme categories are presented in Table 2.

Education and preparation to cope with life as a racehorse was the most frequently identified theme in trainers' responses. Thirty-three trainers (89.2% of the 37 trainers who provided a response to this question) were consistent in describing the breaking-in stage as "basic" and "fundamental" to the adjustment of the thoroughbred horse to a career in racing (see Table 3). This was well captured by the words of one trainer who described the breaking-in stage as being "like a cement slab, the foundation" (T19). Trainers spoke of an education aimed specifically at preparing the horse for the discipline of flat racing. Approximately half of the trainers related that the breaking-in stage would produce a horse that was confident, well mouthed and accepting of a rider (see Table 3). Breaking-in was seen as an opportunity for the horse to have a positive experience and produce a horse that was both confident and relaxed. A horse that was not broken-in well was seen as one that might be difficult to train and more likely to develop problems. One trainer commented that while breaking-in provides "primary education and the fundamentals, some (horses) will still have difficult attitudes" (T28).

The importance of breaking-in means that most trainers will have their preferred breakers but sometimes they report that they might lose control over this stage of the horse's education:

'need to do it properly but the owner might want something else' (trainer has preferred breaker) (T27)

**Table 2**

***Examples of Responses Presented by Themes Concerning what the Breaking-in Stage Teaches the Horse (N = 37)***

<b><i>Education/Preparation to Cope with Life as a Racehorse (89.2%)</i></b>
T01: the whole future of the horse, its preparation and education for the future
T02: do it right, the education and you will have less problems later on
T05: every fundamental aspect of what the horse will experience in its racing career, an education for racing/arrive at the track, walk, relaxed, stop and go, brake and steering
T07: like a baby going to school, early education will help it handle the being a racehorse
T12: education teaches them everything, if lacking it impacts negatively on training and racing
T16: everything to prepare them to come to the racetrack, to give them experience without being under training
T33: they have to be well educated or you can't train them
T35: if the horse is not broken in properly then you will have problems
<b><i>Confidence (54.1%)</i></b>
T09: first experience should be positive not terrible, help it to do what it is needing to do
T18: be as kind to the animal as possible, gain his confidence, all aimed at confidence
T19: confident on the ground and being handled
T22: easy to handle and able to cope
<b><i>Acceptance of the Rider/Human (45.9%)</i></b>
T08: response to riders, rein control, move forward in a fluid action
T11: harmony with the rider
T15: riders can get on
T20: to prepare the horse so that a work rider can report that the horse has gone around beautifully, best done (i.e. the breaking-in) by an equestrian rider
T27: aim to be ready to ride, walk into the barriers and take a small saddle

***Mouthing (45.9%)***

T06: remote control, on and off button

T08, T19: well mouthed

T22: well mouthed, steer properly

T24: to go, stop and steer

T35: to be “mouthed” properly so the horse will rein-back to you

T36: good mouth

**Table 3*****What the Breaking-in Stage Teaches the Horse - Number of Responses within a Theme and the Number of Trainers with a Response in that Theme (N=37)***

<b>Theme</b>	<b>Total number of responses</b>	<b>Number of trainers with a response</b>	<b>Proportion of trainers with a response</b>
Education/preparation to cope with life as a racehorse	41	33	89.2
Confidence	20	20	54.1
Acceptance of the human / rider	17	17	45.9
Well mouthed	18	17	45.9

Those trainers who reported that breaking-in produced well mouthed horses had significantly more years of experience (mean 23.2, SD 11.9) than trainers who did not report this theme (mean 14.0, SD 11.0;  $t(35) = -2.47, p = 0.019$ ). Years of training experience did not differ for any other breaking-in theme.

One trainer with over 40 years experience offered the following comments about breaking-in:

“teach him [the horse] to lead, bag him to decrease fear, calm them, rub and touch them around the head so they will accept gear, bridle, rein control, mouthing the horse and light rein control, talk to the animal, voice control, for the barriers walk him through don’t lock him in and then do. With an increased

number of horses, [you have] decreased time for the individual, [you] can't afford to put too much work into one animal" (T17)

### 3.3 Problems Encountered When Horses Enter the Stable Environment for the First Time

Trainers were asked if in their experience, they found that horses have problems when they come into the stable environment for the first time. Just over two thirds of trainers (70.3%,  $n=26/37$ ) reported that some horses have problems when coming into the stable environment for the first time. For these trainers, problems reported fell into three main areas: adjustment /settling in to an unfamiliar environment (88.5%  $n=23/26$ ), increased arousal (34.6%  $n=9/26$ ) and not eating/poor appetite (15.4%,  $n=4/26$ ; see Table 4 for examples). All "problems" were reported to be mild in severity and of short duration ("most settle within days").

While the 26 trainers who reported that some horse have problems upon first entry to the stable environment had fewer years of experience on average (mean 17.0, SD 11.1) than those did not report entry problems (21.1, 14.7), this was not a statistically significant difference ( $t(35) = 0.93, p = 0.358$ ). Similarly there were no significant differences in years of trainer experience by identification of responses among any of the entry problem themes.

Some trainers' ( $n=11/37$ , 29.7%) responses to this question included reasons for why few or fewer problems are currently encountered in this area compared to the past (see Table 5). The reasons offered were consistent and included the horse having a yearling preparation (yearling sales). This preparation would include exposure to a number of the features that would be part of the life of a racehorse, including human contact and handling, introduction to a saddle and rider and the experience of being tied in stalls and boxed. Trainers suggested that this early preparation in combination with thorough and quality breaking-in meant that the horse coming to the racing stable for the first time was well prepared and expected to show only minor difficulties. For example:

“A small percentage, the majority are well prepared, 90% of horses have had a yearling preparation/education, lead, drenched, human interaction. Come to trainers almost broken in as a result of the yearling preparation” (T05)

“yearling sales, then to the breaker, then to me, prepared, handled, good as gold. Some horse are bred at home, spoilt and can be difficult to manage” (T25)

“Some do, but most are broken-in properly and thoroughly so very rarely have a problem” (T28)

“You don’t see problems when the horse comes into the stable environment for the first time, not currently, previously yes, the horse is conditioned to a box at a much earlier age and adapts much more easily, there has clearly been a reduced frequency of box-walkers and weavers” (T24)

**Table 4**

***Examples of Problems Observed in Horses Coming into the Stable for the First Time (N = 26)***

<b><i>Adjustment and settling (88.5%)</i></b>
T06: few days to settle, settling period
T08: creatures of habit, a few days to adjust and the majority do
T19: yes, but only for short periods, 2 days
T20: yes, mild adjustment for 2-3 days
T33: no not really, baby stage, most settle within days
<b><i>Increased arousal (34.6%)</i></b>
T06: hypervigilant
T08: more flight behaviours as unaware of their surroundings
T19: agitated, whinnying
T23: edgy, frightened, stirred up, settle down after a few days
T26: stress in response to confinement, nervous
T29: as a rule no, the horse is a herd animal and will seek out other horses, if the stable is full they will be ok, if isolated they could be stressed
T36: anxious/increased arousal. Soft loose manure, keep them in for a week then put them out

<b><i>Not eating/poor appetite (15.4%)</i></b>
T03: back off their feed, not eating, could be severe
T04: sulk, won't eat for 3-4 days
T18: yes, some will not eat, but all are happy after 2 days
T26: poor appetite, settle after 2-3 days

**Table 5**

***Reasons Offered for No or Mild Difficulties (N=11)<sup>12</sup>***

<b><i>Trainer did not claim / agree that some horses have problems when entering the stable for first time:</i></b>
T07: no, not if broken in properly, if not broken in properly then it is possible
T12: rarely, unless they have been difficult to break in
T16: if well educated then there will be no problem
T21: no it doesn't work like that, horses are boxed as yearlings for sales, and perform from day one
T24: not currently ... previously yes, horses conditioned to a box at a much earlier age and adapt much earlier, clearly a decreased frequency of box walkers/weavers
T37: not now, few years ago yes. All babies are now boxed and handled so reduced, earlier stabling and training they cope better on race-day
<b><i>Trainer did agree that some horses have problems when entering stable for first time:</i></b>
T13: young horse coming into the stable for the first time, handling as a yearling will be important
T28: some do, some don't, it depends on the breaking-in, if handled and have had a yearling sales preparation then no

<sup>12</sup> There were 11 trainers that provided reasons in their responses to Question 10. Three trainers' comments were quoted earlier in the text; this reports the comments made by the remaining eight trainers.

### 3.4 Common Unwelcome Behaviours

Given the importance of the topic under investigation trainers were first asked an open-ended question about common unwelcome behaviours before then being provided with a set list of behaviours and asked to rate frequency and impact across the last racing season. All 37 trainers claimed to observe unwelcome behaviours; however, only 35 reported specific types that were commonly observed (94.6%,  $n=35/37$ ). Two trainers (T22, T35) did not feel able to identify the most common unwelcome behaviours. Although trainers were asked to nominate the three most common unwelcome behaviours they observed, most offered one or two responses and this remained unchanged even when prompted. These 35 trainers provided 66 responses, which are detailed in Table 6.

**Table 6**

***Unwelcome Behaviours - Number of Responses Specifying a Behaviour and Number of Trainers Identifying Specific Behaviours (N=35)***

<b>Behaviour</b>	<b>Number of responses identifying the behaviour</b>	<b>Number of trainers identifying the behaviour</b>	<b>Proportion of trainers identifying the behaviour</b>
Nervous/not relaxed	14	12	34.3
Adjustment to stable routine	10	10	28.6
Stereotypic behaviour	12	8	22.9
Issues on the track	10	7	20.0
Age/sex related behaviours	5	5	14.3
Cranky/sour/not happy	4	4	11.4
Bad attitude	3	3	8.6
Biting and kicking	3	3	8.6
Unwillingness	2	2	5.7
Not eating	2	2	5.7
Lack of confidence	1	1	2.9

The most commonly observed unwelcome behaviours were those related to high levels of arousal ( $n=12/35$ , 34.3%). This grouping included agitated behaviours,

nervousness, the overexcited horse, inability to relax ('fizzy', 'hot') and fractious behaviours. The next most commonly reported behaviours ( $n=10/35$ , 28.6%), were those related to becoming familiar with the environment and the learning of a new routine. This included unwanted behaviours in the new environment such as "spooking", unruly behaviour, impatient behaviours and settling in.

Stereotypic behaviours were the next most common ( $n=8/35$ , 22.9%) with three different types reported; these were wind-suckers, weavers and box-walkers. These terms are defined in the glossary<sup>13</sup>. Of interest were the additional comments made by some of the interviewees about stereotypies. One trainer commented that he had noted a trend for reduction in frequency of horses showing wind-sucking behaviour, something he believed was due to industry players "taking the decision not to take them to the breeding barn"<sup>14</sup>. Another trainer expressed the view that horses showing "wind-sucking" were more likely "to come off the big studs". Other trainers commented on causes with one describing stereotypies (weaving and wind-sucking) as "an extreme manifestation of stress" and another describing box-walking as "boredom related".

Behavioural issues on the racetrack were reported by 20% of trainers ( $n=7/35$ ). The most frequently reported behaviours on track were "jacking up" and problem behaviours at the barriers. Jacking up<sup>15</sup> was defined as refusal by the horse to go forward, including refusal to go out onto the track. Other behaviours mentioned in order of frequency were age/sex related behaviours ( $n=5/35$ , 14.3%), cranky/not happy horse ( $n=4/35$ , 11.4%), bad attitude ( $n=3/35$ , 8.6%), biting and kicking ( $n=3/35$ , 8.6%), unwillingness ( $n=2/35$ , 5.7%), not eating ( $n=2/35$ , 5.7%) and lack of confidence ( $n=1/35$ , 2.9%)<sup>16</sup>.

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<sup>13</sup> The glossary includes definitions of terms used in the interview. Use of the glossary ensured that the definitions given to the respondents were standardised.

<sup>14</sup> Being less likely to breed from horses that were known to be wind-suckers.

<sup>15</sup> See glossary

<sup>16</sup> A small number of trainers ( $n=4$ ) referred to the cranky/sour horse. Whilst it is possible that these characteristics reflect temperament the word sour is often used in racing to reflect possible underlying health problems. This feedback was obtained from trainers during the pilot and led to the term 'sour' being removed from the section on temperament in the interview to avoid any unnecessary confusion.



There were no statistically significant differences between those trainers who did and did not identify unwelcome behaviours and years of trainer experience.

The potential for overlap in some of these categories is recognised but the decision was made not to collapse responses any further at this stage given the aim to maximise the advantages of the interview method and use of open-ended questions in allowing full discovery and reporting of the trainers' views.

Two trainers did not identify any common unwelcome behaviours when asked. One expressed the view that you do not have problems if you have a good system and mentioned "bomb proofing"<sup>17</sup> and the other made reference to each horse as an individual. The latter response was interpreted as a reluctance to generalise and report "commonly observed" behaviours as was asked for in the question, reflecting the trainers' preference to keep an emphasis on individual assessment.

### 3.5 Frequency of Repetitive Type Movement Behaviours and Aggressive Behaviours

Trainers were asked to estimate the frequency of eight specified behaviours that included repetitive type stereotypic behaviours and aggressive behaviours in their stable across the last racing season (see Table 7).

Of the eight behaviours listed, the stereotypic behaviour of crib-biting/wind-sucking was reported by the highest number of trainers with 89.2% of trainers reporting this behaviour as present in at least some of their horses across the last racing season. In terms of frequency estimates, of those trainers reporting crib-biting/wind-sucking behaviour in their horses the majority reported a frequency of between 1 and 10%

Aggressive behaviour toward other horse was reported by the next highest number of trainers with 78.4% reporting this behaviour to be present. Whilst this behaviour was

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<sup>17</sup> Bomb proofing is where the horse is given the opportunity to become familiar and comfortable with objects, places and sensations. It includes features that are part of desensitisation. A bomb proof horse is unlikely to become upset and spook at strange stimuli.

considered common, it was reported to be present in between 1 and 10% of horses by most trainers.

The stereotypic behaviour of box-walking was the next behaviour most commonly reported as being present by trainers. Box-walking was reported as being present by 67.6% of trainers, and of these most estimated a frequency between 1 and 10%.

The two behaviours that were reported to be present by the least number of trainers were weaving and severe head shaking. Head shaking was the least commonly observed behaviour with 78.4% of trainers reporting that this behaviour was not present in any of their stabled horses across the last racing season. Of the eight trainers confirming some experience of this behaviour in their horses, four estimated a frequency of between 1 and 5%. Weaving was reported as being present by 45.9% of trainers and all (100%) estimated the frequency to be between 1 and 10%.

There were no statistically significant correlations between trainer years of experience and any of these behaviours. However, there were significant positive correlations between the frequency of reporting crib-biting and box-walking ( $r_s = 0.33, p < 0.05$ ); between aggression towards other horses and box-walking ( $r_s = 0.34, p < 0.05$ ), accidents ( $r_s = 0.38, p < 0.05$ ), door kicking ( $r_s = 0.43, p < 0.01$ ), and aggression towards people ( $r_s = 0.49, p < 0.01$ ); between box-walking and accidents ( $r_s = 0.53, p = 0.001$ ), and aggression towards people ( $r_s = 0.41, p < 0.05$ ); between accidents and door kicking ( $r_s = 0.55, p < 0.001$ ), aggression towards people ( $r_s = 0.41, p < 0.05$ ), and weaving ( $r_s = 0.47, p < 0.01$ ); between door kicking and aggression towards people ( $r_s = 0.34, p < 0.05$ ), and headshaking ( $r_s = 0.53, p = 0.001$ ); between aggression towards people and weaving ( $r_s = 0.43, p < 0.01$ ); and between weaving and head shaking ( $r_s = 0.37, p < 0.05$ ). In other words, trainers who identified one of these behaviours as occurring frequently tended to identify the other behaviour as also occurring frequently.

**Table 7**

***Trainer's Perception of the Proportion of Horses in their Stable across the Previous Racing Season with Repetitive, Stereotypic and Aggressive Type Behaviours (N = 37)***

<b>Behaviour</b>	<b>None</b>	<b>0-1%</b>	<b>1-5%</b>	<b>5-10%</b>	<b>10-20%</b>	<b>20-100%</b>
Crib-biting/wind-sucking <sup>18</sup>	10.8	5.4	37.8	29.7	13.5	2.7
Aggressive behaviour toward other horses	21.6	18.9	27.0	16.2	16.2	0.0
Box-walking and pacing	32.4	16.2	32.4	13.5	5.4	0.0
Accident prone e.g. barging	43.2	10.8	21.6	8.1	13.5	2.7
Door kicking/pawing behaviour	43.2	8.1	13.5	27.0	5.4	2.7
Aggressive behaviour toward people	43.2	18.9	18.9	16.2	2.7	0.0
Weaving	54.1	8.1	29.7	8.1	0.0	0.0
Severe head shaking	78.4	5.4	10.8	5.4	0.0	0.0

Note: numbers in the table are the percentage of trainers identifying a specific proportion of horses displaying the behaviour

<sup>18</sup> The entries are percentage of trainers. Items are shown in descending order of frequency according to the 0% column. Crib-biting was recorded as present at least some of the time by 89% of trainers, whereas severe head shaking was recorded as present to some degree by 22% of trainers.

### 3.6 Impact of the Repetitive, Stereotypic and Aggressive Type Behaviours

Regardless of whether or not horses in their own stable had demonstrated unwelcome behaviours, trainers were asked about their perceptions of the impact of certain behaviours. The behaviours rated by the highest proportion of trainers as having a severe impact on the horse's ability to succeed were being accident prone (27.0%,  $n = 10/37$ ) and box-walking (21.6%,  $n = 8/37$ ; see Table 8). The most common repetitive, stereotypic behaviour, crib-biting/wind-sucking, was only considered to have a severe impact by one trainer (2.7%). Interestingly, almost one-fifth of the trainers (21.6%,  $n = 8/37$ ) reported having insufficient experience of head shaking behaviour to be able to describe its impact.

There was not a statistically significant correlation between years of trainer experience and ratings of the impact of repetitive behaviours on the horse's ability to succeed. Where trainers felt they had sufficient experience to rate impact, there were significant positive correlations between ratings of the impact of certain behaviours, for example door kicking and head shaking ( $r_s = 0.76, p < 0.001$ ); weaving and box-walking ( $r_s = 0.60, p < 0.001$ ); aggression towards people and head shaking ( $r_s = 0.59, p = 0.001$ ); box-walking and head shaking ( $r_s = 0.58, p = 0.001$ ); crib-biting and head shaking ( $r_s = 0.54, p < 0.01$ ); door kicking and aggression towards people ( $r_s = 0.47, p < 0.01$ ); aggression towards other horses and head shaking ( $r_s = 0.47, p = 0.01$ ); crib-biting and door kicking ( $r_s = 0.46, p < 0.01$ ); box-walking and door kicking ( $r_s = 0.45, p < 0.01$ ); and box-walking and aggression towards people ( $r_s = 0.40, p < 0.05$ ).

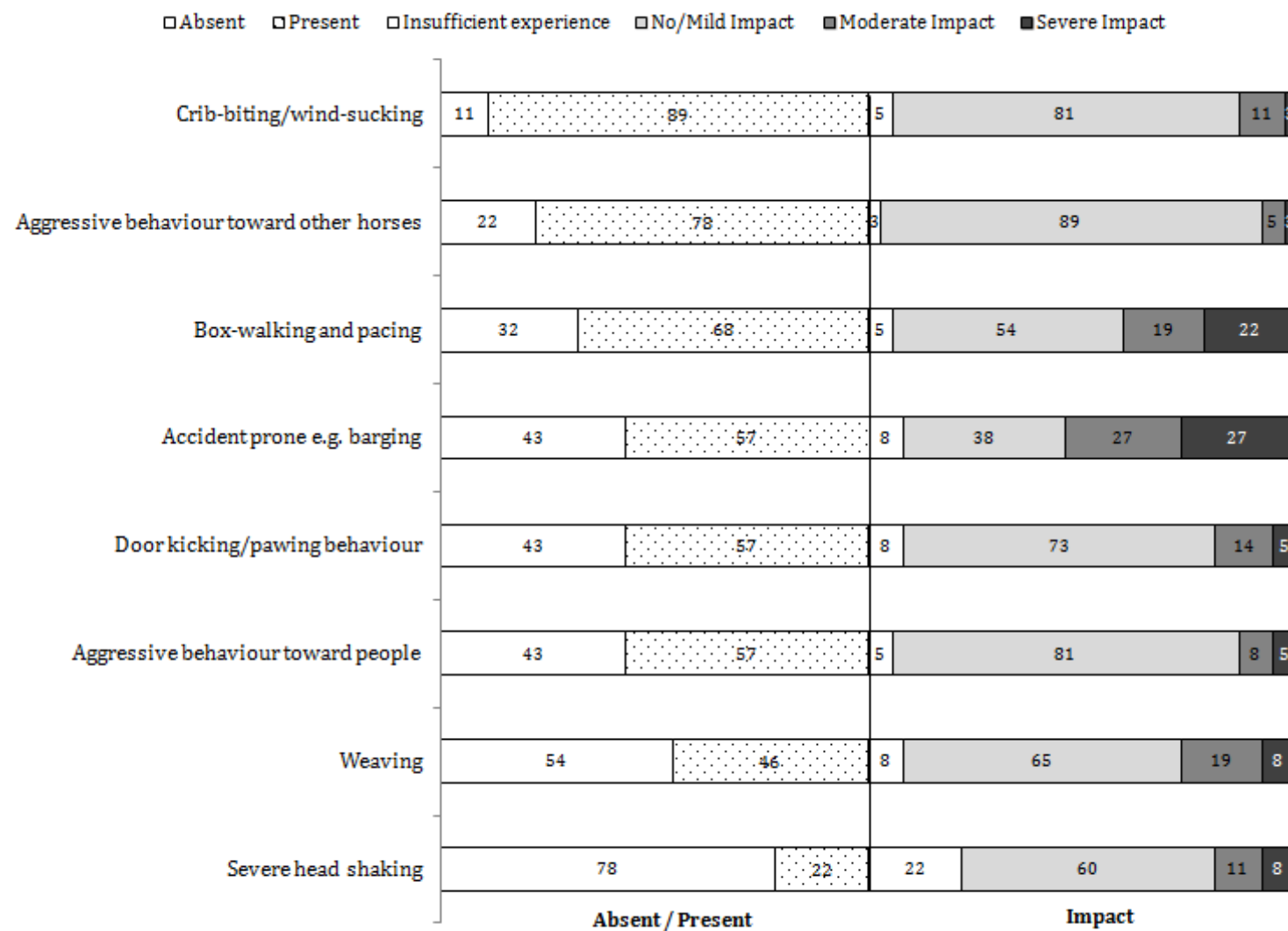
Combined frequency and impact of repetitive, stereotypic and aggressive type behaviours are illustrated in Figure 2.

**Table 8*****Trainer's Perception of the Impact of Repetitive, Stereotypic and Aggressive Type Behaviours (N = 37)***

<b>Behaviour</b>	<b>Insufficient experience</b>	<b>No or Mild impact</b>	<b>Moderate</b>	<b>Severe</b>
Crib-biting/wind-sucking	5.4	81.1	10.8	2.7
Aggressive behaviour toward other horses	2.7	89.2	5.4	2.7
Box-walking and pacing	5.4	54.1	18.9	21.6
Accident prone e.g. barging	8.1	37.8	27.0	27.0
Door kicking/pawing behaviour	8.1	73.0	13.5	5.4
Aggressive behaviour toward people	5.4	81.1	8.1	5.4
Weaving	8.1	64.9	18.9	8.1
Severe head shaking	21.6	59.5	10.8	8.1

Note: numbers in the table are the percentage of trainers identifying a specific impact of a behaviour. Some trainers, when asked to rate the impact of the behaviours indicated that they did not feel that they had sufficient experience of the problem behaviour to comment in a meaningful way. For some, this was due to the fact that they had not had a horse showing the particular behaviour but for others it was due to low frequency of horses showing the behaviour over time.

**Figure 2. Combined frequency and impact ratings of trainer's perception of repetitive, stereotypic and aggressive type behaviours**



### 3.7 Frequency of Evasive Unwanted Behaviours

Having provided ratings for the repetitive, stereotypic and aggressive behaviours trainers were asked to estimate the frequency of a list of unwanted behaviours in the ridden racehorse during the previous racing season.

Shying and over-racing/pulling were the two behaviours most commonly reported by trainers with 81.1% reporting these behaviours to have been present in at least some of their horses across the last racing season (see Table 9). In terms of frequency estimates, shying behaviour was reported as a frequent behaviour with just under half of all trainers estimating a frequency of greater than 10% of their horses during the previous racing season, and just under a quarter rating frequency at greater than 20%. Similar ratings were given for over-racing/pulling with one third of all trainers rating frequency at greater than 10%. Just over one-fifth of all trainers rated frequency to be greater than 20%.

Barrier problems and spinning away were reported by the next highest number of trainers with 73.0% reporting these behaviours to be present. For both of these behaviours the majority of trainers estimated a frequency of between 1 and 10%.

Of the three different specific types of barrier problems investigated, fractious/panic behaviour by the horse when in the barriers was the most commonly reported with 67.6% of trainers reporting this behaviour as present in at least some of their horses across the last racing season. The next most common barrier behaviour was consistent failure to enter the barriers reported by 56.8% of trainers. The least common barrier behaviour was the horse showing a consistent failure to leave the barrier at the jump, however this was still reported to have been present in at least some of their horses across the last racing season by 43.2% of all trainers. Frequency estimates for all three of these barrier problems were reported by the majority of trainers at between 1 and 10% of their horses.

Refusal to run was the behaviour reported to be present by the least number of trainers with 67.6% of trainers reporting that this behaviour was not present in any of their stabled horses across the last racing season.

Years of trainer experience was significantly negatively correlated to the reported prevalence of over-racing ( $r_s = -0.49, p < 0.01$ ), resistance ( $r_s = -0.47, p < 0.01$ ) and jacking-up ( $r_s = -0.38, p < 0.05$ ). This means that those with more years of experience reported lower rates of these behaviours.



**Table 9**

***Trainer's Perception of the Proportion of Horses in their Stable across the Previous Racing Season with Evasions/Unwanted Behaviours<sup>19</sup> (N = 37)***

<b>Behaviour</b>	<b>0%</b>	<b>0-1%</b>	<b>1-5%</b>	<b>5-10%</b>	<b>10-20%</b>	<b>20-100%</b>
Shying	18.9	2.7	18.9	13.5	21.6	24.3
Over-racing/pulling	18.9	8.1	24.3	16.2	10.8	21.6
Barrier problems	27.0	8.1	32.4	18.9	8.1	5.4
Spinning away	27.0	13.5	32.4	21.6	5.4	0.0
Resistance	29.7	8.1	35.1	21.6	5.4	0.0
Jacking up (refusing to go forward)	29.7	10.8	35.1	16.2	5.4	2.7
Fractious/panic behaviour in the barriers	32.4	5.4	32.4	18.9	8.1	2.7
Rearing	37.8	13.5	27.0	21.6	0.0	0.0
Consistent failure to enter the barriers	43.2	10.8	21.6	16.2	2.7	5.4
Refusal to pass	45.9	2.7	27.0	18.9	2.7	2.7
Bucking	48.6	10.8	21.6	13.5	2.7	2.7
Consistent failure to leave barrier at the jump	56.8	2.7	29.7	8.1	0.0	2.7
Bolting	56.8	8.1	21.6	10.8	2.7	0.0
Refusal to run	67.6	10.8	16.2	5.4	0.0	0.0

Note: numbers in the table are the percentage of trainers identifying a specific proportion of horses displaying the behaviour

<sup>19</sup> See appendices for table showing all percentage categories individually

### 3.8 Impact of the Evasions/Unwanted Behaviours on Training and Racing Performance

Although shying was reported as a frequently observed behaviour, the majority of trainers rated its impact as low, with 78.4% reporting the impact of shying behaviour to be either no impact or mild (see Table 10). Over-racing/pulling was not only reported to be a common behaviour shown in horses across the last racing season but was also consistently rated as impacting in a moderate or severe way by 83.8% of trainers.

In addition to over-racing/pulling, the other behaviours most commonly reported as having a severe impact were barrier problems, along with refusal to run, refusal to pass and bolting. Approximately three-quarters of the trainers reported having experience with horses that showed problem behaviours associated with the barriers. In terms of impact, 89.2% of all trainers reported the impact of barrier problems to be either moderate or severe.

Of the three types of barrier problems all were rated as having a major<sup>20</sup> impact. If trainers felt they had sufficient experience to rate the impact, both consistent failure to enter the barriers and consistent failure to leave the barrier at the jump were rated as having a moderate or severe impact by all trainers. Fractious/panic behaviour in the barriers was similarly rated as having moderate or severe impact by 89.2% of all trainers. It is noted that with regard to all four items about barriers, 8.1% of trainers reported insufficient experience of this problem to comment on the impact.

The situation was similar with refusal to run. Just over one fifth of the sample (21.6%) reported having insufficient experience of the problem to comment. The remaining 78.4% were consistent in reporting the impact of this behaviour to be major, i.e. either moderate or severe.

The impact of refusal to pass behaviour was also reported on by 78.4% of trainers, who mostly rated the impact as moderate or severe. Bolting was reported as present

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<sup>20</sup> The term major will be used when the impact ratings for both moderate and severe are combined.

by 43.2% of trainers and again was rated as having a major (moderate or severe) impact by nearly all those that had experienced this behaviour in their horses.

There were no statistically significant correlations between years of trainer experience and the impact of evasions or unwanted behaviours.

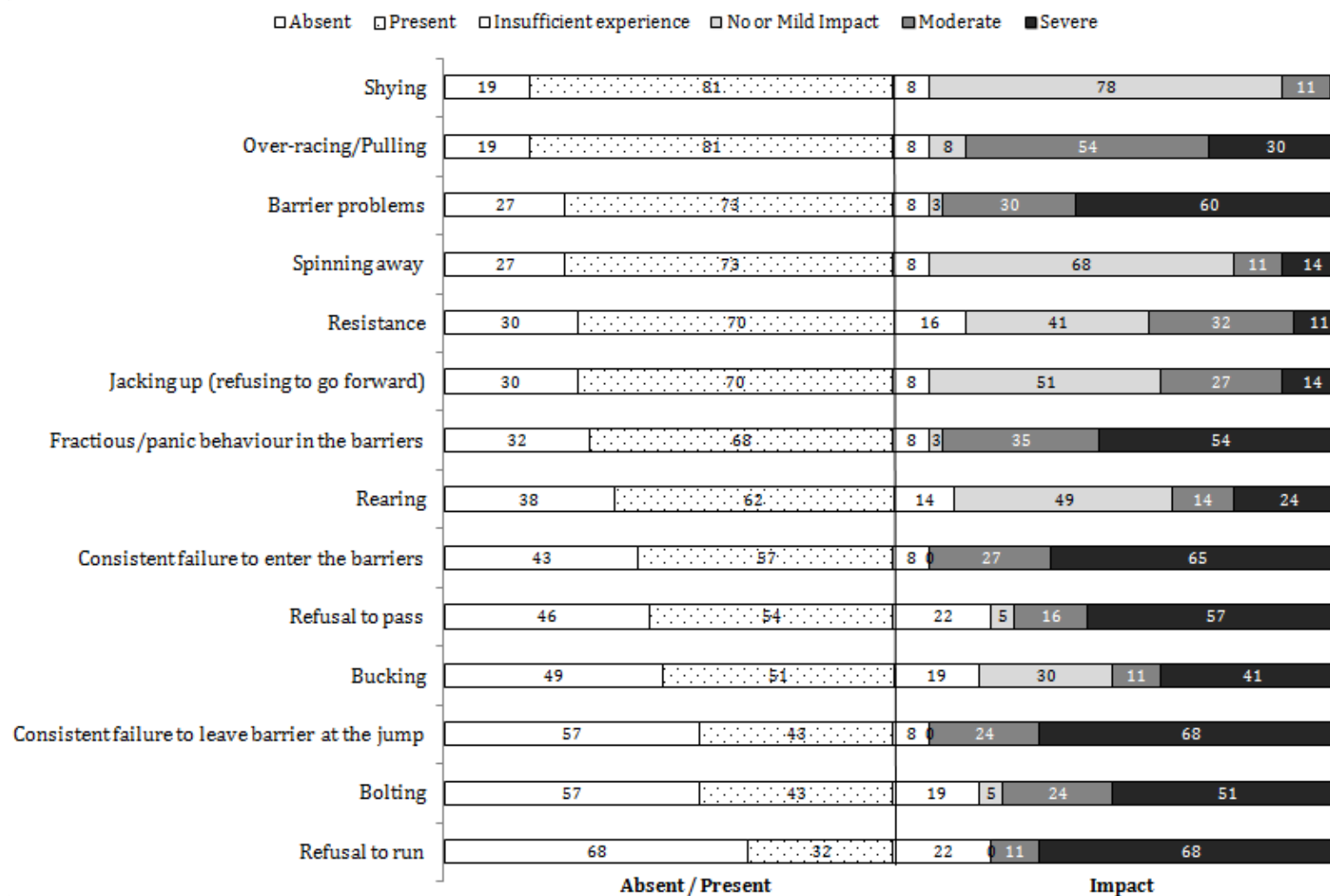
Figure 3 shows the combined frequency and impact ratings of trainer's perception of the impact of evasions/unwanted behaviours on training and racing.

**Table 10*****Trainer's Perception of the Impact of Evasions/Unwanted Behaviours on Training and Racing Performance (N = 37)***

<b>Behaviour</b>	<b>Insufficient experience</b>	<b>No or Mild impact</b>	<b>Moderate</b>	<b>Severe</b>
Shying	8.1	78.4	10.8	2.7
Over-racing/pulling	8.1	8.1	54.1	29.7
Barrier problems	8.1	2.7	29.7	59.5
Spinning away	8.1	67.6	10.8	13.5
Resistance	16.2	40.5	32.4	10.8
Jacking up (refusing to go forward)	8.1	51.4	27.0	13.5
Fractionous/panic behaviour in the barriers	8.1	2.7	35.1	54.1
Rearing	13.5	48.6	13.5	24.3
Consistent failure to enter the barriers	8.1	0.0	27.0	64.9
Refusal to pass	21.6	5.4	16.2	56.8
Bucking	18.9	29.7	10.8	40.5
Consistent failure to leave barrier at the jump	8.1	0.0	24.3	67.6
Bolting	18.9	5.4	24.3	51.4
Refusal to run	21.6	0.0	10.8	67.6

Note: numbers in the table are the percentage of trainers identifying a specific impact of a behaviour. Some trainers, when asked to rate the impact of the behaviours indicated that they did not feel that they had sufficient experience of the problem behaviour to comment in a meaningful way. For some, this was due to the fact that they had not had a horse showing the particular behaviour but for others it was due to low frequency of horses showing the behaviour over time.

**Figure 3. Combined frequency and impact ratings of trainer's perception of the impact of evasions/unwanted behaviours on training and racing**



One trainer reported that he had few problems with horses and the barriers and provided the following description of his approach to training in this area:

“[You have to] trust that the horse will learn, don’t force or push the horse. I have very little problem with barriers, but handling here is so important. I ask my breaker to walk the horse in and out only. When they come into the stable I put a bit of work into them so they are not too jazzy and then walk them into the barriers, I treat them as though they haven’t been there before, jump out about the third time, but rather than have the gates shut electronically, this shuts all the gates and so when they open there is noise etc. I have the barrier attendants hold the gates manually, then canter them.” (T32)

### 3.9 Trainer’s Perceptions of the Factors Which May Contribute to the Development and/or Maintenance of Behavioural Problems or Unwelcome Behaviours

Factors that might contribute to the development and /or maintenance of unwelcome behaviours were presented in a list to trainers. Trainers were first asked whether they agreed or disagreed that a specific factor may be a contributor. If they agreed, trainers rated the degree to which they felt they could reduce the impact of the factor as follows, “Yes and can reduce the impact of the factor” (i.e. the contributing factor was modifiable) or “Yes, but difficult to reduce the impact of the factor” (i.e. the contributing factor was fixed). Trainers’ responses are summarised in Table 11.

Responses were highly consistent on this item. The vast majority of trainers (between 78.4 and 100.0%,  $n=29/37$  to  $37/37$ ) confirmed the listed items as potential contributors to the development and/or maintenance of unwelcome behaviours and also saw them as able to be modified. Two factors were identified by trainers as relevant to the development and /or maintenance of unwelcome behaviours but difficult to reduce in terms of impact; these were “genetics/breeding” (21.6%) and “temperament”(10.8%). Although the vast majority of trainers indicated that all of the factors could contribute to the development and/or maintenance of unwelcome behaviours a small percentage said that the following factors did not contribute; confinement/isolation ( $n=6/37$ , 16.2%), gear ( $n=5/37$ , 13.5%) and age ( $n=5/37$ ,

13.5%). Some comments were made by these trainers explaining their responses. In relation to any contribution to unwelcome behaviour from confinement /isolation three trainers made comment, and all indicated that the factor was either not present or managed:

T31: [horses] don't get confined, they always have visual contact [with other horses]

T34: the odd horse will be trained out of a paddock

T35: [no because of] access to yards.

The last two comments suggest that confinement/isolation can be a factor for some horses but one that is able to be managed, and for this reason the trainers have responded "no" when asked about its role as a contributing factor in their individual cases. There were no comments made by any of the five trainers that indicated that age does not contribute to the development and/ or maintenance of unwelcome behaviours.

Once the 18 items on the list had been considered all trainers were asked whether there were any other factors, not mentioned, that they felt might contribute to the development and/or maintenance of behavioural problems. One trainer (T34) provided a response as follows:

"In Australia the climate allows us to go to the paddock and race for 12 months of the year. Horses might have between six to seven starts in a preparation followed by six weeks off. In Europe horses might race for eight months and stay in work for this period. Some trainers (trainers name mentioned) will give the horse more runs but with less work in between".

For this trainer, the balance between training, racing (number of starts) and spelling (in the paddock) was felt to be an important factor in managing the horse and the development of any unwelcome behaviours.

Since the majority of factors were considered modifiable contributors, there was no investigation of whether trainer years of experience differed by response (i.e. not a contributor, modifiable or fixed contributor).

**Table 11**

***Trainer's Perceptions Regarding the Contribution of Specific Factors to the Maintenance and/or Development of Unwanted Behaviours and whether Contributing Factors were Modifiable or Fixed (N = 37)***

	<b>Not a contributor</b>	<b>Modifiable contributor (can reduce the impact of this factor)</b>	<b>Fixed contributor (difficult to reduce the impact of this factor)</b>
Diet and feeding practices	5.4	91.9	2.7
Confinement/isolation	16.2	83.8	0.0
Stress	2.7	94.6	2.7
Fear	2.7	97.3	0.0
Boredom/loss of interest	2.7	91.9	5.4
Exercise levels too demanding	0.0	100.0	0.0
Habit	5.4	86.5	8.1
Pain	0.0	94.6	5.4
Gear	13.5	86.5	0.0
Rider (skill level, confusing signals)	2.7	97.3	0.0
Age	13.5	78.4	8.1
Maturity	2.7	97.3	0.0
Human-horse interaction	2.7	97.3	0.0
Past bad experiences	0.0	91.9	8.1
Weaning/early handling/breaking	0.0	91.9	8.1
Genetics/breeding	0.0	78.4	21.6
Temperament/nervousness	0.0	89.2	10.8
Physical health problems	0.0	100.0	0.0
Other <sup>21</sup>	97.3	2.7	0.0

<sup>21</sup> One trainer (3% equals one trainer) gave a response when asked about other factors.



### 3.10 Trainer's Perceptions of the Importance of Temperament in Racehorse Performance

All 37 trainers felt temperament was an important factor in racehorse performance. A few trainers elaborated, and their comments highlight the importance of temperament in both trainability and performance. All comments are presented below:

T11: temperament is a crucial factor, an underestimated factor; it can be the difference between winning and losing

T18: the calmer the horse the better it will run

T21: not a good horse without a good temperament, calm in control of themselves, resilient with an ability to handle stress and good recuperative powers

T22: the horse needs ability/an engine, temperament is the next most important thing

T27: you need a good temperament

T31: easy to train

### 3.11 Trainer's Identification of Temperament Traits Associated With Behaviour-Related Problems and Poor Performance

There was also a high level of agreement amongst trainers when asked to identify the temperament traits they had found to be associated with behaviour-related problems and poor performance. Over three-quarters of trainers (78.4%,  $n=29/37$ ) discussed the highly strung/nervous horse. Other temperament types mentioned in order of frequency were bad attitude (10.8%,  $n=4/37$ ), aggressiveness (5.4%,  $n=2/37$ ) and unwillingness (5.4%,  $n=2/37$ ).

Some trainers went on to comment about the highly strung nervous horse (see Table 12). These comments described the highly strung nervous horse as presenting a number of challenges in training and management. The highly strung temperament type was described as interfering with eating behaviour, the amount and type of work the horse was able to perform and learning. Trainers spoke about the need for management to continually aim at helping the horse to settle and relax. These comments are presented below. These comments have not been coded as they were not made in response to an open-ended question. They are reported here because they were felt to have value and provide further insights into the views and beliefs of trainers.

**Table 12**

***Comments Regarding the Highly Strung/Nervous Horse Temperament***

<b>Continual management</b>
T18: highly strung sweaty horse, settle through routine
T20: always aiming at keeping the horse calm
T25: highly strung nervous horse, handle them, try to make them less fearful, know what is coming
T35: the big thing is to get them to relax
<b>Impact</b>
T02: stressed when worked, overwork and hard to work, not switching off
T13: stressed/anxious horse, this is the key, interferes with learning, the horse is just not listening
T14: highly strung horse, affects how they eat and work
T20: they undo themselves
T24: highly strung horses, great difficulty getting them to perform
T27: they run the race before they get there
T28: the nervous, highly strung horse, you have got to under-work them

### 3.12 Trainer's Identification of the Most Common Temperament Traits Associated With Behaviour-Related Problems and Poor Performance

The findings regarding temperament traits in section 3.11 were confirmed when trainers were asked to select two temperament traits associated with behaviour-related problems and poor performance from a list of seven temperament types presented to them (see Table 13). Some trainers indicated that they wished to nominate only one trait as relevant, and one trainer did not mark any, explaining that in his view all could be managed. These response preferences were accepted and thus the total frequency in the Table 13 sums to 69 rather than 74. There were no statistically significant differences in trainer years of experience by whether or not a certain temperament trait was identified or not.

**Table 13**

***Trainer's Perceptions of the Most Common Temperament Traits Associated with Behaviour-Related Problems and Poor Performance***

<b>Trait</b>	<b>Frequency</b>	<b>Percent</b>
Tense, highly strung, nervous	35	94.6
Bad attitude	23	62.2
Unwillingness	6	16.2
Fearful	3	8.1
Un-cooperative	2	5.4
Not smart, slow to learn	0	0.0
Lazy	0	0.0

Consistent with the responses to the open-ended questions, the highly strung/nervous horse was most frequently identified as the temperament type most likely to be associated with behaviour related problems and poor performance from the list of temperaments.

Two of the temperament descriptors "lazy" and "not smart, slow to learn" were not identified by any of the trainers as problematic (associated with behaviour related problems and poor performance). Comments made about the "lazy" horse suggested

that trainers preferred this quality over some others, (especially the highly strung/nervous type) and that it was seen by some as a positive, for example “love it”(T13), “wouldn’t worry” (T14), “good quality”(T15), “don’t mind it, know when to switch on” (T26), “in a certain horse can be a bonus” (T30), “not a problem” (T36) and “nothing wrong as long as they are a racehorse” (T28).

Additional comments made about the “not smart/slow to learn” horse also suggested that this was not seen as likely to lead to problems with behaviour or performance and likely to be remedied with time:

T24: “take time, not necessarily going to have a negative impact on performance, no effect on athletic ability”.

### 3.13 Options Trainers Would Consider When Confronted with a Horse with Temperament Traits Associated with Behaviour-Related Problems and Poor Performance

Trainers were asked to describe what options they would consider when confronted with a horse showing the temperament trait they had nominated in the earlier question (Question 19; see Table 14). This meant that, as reported above, the majority of trainers’ comments were made about the horse with the highly strung/nervous temperament type.

The trainers who would consider routine/work when confronted with a difficult temperament had significantly fewer years of experience (mean 16.2, SD 10.7) compared to those who did not consider this option (mean 26.9, SD 15.2;  $t(35) = 2.19$ ,  $p = 0.035$ ). Conversely, those trainers who would consider continual assessment and management had significantly more years of experience (mean 22.8, SD 13.6) compared to those who did not consider this option (mean 13.4, SD 8.3;  $t(35) = -2.53$ ,  $p = 0.016$ ). There were no statistically significant differences in trainer years of experience for the other options for dealing with a difficult temperament.

**Table 14*****Options Considered when Confronted with a Difficult Temperament (N = 37)***

	<b>Frequency</b>	<b>Percent</b>
Routine/work	30	81.1
Graded exposure	22	59.5
Continual assessment and management	19	51.4
Staff and handling	10	27.0
Therapeutic use of medication	6	16.2
Change diet	6	16.2
Exclude organic causes	3	8.1
Consultation with other professionals	2	5.4

The two most common temperaments associated with problems (tense, highly strung, nervous and bad attitude), were cross-tabulated against the four most common management options (work type and routine, graded exposure, continual assessment and management, staff and handling) (see Table 15). Of the 35 trainers who identified 'tense, highly strung, nervous' temperaments as problematic, a substantial proportion (80.0%) suggested routine/work as a management option, over half suggested graded exposure and just under half continual assessment/management. Staff and handling management options were only suggested by just over a quarter of these trainers. A similar pattern of management options was suggested for those 23 trainers who identified 'bad attitude' as a problematic temperament trait.

**Table 15*****Management Options Cross-Tabulated Against the Two Most Commonly Identified Problematic Temperament Traits***

		<b>Tense, highly strung, nervous</b>		<b>Bad attitude</b>	
		<b>Yes % (n=35)</b>	<b>No % (n=2)</b>	<b>Yes % (n=23)</b>	<b>No % (n=14)</b>
<b>Routine/work</b>	<b>Yes (n=30)</b>	80.0	100.0	73.9	92.9
	<b>No (n=7)</b>	20.0	0.0	26.1	7.1
<b>Graded exposure</b>	<b>Yes (n=22)</b>	57.1	100.0	52.2	71.4
	<b>No (n=15)</b>	42.9	0.0	47.8	28.6
<b>Continual assessment/ Management</b>	<b>Yes (n=19)</b>	48.6	100.0	47.8	57.1
	<b>No (n=18)</b>	51.4	0.0	52.2	42.9
<b>Staff and handling</b>	<b>Yes (n=10)</b>	28.6	0.0	26.1	28.6
	<b>No (n=27)</b>	71.4	100.0	73.9	71.4

Trainer's responses indicated that it was accepted that the horse with the highly strung/nervous temperament type presented challenges and would need to be managed. Responses in order of frequency were modifications to standard training approaches ( $n=29$ ), continual assessment and management ( $n=19$ ) and increased time ( $n=9$ ). The main modifications to training included early intervention, continual assessment to inform management, increased time, this included increased time to complete training tasks but also sending the horse to the paddock to allow for increased maturity before the demands of training are introduced and change to the type of exercise and work completed.

The principles of graded exposure underlying the management of the highly strung, nervous horse can be seen in the following comments:

T07: Manage the horse from the start, constant management, provide gradual and consistent time at the track, take the horse down to the track even if it is not racing, stop and start the horse, have it come in and out of the stable.

T20: Use of very experienced riders and handlers, take time with the horse, no rushing. The horse would be first to the track in the morning and last to leave, moderate tempo, give him increased longer work and less fast work and more than one preparation. Get the owner/client onside due to associated financial cost.

T22: Work with him, gain his confidence with riders, handlers and the environment. Go slowly, might use the walker for three weeks, expose them to everything gently, gradually expose them a little bit at a time. There is the risk of accident/injury, might use a sedative to calm them, then they will be in a better state of mind, increased confidence.

One trainer reported that trainers can identify the problem horse but might come under pressure from other sources:

T26: There is pressure on trainers from owners and the industry. For example two year old racing, trainers are recognising the problem horse but are under

pressure. There is big money on offer and an expectation from owners to get an early return. For the industry to make stallions.

The following tables (Table 16 to Table 26) provide examples of the various themes among management options, presented by temperament trait.

**Table 16**

***Examples of the Theme “Time” as a Management Option, Presented by Temperament Trait***

<b>Management Option: TIME</b>
<b><i>Temperament: Tense, highly strung, nervous</i></b>
T01: spend a greater amount of time
T03: increase patience and time
T11: not to rush the horse, patience and time
T14: be prepared to go slower
T17: increased time spent
T24: take time with the horse, no rushing
T27: spend more time with him
T32: talk to staff, advise to take horse along gently, don’t razz them up, patience
T36: time is the most important thing
<b><i>Temperament: Aggressiveness</i></b>
T05: increase time spent with the horse

**Table 17**

***Examples of the Theme “Continual Assessment and Management” as a Management Option, Presented by Temperament Trait***

<b>Management Option: CONTINUAL ASSESSMENT AND MANAGEMENT</b>
<b><i>Temperament: Tense, highly strung, nervous</i></b>
T01: work with the horse constantly
T07: manage issues from the start
T07: constant management
T09: manage it
T09: early management, quick and consistent
T13: remove pain (assessment and diagnosis, exclude or address medical causes)



T13:	remove barriers and promote coping, staff handling
T17:	increased attention
T18:	manage their training, individual approach, watching and respond to signs eg. Shaking
T19:	get earlier individual attention
T20:	constant management of the highly strung horse
T22:	work with him
T23:	start them off and see where they have a problem
T23:	do my own assessment
T34:	every horse is individual
T35:	every horse is an individual
T37:	don't know the options until I get him
T37:	everyone is an individual/progress at different rates
<b><i>Temperament: Aggressiveness</i></b>	
T05:	investigate and exclude medical causes
T10:	address the individual case eg some horses like their own space
T10:	constant assessment and management, staff aware
<b><i>Temperament: Bad Attitude</i></b>	
T31:	why? trying to work out why
T31:	are they happy where they are stabled, boredom?
T31:	check for pain
<b><i>Temperament: Unwillingness</i></b>	
T21:	assess ability, are they worth the stress
T29:	exclude organic causes then clear that it is mental/learned
T29:	assessment, what are the reasons why they are unwilling

**Table 18**

***Examples of the Theme “Environment Change” as a Management Option, Presented by Temperament Trait***

<b>Management Option: ENVIRONMENT CHANGE</b>	
<b><i>Temperament: Tense, highly strung, nervous</i></b>	
T03:	rotate through paddock and yard
T04:	get away from the racetrack, change environment
T04:	might recommend that it go to a non racetrack environment

T07:	stop and start as required (horse in and out)
T11:	in and out of the stable (float trips home)
T12:	change environment where possible, this may be limited if oncourse stabling options
T14:	bring the horse in and out waiting for mental maturity
T20:	sent them out to the bush to try to get them going
T24:	more than one preparation
T28:	content environment
T36:	in and out for 2 years
<b><i>Temperament: Bad Attitude</i></b>	
T15:	change of environment
T25:	can lose the behaviour when environment is changed
<b><i>Temperament: Unwillingness</i></b>	
T29:	if mare, send it to the breeding barn

**Table 19**

***Examples of the Theme “Work Type and Routine” as a Management Option,  
Presented by Temperament Trait***

<b>Management Option: WORK TYPE AND ROUTINE</b>	
<b><i>Temperament: Tense, highly strung, nervous</i></b>	
T01:	lunge before riding if needed
T01:	increase slow work
T02:	try to help it, aim at a happy horse
T03:	work it, decrease pressure
T03:	as you would a happy horse
T06:	change work regime
T08:	keep horse happy
T08:	use swimming, treadmill, avoid the track
T08:	consistent rider
T12:	change training routine
T13:	light exercise
T13:	positive human interaction
T14:	pace, minimise change
T14:	keep routine

T16:	keep happy
T16:	routine
T18:	right people (calm) around him
T20:	routine in the stable
T22:	gain his confidence with riders, handlers and the environment
T22:	go slowly, walker for 3 weeks,
T23:	be prepared to change routine
T24:	first to the track in the morning and last to leave
T24:	moderate tempo
T24:	increase longer work and less fast work
T26:	routine vital, know what they are doing and when
T27:	after work take him for a pick of grass
T35:	might use the pool and swim them
T35:	go for long walks with a handler (not on the walking machine)
T35:	might work them twice a day
<b><i>Temperament: Bad Attitude</i></b>	
T15:	change routine at the track, mental management e.g. swimming horses is great break up of their routine
T31:	change routine, find the key
T33:	change the environment, take them to the beach
T33:	walk them over the hill and have them enter the track from a different entry point
T33:	do something different

**Table 20**

***Examples of the Theme “Gradual Exposure” as a Management Option, Presented by Temperament Trait***

<b>Management Option: GRADUAL EXPOSURE</b>	
<b><i>Temperament: Tense, highly strung, nervous</i></b>	
T07:	gradual and consistent time at the track, gradual exposure
T07:	take horse down even if it is not racing
T16:	work them with a partner (quiet horse, give confidence)
T19:	work them at different times
T19:	trot and canter out in the bullring rather than the tunnel (hot house

environment)
T20: get him used to things gradually, progressively introduce him
T22: expose them to everything gently
T22: gradually expose them a little bit at a time, but risk of accident and injury
T27: take him to the races and not race him
T28: work them at a quieter time of day
T28: link them up with a mate, friend
T28: less likely to gallop (fast work)
T30: work it first or last (avoid traffic and any situations which have pressure)
T34: use the pony, comfort zone, shut down the risk of the horse having a bad experience
T34: work the horse in the middle of the work morning, not early
<b><i>Temperament: Aggressiveness</i></b>
T05: re-socialise it, gradually introduce the horse to situations where it is not normally aggressive
T05: graded exposure to avoided situations
<b><i>Temperament: Bad Attitude</i></b>
T33: lead off the pony

**Table 21**

***Examples of the Theme “Diet” as a Management Option, Presented by Temperament Trait***

<b>Management Option: DIET</b>
<b><i>Temperament: Tense, highly strung, nervous</i></b>
T01: change diet, cut down fuel (grain)
T06: change diet
T12: diet change, decrease hard feed
T16: diet (less fuel)
T26: don’t over-grain (back off a bit)
T28: look at feed, change feed, change from hot feed to cool feed

**Table 22**

***Examples of the Theme “Experienced Staff/ Riders” as a Management Option, Presented by Temperament Trait***

<b>Management Option: EXPERIENCED STAFF/RIDERS</b>	
<b><i>Temperament: Tense, highly strung, nervous</i></b>	
T24:	use of very experienced rider
T24:	use of very experienced handler
T30:	improve rider/horse safety
T32:	put best rider on
T34:	use senior riders

**Table 23**

***Examples of the Theme “Medications” as a Management Option, Presented by Temperament Trait***

<b>Management Option: MEDICATIONS</b>	
<b><i>Temperament: Tense, highly strung, nervous</i></b>	
T22:	sedative, calm them, better state of mind, increased confidence
T26:	sedazine paste promote adjustment (monday mornings if they had sunday off), in the first week, taper the dose, never in a galloping horse
T30:	carefully managed medication can be a good tool
T32:	use of sedatives, aim to have the horse have a positive experience (early stages only)
T34:	use of medication to shut down the risk of a bad experience
T35:	don't generally use medication but would if it cut down the risk of a bad experience or injury

**Table 24**

***Examples of the Theme “Send to Breaker / Specialist” as a Management Option, Presented by Temperament Trait***

<b>Management Option: SEND TO BREAKER/SPECIALIST</b>	
<b><i>Temperament: Bad Attitude</i></b>	
T15:	send the horse back to the breaker
<b><i>Temperament: Unwillingness</i></b>	
T21:	send them back to the breaker
T21:	only get one shot at it, take them out and go to the best specialist for the problem

**Table 25**

***Example of the Theme “Punishment” as a Management Option, Presented by Temperament Trait***

<b>Management Option: PUNISHMENT</b>
<p><b><i>Temperament: Bad Attitude</i></b></p> <p>T25: punish the behaviour immediately</p>

**Table 26**

***Further Comments Regarding Management Options, Presented by Temperament Trait***

<b>Further Comments</b>
<p><b><i>Temperament: Tense, highly strung, nervous</i></b></p> <p>T04: training on a racetrack</p> <p>T09: business comes into decisions</p> <p>T20: some horses won’t travel</p> <p>T23: rare to send them back to the breaker (one in 8 years)</p> <p>T24: owner/client onside due to financial costs</p> <p>T36: might then show average ability, slowing down our process in identifying the actual level of ability</p> <p>T36: don’t use medication</p> <p>T37: don’t use medication (gives a false sense of well being)</p> <p><b><i>Temperament: Aggressiveness</i></b></p> <p>T10: different degrees</p> <p><b><i>Temperament: Bad Attitude</i></b></p> <p>T25: bad attitude, bites and kicks</p> <p><b><i>Temperament: Unwillingness</i></b></p> <p>T29: soreness can lead to jacking up, but this can turn into a mental problem, conditioned anxiety</p>

### 3.14 Discontinuation of Horse from Training and Racing Due to Unsuitable Temperament

Just over two thirds of trainers (70.3%,  $n=26/37$ ) reported that they had discontinued a horse from racing at some time across their career because of unsuitable temperament. Trainer years of experience did not differ significantly between those who had or had not discontinued a horse from racing ( $t(35) = -0.86, p = 0.394$ ).

A review of responses clearly indicated that this was an occasional rather than frequent occurrence. Trainers' responses gave the impression that this was such an infrequent occurrence that they were able to remember well the few occasions that it may have occurred. Typical comments are presented in Table 27.

**Table 27**

***Comments Regarding Discontinuation of a Horse from Training and Racing due to an Unsuitable Temperament***

T01: yes not often, 1-2%, can't [the trainer] manage it and [can't] take the risk of injury, if the horse has good breeding, has potential or is a proven group performer then [I would] try other methods, motivation is a business factor
T02: yes, one [its temperament] had a massive impact on ability, it did not want to be a racehorse, breeding comes into it
T08: yes, bad barrier manners in a highly strung horse, the horse was definitely mad, they [the horse with unsuitable temperament] need to have above average ability to persevere, an unsuitable temperament holds them back from realising their potential
T11: yes definitely, rare but it will happen
T15: yes, but not often, estimated at one in 100
T17: yes, but that was a long time ago, 90% of horses these days come from the big studs and they educate them. They [the stud farms] are making a lot more money so there is increased staffing and attention.
T18: occasional yes, none in the last season
T19: once in 30 years
T22: yes, none last season, 2 across the last 6 years
T23: yes but very rare, one in 10 years, some are not or don't want to be racehorses
T24: yes, one horse
T30: yes, two horses across five years
T36: two in 22 years

Of those trainers that had not discontinued a horse ( $n=11$ , 29.7%), one indicated that it was not temperament per se that led to a decision to discontinue the horse but unsuitable temperament in combination with poor performance (T26):

no, not 100% unsuitable temperament, but the combination of low performance and difficult temperament, never due to behaviour and temperament in isolation.

### 3.15 Trainers' Perceptions Regarding Need to Prepare the Horse Mentally

All 37 trainers agreed that they needed to work to prepare the horse mentally in addition to training efforts aimed at ensuring physical fitness. Given the sequencing of the interview questions trainers' responses to the earlier questions had meant that many had already declared both an interest in and focus on the maturity (mental) of the horse and preparation of the horse mentally which meant that many ( $n=28/37$ , 75.7%) did not offer any further comments. Of those who did ( $n=9/37$ , 24.3%) their comments were consistent in suggesting that this was not only considered to be important but also a goal of all training activity (see Table 28). Trainers again made reference to the "happy horse" and their responses suggested that the happy horse will be one where the horse is mentally prepared to cope with the demands of training and racing.



**Table 28**

***Comments Regarding the Need to Work to Prepare Horses Mentally (N = 9)***

T04: yes, aiming at the happy horse via change
T05: yes, and the impact of consistently failing to perform can be demoralising
T07: yes, doing that all the time, routine in the stable
T24: yes, most definitely, just as important as the physical preparation [of the horse] mentally is about not taking giant steps, slow, progressive, routine, constant observation of how the horse is doing in the stables, is it bright and doing well or is it a little bit off?
T26: there is pressure from owners and the industry, for example 2 year old racing means there are huge dollars on offer and an expectation from owners to get an early return
T28: yes the horse needs to be ready to race mentally
T30: yes do it constantly, goes hand in hand with training for physical fitness
T31: yes, the horse needs to be mentally strong, bombproof, trainable, sensible, copes, a bombproof horse [is one that] copes with any conditions
T35: yes, [you have to] train them mentally, each horse is an individual, could put them over the jumps, you could swim them to calm them, access to yards is huge, the horse that won't eat won't do well in a box

### 3.16 Methods to Manage Unwelcome Behaviours

Trainers were asked to rate how often across the last racing season they had used each of a number of specified methods in their management of unwelcome behaviours. The frequency of the use of each method was rated by trainers as either “never”, “sometimes”, “frequently” and “routinely”.

It was thought that frequently would be used to rate methods that may be used often. This would be more than “never” or “sometimes”. Routinely would be used when the methods listed were part of the trainers’ standard practice. Trainers’ responses suggested that this difference was understood and also meaningful. Information gathered during the pilot phase highlighted the importance of routine and routine practices in horse management.

### **3.16.1 Consultation with Other Professionals**

Regarding consultation with other professionals, the most frequent and routine consultations were with a senior horseman (frequently  $n=7/37$ , 18.9%; routinely  $n=18/37$ , 48.6%) or animal learning/behaviour specialist (frequently  $n=2/37$ , 5.4%; routinely  $n=22/37$ , 59.5%; see Table 29). Trainers' responses indicated that the vast majority saw themselves as animal/behaviour specialists. All trainers who confirmed the response category routinely indicated that the animal behaviour specialist being rated was them. Further, some of those trainers who responded "never" provided the qualification that this was because they viewed themselves as having this particular expertise. Combining these results, a minimum of  $n=24$  of the 37 trainers (64.8%) viewed themselves in their role as trainer as an animal learning/ behaviour specialist. This was not the same for consultation with a "senior horseman", where four trainers reported viewing themselves as the senior horseman.

Over two thirds of trainers (70.3%,  $n=26/37$ ) reported that they had "never" or only "sometimes" consulted with a veterinarian about a behaviour related problem. Routine consultation with a veterinarian about behaviour related issues was reported to occur by 13.5% ( $n=5/37$ ) of trainers.

Seven trainers made mention of other professionals that they had consulted over the last racing season to provide assistance to them in their management of unwelcome behaviours. These were in order of frequency "other trainers" ( $n=2$ ), "dentist" ( $n=2$ ), "track work rider" ( $n=1$ ), "owner" ( $n=1$ ), farrier ( $n=1$ ) and acupuncturist ( $n=1$ ).

There were no statistically significant correlations between frequency of consultation with other professionals and trainer years of experience.

**Table 29*****Frequency of Consultation with other Professionals in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Veterinary consultation	27.0	43.2	16.2	13.5
Return horse to breaker	21.6	67.6	2.7	8.1
Senior horseman	5.4	27.0	18.9	48.6
Chiropractor	27.0	43.2	5.4	24.3
Animal learning/ behaviour specialist	27.0	8.1	5.4	59.5

**3.16.2 Changes to the Horses' Routine**

All trainers reported that their management of unwelcome behaviours involved changes to the exercise routine of the horse and rider interventions (change of rider, specific instruction to rider, use of a consistent rider; see Table 29). Well over three-quarters of trainers (86.5%,  $n=32/37$ ) reported that these interventions were used either frequently or routinely. The type of change to the exercise routine was reported to be just as likely to take the form of an increase in work ( $n=6/37$ , 16.2% reported as frequently) as a reduction in work ( $n=7/37$ , 18.9% reported as frequently). Trainers' comments here emphasised the importance of individualised assessment and management. Increased variety in the routine of the horse was undertaken frequently or routinely by just under three quarters of trainers (70.3%,  $n=26/37$ ). Opinions regarding changes to feed (type and/or schedule) and the stable routine were fairly evenly distributed across ratings categories. Regarding changes to feed, just over half (51.4%,  $n=19/37$ ) of the trainers reported this to be a frequent or routine strategy used, while an almost equal number (48.6%) reported use of the strategy only sometimes or never. A similar result was found for change to the stable routine, just under half (48.6%,  $n=18/37$ ) of trainers rated use of this strategy as routine or frequent, the remaining 51.4% reporting its use as sometimes or never. It was clear from the pattern of trainers' responses that changes in the exercise routine were viewed as separate and different to change to the stable routine.

The number of trainer years of experience was significantly positively correlated to the frequency of several different strategies of changing the horse's routine. Specifically, increased variety in routine ( $r_s = 0.40, p < 0.05$ ), reduction in work ( $r_s = 0.35, p < 0.05$ ), increase in work ( $r_s = 0.35, p < 0.05$ ), and change of rider ( $r_s = 0.34, p < 0.05$ ) were all associated with greater years of trainer experience.

**Table 30**

***Frequency of Use of Changes to the Horses' Routine in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Increased variety in routine	10.8	18.9	21.6	48.6
Change to exercise routine	0.0	13.5	32.4	54.1
Change to stable routine	27.0	24.3	13.5	35.1
Reduction in work	10.8	18.9	18.9	51.4
Increase in work	5.4	29.7	16.2	48.6
Change of rider, specific instruction to the rider, use of a consistent rider	0.0	13.5	16.2	70.3
Change to feed, type and/or schedule	10.8	37.8	10.8	40.5

### **3.16.3 Change of Environment**

All trainers reported that their management of unwelcome behaviours would include sending the horse to the paddock at least sometimes (27.0%,  $n=10/37$ ), with the majority (73.0%,  $n=27/37$ ) reporting that this would be done either frequently or routinely (see Table 31). All but one trainer (2.7%) reported that they would change the stall in the stable at least sometimes, with just over half (51.4%,  $n=19/37$ ) of trainers reporting use of this strategy either frequently or routinely.

Increased frequency of the use of change of stall in the stable was associated with greater years of trainer experience ( $r_s = 0.34, p < 0.05$ ).

**Table 31**

***Frequency of Use of Changes to the Horses' Environment in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Send the horse to the paddock	0.0	27.0	18.9	54.1
Change stall in the stable	2.7	45.9	13.5	37.8

### **3.16.4 Modification of Training Methods**

All trainers reported the use of gear changes in their management of unwelcome behaviours at least sometimes, with over half (56.8%,  $n=21/37$ ) reporting their use as either frequent or routine (see Table 32).

All but one trainer (2.7%) reported the use of graded exposure at least sometimes, with over three quarters of trainers (78.4%,  $n=29/37$ ) reporting use of this strategy either frequently or routinely.

All but two trainers (5.4%) reported that they would develop a behaviour management program at least sometimes, with approximately two-thirds of trainers (64.9%,  $n=24/37$ ) reporting use of this approach either frequently or routinely.

All but two trainers (5.4%) reported that they would look to vary speeds and distances in training at least sometimes, with over two thirds of trainers (70.3%,  $n=26/37$ ) reporting use of this approach either frequently or routinely.

Of the four modifications to training methods investigated graded exposure was the method most frequently reported to be used in a routine manner, followed by varying speeds and distances in training, development of a behaviour management program and finally the use of gear changes (see Table 32 for details).

None of the frequency of use of modification of training method variables was associated significantly with trainer years of experience.

**Table 32**

***Frequency of Use of Modification of Training Methods in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Varying speeds, distances in training	5.4	24.3	10.8	59.5
Develop a behaviour management program	5.4	29.7	10.8	54.1
Graded exposure/ habituation e.g. gradually introduce the horse to crowd noise	2.7	18.9	13.5	64.9
Gear changes	0.0	43.2	21.6	35.1

### **3.16.5 Medical Intervention**

Responses showed that surgery was not commonly used in the management of unwelcome behaviours with over half (59.5%,  $n=22/37$ ) of all trainers reporting that they had never used surgery for this purpose with a further third (32.4%,  $n=12/37$ ) reporting its use sometimes (see Table 33).

While 86.5% of trainers ( $n=32/37$ ) reported using medication as prescribed or recommended only 27.0% ( $n=10/37$ ) used it frequently or routinely.

Neither frequency of use of surgery, nor use of medications were significantly correlated with trainer years of experience.

**Table 33*****Frequency of Use of Medical Intervention in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Surgery	59.5	32.4	5.4	2.7
Use of medications as prescribed/ recommended	13.5	59.5	8.1	18.9

**3.16.6 Management through Selection of Certain Race Venues**

Management of unwelcome behaviours in racing through venue selection in an attempt to reduce any impact was a strategy reported to be used by over three quarters of trainers (81.1%,  $n=30/37$ ; see Table 34). This was not significantly correlated with trainer years of experience.

**Table 34*****Frequency of Use of Selection of Race Venues in the Management of Unwelcome Behaviours (N = 37)***

	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Selection of certain race venues to reduce the impact of the unwelcome behaviour	18.9	27.0	10.8	43.2

**3.16.7 Positive and Negative Reinforcement**

Food rewards were not reported by trainers to be a favoured approach in their management of horses showing unwelcome behaviours. The majority of trainers (86.5%,  $n=32/37$ ) reported that they never used food rewards (see Table 35). One trainer (2.7%) reported the frequent use of food rewards and no trainers reported routine use.

Other methods of positive reinforcement such as verbal praise were reported to be used routinely by 75.7% ( $n=28/37$ ) of all trainers, with 94.6% ( $n=35/37$ ) reporting use either frequently or routinely in their management of unwelcome behaviours. Negative reinforcement was reported to be used routinely in managing unwelcome behaviours by approximately half (51.4%,  $n=19/37$ ) of trainers. Just under two thirds (64.9%,  $n=24/37$ ) of all trainers reported using negative reinforcement either frequently or routinely.

None of the use of rewards or punishments variables were associated with trainer years of experience.

**Table 35**

***Frequency of Use of Positive and Negative Reinforcement in the Management of Unwelcome Behaviours (N = 37)***

<b>Positive and Negative Reinforcement</b>	<b>Never (%)</b>	<b>Sometimes (%)</b>	<b>Frequently (%)</b>	<b>Routinely (%)</b>
Use of food rewards	86.5	10.8	2.7	0.0
Positive reinforcement e.g. verbal praise	5.4	0.0	18.9	75.7
Negative reinforcement e.g. withdrawal of pressure	5.4	29.7	13.5	51.4

Three trainers mentioned another option for management of unwelcome behaviours. Two trainers mentioned the use of the pony, sent out to help settle the horse that has become too wound up after being worked. One trainer, following answering the section that asked about consultation with other professionals, added that he would “talk with colleagues about the problem”.

Again trainers made reference to the happy horse and how this might be used as a benchmark for all management decisions and any change. For one trainer (T07) this view was as follows:



if behaviour changes there will always be a reason, if the horse is settled in and happy, they will talk to you through the feed tin.

After answering the questions about management one trainer (T20) commented on how other factors can have an influence:

yes but you have got to learn to train the owner before the horse, this is difficult where money is concerned, you can have the ideal situation but then there are factors such as owners.

### 3.17 Retirement or Discontinuation of Horses Over the Previous Racing Season Due to Behaviour-Related Issues

Approximately two-thirds of the trainers (64.9%,  $n=24$ ) reported that of the horses retired or discontinued over the previous racing season, none were due to behaviour related issues (see Table 36). The proportion of horses retired or discontinued was not correlated with trainer years of experience.

**Table 36**

***Proportion of Horses Retired or Discontinued over the Previous Racing Season due to Behaviour-Related Issues Presented by Stable Size<sup>22</sup> (N=37)***

	<b>Total (<math>n=37</math>) % (<math>n</math>)</b>	<b>Small stables (<math>n=20</math>) % (<math>n</math>)</b>	<b>Large stables (<math>n=17</math>) % (<math>n</math>)</b>
None	64.9 (24)	65.0 (13)	64.7 (11)
0-1%	13.5 (5)	20.0 (4)	5.9 (1)
1-5%	10.8(4)	0.0 (0)	23.5 (4)
5-10%	5.4 (2)	10.0 (2)	0.0 (0)
10-20%	2.7 (1)	0.0 (0)	5.9 (1)
30-50%	2.7 (1)	5.0 (1)	0.0 (0)

<sup>22</sup> small stables are defined as  $\leq 40$  horses, large stables as  $> 40$  horses.

It is noted that there was wide variation in stable size. The number of horses in the stable might exert an influence on trainers' estimates of frequency. A review of the stable size where a frequency of between 30-50% was reported showed that this was one of the smaller sized stables, one in which only six horses were trained (see Table 36).

### 3.18 Poor Performance Due to Behaviour-Related Problems

Of those horses that showed poor performance (defined as the horse failing to reach a level of performance that would allow it to be competitive) over the last racing season behaviour-related problems were identified as the main cause in between 1-30% of cases by approximately a third of trainers (35.1%,  $n=13/37$ ; see Table 37). Just under two-thirds (64.9%,  $n=24$ ) of the trainers interviewed reported that behaviour related problems were not a main cause of poor performance. The proportion of horses with poor performance estimated by trainers was not significantly correlated with years of experience.

**Table 37**

***Estimated Proportion of Horses with Poor Performance due to Behaviour-Related Problems (N=37)***

	Frequency	Percent
None	24	64.9
0-1%	2	5.4
1-5%	4	10.8
5-10%	2	5.4
10-20%	4	10.8
20-30%	1	2.7

Trainers' comments indicated that lack of ability was the main reason for poor performance and discontinuation (T21):

none were due to behaviour problems, it was due to lack of ability. If a horse had a problem and was no good they would be out quicker, staff don't like them and you don't like them.

### 3.19 Loss of Performance Due to Behaviour-Related Problems

Of those horses that showed loss of performance (defined as a horse failing to reach a previously established level of performance) over the last racing season behaviour-related problems were identified as the main cause in between 1-10% (27.0%,  $n=10/37$ ) of cases (see Table 38). Just under three-quarters (73.0%,  $n=27/37$ ) of the trainers interviewed reported that behaviour-related problems were not a main cause of loss of performance. The estimated proportion of horses with loss of performance was not significantly correlated with years of trainer experience. Loss of performance was most usually linked to a physical problem or undiagnosed medical condition. A view expressed in the following comment (T21):

this [loss of performance] is usually a deep seated, chronic medical problem, "bleeder", I had two shockers, eventually identified medical/physical problem, this is usually in younger horses.

**Table 38**

***Estimated Proportion of Horses with Loss of Performance due to Behaviour-Related Problems (N=37)***

	Frequency	Percent
None	27	73.0
0-1%	2	5.4
1-5%	3	8.1
5-10%	5	13.5

After answering the questions about wastage some trainers reflected on the real commercial pressures that are present that can influence decisions around performance:

you can't carry them, poor performing horses, you do an assessment early and move them on, you might try to win with the horse and then move it on, race then down in class, at the provincial or country, there is a high standard at metropolitan level (T22)

it's about class, if the horse can't handle the level of competition, especially when metropolitan based, racing on the country circuit isn't really an option given the amount of prize-money (T27)

### 3.20 Attributes of a 'Good' Trainer

Trainers were asked to nominate the top three points that in their view make a 'good' trainer. It was observed that of all the questions asked this was the one with which trainers appeared to feel a little uncomfortable, but this was not to a level that prevented responding. The interviewer was able to observe trainers' levels of discomfort and learned early on to preface this question with the following phrase "now to the question that nobody likes". This appeared to work well to reassure trainers that a slight level of uneasiness when responding was normal.

Responses to the question of attributes which make a 'good' trainer, in order of frequency are presented in Table 39. The trainers who identified instinctual knowledge had significantly more years of trainer experience (mean 24.7, SD 15.0) than those who did not identify this attribute (mean 15.5, SD 9.9;  $t(35) = -2.21$ ,  $p = 0.034$ ). There were no other statistically significant differences in years of training experience by attribute.

**Table 39*****Attributes which make a 'Good' Trainer (N=37)***

	<b>Number of responses identifying the attribute</b>	<b>Number of trainers identifying the attribute</b>	<b>Proportion of trainers identifying the attribute</b>
Knowledge & understanding of the horse	27	21	56.8
Continual assessment and observation	20	18	48.6
Patience	14	14	37.8
Instinctual knowledge	11	11	35.1
Knowledge of feed	9	9	29.7
Horse placement	8	8	21.6
Hard work and dedication	6	6	16.2
Business skills/handling owners	5	5	13.5
Experience	4	4	10.8
Good horse	4	4	10.8
Good staff and owners	4	4	10.8

Over half of all trainers ( $n=21$ , 56.8%) reported that a good trainer will be one with a knowledge and understanding of the horse. Comments here emphasised the knowing of the individual horse, the understanding of the nature of the horse and application of this knowledge to condition the horse without 'hurting' it, to produce a happy horse and one that shows consistent performance over several seasons.

The second most frequently identified quality of a good trainer was assessment and observation skills ( $n=18$ , 48.6%). Comments here again emphasises individual assessment, continual observation of the horse to gather information about how the horse is going and to inform decision making, observation and assessment were described as routine activities.

Patience in a trainer was identified as an asset by just over one-third of trainers (37.8%). Comments here suggested that the trainer rely on their observation and

assessment and for them not to be in a hurry. This would require managing any pressures that could be present such as financial/commercial and from owners.

Several trainers suggested that the 'good' trainer was one that had an eye for the horse. This was defined by trainers as the ability to look at the horse and assess it, identify how it is going and the presence of any problem. These comments described what was coded as instinctual knowledge.

Trainers ( $n=9$ , 29.7%) identified knowledge about feeding the horse as important for a good trainer. Comments mentioned the need for a good knowledge about feed and the need to feed horses properly and in a way that is appropriate for their levels of exercise and work.

The importance of placing the horse well was mentioned ( $n=8$ , 21.6%). Trainers' comments spoke about the importance of placing each horse in the right race, where the horse can be expected to be competitive "in the right company" and even have an advantage. Good horse placement requires good judgement and accurate assessment of the ability level of the horse.

For some trainers ( $n=5$ , 13.5%) a good trainer in the racing industry of today is the one who possesses strong business skills.

Trainers also identified the value of experience ( $n=4$ , 10.8%), hard work and dedication ( $n=6$ , 16.2%), having a good horse to work with ( $n=4$ ) and also having good staff and owners ( $n=4$ ).

Examples of comments regarding aspects of a good trainer, presented by identified themes, are presented in Table 40.

**Table 40*****Examples of Comments Regarding Aspects of a Good Trainer***

<b><i>Knowledge and understanding of the horse</i></b>
T01: knowledge of the horse, knowing your individual horse
T07: great understanding of the horse and its nature and its behaviour, horsemanship
T08: understanding the horse and its nature
T30: understanding and knowing your individual horse
<b><i>Continual assessment and observation</i></b>
T03: constant assessment regarding where they are at
T25: assessing a problem, how to handle a problem
T26: observation, hard work, you need to spend as much time around them as you can. Be open minded, be open to new ways of doing things, they are all individuals
T27: be a hands on trainer, observation
<b><i>Patience</i></b>
T05: temperament, patience
T24: patience
T25: patience, not panicking and making rash decisions, given the commercial/financial pressures and owners
T35: not to be in a hurry
<b><i>Instinctual knowledge</i></b>
T14: eye for a horse
T20: [I'm] from the old school, train what you can see
T24: highly instinctual
<b><i>Knowledge of feed</i></b>
T08: expert in feeding
T18: knowledge of feed
<b><i>Business skills and handling owners</i></b>
T02: today it is the good businessman
T08: to be able to handle owners and their desires, need authority
<b><i>Horse placement</i></b>
T06: good knowledge of the racing game, planning and placement
T08: placing horses in the right race

### 3.21 Confidence in How Well Placed Trainers' Felt to Assess and Manage Behaviour Problems

All trainers rated their confidence in how well placed they felt they were to assess and manage behaviour problems as a '4' ( $n=2$ , 5.4%) or '5' ( $n=35$ , 94.6%) where 5 was 'extremely confident' and 1 was 'not at all'. This is consistent with the earlier finding where just under two thirds (64.8%) of trainers viewed themselves as an animal behaviour specialist. Trainer confidence was not significantly correlated with years of trainer experience.

Some trainers ( $n=11$ ) offered comments and these made mention of the value of experience whilst others identified aspects of the environment as limiting factors in this regard. One trainer suggested that these limitations could be overcome, at least in part by having access to yards. Another trainer commented as follows (T21):

I am competent [up] to a point, but also aware of my limitations. For example, if other people are better qualified and quicker [it would make sense to] send the horse if you can get a better result. We are not set up for bad horses with bad temperaments. At this track there are 800 horses in work, [the environment] is busy, frantic, you can't grade exposure and this can be a factor for some horses.

### 3.22 Trainers' Perceptions of Other Aspects Which Would Assist in the Management of Unwelcome Behaviours

Just over half of the trainers ( $n=19/37$ , 51.4%) responded to an open-ended question which asked if there was anything that would further assist them in the management of unwelcome behaviours. Those who did or did not respond to this question did not differ significantly in terms of years of training experience. Themes emerging from these comments are presented in Table 41.

Responses in order of frequency were as follows: more resources on track ( $n=9$ , 24.3%) such as a bull ring, bigger/wider barriers for training, open barriers and loading bay access at the track (this was particular to one of the track sites). Access to yards at the racecourse ( $n=4$ , 10.8%) as an alternative to boxes in the stables was mentioned and seen as another measure offering increased scope to manage the horse



at the track rather than transporting them out to another facility for a period. Trainers also highlighted that fact that they are training within the environmental and time constraints of the racecourse ( $n=3$ , 8.1%); typically access to the track is restricted to the early hours of the morning up to about 9.00am when the track is closed.

Consequences associated with this were operating in a busy environment, being forced to rush things through with limited time for follow-up, with one trainer indicating that these factors combine to mean that trainers with stables on track are “not set up for bad horses or those with bad temperaments”(T21). For example (T21):

I would like some horses to be broken-in on the racetrack but this is no longer possible, not allowed. It is difficult to have a pony, work a lot of horses off a pony, but there is nowhere to do this given the pressures, so we lead them on slow work mornings and keep the saddle off.

Trainers also identified the need for a better standard of strappers and track work riders ( $n=3$ , 8.1%) if early intervention to manage problem behaviours is to be effective, “the problem horse needs to be matched with a good strapper, you don’t want an inexperienced person handling a problem horse” (T27) and “a better standard of track-work riders, so that the skill level of the rider can be matched to the horses’ level, early intervention to address a problem requires riders with a range of skill levels” (T03). Other factors mentioned included improved breaking-in (2.7%,  $n=1$ ) and a better knowledge of the history of the horse (2.7%,  $n=1$ ). The mention of these factors that would assist with the management of unwelcome behaviours was not associated with years of training experience.

Some of the trainers who responded “no” when asked if there was anything that would further assist them in their management of unwelcome behaviours, went on to express a view that the racetrack is not the place to undertake correction of behaviour related problems. This view was expressed as follows, “on-track facilities are adequate, if problem remove them to the breaker”(T08) and “I do not believe that the on-track race stables are the right environment for re-educating horses, send them away where they can relax and learn” (T14). Along these same lines another trainer spoke of using an adjunct training facility not based on-track to “correct” behaviour (T36). Other

responses , whilst acknowledging some limitations to facilities emphasised the need for the horse to cope, “facilities are as good as they can be, the horse has to cope”(T31) and “you can always change the facilities, but at the end of the day horses are here to be trained to race, so they need to learn to cope”(T29). One trainer spoke about limited space but also commented that “country horses [who] have greater space do not live up to their potential” (T06).

**Table 41**

***Themes Emerging from Comments Regarding Other Aspects which would assist in the Management of Unwelcome Behaviours***

	<b>Frequency</b>	<b>Percent</b>
Resources on track	9	24.3
Access to yards	4	10.8
Better standard of track-work riders/strappers	3	8.1
Improved environment and time	3	8.1
Knowledge of history of horse	1	2.7
Improved breaking-in	1	2.7

### 3.23 Trainers’ Perceptions of Changes to the Rules of Racing That Would Assist in the Management of Unwelcome Behaviours

Approximately half of the trainers ( $n=18/37$ , 48.6%) responded to an open ended question and offered ideas for recommendations or changes to the rules of racing that they believed could assist them in their management of unwelcome behaviours (see Table 42). There were no significant differences in trainer years of experience between those who did or did not identify changes to the rules of racing that would assist in the management of unwelcome behaviours.

**Table 42*****Trainers' Perceptions of Changes to the Rules of Racing that would assist in the Management of Unwelcome Behaviours (N=37)***

	Frequency	Percent
Rules regarding barriers	11	29.7
Extended hours of access to track to assist with education	4	10.8
Increased race day handlers and ponies	4	10.8
Increased consultation with trainers on proposed rule changes	2	5.4
Review rules about therapeutic medication use	2	5.4
Rules emphasise the welfare of the animal	2	5.4

The area that drew most comment ( $n=11$ , 29.7%) was the barriers. There was concern expressed about horses being left to stand for too long in the barriers, barrier design that does not open at the front, calls for some increased flexibility in loading rules to allow known “difficult” or “troublesome” or “claustrophobic” or “unruly” horses to be loaded later or early, insufficient barrier attendants and ponies (this was noted to be at odds with practices in other racing countries such as Japan and the United States).

Typical comments here included:

the barriers, some horses are claustrophobic, this is known at the barrier trials, these horses must be allowed to load last (T33)

change the barrier loading rules, every horse could be graded with the trainer and stewards, if we know that a horse is claustrophobic then why would we deliberately stress it, this is about the welfare of the horse, also concern about jockey abuse (T18)

difficult horses should be allowed to go into the barriers late, a more sympathetic attitude reflecting an understanding of the horse and its nature (T11)

the Racing NSW barrier policy, should be allowed to load problem horses last, currently they take too long and hold them too long, need more ponies and attendants (T26)

Several trainers ( $n=4$ , 10.8%) called for an extension to track hours to help with the education of the horse as follows:

time educating the horse in the barriers, typically one hour for education and one hour for jump-outs, there may be 700 horses so this is inadequate, with education it takes as long as it takes, as long as you need to get the job done (T22)

to allow younger horses to concentrate better, babies can concentrate and attend better when quiet and learn better, shut down over-stimulation (T04)

Amongst those trainers that did not suggest rule changes ( $n=19/37$ , 51.4%) reasons for this were given by some ( $n=11/19$ ). Again there was the idea that the “horse need to learn to cope”, and there was also mention of the commercial realities of racing and their impact leading to the following remarks:

there are (changes to the rule of racing that would be helpful in the management of unwelcome behaviours) but it would be unfair to reward/penalise other horses, not able to address the specific needs of one horse unless the rules can be applied across the board (T36)

the rules aim at keeping it fair and even, they get it right more often than not, racing is a sport that is gambled on so it is up to the trainer to present the horse in a fit state to race mentally and physically (T13)

No, the rules are adequate, commercial pressures are a reality (T05)

Of those that did not suggest rule changes, some ( $n=5$ ) made comments that were complimentary as follows:

use jump out staff on Tuesday and use this to educate the horse, then these same staff are the barrier attendants on race day (T15)

we have a great governing body and they are trying (T16)

the rules are pretty good, you can appeal to the stewards (T24)

pretty good (T25)

fine, good (T31)

### 3.24 Trainers' Further Comments

The final question in the interview asked the trainer if he would like to make any further comments. The offer to make final comments was accepted by just under half of all trainers ( $n=17/37$ , 45.9%). Only those comments that either presented a new idea or added something to what had already been reported are presented.

One trainer, reflecting on the development of behaviour problems in the thoroughbred racehorse further emphasised the importance of the breaking-in stage by suggesting that horse breakers to the thoroughbred racing industry be regulated (T04):

breakers should be controlled, if a horse learns the wrong thing then they will have leaned bad habits

This sentiment was also expressed by another trainer who made the following comment during interview (T14):

breaking-in is very important, one size fits all doesn't work, given its [breaking-in] importance and the importance of perception [of the industry] it should be regulated

For another trainer the impact of behaviour problems, despite being low frequency was keenly felt on the racing stable (T12):

behavioural problems have a minimal impact [on the horse and its performance], [they may be] low frequency but can have a severe impact and be a major issue in the stable, may only be 1%, but involves owners and staff and can be time consuming

One of the less experienced trainers, having been training for less than 5 years reported few difficulties with behaviour problems (T28):

I have been training for 3 ½ years and don't have a problem. The level of breakers are improving, they are charging a lot more but they are doing a more thorough process, also breaking and pre-training before the horse comes into the stable

This view was also captured in the comments of another more experienced trainer who emphasised better management of the horse in the early period as having a positive influence on behaviour and behaviour related problems (T17):

things are done now that help behaviour. There is a standard now, early preparation for weanling sales, so they [horses] are better managed in the early period

### 3.25 Trainers' Perceptions of Changes to Industry Practices

After completion of the first six interviews the investigator noticed that five of these trainers had made comments at various points during the interview about changes to industry practices that they believed had resulted in an overall reduction in rates of behaviour related problems compared to the past. Examples of these comments from the early interviews are provided below:

99% of horses are fine, horses are boxed from 1 to 2 years [of age], they are easier to break in with so much handling compared to a two year old from the paddock (T02)

well bred horses are looked after like royalty, any problems are 80% manmade, now they are getting in early, [there is] more consistent handling compared to 10 years ago, now you can nearly jump on them at the sales (T04)

every horse is an individual, [the] ratio of 1 staff member to every 4-6 horses [is the] same as the ratio of bigger stables, 90% of horses have had a yearling education, lead, drenched and human interaction. Horses come to trainers almost broken in as a result of their yearling preparation (T05)

behavioural problems have reduced and are different , horses are better educated and this education starts earlier (T06)

Given the consistency of this theme, the investigator prepared an additional question that was asked to all remaining trainers ( $n=31$ ) (at the end of the interview, after final comments) if they had not, at some point made a comment related to this issue. The question was worded as follows:

*If I was asking these same questions about behaviour related problems and their frequency 10 years ago would the situation have been the same?*

A total of 24 trainers were asked the additional question at the end of the interview. One trainer did not have the opportunity to comment as he was one of the first six trainers. Of the 36 trainers, one did not answer and a further three provided responses that were not directly related to the question. Of the remaining 32, the vast majority ( $n=31/32$ , 96%) responded by speaking to a trend for improvement and a reduction in the level of behavioural problems seen when compared to 10 years ago.

One trainer agreed that there had been change to industry practice but did not feel that this had led to any difference in behaviour related problems and their frequency but had created a different problem:

there have been no significant differences over time, in my view horses are confined and handled way too much, they are weaker than they used to be in their constitution and soundness (T11)

if a horse is badly handled when they are young or miss an early education, the horse can be difficult. The current scene, [we have] yearling sales, horses are prepared for the yearling sales so I feel that things have improved over time, [horses are] better bred and better cared for, you don't see badly bred horses today like you used to (T07)

horses are better educated, better prepared for horse sales, increased handling (T08)

compared to 10 years ago, everything has improved dramatically (T14)

I agree that you are seeing less behavioural problems, everything is better, especially improved horse breakers (T23)

behaviour problems were more common 20 years ago. There has been change, the breeding industry is now financially viable and strong, with increased dollars spent on rearing and nurturing, which has equalled a better product (T24)

I agree that rates of problem behaviours are reduced compared to 5-10 years ago, now I buy from the sales, horses are already half broken in. This is very different to the home bred with no collar, horses are better bred, they come off the big studs where they have been professionally handled and bred (T27)



## Chapter 4: Discussion

The initial impetus for this study was the fact that high rates of wastage (horses being lost to the industry) have been consistently reported in the thoroughbred racehorse population. Other studies have focussed almost exclusively on physical or veterinary causes of wastage and there has been little or no investigation of behaviour-or temperament-related factors. Wastage studies have looked across the lifespan of the horse (including reproductive losses); however, the current study focussed on horses in training and racing. There are several reasons why behaviour and temperament could be considered as contributors to wastage:

1. *genetics*: the thoroughbred is a product of selective breeding which has led to an intensification of breed characteristics, including a highly strung/reactive temperament type;
2. *environment*: intensive management, which has been shown to be associated with the development of abnormal behaviours such as stereotypies, and studies have documented higher rates of these problem behaviours in thoroughbreds when compared to other horse breeds;
3. *discipline specific demands*: stresses are associated with the demands and pressures of athletic training and performance in the discipline of flat-racing;
4. *industry specific demands*: thoroughbred racehorse trainers are part of the industry with a unique set of pressures and demands where success is related to performance.

The current study provides a valuable and unique insight into the views of 37 Australian thoroughbred racehorse trainers with regard to behaviour-related problems and temperament and the impact of these on horse preparation, training and racing. Trainers recognised that they were challenged with managing the horse in a less than ideal environment and the need for focus on mental as well as physical preparation. They identified both abnormal and unwelcome behaviours and recognised temperament as an important factor in racehorse performance. They recognised these factors as potential contributors to wastage but also reported confidence in their ability to mitigate this through skilled management.

## 4.1 Behaviour-Related Problems in Thoroughbred Racehorses in Training and Racing

### **Research question 1.**

### **Do thoroughbred racehorse trainers report behaviour-related problems in thoroughbred racehorses in training and racing?**

#### **The breaking-in stage**

Quality breaking-in was described as being fundamental to the horse and its adjustment to racing, with trainers consistently reporting that a horse could not be trained if it was not well educated at this stage. This is in agreement with the literature that identifies breaking-in, or foundation training (McLean, 2003), as providing the basic responses upon which discipline specific training can be added. Trainers' reports of what the breaking-in stage teaches the horse, i.e., education and preparation to cope with life as a racehorse, confidence, acceptance of the rider/human and mouthing, were also consistent with the literature (McLean, 2003). The association reported by trainers between poor quality breaking-in and increased difficulties in training and an increased likelihood of problem behaviour is also in accordance with research findings. For McGreevy and McLean (2005) inadequate foundation training can be associated with an increase in behaviour problems and higher rates of wastage for behavioural reasons. Despite recognition of the importance of this educational stage, there are no published studies looking directly at the breaking-in stage in the thoroughbred racehorse and its relationship to measures of performance and behaviour problems.

In terms of industry practice there is no current regulation of, or registration for, horse breakers who service the thoroughbred racing industry. The Australian Racing Board (ARB) former CEO, Mr A. Harding, advised that the ARB had never considered the issue of licensing people who break-in horses. He offered his opinion that breaking-in was an "ancillary activity" and stated that regulation of this area not "necessary or feasible" i.e. not an area for industry regulation (personal communication).<sup>23</sup> The implications

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<sup>23</sup> The researcher contacted the CEO of the ARB, Mr A. Harding, and was advised of his views on this matter in writing (4<sup>th</sup> July 2012).

of this are not clear; however on a practical level trainers reported that they influence this stage, where possible, by using their preferred breaker(s).

For McGreevy (2005) improved breaking-in or foundation training may improve the high wastage rates in the racing industries. Given the importance of the breaking-in stage, future research is indicated. This might include investigation of the specifics of the breaking-in stage for thoroughbred horses being prepared for flat racing, the extent to which methods used are consistent with principles associated with learning theory and its application, feedback from breakers about any difficulties encountered (such as those associated with temperament) and wastage due to behaviour and temperament associated with this stage. It might also be informative to seek information from breakers about the number of horses that are returned to the breaker and the reasons for this, as such information may highlight areas where current management practices can be improved. It has been suggested that behaviour problems can be rectified if the horse is returned to the breaker and basic responses retrained (McGreevy & McLean, 2007). A report investigating causation of injuries to humans that result from working with horses in the Victorian thoroughbred horse racing industry offered the following recommendation: “given the key role that they may play in establishing behaviour patterns and traits within animals they work with, it is recommended that consideration be given to the licensing and accreditation of horse breakers and pre-trainers” (Cowley, Bowman, & Lawrance, 2006, p. 35). An improved evidence base may provide guidance to the thoroughbred racing industry and its practice and policy in this area.

### **Racehorse initial entry into training stable**

The vast majority of trainers reported that horses showed a low frequency of unwelcome or abnormal behaviours on entering the stable for the first time, and that these were mild in severity. This finding appears to contrast with reports of the onset of stereotypic behaviours, such as weaving, being associated with changed environments and reports of high prevalence of stereotypies and other abnormal behaviours in horses stabled for the first time (Waters et al., 2002; Visser et al., 2008). It is of note that stereotypic behaviours may be the result of acute stress as well as the response to chronic frustration (Luescher et al., 1991), so the emphasis in the current study on behaviours at ‘initial entry’ to the stable would not necessarily explain the

low reported frequencies of stereotypies. Trainers reported the low frequency of problem behaviours was different to what might have been seen in years past and attributed this to current industry practice that emphasises the preparation of young horses (weanlings, yearlings and 2 year olds) for sales. In Australia there have been no recent studies investigating prevalence rates of behaviour problems. However, indirect support can be found in the study by Parker et al., (2008) that reports that breeders (this study included Australian breeders) report reduced rates of abnormal/stereotypic behaviours compared to prevalence estimates from 10 years ago. The writers conclude that this suggests that the industry may be adopting some of what research has suggested in terms of weaning and extensive management practices.

This explanation, that lowered rates reflect changes in industry practice, appears consistent with the view that deliberately preparing the horse for both aspects of its domestic life and for the specific discipline it will undertake could reduce stress and improve coping (Ladewig, 2005; Mills & Nankervis, 1999). Ladewig (2005) refers to “preventative ethology<sup>24</sup>” where the transition into adulthood will be facilitated by consistency between conditions of early rearing and later life. Exposing the animal to the right conditions at the appropriate developmental stage can reduce the risk of behaviour problems developing. Although within the industry horse preparation may be driven more by other factors such as maximising financial returns to the breeding industry, there is the potential for welfare benefits to the horse. Parkin’s (Parkin, 2009) suggestion of the advantages of early training and racing in 2 year olds may be an interesting parallel. Contrary to concerns that training and racing of young horses would be detrimental to their welfare, evidence showed that resultant increased bone and cartilage strength, and thus fracture prevention, could result. It appears that excessive early training may be detrimental, but that no preparation at all produces no specific strengthening of the musculoskeletal system and a greater potential for injury in racing. This is consistent with the findings from two Australian studies that have shown that horses that raced as 2 year olds had on average more starts and longer racing careers than those horses that first raced at 3 years of age or older (More, 1999, Bailey, 1997). Early education and discipline specific preparation, combined with

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<sup>24</sup> The scientific study of animal behaviour

quality breaking-in, could promote coping (the ability to thrive in the training environment) and build psychological resilience that may be associated with reduced frequency of problem behaviours and increased career longevity.

### **Trainers' views of the most common unwelcome behaviours**

Unwelcome behaviours were described by trainers but most reported fewer than the three behaviours asked for in the question. The most common behaviours reported were nervous/high arousal behaviours that were consistent with the temperament trait of “emotionality”, those associated with adjustment to new environment and routine, followed by stereotypic behaviours.<sup>25</sup>

The prevalence of temperament and adjustment-related behaviours in thoroughbred horses is difficult to obtain, and so comparisons with the literature are not possible. In terms of stereotypic behaviours, 89% of trainers in the current study could identify at least one horse in their stable displaying a stereotypic behaviour, which is similar to the 80% of racing stables having at least one horse with stereotypic behaviours reported by McBride and Long (2001). Frequency estimates provided by trainers for stereotypic behaviours were consistent with those reported in the literature for thoroughbred racehorses. Of the trainers who reported crib-biting/wind-sucking, the majority identified prevalence as between 1-10%, similar to the estimate range from 2.8% to 6.8% in other studies (Prince, 1987; McGreevy et al., 1995; Luescher et al., 1998; Rebdo et al., 1998). The other most commonly identified behaviours were weaving and box-walking, with most trainers estimating the prevalence to be lower (1-5%), which is in line with other studies (weaving: 2.8% to 5.0%; box-walking 1.1% to 1.7%; Prince, 1987; McGreevy et al., 1995; Rebdo et al., 1998).

It was also found that trainers who reported the presence of one stereotypic behaviour often reported the presence of another. While the present study does not allow confirmation that the two stereotypies might be present in the one horse, this finding

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<sup>25</sup> In response to trainers' discussion of “unwelcome behaviours” the academic distinction made between unwelcome and abnormal behaviours (such as stereotypies) was not applied, nor challenged by the researcher which was consistent with the aim of promoting ‘user-friendly’ terminology and rapport.

does appear to be consistent with the literature that reports the presence of one stereotypy increases the chances of a second (Mills et al., 2002).

## 4.2 The Impact of Behaviour-Related Problems in Horses in Training and Racing

### **Research question 2.**

#### **How do thoroughbred racehorse trainers view any/the impact of behaviour-related problems in horses in training and racing?**

Following on from questions regarding behaviours and their prevalence, trainers were asked about the impact of behaviour-related problems on training and racing. The majority of trainers perceived stereotypic and aggressive-type behaviours as having either no or a mild impact on the horses' ability to succeed in training and racing. For each of the stereotypic behaviours reviewed, at least some trainers rated the behaviour as having a moderate or severe impact. These findings of variable impact ratings suggest that each of the behaviours can be present to varying degrees and the impact may reflect dimensions of intensity and severity. For instance, about as many trainers rated box-walking as having no or mild impact as rated it as having a moderate or severe impact. Further elucidation of causes of stereotypies and factors involved in their maintenance and severity might assist in the assessment of welfare and performance implications.

Shying and over-racing were recognised by the majority of trainers as problematic evasive behaviours, and were considered by many trainers to be quite prevalent amongst their horses (e.g., occurring in more than 20% of horses in their stable). In terms of impact, shying was viewed as being less problematic than over-racing. While two-thirds of trainers observed barrier problems in their horses, the estimated prevalence amongst their horses was lower than for shying and over-racing. Though considered relatively uncommon, when present, barrier problems were seen to have a substantial impact on performance, with 60% of trainers rating impact as severe. Although prevalence estimates of problem behaviours are important, they are only one component of the issue. They can only be properly understood within the context of

the discipline-specific demands placed on the horse and the required performance. Importantly, prevalence does not provide information on the implications of behaviours for the trainer. Results from the current study clearly demonstrate a disconnect between the prevalence of evasive behaviours and their perceived impact. Where behaviours impact negatively on performance there is potential for wastage. Studies need to move beyond simply ascertaining the prevalence of problem behaviours to include the wider assessment of the impact of these problems and hence delineate their contribution to wastage.

### 4.3 Strategies Used by Thoroughbred Racehorse Trainers in the Management of Horses with Behaviour-Related Problems

#### **Research question 3.**

#### **What strategies do thoroughbred racehorse trainers use in their management of the horse with behaviour-related problems?**

The findings of this study suggest that thoroughbred racehorse trainers recognise that they are managing the thoroughbred racehorse in an environment that presents a number of challenges. Trainers report that training needs to focus not only on physical conditioning but also on efforts aimed at preparing the horse mentally. All trainers in the current sample believed mental preparation of the horse was as important as physical conditioning, which is perhaps surprising given the lack of attention to this aspect in the literature. Trainers made reference to the “happy horse”<sup>26</sup> and identified this as one goal of all management and training activity. For trainers the “happy horse” was the horse that was well adjusted, bright, settled in the stable and eating well. Trainers reported continual assessment of each horse relative to this standard. A horse that showed signs that were not consistent with the “happy horse” norm would require closer observation and assessment and would often prompt a change in management practice. This trainer-generated concept of the “happy horse” impressed

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<sup>26</sup> The concept of the “happy horse” offered here by trainers should not be confused with the Fédération Equestre Internationale’s (FEI) “happy athlete” as outlined in their Rules for Dressage Events Article 401.1: The object of Dressage is the development of the Horse into a happy Athlete through harmonious education. As a result, it makes the Horse calm, supple, loose and flexible, but also confident, attentive and keen, thus achieving perfect understanding with the Athlete.



as providing a useful concept for further development. This could include attempts to develop the “happy horse” ideal to provide a baseline or reference point against which the significance of deviations and behaviour change could be assessed.

Another view expressed by the majority of trainers was the emphasis on the individual horse and individual assessment and management. This was continually articulated directly and in response to questions where the trainer indicated a reluctance or difficulty generalising due to individual differences. This view is consistent with the literature that emphasises individual differences; for instance McGreevy’s (2004) guidelines for evaluating behaviour problems is centred around development of an individual behavioural profile. Trainers’ understanding of the importance of individualised management contrasts with typically reported negative perceptions of the thoroughbred horseracing industry (Animals Australia; Randle, 2010).

One of the main rationales for targeting trainers for interview on the topic of management was evidence suggesting that trainers employ successful training techniques (McLean, 2003). However, it is understood that this expertise is generally developed through experience and what might be referred to as “instinctual knowledge” rather than formal educational training (Goodwin, et al., 2009). The vast majority of trainers in the current study indicated that they viewed themselves as an “animal learning/behaviour specialist”. This finding was somewhat unexpected, as the term was defined and intended by the investigator to refer to a person with specific formal training and knowledge in the area of learning theory and the application of those principles to animal behaviour and behaviour modification. In contrast, only four trainers viewed themselves as being a “senior horseman” yet all trainers rated themselves as being either “very” or “extremely” confident in their ability to assess and manage behaviour problems in their horses. The extent to which this confidence is justified, or is a reflection of attitudes borne in an environment with expectations of success and where reputation is paramount, is unknown. However, trainers often described management techniques that would appear consistent with good practice based on learning theory. The vignette method, whereby a sample of trainers are all presented with the same case and asked their opinion on management strategies, would allow for closer investigation of actual knowledge base.

Consistent with trainers' views of their own skillset, consultation with veterinary surgeons in regards to a behaviour problem was not routine. This may also reflect the impression provided from veterinarians themselves in the pilot study - namely that behavioural aspects of equine care are not their focus. It is also in line with data from Buckley, Dunn, and More (2004) where owners of pony club horses reported consultation with a veterinarian about behaviour-related problems to be a "last resort" option and with the veterinarian being seen as a disease expert, rather than an 'animal health' expert. This lack of consultation is interesting given the current emphasis on developing equitation science and the focus within this area on veterinarians improving their assessment and knowledge skills around behavioural problems (McGreevy, 2004).

Despite focus on individual assessment and tailored management, routine development of a behaviour management program was reported by just over half of the trainers, with a further 11% claiming to do this frequently. Approximately two-thirds of trainers would use graded exposure on a routine basis. Other management strategies reported by trainers as used either frequently or routinely included changes to the exercise routine of the horse and rider interventions (e.g. change rider, use of a consistent rider). Sending the horse to the paddock was a strategy used by most trainers in a frequent or routine way. Less frequently employed management strategies included gear changes, returning the horse to the breaker, use of medications and surgery. Trainers were less consistent in their views regarding the use of changes to the stable routine, changes to feed type or schedule, changing the stall in the stable and selection of a certain race venue to reduce impact of behaviour, with approximately half using these strategies frequently or routinely, and half never or sometimes. These findings are interesting given that the expression of unwelcome behaviours has been reported to be influenced by a novel environment, which can produce either a worsening or improvement in the individual horse (McDonnell, 2005).

Throughout the interviews, and not just specifically in response to types of management strategies, trainers discussed the use of sending the horse to the paddock for varying durations (not just for official spelling). Although all trainers had their stables based at or near the racetrack, some reported that they had access, albeit

limited, to yards on site. This strategy has been reported to be associated with reduced levels of problem behaviour and improved performance in standardbred and thoroughbred racehorses (Drissler, 2006; McGreevy, et al., 1995). Yards on track have the advantage of avoiding stress associated with transport to a spelling facility (Waran & Cuddeford, 1995). The use of spells of short duration (between 2-3 weeks) has been shown to have little negative effect on cardiorespiratory and muscular fitness (Snow & Guy, 1979; Wilson, Thornton, Inglis, & Ainscow, 1987), so mental benefits may be achieved without significant loss to physical conditioning (Rose & Evans, 1990). It appeared that use of time away from the stable, whether for days or weeks, was routinely used in a preventative approach to assist an 'at risk' horse by reducing the negative impact of the stable environment.

The majority of trainers reported that they did not use food rewards, but they did report using positive reinforcement in the form of verbal praise. Negative reinforcement, most usually described as pressure release, was reported to be used frequently or routinely by just under two-thirds of trainers. Descriptions provided by a small number of trainers suggested that they understood the term negative reinforcement to be equivalent to punishment. When the standard definition of negative reinforcement was provided some trainers changed their response. Misunderstandings of the terms of learning theory have been shown amongst some equestrian coaches (Warren-Smith & McGreevy, 2008). Findings from the present study do not support the assertion by McLean and McGreevy (2004) that there is scant evidence of knowledge and application of the principles of learning theory by horse trainers. The investigator had considered asking questions relevant to this issue at the outset of the study; however, feedback received during the pilot stage had been very definite in suggesting that the use of learning theory terminology would not be well received by trainers and could jeopardise rapport. Thus the items regarding use of positive or negative reinforcement were minimal and defined in a way that did not emphasise technical learning terms.

It is not possible to interpret these results in terms of the appropriateness of specific strategies to particular behaviour problems. Broadly, responses appeared to indicate that trainers are using clear thoughtfulness around the issue and proactive management. This is consistent with the idea that trainers recognise that the stable

environment is inherently stressful and strategies that aim at restoring aspects of the horse's natural environment are likely to provide a level of stress reduction. A fixed list of management strategy options was presented to the trainers in the interview, but the only additional strategy raised was the use of a pony, suggesting that trainers judged that the list provided adequately covered their range of preferred techniques and strategies. Trainers' responses suggested that these terms were being understood in the way the investigator had intended. This does not necessarily mean that the underlying theoretical principles were also being fully understood (Goodwin, et al., 2009). Again, further study of the actual knowledge base of trainers with regards evidence-based management strategies for behaviour problems deserves further attention.

#### 4.4 Behaviour-Related Problems as Factors That Contribute to Wastage, Poor Performance and Loss of Performance

##### **Research question 4.**

##### **Do thoroughbred racehorse trainers identify behaviour-related problems as factors that contribute to wastage, poor performance and loss of performance?**

Despite trainers recognising the severe impact of some behaviour-related problems on performance, they did not report behavioural factors to be significant contributors to wastage. Most trainers (approximately three-quarters) did not identify behavioural problems as the main cause of wastage (discontinuation or retirement), poor performance, or loss of performance. Behavioural problems were cited as the main cause in only a minority of horses (between none to 1%). This apparent discrepancy could be due to recall bias, which may be affected by stable size. One trainer, for example, reported that of horses in his stable that had been discontinued the reason in 30-50% of cases was behavioural problems; further investigation of this report showed that this was one of the smaller sized stables, in which only six horses were trained. Another possible explanation is that trainers are 'primed' to think of wastage in physical terms as has been the tradition in the literature. As suggested by Hayek (2004), there is the potential for difficulty in nominating a single reason for wastage,

the primary cause sometimes being unclear, e.g., behavioural problem leading to injury and eventually resulting in wastage. Consequently, the separation of the physical from the behavioural needs to be a main goal in assessment (McDonnell, 2005; Randle, 2010). Furthermore, poor performance is typically viewed in terms of limited athletic ability, which is quite separate from behavioural problems. But equally plausible, the efficacy of management of behavioural problems may be such that wastage as an end result is avoided.

The study did not set out to gather precise data in this area but rather to explore trainers' views and identify trends that might inform future research. The majority of trainers did not report behavioural factors to be a *main cause* of poor performance or loss of performance. This does not mean that trainers did not view behavioural factors as *contributing* to poor performance or a loss of performance. Trainers' spontaneous comments about loss of performance suggested the role of a physical problem or undiagnosed medical condition which is consistent with the literature (Marlin & Nankervis, 2002).

#### 4.5 Temperament as a Factor in Racehorse Training and Performance and its Contribution to Wastage

##### **Research question 5.**

**Do thoroughbred racehorse trainers consider temperament to be an important factor in racehorse training and performance and does it to contribute to wastage?**

Temperament was viewed as an important factor in racehorse performance by all trainers in the current study and identified as second only to ability. Consistent with the literature, trainers spoke to temperament as influencing both performance (Visser, et al., 2001b) and ease of training (Lansade & Simon, 2010; Seaman, et al., 2002). Poor performance and an increased likelihood of behaviour-related problems were reported by the vast majority of trainers to be associated with the tense, highly strung, nervous horse. In terms of the impact of temperament, trainers reported disturbed

eating behaviour, limitations to the amount and type of work the horse could perform and reduced learning abilities; the latter was captured in the following trainer statement “the horse is just not listening”. These reports appear consistent with the literature where nervousness (emotionality) in horses has been reported to influence amongst other things eating and drinking (McCann, Heird, Bell, & Lutherer, 1988) and learning ability (Visser, van Reenen, Schilder, et al., 2003). Despite trainers identifying negative impacts associated with certain temperament types, they also reported high confidence in their ability to minimise any negative impact on performance through management. There is very little literature published that looks at the management of temperament in the thoroughbred racehorse in training and this has great potential for further exploration.

While some temperament types were identified by trainers as being unhelpful and likely contributors to poor performance and behaviour problems, others were not. These included the “lazy” horse and the “not smart/slow to learn” horse, where trainers’ comments suggested that there was little negative effect on athletic ability. The “not smart/slow to learn” type was included by the investigator in the current interview because it has been referred to in the literature on equine temperament.

Trainers described the need for proactive management of the horse with the “highly strung/nervous” temperament type. Strategies reported emphasised early intervention, gradual progression and exposure, with many of the descriptions provided by trainers appearing to be consistent with the principles of graded exposure. For instance, trainers provided the following examples of graded exposure: *‘expose them to everything gently, use the walker first, give him gradual and consistent time at the track, take him to the track even if he is not racing’* and in terms of more general attempts to minimise excitability: *‘give him increased longer work and less fast work, medication if there is the risk of accident /injury or a bad experience, rotate through paddock and yard, change diet, cut down fuel, use of more experienced handlers and riders’*. This is of interest given findings from the literature on the treatment of disorders such as exertional rhabdomyolysis (ER) that may be stress-related. Management tailored to the individual horse that minimises excitability “may be the most effective for controlling ER” (MacLeay, Sorum, Valberg, Marsh, & Sorum, 1999, p. 1562). Management of the “highly strung/nervous” horse would most likely be

associated with some increased time and staffing demands, incurring additional financial costs. Given this, trainers identified the need to get owner(s) approval to proceed with this type of management plan.

Of the other temperament types, “bad attitude” was the next most frequently identified temperament type associated with poor performance and behaviour-related problems. A review of management approaches used showed these to be similar to those used for the “highly strung/nervous” horse except for sending the horse back to the breaker and punishing the behaviour immediately, which were reported very infrequently, but there were also notable points of difference.

Although the majority of trainers reported that they had discontinued a horse from training and racing due to unsuitable temperament, this was reported to be an infrequent and rare occurrence. The low incidence of wastage directly linked to temperament is reflected in the finding by Hayek (2004) that when racehorse trainers were asked to consider the last five horses to leave their stables and identify the primary reason, unsuitable temperament/behaviour was cited in 6.4% of cases. A small number of trainers made reference to the fact that a horse presenting with the combination of poor performance and unsuitable temperament would be more likely to be discontinued than one with a difficult temperament which proved to have above average ability, reflecting the ever-present commercial pressures. Use of anthropomorphic terminology by the researcher to describe temperament appeared to facilitate understanding by trainers. Rather than trainers’ responses suggesting a “blaming” of the horse, there was a high level of reporting of management of temperament-related problems. This is not consistent with the concern raised by McLean and McGreevy (2010) where the use of such terms “may be detrimental to optimal equine welfare” (p. 203).

## 4.6 Additional Topics

### **Suggestions for Industry Improvements**

Trainers recognised that they operate within the constraints of the thoroughbred racehorse industry and its rules. Some were able to identify areas of improvement in

terms of racetrack resources and access, whereas others suggested that the racetrack was not the ideal setting for management of behaviour-related problems. Trainers' suggestions were reasonable and reflected management practices in line with animal learning principles such as open/bigger/wider barriers to assist with grading exposure in training, and increased hours of access specifically to allow exposure to continue for the required length of time rather than having to be discontinued prematurely with potential negative effects. Equally validly and in line with animal learning principles, some trainers expressed the view that the racetrack was not the place to undertake correction of behaviour-related problems given that re-education and learning are best achieved when the horse is relaxed and not under pressure. In addition, some trainers stated that no changes in racetrack resources and access were necessary as horses need to 'learn to cope'.

The area that drew most comment in terms of the current rules of racing were those that related to the barriers. Suggestions here included the view that horses are left to stand too long (increasing the risk of a bad experience), barriers that do not open in front and increased flexibility to current loading rules to allow the known "problem" horse to be loaded last (currently this is not allowed; horses can be given permission to be loaded first but not last). This is where issues related to what might be best for the horse conflict directly with integrity measures aimed at presenting racing as an attractive wagering option, something that depends on the perception of an even playing field. Still others acknowledged that some changes to the rules could be helpful but recognised there was little scope to change the rules unless they could be applied across the board.

## **Wastage Definitions**

In exploring trainers' views on the contribution of behaviour- and temperament-related aspects of wastage, inadequacies in the generally accepted definitions of wastage emerged. Definitions of wastage in the literature have included 'time out' and 'days lost to training'. This is understandable and appropriate in the context of the management of physical illness or injury. However, trainers in the current study clearly described giving the horse time away from the stable environment, training and racing activities as a routinely used strategy in the management of behaviour and temperament problems with a preventative emphasis. Using current definitions this



type of early, proactive and often preventative management would also qualify as wastage. However, one could ask if this management actually constitutes wastage if the strategy has the main aims of reducing stress, promoting coping and assisting the horse to be well placed mentally to reach its maximal performance as well as preventing the development of behaviour-related problems that may become severe enough to prevent the horse from being trained or raced. Research would benefit from having a more consistent definition of wastage, and this is one factor that needs to be taken into account.

#### 4.7 Strengths and Limitations of the Study

This is the first study to focus on thoroughbred racehorse trainers' perceptions regarding behaviour- and temperament-related problems and any perceived contribution to wastage, and provides a foundation for development of further research. The study is timely given recent interest and development in equitation science. The response rate was excellent, perhaps indicating a growing interest from trainers in behavioural and temperament factors in thoroughbred racehorse training and racing. Furthermore, all participating trainers expressed interest in being recontacted to assist with further research into the topic, indicating a commitment to being part of enhancing current practice and understanding in the area. Many of the findings were consistent with existing theory and available data and indicate areas of potential future research.

Statistical information regarding total number of trainers, by licence type, and stable size were??, and consequently definitive conclusions regarding the representativeness of the current sample are unable to be made. However, characteristics of the current sample are similar to those reported in other studies of thoroughbred racehorse trainers in Australia. For instance, in the current study the median stable size (40, range 3 to 350) of the 37 trainers interviewed is similar to that reported by Bailey et al. (1997) who interviewed 40 trainers (median stable size 39, range 6 to 200). However, for studies that have included all licence categories the number of horses reported per stable is lower (e.g. mean of 5.4 horses in Hayek et al., 2004; mean of 7.3 horses in Speed & Andersen, 2007). The average duration trainers had worked as a

thoroughbred racehorse trainer was 18.2 years in the current study, similar to the 17 years reported by Speed and Andersen (2007) in a sample of 303 trainers from Victoria, Australia. The extent to which the current findings reflect the views of trainers from the licence categories not included in the current study (i.e. country trainer, owner/trainer, hobby), given their consistently smaller stable sizes and likely differences in terms of business operation and associated pressures, is not known.

Any concerns about small sample size in the current study were offset by saturation of responses (the point at which no new insights are likely to be obtained) being achieved early on in the conduct of interviews for many questions, and also by the consistency of responses across trainers on many issues (National Health and Medical Research Council, 2007). While it may have been desirable to have greater consistency in terms of stable size (e.g. greater ease of interpretation of reported proportions across stables), the current sample was representative of the larger population of thoroughbred racing trainers in Australia with metropolitan and provincial licences and their stables on the racetrack. However, the stables of the trainers' involved in the study were located at the largest training centres and it is possible that these operations are better resourced, and perhaps include access to better bred or higher priced horses, and those that have undergone a sales preparation. For this reason, results from the current sample may not be generalisable to country racing.

It was possible that responses could have been biased by a self-selection process and prior to approaching participants there had been concerns regarding trainers' receptiveness towards discussions of potentially sensitive topics. However, as only three trainers from the randomly selected sample of 40 refused to participate, this would suggest a general willingness amongst trainers in the thoroughbred racehorse industry to discuss these matters and indicate against such a bias.

The methodology of a structured interview, as employed in the current study, has been criticised as having some inflexibility with regards to relating the interview to a particular individual and their circumstances. The exploratory nature meant that developing a survey was premature. In addition, trainers were given the opportunity throughout the interview to provide further comment. The face-to-face nature of the interview may have created a response bias whereby trainers felt more inclined to

respond in a certain way. This may have lead to under-reporting rates of problems, and over-reporting skill levels in managing problems. However, reported prevalence of behaviour problems appeared to be in line with the literature, and confidence in management appeared to be supported by reports of clear management strategies. While the accuracy of trainers' views has the potential to be affected by recall bias, trainers' at this level are familiar with and benefit from close monitoring of stable movements.

## 4.8 Further Research

The results of the current study provide valuable information to generate more detailed hypotheses and directions for further data collection. For instance, trainers recognised improvements that they believed were associated with reduced numbers of horses with significant behaviour- and temperament-related problems. For them, this reflected change and improvement in thoroughbred racehorse industry practice, with greater professionalism during each stage of preparation prior to the horse entering their stable. There is scope for longitudinal studies aimed at investigating causes and relative impacts of these different stages. It would be an advantage to seek the co-operation of administrative bodies and thoroughbred racehorse industry participants in further research given their expressed commitment to improved welfare and reduced wastage rates.

As noted by proponents of equitation science, progress in the study of behaviour- and temperament-related problems requires advances in the development of objective measures of temperament, training and performance. Improvements in subjective measures of these aspects, such as development of operationally defined terminology to facilitate survey comparisons across disciplines or between countries, are needed. Face validity of these concepts, that is, acceptability and comprehension of this terminology amongst industry participants, is paramount. For Moffitt, Caspi, and Rutter (2006):

“.. recent demonstrations of G X E [the gene-environment interaction] reveal that potentiated effects of environmental risks can be unexpectedly large, in the specific context of genetic vulnerability. Thus, findings of G X E reframe the scientific question for environmental researchers. The question is not “Is there any effect of environmental risk?” or “How big is the average effect of an environmental pathogen across all people exposed to it?” but rather “Who is at the greatest risk from an environmental pathogen?”.”(p. 19)

The trend in epidemiological equine research is away from the identification of risk factors to the identification of the “at risk” horse. The design of studies in the future would benefit from shifting focus away from broader correlational analysis towards

more precise recognition of individual differences, which has greater appeal in terms of tailoring management with the promise of greater efficacy and thus reduced wastage. Investigation of the relative contributions of inherited factors (genetics) and external factors (environment) would advance this study of individual differences with implications for intervention (Moffitt, Caspi, & Rutter, 2006). The gene-environment interaction theory explores why two individuals exposed to the same poor environment differ in terms of its negative effects. To date, understanding of the impact of the equine environment has been relatively simplistic, without adequately considering amount of exposure or individual differences.

The thoroughbred racehorse provides an attractive research target. The animal is selectively bred, the majority of horses will be exposed to a standard early management before being trained for racing under intensive management conditions. Breeding, veterinary and race performance records are maintained (Parkin, 2007). It is hoped that future researchers will be drawn to answer some of the questions which the present study has raised.

## 4.9 Conclusions

The study investigated whether high rates of wastage in the thoroughbred horse racing industry could be linked by trainers to factors other than physical or veterinary causes, more specifically to behavioural and temperament factors. It was clearly demonstrated that trainers can recognise behavioural problems such as stereotypies and unwelcome behaviours, and can judge the relative impact of these behaviours. They also appear confident in their use of what they view as behavioural interventions to address these behaviours. Trainers were also able to relate to the concept of particular temperament types, for example the “highly strung/nervous” horse. While temperament was considered an important factor in racing performance, behavioural problems were not seen as main contributing factors to wastage, poor performance and loss of performance. Discontinuation of a horse from training and racing due to unsuitable temperament was reported to be an infrequent and rare occurrence. The issues surrounding thoroughbred racehorse wastage are complex and certainly involve factors other than physical problems. Studies of thoroughbred racehorse wastage should include a focus on behavioural- and/or temperament-related

problems and measurement of their discipline specific impact. Greater consideration of the 'at-risk' horse, as recognised by trainers, appears warranted and necessary.

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## APPENDICES

Appendix 1 removed from Open Access version as it may contain sensitive/confidential content.

Appendix 2 removed from Open Access version as it may contain sensitive/confidential content.

## Appendix 3: Expression of interest

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### UNWELCOME BEHAVIOURS IN THOROUGHBRED RACEHORSES

You are invited to participate in a study investigating behaviour related problems and unwelcome behaviours in the thoroughbred racehorse.

We are interested in obtaining the views of thoroughbred racehorse trainers to gather information about racehorse behaviour(s) and temperament and how they may interfere with the overall adjustment and performance of racehorses in both training and racing.

We aim to interview some 40 horse trainers and will be very interested to hear what trainers have to say. There has been no previous study in Australian Racing looking at this question. Any information or personal details gathered in the course of the study will be confidential (except as required by law).

The research is part of a Doctorate Degree I am undertaking at Macquarie University and there are no other interested parties.

If you agree to participate it is estimated that the interview will take not more than 45 minutes to complete.

I will contact you in the next few days and provide any further information you may require and let you advise as to whether you wish to participate in the study or not.

Yours sincerely

Elaine Barrett  
*Macquarie University Postgraduate  
Level 4, The Clinical Centre  
94 Mallett Street  
CAMPERDOWN NSW 2050*

*Mobile:*  
*Email:*

## Appendix 4: Information sheet and consent form



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### INFORMATION AND CONSENT FORM

#### Unwelcome Behaviours in Thoroughbred Racehorses

You are invited to participate in a study investigating behavioural problems in thoroughbred racehorses. We are interested in obtaining the views of thoroughbred horse trainers to gather information about racehorse behaviour(s) and temperament and how they may interfere with the overall adjustment and performance of racehorses in both training and racing. We hope that a better understanding of these factors may assist in improved horse performance and welfare.

The study is being conducted by Elaine Barrett, Clinical Psychologist, and will form part of the requirements for the Doctorate of Clinical Psychology Degree being undertaken at Macquarie University. The research will be supervised by Dr Alan Taylor (Department of Psychology) and Dr Julia Irwin (Department of Psychology). If you have any questions regarding this study please contact Elaine Barrett on .

If you decide to participate it is estimated that the interview will take 45 minutes to complete. Any information or personal details gathered in the course of this study are confidential (except as required by law). No individual will be identified in any publication of the results. No-one other than the Chief Investigator and the Supervisors named above will have access to the original data. A summary report of the main findings will be sent to you at the completion of the study.

Participation in the study is entirely voluntary: you are not obliged to participate and if you do decide to participate, you are free to withdraw at any time without having to give a reason or without consequence.

**I \_\_\_\_\_ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research knowing that I can withdraw from further participation in the research at anytime without consequence. I have been given a copy of this form to keep.**

**Participant's Name:**  
(block letters)

**Participant's Signature: \_\_\_\_\_ Date:**

**Investigator's Name:**  
(block letters)

**Investigator's Signature: \_\_\_\_\_ Date:**

*The ethical aspects of this study have been approved by the Macquarie University Ethics Review Committee (Human Research). If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the committee through the Director, Research Ethics, (telephone [02] 98507854, fax [02] 9850 8799, email: [ethics@mq.edu.au](mailto:ethics@mq.edu.au)). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.*

## **Appendix 5:        Structured Interview of Thoroughbred Racehorse Trainers**

**Trainer ID No.** \_\_\_\_\_

This is a survey of Australian thoroughbred racehorse trainers. This interview aims to gather information about racehorse behaviour and how behaviour(s) and temperament may interfere with the overall adjustment and performance of racehorses in both training and racing. The focus is on unwelcome behaviours: these may be normal but still create a problem for the trainer given the demands of the discipline of racing.

1. How many years have you worked as a trainer of thoroughbred racehorses?

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2. What type of training licence do you hold?

Prompt: How long have you held your licence?

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3. What is your background?

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Prompts: what has been your work history?

- a) Have you had experience in the education of young horses?
- b) Have you had experience training riders?
- c) Have you worked with problem horses?

4. How many horses do you currently have on your books (in stable and at pasture)?

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Prompts:

- a) In work
- b) Total number, size of operation

5. Across the last racing season how many horses would you have had in your stable?

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6. Do you retain your own track work riders?

Yes

No

7. How important to the horse and its adjustment to racing do you consider the quality of the breaking-in stage?

**Not important**

**Of some  
importance**

**Important**

**Very important**

8. What does the breaking-in stage teach the horse?

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9. On average, how much time would each horse spend out of its box each day?

**1/2hr**

**1hr**

**1 1/2hrs**

**2hrs**

**2 1/2hrs**

**3hrs**

**>3hrs**

10. Have you found that some horses have problems when they come into the stable environment for the first time? Can you give details?

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11. Please name the most common unwelcome behaviours that you observe?

(I will go on to ask about specific behaviours but I am first interested to get your general views)

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Prompts:

- a) Can you list your top three? (Only to be asked if they offer less than three)
- b) Which of these is the most problematic?

**(This section refers to repetitive type movement disorders)**

12. Across the last racing season of the total number of horses in your stable, can you estimate how many horses have shown each of the behaviours listed below?

<b>Q 12</b>	<b>Frequency</b>
a. Crib-biting/wind-sucking	
b. Weaving	
c. Box-walking and pacing	
d. Accident prone e.g. barging	
e. Door kicking/pawing behaviour	
f. Aggressive behaviour toward other horses	
g. Aggressive behaviour toward people	
h. Severe head shaking	

13. Do these behaviours impact on the horse's ability to succeed?

**Please write the number that corresponds to your rating next to each item.**

Rating guide for Q13 performance			
<b>No impact</b> <b>1</b>	<b>Mild impact</b> <b>2</b>	<b>Moderate Impact</b> <b>3</b>	<b>Severe Impact</b> <b>4</b>
No impact	Minor impact	Definite impact on trainability and performance	Horse not able to be trained and/or raced may be removed from stable

<b>Q 13</b>	<b>Performance</b>
a. Crib-biting/wind-sucking	
b. Weaving	
c. Box-walking and pacing	
d. Accident prone e.g. barging	
e. Door kicking/pawing behaviour	
f. Aggressive behaviour toward other horses	
g. Aggressive behaviour toward people	
h. Severe head shaking	

**(The following section refers to evasions/unwanted behaviours in the ridden horse)**

14. From your own experience across the last racing season, what proportion of horses show the following behaviours? (see table below)

<b>Questions 14</b>	<b>Frequency</b>
a. Shying	
b. Jacking up (refusing to go forward)	
c. Spinning away	
d. Rearing	
e. Bucking	
f. Over-racing/Pulling	
g. Resistance –changes in speed/direction not desired by the rider	
h. Refusal to run	
i. Refusal to pass other runners in a race	
j. Bolting	
k. Barrier problems	
l. Consistent failure to enter the barriers	
m. Consistent failure to leave the barrier at the jump	
n. Fractious/panic behaviour in the barriers	

15. To what extent does each of these behaviours impact negatively on training and racing performance? (see table below).

<b>Rating guide for Q15.</b>			
<b>No impact 1</b>	<b>Mild Interference 2</b>	<b>Moderate 3</b>	<b>Severe 4</b>
<b>No impact</b>	<b>Minor impact</b>	<b>Definite impact on trainability and performance</b>	<b>Horse not able to be trained and/or raced may be removed from stable</b>

<b>Questions 15</b>	<b>Performance</b>
a. Shying	
b. Jacking up (refusing to go forward)	
c. Spinning away	
d. Rearing	
e. Bucking	
f. Over-racing/Pulling	
g. Resistance –changes in speed/direction not desired by the rider	
h. Refusal to run	
i. Refusal to pass other runners in a race	
j. Bolting	
k. Barrier problems	
l. Consistent failure to enter the barriers	
m. Consistent failure to leave the barrier at the jump	
n. Fractious/panic behaviour in the barriers	

16. To what extent do you think that each of the following contribute to the **development and/or maintenance** of behavioural problems? (factors that influence the development of unwelcome behaviours).

**From the list below please:**

**Place a tick in the relevant box for each item listed below**

	NO	YES And can reduce the impact of this factor	YES But difficult to reduce the impact of this factor
Diet and feeding practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confinement/isolation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boredom/loss of interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exercise levels too demanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rider (skill level, confusing signals)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Age/immaturity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human-horse interaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Past bad experiences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weaning/early handling/breaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Genetics/breeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperament/nervousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify)

17. How often have problems related to behaviour been the **main** reason for you to recommend that the horse not continue its racing career?

1. Never
2. Occasionally
3. Often
4. Very Often

## Temperament

It is suggested that temperament has an important effect on sport performances in horses and in the match between horse and discipline.

18. Is temperament an important factor in racehorse performance?

Yes

No

19. What temperament traits can create a problem for you in your training of the horse?  
(are there certain temperaments that are associated with behaviour related problems and/or poor performance)

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### Below is a list of common temperament traits

From the list below **please circle the two traits** that are most commonly associated with behaviour related problems and/or poor performance.

<b>GOOD ATTITUDE</b>	_____	<b>BAD ATTITUDE</b>
<b>WILLINGNESS</b>	_____	<b>UNWILLINGNESS</b>
<b>RELAXED, CALM</b>	_____	<b>TENSE, HIGHLY STRUNG, NERVOUS</b>
<b>SMART, QUICK TO LEARN</b>	_____	<b>NOT SMART, SLOW TO LEARN</b>
<b>ADVENTUROUS</b>	_____	<b>FEARFUL</b>
<b>CO-OPERATIVE</b>	_____	<b>UNCOOPERATIVE</b>
<b>ENTHUSIASTIC, KEEN</b>	_____	<b>LAZY</b>

20. What options would you consider when confronted with a horse showing this temperament? (insert nominated temperament as above)

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21. Have you discontinued a horse from training and racing because the temperament was unsuitable?

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22. In addition to training the horse to ensure physical fitness, do you find you need to work to prepare the horse mentally?

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## **This next section looks at management**

23. Across the last racing season how often have you used each of the following methods to manage unwelcome behaviours?

### **Consultation with Other Professionals**

Veterinary consultation	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Return the horse to the breaker	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Senior horseman	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Chiropractor	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Animal learning/behaviour specialist	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Other?				

### **Changes to the Horses Routine**

Increased variety in routine	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Change to exercise routine	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Change to the stable routine	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Reduction in work	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Increase in work	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Change of rider, specific instruction to the rider, use of a consistent rider	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Change to feed, type and /or schedule	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>

### **Change of Environment**

Send the horse to the paddock	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Change stall in the stable	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>

### **Modification of Training Methods**

Varying speeds, distances in training	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Develop a behaviour management program	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Graded exposure/habituation eg gradually	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>



introduce the horse to crowd noise				
Gear changes	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
<b>Medical Intervention</b>				
Surgery	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Use of medications as prescribed/ recommended	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
<b>Manage</b>				
Selection of certain race venues to reduce the impact of the unwelcome behaviour	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
<b>Positive and Negative Reinforcement</b>				
Use of food rewards	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Positive reinforcement e.g. verbal praise	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
Negative reinforcement e.g. withdrawal of pressure	<b>Never</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Routinely</b>
<b>Other</b>				

24. Over the last racing season how many horses have you retired or discontinued from racing? What percentage of these horses were retired or discontinued due to behaviour related problems?

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25. Over the last racing season, of those horses that showed poor performance, can you estimate in what percentage of cases were behaviour related problems the main cause?

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26. Over the last racing season, of those horses that showed loss of performance (a previously established level of performance is lost) in what percentage of cases were behaviour related problems the main cause?

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27. People say that there are good and bad trainers? Please give your top three points that make a good trainer?

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28. As a trainer how well placed do you feel to assess and manage behavioural problems?

<b>Not at all</b>		<b>Somewhat</b>		<b>Extremely</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Prompt:

a) Please give reasons for your answer?

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29. Is there anything that would further assist you in the management of unwelcome behaviours?

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30. Are there any recommendations or changes you would make to the rules of racing that would assist you in this area?

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31. Do you have any further comments?

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**Thank you for your time.**

Appendix 6 removed from Open Access version as it contains published material.

## GLOSSARY OF TERMS

*(Standardised definitions of key terms to be used in trainers' interviews as required).*

**accident prone:** this refers to the horse that tends to be more accident prone compared to others, this might include barging type behaviours.

**adventurous:** the horse is curious, open to new experiences, readily explores new situations, may be described as brave (partly adapted from Lloyd et al., 2008).

**animal learning/behaviour specialist:** an individual with particular expertise in the understanding of animal behaviour, will use learning theory principles to modify behaviour.

**bad attitude:** the horse does not do what is asked of it and does not approach its work willingly.

**behaviour management program:** systematic and planned program that involves behaviour change procedures aimed at changing a specific behaviour in an individual horse.

**bolting:** where the horse takes control of the rider and runs at full gallop or flight.

**box-walking:** box-walking is when the horse walks or paces out repeatedly a fixed route around its stall. It can be sustained for long periods (McGreevy, 2004, Equine Behaviour).

**breaking-in:** refers to the basic training given to a young horse to prepare it for racing, there is some variation in what might be included in this stage.

**bucking:** the horse jumps upwards, arches their back and kicks their heels up.

**co-operative:** obedient, not stubborn, the horse that is easy to train.

**crib-biting/wind-sucking:** crib-biting is when the horse holds onto a fixed object with its teeth, it will also be arching its neck and leaning backwards, it may or may not be swallowing air and can but does not have to producing a grunting noise. Wind-sucking refers to the same behaviour where the horse will be swallowing air (adapted from McGreevy, 2004, Equine Behaviour).

**enthusiastic, keen:** effort made by the horse in its work, the horse does 'put in' (partly adapted from Visser et al., 2010).

**fear:** is a negative emotion that results from the perception of danger or threat. Fear can develop in response to specific situations and can lead to avoidance and escape behaviour, including activation of the horses' fight or flight response.

**fearful:** fearfulness is when the horse will typically show a tendency to react to a wide variety of situations as if they are threatening or present some kind of danger, often this response will be one of retreat or avoidance (partly adapted from Lloyd et al., 2008; Visser et al., 2010).

**good attitude:** the horse does what is asked of it and appears to enjoy its work.

**graded exposure/habituation:** repeated low level exposure to the unfamiliar/fear producing situation that results in a gradual reduction in the horses response. Usually this is done gradually and only increased when the horse shows that it can cope and does not produce the problem behaviour. Habituation is said to have occurred when the horse can be exposed to the original stimulus that was provoking a problem response and not show the same magnitude of response.

**jacking up:** refusing to go forward but not rearing, baulking, including refusal by the horse to go out onto the track. Can be a reaction to an incident or irritant. Can occur during the race but this is referring to when the horse is able to be stationary, digs the toes in, straight legged and refuses to go forward (after feedback from pilot study).

**lazy:** lack of effort made by the horse in its work, the horse does not 'put in'.

**loss of performance:** when a horse has previously established or demonstrated a level of racing performance and then this is lost.

**negative reinforcement:** this is where something that the horse finds unpleasant is removed or decreased, for example the withdrawal of pressure immediately following a response. This is done for the purpose of rewarding the desired response or behaviour and usually results in an increase in the strength and likelihood of the behaviour being shown. This is not the same as punishment.

**not smart, slow to learn:** the horse shows low levels of learning ability, this horse might be described as slow or not very intelligent.

**over-racing/pulling:** when the horse fails to settle into a smooth, efficient stride required to enable it to conserve energy resulting in premature and inefficient overuse of energy.

**poor performance:** when the horse shows a lower level of performance than expected, as measured against what is typical for a thoroughbred horse.

**positive reinforcement:** this is where something that the horse finds pleasant, a reward is added, such as verbal praise immediately following a response. This is done for the purpose of rewarding the behaviour and making this response more likely in the future.

**rearing:** the horse stands on its hind legs with its forelegs in the air (adapted from Boyd & Houpt, 1994).

**refusal to run:** the horse refuses to comply with rider requests and simply does not run.

**relaxed/calm:** the horse is calm and relaxed in itself, does not get phased by too much (partly adapted from Visser et al., 2010).

**resistance:** changes in speed and or direction not desired by the rider.

**severe head shaking:** this is where the horse shakes its head for no obvious reason, the head shaking behaviour can become severe, with increased frequency and intensity.

**shying:** the horse suddenly moves sideways, may be associated with uncertainty or fear (sudden perceived visual impacts). Shying may be defined as reacting to another horse or any object or movement (shadows, reflections, birds) that interrupts the horse's concentration. Shying can occur in both training and racing and can become frequent or almost habitual.

**smart, quick to learn:** shows good learning ability, learns things fast/easily, this horse might be described as intelligent (partly adapted from Lloyd et al., 2008).

**spinning away:** horse suddenly spins away against the riders instruction.

**stress:** stress can come from a wide variety of sources and will result in activation of the horses' sympathetic nervous system. Stress can be both acute and chronic.

**temperament:** temperament describes the way an individual horse characteristically behaves across different situations. The behavioural characteristics of the horse that are typical for it across situations and over time. These are stable characteristics that are believed to have a strong genetic component (adapted from Lansade et al., 2008b)

**temperament traits:** temperament "traits" or "dimensions" are used to describe the individual differences that horses may show in their general behaviour tendencies, what is most typical for the horse, such as "nervousness", the horses tendencies in ordinary care and daily training (adapted from Momozawa et al., 2003).

**tense, highly strung, nervous:** the nervous horse, highly excitable, skittish, takes a long time (and may not) to adapt to unfamiliar objects and change, may show restraint in posture and movement due to tension (partly adapted from Lloyd et al., 2008).



**unco-operative:** not obedient, stubborn, does not give in easily, can be difficult to train (partly adapted from Visser et al., 2010).

**unwelcome behaviour:** any behaviour that interferes in your management and training of the horse, for example anything that may interfere with your ability to put the work into the horse or to get it fit.

**unwillingness:** the horse does not work well with you and is unresponsive to commands (partly adapted from Visser et al., 2010).

**weaving:** where the horse may sway its head laterally but it can also include swaying movement of the rest of the body, the shoulders and the picking up the front and sometimes the hind legs (adapted from McGreevy, 2004, Equine Behaviour).

**willingness:** the horse works well with you and is responsive to commands (partly adapted from Visser et al., 2010).