



Quantitative and qualitative assessment of the response of foals to the presence of an unfamiliar human

Michela Minero^{a,*}, Maria Vittoria Tosi^a, Elisabetta Canali^a, Françoise Wemelsfelder^b

^aDipartimento di Scienze Animali, Sezione di Zootecnica Veterinaria, Facoltà di Medicina Veterinaria, Università degli studi, Via Celoria 10, 20133 Milano, Italy

^bScottish Agricultural College, Bush Estate, Penicuik, Midlothian EH26 0PH, Scotland, United Kingdom

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ABSTRACT

This work aimed to apply a combined qualitative and quantitative approach to the interpretation of an on-farm behaviour test for horses, and to examine whether 1 month of handling would affect the response of yearlings to an unfamiliar stationary human in their home environment. Throughout a 1-month period, 14 Thoroughbred Yearlings (16 ± 0.22 months old) that had formerly experienced minimal contact with humans, were handled daily for about 45 min. The yearlings were tested twice, just before and just after the handling period. The behaviour of the horses during the tests was both video-recorded and directly recorded by the experimenter using an instantaneous time sampling recording method. Quantitative analysis of these data was achieved using principal component analysis (PCA). Qualitative analysis took place from video clips using a free choice profiling (FCP) methodology that requires observers to generate their own qualitative descriptors of behaviour, and in a second phase instructs these observers to quantify their personal descriptors on a Visual Analogue Scale. Observers were 21 veterinarians who were unaware that the horses had been handled in half of the clips and not in the other half. The data generated through FCP assessment were analysed using generalised procrustes analysis (GPA). Any differences in behaviour that may have occurred before and after the handling period were evaluated by comparing horse scores on the main PCA and GPA factors using a Wilcoxon matched-pairs test. To compare qualitative and quantitative assessments, both the quantitative behaviour measures and the qualitative behaviour scores were correlated to the main PCA factors obtained from the quantitative analysis using Spearman's rank correlation. PCA analysis revealed three main factors (explaining 30%, 23% and 21% of the total variation between horses, respectively). The first factor showed high-negative loadings for immobile behaviour and high-positive loadings for contact and nibbling behaviour, and indicated that the horses tended to be more inclined to approach and contact the experimenter after handling ($p = 0.08$). GPA analysis revealed two main factors of expression (explaining 51.4% and 10.2%, respectively). Both factors indicated significant qualitative differences in the behavioural style of yearlings before and after handling ($p < 0.05$ and < 0.01 , respectively), characterising yearlings as 'suspicious/nervous' and 'impatient/reactive' before handling, and as 'explorative/sociable' and 'calm/apathetic' after handling. The correlation between GPA factor 1 scores with PCA factor 1 scores was highly significant (Spearman's $r = 0.75$; $p < 0.001$), while those between GPA factor 2 scores with PCA factor 2 and 3 scores were not significant ($r = -0.255$; ns and $r = 0.251$; ns, respectively). On the whole a meaningful relationship was found to exist between the quantitative and qualitative behavioural assessments of the horses' behaviour, indicating that these methods may be usefully combined in interpreting a behavioural test involving the presence of an unfamiliar human person.

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* Corresponding author at: Dipartimento di Scienze Animali, Sezione di Zootecnica Veterinaria, Istituto di Zootecnica, Facoltà di Medicina Veterinaria, Università degli studi, Via Celoria 10, 20133 Milano, Italy. Tel.: +39 02 50318042; fax: +39 02 50318030.

E-mail address: michela.minero@unimi.it (M. Minero).

1. Introduction

The quality of the human–horse relationship greatly affects the welfare of farmed horses, and in turn the horses' level of confidence influences their disposability to work with man. This hypothesis, well known in practice, has been confirmed by many scientific studies: rough or uneducated riders can inadvertently cause pain to the horses, soon causing a conditioned fear response of avoidance (Casey, 2002). Intensively handled foals are calmer and more tractable than untreated ones (Simpson, 2002), however their learning efficiency can deteriorate if they are pushed to work too hard (Rubin et al., 1980). In light of these findings, any method for evaluating a horse's relationship with humans when assessing horse welfare on stud farms could be of considerable practical importance.

Behavioural tests have been frequently used in various animal species to assess the level of fear and reactivity towards humans (Hemsworth and Barnett, 2000). Hemsworth and Coleman (1998), for example, showed that general approach behaviour is influenced by the level of fear of man due to previous handling experiences, and Waiblinger et al. (2003) found that in cows, the avoidance distance towards an unfamiliar person reflects both the stockman's and the cow's role in the human–animal relationship. Various studies involving behavioural fear tests in horses have been published (Le Scolan et al., 1997; Mackenzie and Thiboutot, 1997; Wolff et al., 1997; Jezierski et al., 1999; Anderson et al., 1999; Hausberger and Muller, 2002; Søndergaard and Halekoh, 2003; Visser et al., 2003), and it has been shown that handling foals affected their reactions to humans in a novel environment but not in the home environment (Søndergaard and Halekoh, 2003). Unfortunately it is not simple to estimate the validity of tests aimed to measure variables such as fear of humans, because the quality of a horse–human relationship is complex and we tend to lack thorough knowledge of whether and how the observed behaviours in a horse are affected by the animal's previous experience with man. Thus it is often difficult to establish the underlying motivation of an animal's behavioural response (Seaman et al., 2002). For example, approach behaviours towards an unfamiliar human may not only be elicited by different levels of fear, but also by other motivational states such as the presence or absence of curiosity. In addition to validity and reliability, a crucial criterion for developing tests suitable to be carried out on farm is that they have to be feasible and adaptable to stud farms with different structural characteristics. This requirement often brings a cost of simplification, leaving the experimenter to wonder whether or not he/she inadvertently missed important bits of information; for example, it is difficult to interpret unambiguously postural signals such as “ears back” when they are isolated from the larger context in which they developed.

The qualitative assessment of behaviour integrates and summarises the different aspects of an animal's dynamic style of interaction with the environment, using expressive terms such as ‘calm’, ‘friendly’, ‘anxious’ or ‘hostile’ (Stevenson-Hinde et al., 1980). This type of assessment consists of a process of integrating measure-

ment and interpretation and is highly sensitive to context, and it could therefore be a useful addition to classical ethological measures of animal behaviour in human approach tests (Wemelsfelder et al., 2000, 2001). Animal professionals (breeders, riders, veterinarians) frequently use qualitative terms to describe the temperament of horses and interpret their relationship with them, but can be in danger of creating an anthropomorphic picture that relies on popular unvalidated beliefs or has strong moral overtones. A qualitative research approach that facilitates the quantification of qualitative descriptors for the benefit of scientific computation could potentially bridge the gap that traditionally exists between these subjective judgements and scientific measurement approaches. Wemelsfelder et al. (2001) have developed an experimental free choice profiling (FCP) methodology that combines procedures of qualitative interpretation with procedures of quantitative scoring (see Section 2 for further details).¹ Using this method, a previous study by Napolitano et al. (2008) found that qualitative assessments of behaviour in horses and ponies showed meaningful correlations with both subjective assessments and quantitative ethogram-based measures of the same animals.

In light of these considerations, the aim of this work was twofold: generally to apply a combined qualitative and quantitative assessment approach to the interpretation of an on-farm behavioural test for horses, and more specifically to examine whether and if so, how, 1 month of intensive handling would affect the response of yearlings to an unfamiliar stationary human in their home environment.

2. Materials and methods

2.1. Animals, housing and management

Experimental subjects were 14 Thoroughbred Yearlings, 7 females and 7 males, ranging in age from 16 to 18 months at the beginning of the experiment. They belonged to different farms of Northern Italy and they were taken to the Yearling Training Centre 1 week before the start of the experiment. The horses, which formerly lived in groups in grassy paddocks, receiving minimal contact with humans (other than for de-worming and vaccination), were individually stabled in loose-boxes with straw bedding after reaching the training centre. Box stalls were 3.5 m × 3.5 m wide, with concrete walls and a frontal sliding door. Each box had a window at 2.5 m from the floor, opposite to the frontal door. Horses were submitted to the same daily management routine, water was available ad libitum and they were fed hay and concentrate twice a day approximately at 6:30 a.m. and 3:30 p.m. Boxes were cleaned at approximately 9:00 a.m.

2.2. Behavioural testing and experimental handling procedures

The yearlings were prepared for the auctioneer sales over a period of 1 month. Throughout this period, they were handled daily for about 45 min to become accustomed to humans and receptive to subsequent training. The handling procedure consisted of haltering, leading outdoor to the paddock, brushing, picking up their feet and receiving veterinary examinations.

The yearlings were tested twice, once just before and once after the handling period. The day before the start of the handling period, all horses were individually tested in the presence of an unfamiliar person in their

¹ Even though this research approach includes a quantitative phase, we will continue to refer to it throughout the paper as ‘qualitative assessment’ of behaviour, in contrast with conventional quantitative measurements that tend not to include a phase of integrative, qualitative judgement.

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