Horse owners' utilisation of positive reinforcement and its perceived effects on horse's behaviour.

RESEARCH ARTICLE

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ABSTRACT

Positive reinforcement (PR) is an effective alternative that can enhance animal welfare but remain under-utilised by equestrians who favour negative reinforcement (NR). This study aimed to gather further information on the use of PR by equestrians, its impact on horses' behaviour and how it may differ when used in conjunction with NR. Two hundred ninety-eight horse owners who reportedly transitioned from training their horses using NR to PR or a combination of the two completed an online survey. Horses were sorted into one of two groups depending on whether their owners reported solely using PR to reinforce and maintain desired behaviours or a combination of both types of reinforcement. Respondents were asked to score various aspects of their horse behaviours on a 4-points Likert scale pre and post-implementation of PR to evaluate the differences in the horses' behaviour before and after PR as well as the potential differences between groups. Additional data was gathered on the type of behaviour trainers, perceived benefits and issues of PR, tools and techniques used. Data analysis of behaviour score shows a significant decrease in undesirable behaviours and an increase in desirable behaviours post-implementation of PR which suggest that PR may improve horse' welfare and enhance the ownership experience. No significant difference was found in the behavioural scores of the PR and PR + NR group or the types of behaviour trained but there was a significant difference in the training tools and techniques used.

1.0 INTRODUCTION

Reinforcement is an important principle of learning theory that increases the probability of desired behaviours being performed (Skinner, 1953). Reinforcement may either be positive or negative depending on whether it involves the addition or removal of a stimulus following the desired behaviour (Chance, 1993). Traditionally, horse training primarily involves negative reinforcement (NR); the removal of aversive stimuli following desirable behaviours to maintain or increase their occurrence (Skinner, 1953). For example, horses go forward to release the trainer's leg pressure or stop to release rein tension (McGreevy *et al.,* 2018, p104). The other reinforcement method is positive reinforcement (PR) which is defined as the addition of a pleasurable stimulus following desirable behaviours, maintaining, or increasing their occurrence (Skinner, 1953). Through PR is not often used in traditional horse training it is commonly used in learning experiments, for example, to demonstrate horses' ability to communicate blanketing preferences through the touch of symbols (Mejdell *et al.,* 2016), to research higher-order cognition such as relational learning (Gabor and Gerken, 2012) or social learning (Krueger, Farmer and Heinze, 2014).

While trainers using NR must first apply an aversive stimulus to trigger a desired behaviour which can then be reinforced by its removal (Zeligs, 2014, p108), trainers using PR have more varied operant conditioning techniques at their disposal, including: luring, which consist of presenting a strong positive reinforcer before the behaviour occur to lure the animal into performing it (Zeligs, 2014, p130), targeting, which involve using an object that the animal has previous learned to touch to define a desired movement (Zeligs, 2014, p137), mimicry, which involve learning the behaviour through watching and imitating someone else (Zeligs, 2014, p113), moulding, which can be used either as a form of PR or NR and involve using physical touch to sculp the desired behaviour (Zeligs, 2014, p125) and lastly, capturing and free-shaping, which are sometimes distinguished from each other (O'Heare, 2010; Veillard-Muckensturm, 2017) or referred to as a single technique (Zeligs, 2014, p108) that involve seeking out the desired behaviour (capturing), or approximation of the desired behaviour (free-shaping). PR also often involves the use of a clicker-type signal that is pressed when the animal performs a desired behaviour and is followed

by a pleasurable stimulus, hence the term "clicker training" is occasionally used interchangeably with PR (Pryor, 2002). While not indispensable to learning, this signal aims to bridge the gap between the desired behaviour and its consequence which reduce the negative impacts of delayed reinforcement on learning speed (Lattal. 2010).

Positive reinforcement is widely misunderstood by accredited riding coaches with 79.5% of them rating PR as “very useful,” but only 2.8% of them correctly explained its use (Warren-Smith and McGreevy, 2008). When coaches were asked to rate the effectiveness of rewards 78.2% of them rated the release of an aid as the most effective reward, which constitutes NR rather than PR and only 7.4% of respondents chose to label a positive reinforcer such as scratching, turn out and food as a most effective reward (Warren-Smith and McGreevy, 2008). Some research may also have inadvertently misrepresented the use of positive reinforcement with horses. For example, Innes and McBride, 2008 study aim was to compare the behaviour and physiology of horses trained with either NR or PR, however, the behaviour being trained with PR was jointly negatively reinforced by the simultaneous release of pressure which was applied to induce backward movement. While the results highlight the potential benefits of incorporating PR to horses in rehabilitation such as increased motivation to participate, it is more representative of the benefits of coupled reinforcement than PR. A suitable alternative to aversive stimulation would have been nose targeting which consists of teaching the horses to touch a target with their nose through pairing the touch with food and then use said target to prompt backward movement (Veillard-Muckensturm, 2017, p74).

Another example is Hockenhull and Creighton, 2013, who labelled verbal praise and patting as positive reinforcers neither of which have an innate or salient positive value to the horse (Lansade and Calandreau, 2018; Kieson *et al.,* 2020; Takashi *et al.,* 2016) and therefore would require timely, consistent pairing with a primary reinforcer such as food before being described as positive reinforcers (McGreevy, 2004; Ramirez, 2020, p54). Given the lack of differentiation between primary and secondary reinforcers in the study and riders’ poor understanding of learning theory highlighted by other studies (Brown and Connor, 2017; Warren-Smith and McGreevy, 2008), it is unlikely that 83% of the participating riders were rewarding their horses when they perform appropriate behaviour.

In leading zoo and pets organisations such as the Marine Animal Trainer Association (IMATA, 2021), Animal Behaviour Management Alliance (ABMA, 2021) and Association of Professional Dog Trainers (APDR, 2021), positive reinforcement is favoured over negative reinforcement. Reported benefits of the adoption of PR are various in pets and exotics such as improved care (Fagen, Acharya and Kaufman, 2014), improved emotional state and trust (Tresz and Murphy, 2008), improved safety (McKeel, 2005), reduction in unwanted behaviours such as aggression (Minier *et al.,* 2011) and stereotypies (Coleman and Maier*,* 2010). In horses, one study that looked at the differences between horses trained to load in a trailer with PR and the ones trained with NR, found horses trained with NR displayed significantly more discomfort behaviours per training session than the others (Hendriksen, Elmgreen and Ladewig, 2011). Additionally, horses trained with PR learned significantly faster, an effect that also been found in Sankey *et al*., 2010 study which aim was to investigate the effect of NR and PR on horses' perception of human. Sankey *et al*., 2010 found that the type of reinforcement has a major effect on the animal's emotional state and perception of humans and had lasting effects. NR was associated with a negative emotional state, as evidenced by heart rate measurement and behavioural measurements and PR was associated with an increased interest in humans even after training. Similar results were also found in another comparative study where body tension, attitude towards the trainer, head and ear position were measured (Freymond *et al.,* 2014).

The benefits of using positive reinforcement with horses can also be seen in studies where its use in conjunction with negative reinforcement. Innes and McBride, 2008, found that the addition of PR caused horses to be more motivated for the training and to exhibit more exploratory behaviour in novel situations and environment than horses trained with NR only. Another study designed to compare the effectiveness of using NR only and negative reinforcement coupled with positive reinforcement (NR + PR) to teach a new frightening task found no significant difference in both methods (Heleshi, Bauson and Bello, 2008). However, while not statistically significant out of the nine horses who failed to learn the new task, six were from the NR only group. Furthermore, the researchers spotted differences in variables that they were not measuring but require further investigation related to behaviour and handler safety. Horses in NR + PR condition were calmer passing the tarp while NR horses rushed across and were

more difficult to handle, requiring more physical effort from the handler (Heleshi, Bauson and Bello, 2008).

These studies show that positive reinforcement is an effective training tool that provides horses with welfare benefits and therefore should not be overlooked in favour of traditional handling methods which primarily rely on negative reinforcement. However, its usage has only been scientifically studied in controlled settings and for specific tasks which may not be representative of its real-world application, none of which involve riding. Furthermore, differences between the use of PR and its coupled use with NR has not been investigated in horses. Therefore, the aim of this study was to investigate how horse owners who have incorporated positive reinforcement use it and the perceived effects of its implementation on their horse's behaviours using a questionnaire that accounts for the potential differences between PR and NR + PR on behaviours and explores a variety of husbandry, training and ridden tasks.

2.0 METHODOLOGY AND METHODS

2.1 Participants.

Participants were recruited using convenience and snowball sampling through the distribution of the questionnaire on positive reinforcement-related Facebook groups and Instagram. Due to the nature of social media and an automated invitation to share the survey upon its completion, the questionnaire was distributed further into other groups and personal feeds, increasing its reach.

2.2 Questionnaire design.

The study was a retrospective, longitudinal, natural experiment which utilised a three-page online questionnaire designed to be completed within 10 minutes and hosted on Google forms (Appendix A) to obtain quantitative and qualitative data on horses' behaviours pre and post-implementation of PR as well as information on how their owners utilised PR. No personal data were collected, ensuring confidentiality and the purpose of the survey was disclosed on the first page to achieve informed voluntary participation; submission of a completed questionnaire was stipulated as consent to participate.

The survey questions were grouped into two categories. The first group of questions (one to seven) focused on gaining background information about the respondents' horses including age, breed, sex and training history. Two of these questions also sorted participants into one of the two types of training evaluated, PR only and PR used in combination with NR, and to discard questionnaires from unsuitable respondents. To increase internal validity, a respondent questionnaire was discarded if their answer to question five, which required them to describe positive reinforcement, did not align with Skinner's 1958 definition. If respondents only gave a partially correct or an ambiguous answer, for example, "Rewarding the horse when he does well" their responses to question seven were checked. Question seven was a semi-open-ended multiple-choice question listing common reinforcers and techniques used alongside positive reinforcement, including an "other, please specify" field to allow for clarification. Questionnaires were discarded if the participants did not report using a primary positive reinforcer to train and maintain desired behaviours. Food and

scratches were considered potential primary positive reinforcer due to their innate biological value to horses, while voice praise and patting were not (Lansade and Calandreau, 2018; Kieson *et al.,* 2020; Takashi *et al*., 2016). The ability to use one form of data to validate the other form was one of the reasons a mixed design, combining quantitative and qualitative data, was selected for this study (Driscoll *et al.,* 2007).

Question seven was also used to determine what type of reinforcement respondents used with their horses; Horses of individuals that reported using “aversive stimulation and negative reinforcement” were sorted into the PR + NR group if they also reported using at least one primary positive reinforcer. While choices that did not use secular terminology included cross-referenced definitions from literature, some respondents that did not select “aversive stimulation and negative reinforcement” reported using its use in layman terms such as “pressure and release” using the “other please specify” box.

The second group of questions were statements involving layman terms such as 'friendly' or 'difficult' alongside descriptive examples of behaviours to assess the horses’ behaviours prior and post-implementation of positive reinforcement with high inter-responder reliability. Statements were based on current literature and aimed to explore benefits of PR that have previously been observed in horses or other mammalian species. All questions, except for question 22, were categorical, using a 4-point Likert scale with several responses on a continuum (never; rarely; frequently; always) to account for variation in behaviour and so respondents could be more definite in their response rather than selecting a mid-point. Respondents had to select the option which most adequately described their horses’ behaviour in relation to the statement, but a ‘not applicable’ option was also available to account for horses that may not have experienced a particular scenario due to their management, age or use. Question 22 was a facultative open-ended question that allowed responders to share the additional benefits or issues they experienced while using PR. This allowed them to apply context to the behavioural scores, another benefit of selecting a mixed study design (Driscoll *et al.,* 2007).

2.3 Data analysis

Analysis of quantitative data was conducted using IBM SPSS statistics version 25. Kolmogorov–Smirnov tests were used to check for normality and summative scores were calculated for all data. As the data were categorical and non-parametric, between-groups comparisons in the utilisation of PR were calculated using chi-square tests. Differences in behavioural scores of the horses pre and post PR were calculated using related-samples Wilcoxon Signed Rank Tests as the data sets were non-parametric and utilised the same horses across both conditions. As recommended by Gignac, 2019, Levene's tests were first used to assess the homogeneity of variance between both groups due to their difference in sample size (PR = 222; PR + NR = 76) before calculating the differences in between groups' behavioural scores post-implementation of PR using Mann-Whitney U tests.

Braun and Clarke, 2006, reflective approach to thematic analysis was used to analyse responses to question 22. The analysis was deductive and therefore familiarisation with the data and the generation of codes were derived from responses to the research question. Codes were sorted and collated into potential themes, which later were reviewed and refined to ensure a coherent pattern and consistent account of respondent responses. The reflexive thematic analysis approach recognises that the researcher's experience and value impact the conceptualisation of themes which is arguably an integral part of deep reflection on and engagement with the data (Braun and Clarke, 2019). This however may be perceived as a limitation and further justify the mixed design approach of this study.

3.0 RESULTS

3.1 Utilisation of positive reinforcement by horse's owners.

The survey received 318 responses, 20 of which were discarded due to not meeting the study's requirements. 222 participants reported using PR to obtain and maintain desired behaviours and 76 used a combination of PR and NR. Figure 1 shows that regardless of training methods, respondents used positive reinforcement for a wide range of behaviours. Chi-square found no significance difference in behaviours trained with positive reinforcement in the PR and PR + NR group (X^2 (5, n = 927) = 0.61, p = .988). In both groups, positive reinforcement was most often used to exercise the horse from the ground (PR group = 93.24%; PR + NR group = 88.15%) and less often used for riding (PR group = 63.06%; PR + NR group = 67.1%).

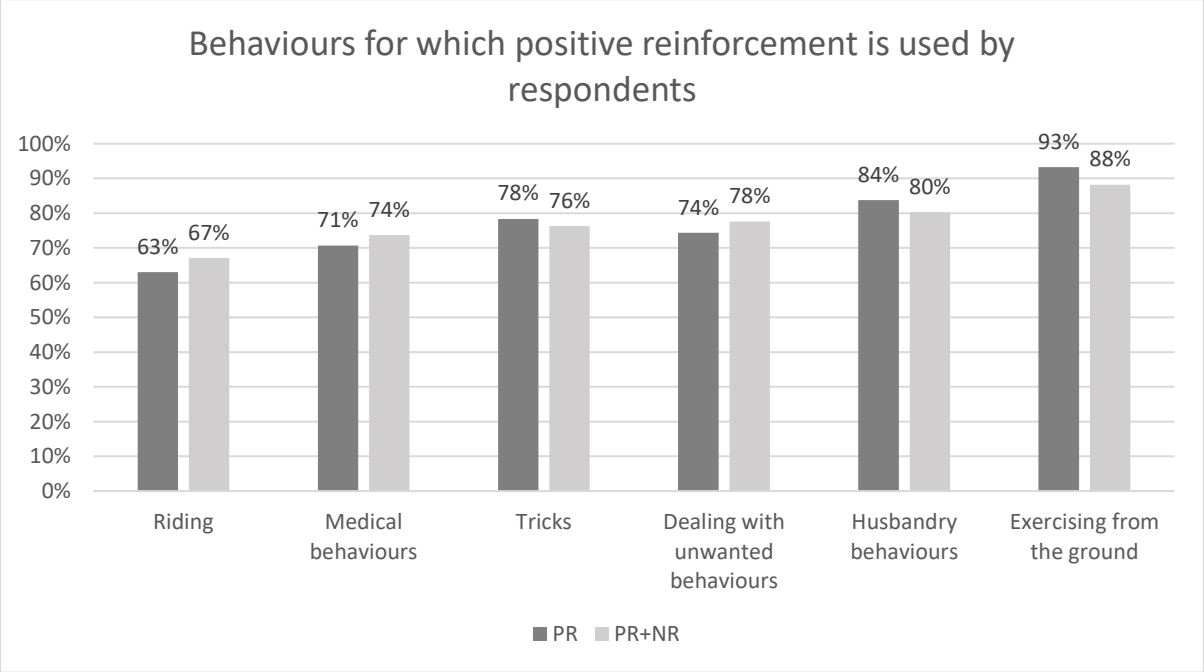

Figure 1. Reported use of positive reinforcement by PR and PR + NR group.

Respondents positively reinforced their horses using scratches (PR group = 60.36%; PR + NR group = 69.73%), real-life rewards (PR group = 52.70%; PR+NR group = 56.57%) and all but one participant from the PR + NR reported using food rewards to reinforce behaviours (n=297). Most participants reported using a bridge signal as a secondary reinforcer (PR group = 94.14%; PR+NR = 83.89%). There was no

significant difference between groups in the kind of positive reinforcer utilised (X^2 (3, n = 616) = 1.597, p = .66).

However, Pearson Chi-square test found a significant difference between the techniques utilised by the PR group to obtain desirable, reinforceable behaviour and the NR+PR group (X^2 (8, n = 1021) = 24.162, p = .002, Cramers V = 0.138). Standardised residuals shown in table 1 suggest that moulding had the most effect on the chi-square test.

Training tools and techniques		**Training group**	
		PR	PR + NR
Targeting	Percentage of respondents	93	74
	Standardized residual	.6	-.7
Free shaping	Percentage of respondents	79	80
	Standardized Residual	-.4	.4
Capturing	Percentage of respondents	78	74
	Standardized Residual	-.1	.1
Moulding	Percentage of respondents	20	45
	Standardized Residual	-2.4	2.5
Luring	Percentage of respondents	39	53
	Standardized Residual	-1.3	1.3
Mimicry	Percentage of respondents	34	34
	Standardized Residual	-.2	.3
Antecedent arrangement	Percentage of respondents	71	54
	Standardized Residual	.7	-.8
Protected contact	Percentage of respondents	61	38
	Standardized Residual	1.3	-1.4
On and off buttons	Percentage of respondents	57	37
	Standardized Residual	1.1	-1.2

Table 1. Cross-tabulation of training tools and techniques for both groups.

3.2 Behavioural assessment of horses

Behavioural assessment was conducted by the caretakers of 156 geldings, 138 mares and 4 stallions from various breeds, the majority of which were full or cross breed quarter horse (12%), Arabian (9%) and thoroughbred (7%). The horses were aged between 6 months old to 28 years and the majority had positive reinforcement implemented into their management and training regime for less than a year (30%).

Related-samples Wilcoxon Signed Rank Tests were used to assess the significance of the differences in behavioural score of the horses pre and post implementation of PR to their management and training regime. A significant difference ($p<0.01$) was found for all behaviours (Appendix B). Table 2 shows the median answers to each statements pre and post PR, evidencing an increase in the desirable surveyed behaviours and a decrease in undesirable behaviours of the sampled population.

Statements	Median	
	Pre PR	Post PR
Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.	Rarely	Never
Horse is difficult to load in trailer/lorry, for example, refuse to move, try to escape, rear etc.	Frequently	Rarely
Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.	Frequently	Never
Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.	Frequently	Never
Healthcare procedures such as hoof care, grooming, bathing, worming is difficult to perform or require a long time to achieve.	Frequently	Rarely
Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.	Rarely	Never
Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable.	Rarely	Never
Horse is reluctant to follow you away from preferred places and things such as companions or grass.	Frequently	Rarely
Horse is easily threatened by novel objects and may be difficult to lead or ride past said novel object.	Frequently	Rarely
Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.	Rarely	Frequently
Horse is curious and eager to explore novel objects and places.	Rarely	Frequently
Horse recovers quickly from a threatening event for example, goes back to being relaxed and responsive to cues after spooking.	Rarely	Frequently
Horse learns new wanted behaviours quickly.	Rarely	Always
Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.	Rarely	Frequently

Table 2. Median answer to behaviour assessment's statements pre and post PR.

Additionally, Mann-Whitney U tests were used to assess differences in the behavioural scores of both groups post implementation of PR. Table 3 shows there was a difference in the median of the two groups for two of the statements pertaining to easiness of healthcare and learning speed, but these differences were not statistically significant ($p<0.05$).

Statements	Median		Statistical analysis
	PR	PR + NR	
Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.	Never	Never	Mann-Whitney U = 7162.5, z = -1.831, p = .067
Horse is difficult to load in trailer/lorry, for example, refuse to move, try to escape, rear etc.	Rarely	Rarely	Mann-Whitney U = 4659.5, z = -.174, p = .862
Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.	Never	Never	Mann-Whitney U = 6202, z = -.322, p = .747
Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.	Never	Never	Mann-Whitney U = 5047, z = -.226, p = .821
Healthcare procedures such as hoof care, grooming, bathing, worming is difficult to perform or require a long time to achieve.	Rarely	Never	Mann-Whitney U = 7466.5, z = -1.261, p = .207
Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.	Never	Never	Mann-Whitney U = 6924, z = -1.717, p = .086
Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable.	Never	Never	Mann-Whitney U = 7760.5, z = -1.118, p = .264
Horse is reluctant to follow you away from preferred places and things such as companions or grass.	Rarely	Rarely	Mann-Whitney U = 8107, z = -.320, p = .749
Horse is easily threatened by novel objects and may be difficult to lead or ride past said novel object.	Rarely	Rarely	Mann-Whitney U = 7276.5, z = -1.865, p = .062
Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.	Frequently	Frequently	Mann-Whitney U = 7988, z = -.262, p = .793
Horse is curious and eager to explore novel objects and places.	Frequently	Frequently	Mann-Whitney U = 7363.5, z = -.946, p = .344
Horse recovers quickly from a threatening event for example, goes back to being relaxed and responsive to cues after spooking.	Frequently	Frequently	Mann-Whitney U = 7324, z = -1.341, p = .180
Horse learns new wanted behaviours quickly.	Always	Frequently	Mann-Whitney U = 7119.5, z = -1.726, p = .084
Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.	Frequently	Frequently	Mann-Whitney U = 5947.5, z = -.731, p = .465

Table 3. Results of Mann-Whitney U tests and Median answer to behaviour assessment's statement post PR for the PR group and the PR + NR group.

3.3 Thematic analysis of respondents' experiences with PR.

Participants were given the opportunity to qualitatively describe positive and negative aspects of their experience of incorporating positive reinforcement to their horses training and management. 159 respondents (80.3% of survey participants) answered this facultative question leading to the emergence of 8 themes (figure 2) which are described in detail in table 4 and Appendix C.

Theme	Respondents who commented on this theme	Description
Food anxiety/aggression	N= 16 (10%)	11 of 16 respondents commented on a reduction in food-related anxiety and aggression. The remaining commented on the lack of improvement in anxiety/aggression around food.
Engagement in training	N= 30 (18.9%)	Respondents commented on an increase in their horse's willingness to engage in training or/and performance improvement.
Horse emotional well-being	N=39 (24.5%)	Respondents commented that aspects of their horse's welfare improved following the implementation of PR through a reduction in signs of fear, chronic stress or/and learned helplessness.
Human emotional well-being	N= 9 (5.6%)	Respondents commented that PR has a positive effect on their emotional well-being.
Self-development	N= 20 (12.6%)	Respondents comments showed aspects of self-development such as knowledge acquisition and reflective thinking.
Safety	N= 19 (12%)	Respondents commented that PR had a positive impact on their physical health and safety or had prevented accidents.
Relationship	N= 22 (13.8%)	Respondents commented that PR had enhanced their relationship with their horses.
Communication	N= 24 (15.1%)	Respondents comment on PR giving opportunities for their horses to communicate.

Table 4. Description of identified themes.

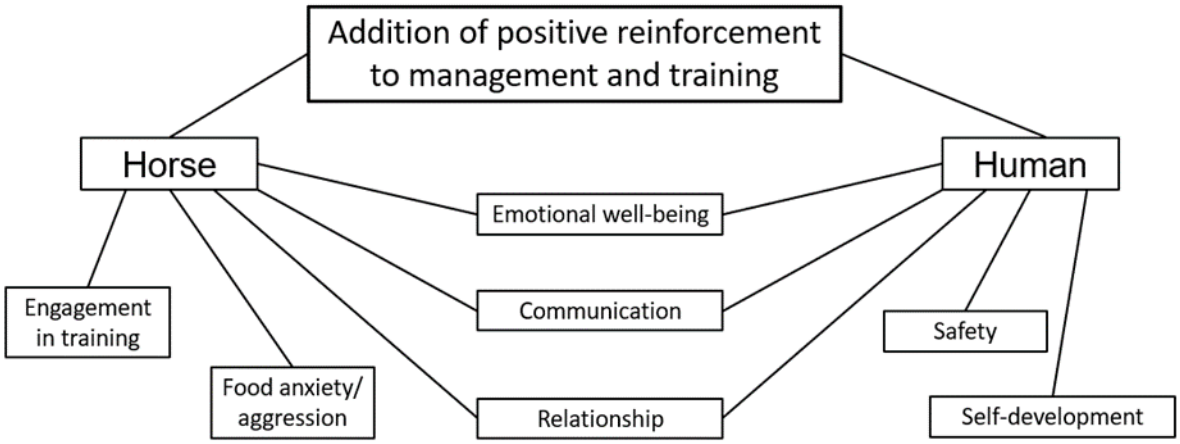

Figure 2. Thematic map.

4.0 DISCUSSION

4.1 Implementation of PR and its effects.

Behavioural scores and thematic analysis reveal a significant difference in the behaviours of horses pre and post-implementation of PR. Sixteen respondents commented on the theme of food-related anxiety or aggression, 11 of which reported a reduction in unwanted behaviours such as “mugging” and “biting” or reported a positive difference in their horse’s behaviour around food when compared to non-PR trained horses.

> “My horse is more polite when I have food in my pocket in the pasture than most of his herd members who sometimes come up to me. The other horses immediately try to turn my pockets upside down (...) and can be mouthy by grabbing my jacket for example.”

This was reportedly achieved through shaping an alternative desirable behaviour such as “keeping head in the middle of the chest” around food and through antecedent arrangement strategies such as “trickle feeding” as recommended by professional trainers (Veillard-Muckensturm, 2017) and proven an effective alternative to punishment (Fox *et al.,* 2012). These results reinforce previous findings that suggest that there is no relationship between hand-feeding and behaviours such as nipping hands and biting clothes (Hockenhull and Creighton, 2010), but instead, as suggested by several respondents, propose that these behaviours are a result of past reinforcement, “they would reinforce it by then giving food” and past management “my horse was previously starved”. It also provides further evidence that positive reinforcement is a useful alternative to aversive techniques in dealing with unwanted behaviours.

Thirty-nine respondents commented on an improvement in the horse's emotional well-being either through a reduction in common signs of fear or chronic stress such as "dancing on the spot and pulling", "bolting" and "aggression" (Young *et al.,* 2012). This is further evidenced in the behavioural scores of the horses to statements pertaining to stress-related behaviours and is in accordance with findings from previous studies that show reduced stress level in animals trained with PR (Dai *et al.,* 2019; Hendriksen,

Elmgreen and Ladewig, 2011). Some owners also commented about their horses being previously “shut down” or “depressed” which could be a sign of learned helplessness that occur due to a lack of control over aversive conditions in training or management, causing behavioural despair (Hall *et al.,* 2008). As PR does not involve aversion to achieve compliance in training (Skinner, 1953), the respondents’ observations of a shift to “a happier, less shut down horse” is likely to be an accurate observation and does corroborate the behavioural scores that evidence a decrease in avoidant behaviours and an increase in exploration. It also further reinforces Innes and McBride, 2008 suggestion that animals who have been subjected to long-term neglect or cruelty should be rehabilitated using PR instead of NR.

A theme that can be linked back to the horses’ emotional well-being is the concurrent increase in the reported health and the safety of the owners due to a reduction in potentially dangerous stress-related behaviours:

> “I feel a lot safer using positive reinforcement. Before I started using it, my horse was bolting often. Now he does not.”

Thirty respondents also mentioned that their horses were more “willing to participate” and therefore the owner’s physical strength and resilience was a less prominent obstacle to effectiveness as previously hypothesised by Heleshi, Bauson and Bello 2008:

> “My hands and wrists are happier with PR training. NR can require a lot of pulling and when my horse runs off and pulls loose, I would always get burns and blister on my hands.”

Apart from moulding all the others operant techniques used to obtain desirable, positively reinforceable behaviour do not require physical strength (Veillard-Muckensturm, 2017). Restraint is also unnecessary in PR training as its primary purpose is to allow for the application and release of aversive stimulation to reinforce behaviours as-well-as to prevent escape from the aversive (McGreevy and McLean, 2009), making PR potentially safer and more accessible to individuals with limited physical strength:

> “I have a severe pain condition that makes me feeble physically using +R means I don’t have to use a headcollar very often, my horse knows the cues to help me rather than make our lives more challenging.”.

Other reported benefits for the owner included an improved emotional state and self-improvement through knowledge acquisition and reflection on their past behaviour:

> “I increased my knowledge in assessing my horse's emotional state. So, I am more aware now when my horse is stressed. I now can read the calming signal my horse is sending.”

The motivational model of self-improvement suggests that while people are intrinsically motivated to achieve a sense of self-competence, the individual’s need for control in an uncertain situation create more active learning, as to resolve uncertainty and regain control (Ashford and Black, 1996; London and Smither, 1999). Self-improvement was, therefore, an expected response to a change in training method but the respondents’ interest in learning about equine affective states may be specific to PR training as suggested by the topic prevalence in recently published horse training books (Weston and Bedingfield, 2019; Gonzalez, 2018; Veillard-Muckensturm, 2017). Furthermore, a study investigating horse riders understanding of affective states found that clicker trainers were more successful in assessing horses’ negative affective states than participants from other styles of horsemanship, suggesting a difference in behavioural knowledge (Bell *et al.,* 2019).

Both thematical analysis and behavioural scores concur with other studies that found PR significantly enhanced the human-horse relationship (Sankey *et al.,* 2010). In this study, owners reported that their horses engaged more frequently in affiliative behaviours and were less avoidant of them. Additionally, some respondents reported events that demonstrated three of the four fundamental features of attachment (safe haven, secure base, proximity and separation distress) such as the owner being perceived as a safe haven to return to when distressed (Ainsworth and Bell, 1970):

> “The other day in the field he spooked when the gate blew in the wind, and he immediately ran over to me. He would not have done that before. So now I think he associates me with good stuff rather than as a threat.”

Proximity seeking, a behaviour that has been interpreted as a mean to cope with distress or a reflection of the responsiveness of the attachment figure was frequently described (Mikulincer and Shaver, 2003) and separation distress was also reported by one respondent:

> “My mare seems to see me as a "security mark". For example, she is going to panic if she is left alone in the arena or with a stranger (even if there is some hay), but she stays really calm if I am with her.”

The fourth feature of attachment theory, the perception of the attachment figure as a secure base from which to explore the world (Mikulincer and Shaver, 2007), was not commented upon. A 2018 study suggests that the safe-base effect, while previously observed in the mare-foal relationship (Hausberger *et al.,* 2007), may not be a characteristic of the human-horse bond as familiarity did not affect behaviour or physiological measures of stress in handling tests (Ijichi *et al*., 2018).

The role of attachment in the human-horse relationship remains largely unstudied but evidence suggests that safety (Payne *et al.,* 2016), the use of food via PR (Payne *et al.,* 2015) and appetitive physical contact (Hama, Yogo and Matsuyama, 1996) contribute positive affective states which are crucial in bond formation. For these reasons, future studies on attachment should consider utilising PR trained horses as participants, comparing their behaviours in the presence of their owners and unfamiliar individuals.

Communication was another prominent theme with the emphasis being on establishing a dialogue where the animal’s answer is valued and respected:

> “Before changing to PR my horse was turned off and mostly performed like a machine. Now I get YES as well as NO with conviction, I sometimes struggle with disappointment when I do not get the response that I want, but the feeling afterwards when I accept a NO is always good.”

Opportunities and choices to try a new behaviour to see what produces a reward without adverse repercussions for offering wrong responses and the ability to terminate the session when desired are prominent features of PR training (Westlund, 2014). Therefore, PR has been used in a study to teach horses to communicate their preferences for wearing blankets (Mejdell *et al.,* 2016) and theoretically could be used

to gain some level of consent for other behaviours. Respondents reported using refusal to participate as feedback and responded by either altering the training plan to promote success as often seen in zoological facilities (Melfi and Ward, 2020) or by no longer asking for the task:

> "I actually no longer ride this horse because he clearly hates it, something I didn't consider pre-PR."

> "In some cases, 'problematic' behaviour (such as stepping away from the mounting block) increased as I started listening to her voice. This means I've stopped riding for the time being."

Conventional riding involving NR can induce physical and psychological trauma that presents itself in the form of undesirable and avoidant behaviours that may be missed or ignored by horse owners (McGreevy, 2002). Nonetheless, NR has been suggested to be a more suitable training technique for ridden animals than PR (Lethbridge, 2009), and this is perhaps evidenced in this study by riding being the least frequently trained behaviour. Alternatively, horses' avoidance of riding due to past aversive experiences combined with their owners newly acquired behavioural skills and ethical consideration may be the primary reason being the small percentage of PR riders.

Another aspect of communication reported by 57% of participants from the PR group is the use of consent behaviours, also known as on-off or start buttons:

> "My horse suffers from Type 2 Polysaccharide Storage Myopathy and has chronic pain so using start button behaviours gives her more control over care situations which she would consider aversive such as rug changes."

Control is a primary reinforcer for behaviour, making its lost in management procedure a punisher capable of reducing behaviour (Friedman, 2005). For example, shifting problems in zoological facilities are often due to the action of moving inside when cued being coupled with the loss of access to the outside (Martin, 2020). This problem can be solved by giving the animal control over the process through its behaviour. For example, in Givskud Zoo, chimpanzees (*Pan troglodytes*) taught to shift into a chute for medical intervention using PR are allowed to control the opening and closing of the door through where they look which reinforce the behaviour of staying in the chute whilst the door was closed (Martin, 2020). In addition to increasing the likelihood of the

desired behaviours occurring, it is suggested that allowing an animal to experience control builds resilience in situations where control is lost, minimising its undesirable effects (Seligman, 1990).

It is possible that the behaviour changes pre and post PR are not the result of PR alone but of a range of non-coercive techniques as suggested by the percentages of participants using antecedent arrangement (54 to 71%) and protective contact (38 to 61%), which are level two strategies on the hierarchy of effective procedures (Friedman, 2005). A respondent also attributes their horses' behavioural changes to systematic desensitisation and counter-conditioning:

> "With this horse I have experienced 1) training with only aversives, 2) training with both appetitives and aversives (mixing) and 3) training with only PR, SD and CC. In fact, I think the SD and CC have been more important than the PR in changing his perception and behaviour and that has to do with counter-conditioning him to me so that he doesn't see me as so much of a threat any longer."

SD and CC are desensitisation techniques used to change an individual's perception of a stimulus, typically from aversive to neutral or appetitive (Ramirez, 1999). SD refer to gradual exposure to the arousing stimulus with increased exposure being dependant on the animal displaying a favourable emotional state and CC, often used alongside SD, consist of pairing the appearance of the arousing stimulus with a stimulus of opposite value (Ramirez, 1999; Zeligs, 2014). Considering the reported value of these methods in reducing fear in horses (Christensen, Rundgren and Olsson, 2006), future questionnaires should enquire about their use by horse's owners.

4.2 Differences in the behaviour of PR and PR + NR horses.

Horses' attribution to one of both group (PR and PR + NR) was dependent on their owners' self-reported use of aversive stimulation and negative reinforcement in response to question 7 (Appendix 1). However self-report surveys carry inherent limitations such as the possibility for the respondent to provide invalid answers due to social desirability bias and response bias (Demetriou, Özer and Essau, 2015). Some measures such as anonymity of participants and self-administration were taken to

reduce the impact of these phenomena but even in self-reported surveys, normative behaviours are still found to be reported at a higher rate than warranted because of respondent's need to present as prosocial (Kreuter, Presser, and Tourangeau 2008). In the context of this study which focused on members of the positive reinforcement-based training community, the use of negative reinforcement may have been under-reported if perceived as counter-normative behaviour. Identity theories propose that survey questions can prompt the participant to reflect not only on self-realised actions but also on ideal self-behaviours and on how an individual ought to act as part of the community (Brenner and DeLamater, 2016). This desire for consistency between the ideal self and the actual self may cause participants to reinterpret the question to be one related to identity rather than actual behaviour and lead to over or under-reporting (Brenner and DeLamater, 2016). Another factor that may have had an effect is that term 'negative reinforcement' is widely misinterpreted (Warren-Smith and McGreevy, 2008) and can apply to the removal of any aversive stimuli following a desirable behaviour (Skinner, 1953), ranging from a small pressure of the legs on the horse's flanks to repeated whip blows (Lethbridge, 2009), participants may not have wanted to select the item "aversive stimulation and negative reinforcement" to question 7 for fear that the research would assume the use of harsh aversive responses which would have been non-normative within the PR-based training community. This hypothesis is reflected in some of the answers of PR + NR respondents to qualitative question 22, where participants described their use of negative reinforcement without being prompted to do so with an emphasis on the aversive being mild:

> "I mainly use NR in riding for steering, but my pressure is mild and I choose not to escalate."

> "I do not ride him much but when I do it's with as much PR as possible, with only very light NR."

One response involves a strong element of guilt over its use, which could be the result of inconsistency between the actual and ideal self (Brenner and DeLamater, 2016). If this feeling were shared by other respondents, it could have led to under-reporting:

> "I love positive reinforcement - I know I am not perfect - for instance I still use small amounts of pressure (told you not perfect) - my horse is mostly voice cue trained but I do still squeeze gently with my legs for lateral work (so there is still

> some pressure and release) and pressure on her lead rope or reins when riding (super light though as I can as she's a very sensitive horse and usually doesn't need much!) but otherwise I try to do as much force free as possible. Totally not perfect. She seems to really enjoy lateral work, so I hope it doesn't upset her too much."

Additionally, some participants who were assigned to the PR + NR group for this study did not tick the item in the list but instead used the "other (please specify)" selection to describe aversive stimulation and negative reinforcement using a widely used euphemism within the equestrian industry; pressure-release (Lethbridge, 2009). This may be interpreted as an attempt at providing a more socially acceptable answer or evidence of a lack of understanding of NR regardless of a definition being provided as part of the questionnaire (Appendix A). The latter is a likely explanation as research reveals that most horse riders have a deficit in learning theory, with only 11.9% of participating accredited coaches correctly defining the use of NR in one study (Warren-Smith and McGreevy, 2008) and 33% of professionals and 12.5% of amateurs equestrians in another (Brown and Connor, 2017). This effect could be controlled for in future surveys by asking participants to not only define positive reinforcement but negative reinforcement as well and discard questionnaires with incorrect answers.

The effects of appetitive and aversive stimuli used concurrently or in proximity remain largely unstudied but some respondent' comments suggest that there may be a difference that was not found in behavioural scores:

> "I noticed that using PR and NR together at the same time caused confusion/frustration for my horse. I still use both, but I will have separate training sessions for the different methods."

> "I have trained lots of horses with mixing reinforcement for many years with good results, but have started using pure PR after realising my horses have more positive emotions about exercises taught with pure PR"

Some studies conducted on a small sample of neurodivergent humans have found that a combined reinforcement contingency was more effective for some participants than PR alone in reaching treatments goals (Bouxsein, Roane and Harper, 2011; Kodak *et al.,* 2007; Piazza *et al.,* 1997). These studies however solely focus on compliance and do not account for the participants' emotional response to the task or

the environment, which has been proposed as one of the main fallbacks of combining reinforcement contingency in animal training (Pryor, 2010, p.136-7). It is hypothesized that a discriminative stimulus associated with both appetitive and aversive consequences may become a “poisoned cue” as the animal become uncertain of the outcome of the discriminative stimulus (Pryor, 2010, p.136-7). This has only been scientifically studied in one master thesis where a dog was taught a behaviour using two different training methods (PR and combined reinforcement) with a different cue for each (Murrey, 2007). While both techniques were effective, the dog’s responses were more accurate in the PR condition and it displayed a higher frequency of high tail wags and a lower frequency of low tail wags than in the combined reinforcement condition, suggesting a preferable emotional state (Murrey, 2007). It is likely that the 4-points Likert scale used in this study is not sensitive enough to reliably capture such subtle behavioural differences linked with affective states, this could also explain why a significant difference was found in the techniques and tools used by both groups but not in their horses’ behaviours. To rigorously access the potentially subtle differences between PR and combined reinforcement, an experiment taking physiological and behavioural measures may be better suited.

5.0 CONCLUSION

The results of this study provide further evidence to previously observed benefits of PR such as enhanced horse-human relationship, improved emotional state, willingness to participate and increased learning speed. The respondent's qualitative answers give examples of real-world implication of the use of PR on horse welfare and provide a basis for further study on the role of PR in improving handler's safety. The ethical implication of this study is that horse training should involve PR to maximise the benefits and lower the cost of the human-horse relationship, but further research is required to understand the differences between PR and the combined approach to reinforcement.

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APPENDIX A: Research's questionnaire.

My name is Alizé Veillard-Muckensturm, I am currently undertaking Animal and Behaviour (Top-up) at Hartpury University and I would like to invite you to take part in a research study.

Purpose of the survey:

Positive reinforcement (PR) is a useful method to obtain desirable behaviours in horses that in past experiments have been associated welfare benefits. However, its usage as only been scientifically studied in controlled settings and for specific tasks which may not be representative of its real-world application. Furthermore, differences between the use of PR and its coupled use with negative reinforcement (NR) has not been investigated in horses. Therefore, the aim of this study is to investigate how horse owners who have incorporated PR use it and the perceived effects of its implementation on their horse's behaviour, accounting for the potential differences between PR and NR + PR on behaviours and explore a variety of husbandry, training, and ridden tasks.

Taking part in the survey:

This survey should take no longer than 10 minutes and no personal data is collected. Please complete the questionnaire if you used to use traditional training and handling methods (which rely on negative reinforcement) but moved to using positive reinforcement or a mixture of positive and negative reinforcements methods. If this statement does not describe you, you should not complete the questionnaire. If you own several horses, select one of your horses and complete the form for this horse only.

Consent and withdraw:

By clicking 'Next' you consent to taking part in this survey. You can withdraw your participation at any time before reaching the end of the survey, incomplete questionnaires will not be used.

If you are unhappy at any stage of the study please contact my supervisor, Dr.Michelle Whitham ones (Michelle.Whitham-Jones@hartpury.ac.uk), at Hartpury University to raise your concerns. You may also contact me at alize.veillard-muckensturm.ucw@hartpury.ac.uk

ABOUT YOUR HORSE AND TRAINING

1) **Horse' age:**
2) **Horse' breed:**
3) **Horse' gender:** [ ] Female [ ] Gelding [ ] Stallion
4) **How long have you been training this horse with positive reinforcement?**
5) **Define positive reinforcement:**

6) **For what types of behaviour do you use positive reinforcement with this horse? (Choose as many as appropriate)**

A. Tricks	B. Husbandry behaviours	C. Medical behaviours
D. Riding	E. Exercising from the ground	F. Unwanted/ problem behaviours
G. Other (specify)		

7) While training your horse with positive reinforcement to perform or maintain a desired behaviour, which of the following tools and methods do you also deliberately use? (Choose as many as appropriate)

A. Bridge signal such as a clicker.	B. Food rewards	C. Scratches
D. Free shaping: reinforcing successive approximation which leads to the desired behaviour.	E. Targeting: Using a target that the animal has learned to touch with specific body parts to stimulate the desired behaviour.	F. Moulding also known as sculpting: Physically moving the animal or part of the animal in a desired position.
G. Aversive stimulation and Negative reinforcement: the introduction of an aversive stimuli to stimulate a response which is then reinforced by the removal of the aversive stimuli.	H. Luring also known as baiting: Using something the horse wants to lure it in a wanted position.	I. Capturing also known as scanning: Reinforcing the desired behaviour as its occurring.
J. Start and off buttons also known as consent behaviours	K. Real-life rewards: Desirable consequences that occur as a direct result of the animal performing the desired behaviour.	L. Protected contact: a neutral barrier which separate the trainer from the animal.
M. Antecedent arrangement: Modifying the environment to make the desired behaviour (or approximation) more likely to occur.	N. Mimicry: Showing or having another demonstrate the desired behaviour.	O. Other (specify)

BEHAVIOURAL ASSESSEMENT

Answer each of the 14 statements for both before and after your implementation of positive reinforcement (PR) using the following code: 1 = never 2= rarely 3= frequently 4= always. 5 = not applicable

8) A. [Before PR] Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

9) A. [Before PR] Horse is difficult to load in trailer/lorry for example refuse to move, try to escape, rear etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is difficult to load in trailer/lorry for example refuse to move, try to escape, rear etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

10) A. [Before PR] Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

11) A. [Before PR] Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

12) A. [Before PR] Healthcare procedures such as hoof care, grooming, bathing, worming is difficult to perform or require a long time to achieve.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Healthcare procedures such as hoof care, grooming, bathing, worming is difficult to perform or require a long time to achieve.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

13) A. [Before PR] Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

14) A. [Before PR] Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

15) A. [Before PR] Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

16) A. [Before PR] Horse is reluctant to follow you away from preferred places and things such as companions or grass.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is reluctant to follow you away from preferred places and things such as companions or grass.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

17) A. [Before PR] Horse is easily threatened by novel object and may be difficult to lead or ride past said novel object.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is easily threatened by novel object and may be difficult to lead or ride past said novel object.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

18) A. [Before PR] Horse is curious and eager to explore novel objects and places.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse is curious and eager to explore novel objects and places.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

19) A. [Before PR] Horse recovers quickly from a threatening event for example, goes back being relaxed and responsive to cues after spooking.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse recovers quickly from a threatening event for example, goes back being relaxed and responsive to cues after spooking.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

20) A. [Before PR] Horse learns new wanted behaviours quickly.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse learns new wanted behaviours quickly.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

21) A. [Before PR] Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.

1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

B. [NOW] Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.

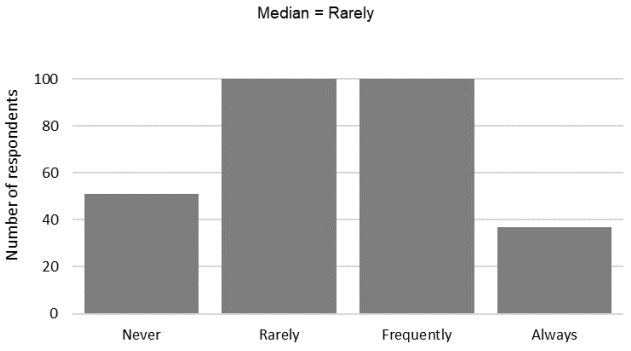
1	2	3	4	5
Never	Rarely	Frequently	Always	Not applicable

22. If you experienced other benefits or issues from incorporating positive reinforcement or a mixture of positive and negative reinforcement methods please describe them below. *

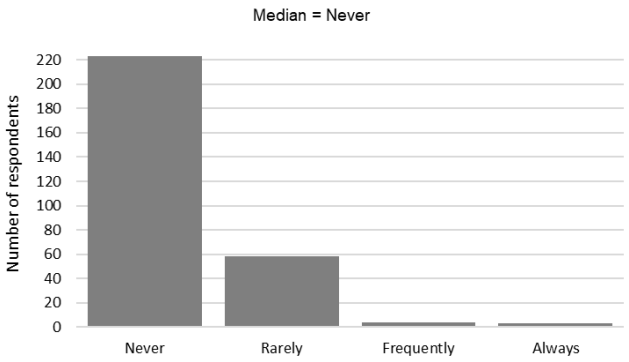
*: facultative answer.

APPENDIX B: Behavioural assessments histograms pre and post PR.

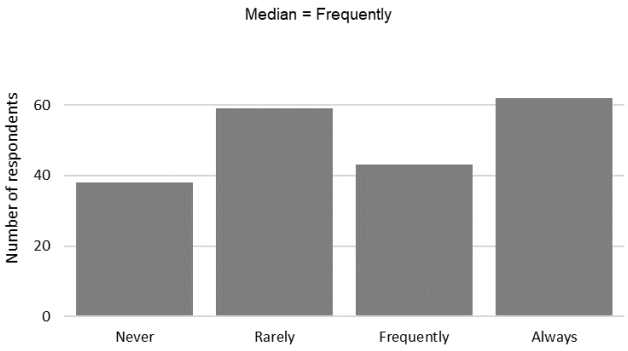
1(a) Pre PR: Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.



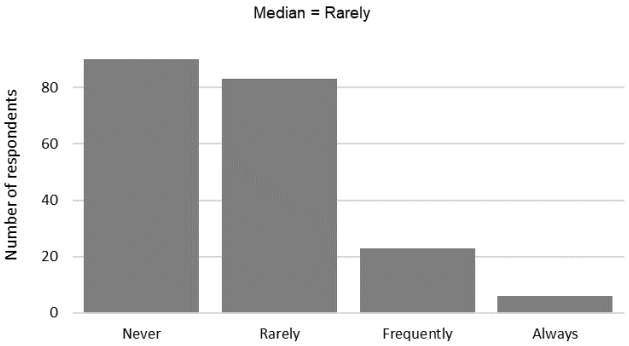
1(b) Post PR: Horse is difficult to catch in the field for example does not come when called, walk away when approached etc.



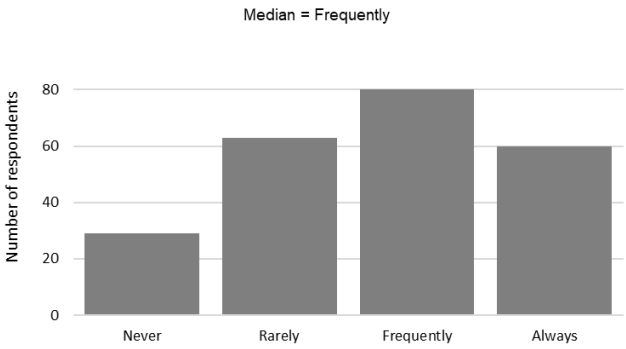
2(a) Pre PR: Horse is difficult to load in trailer/lorry, for example, refuse to move, try to escape, rear etc.



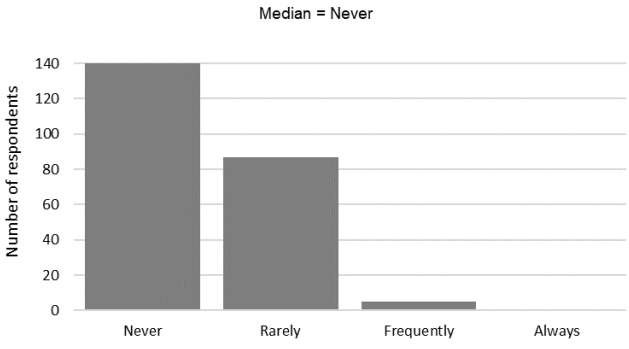
2(b) Post PR: Horse is difficult to load in trailer/lorry, for example, refuse to move, try to escape, rear etc.



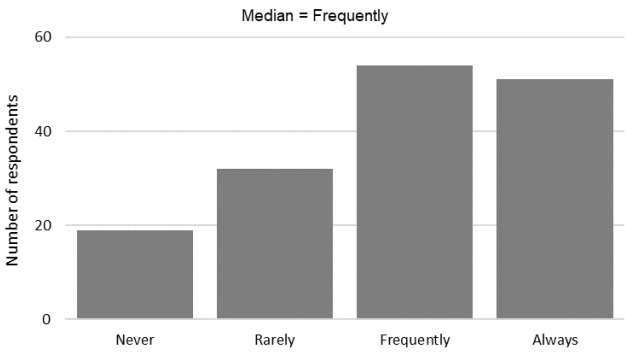
3(a) Pre PR: Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.



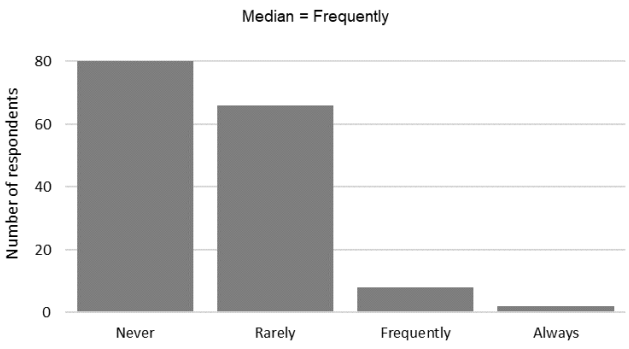
3(b) Post PR: Horse is difficult to tack up for example, avoid the bridle by lifting his head, walk around when being girthed etc.



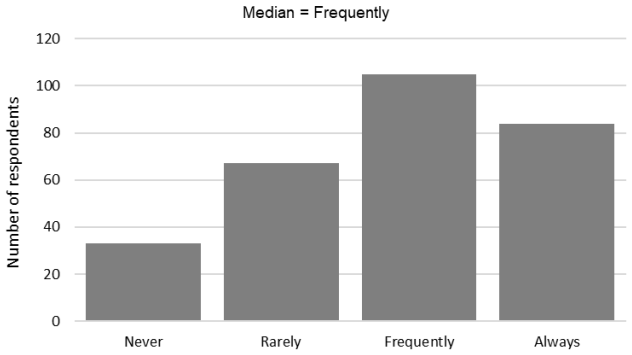
4(a) Pre PR: Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.



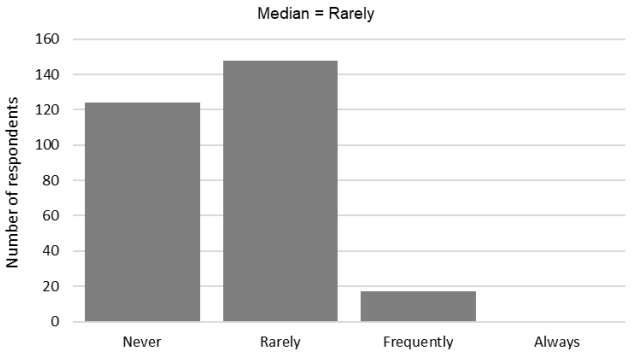
4(b) Post PR: Horse is reluctant to be mounted for example, does not stand still or parallel at the mounting block.



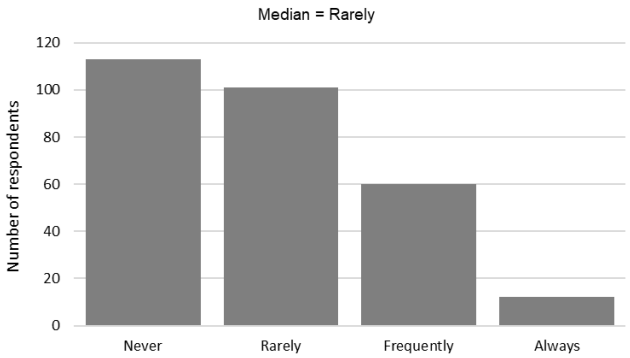
5(a) Pre PR: Healthcare procedures such as hoof care, grooming, bathing, worming are difficult to perform or require a long time to achieve.



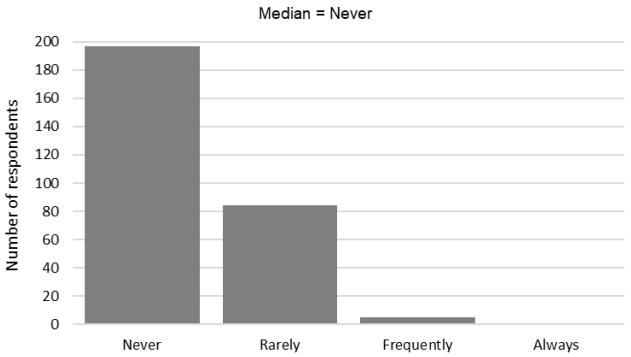
5(b) Post PR: Healthcare procedures such as hoof care, grooming, bathing, worming are difficult to perform or require a long time to achieve.



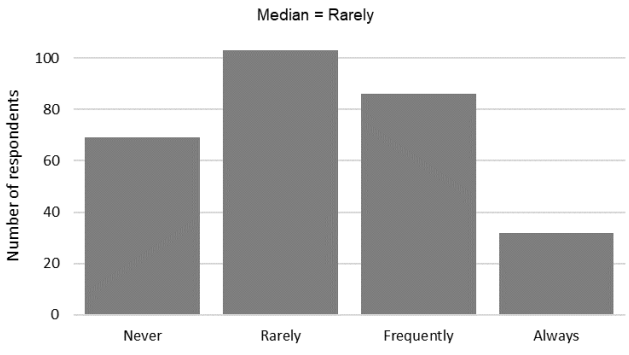
6(a) Pre PR: Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.



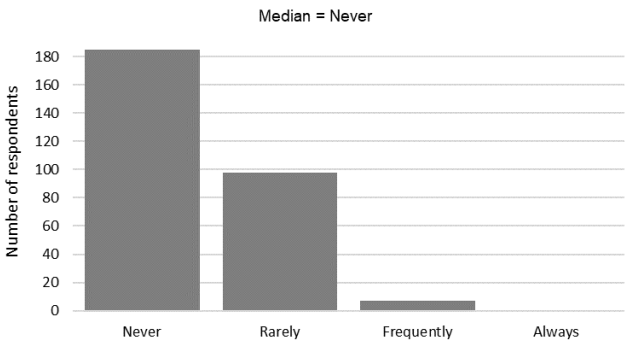
6(b) Post PR: Horse is unfriendly in your presence for example pin ears, threaten to bite or kick etc.



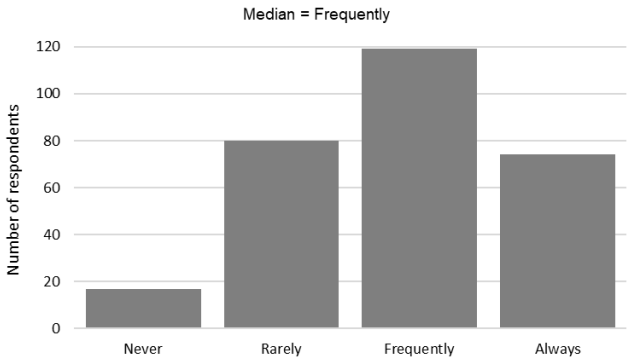
7(a) Pre PR: Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable etc.



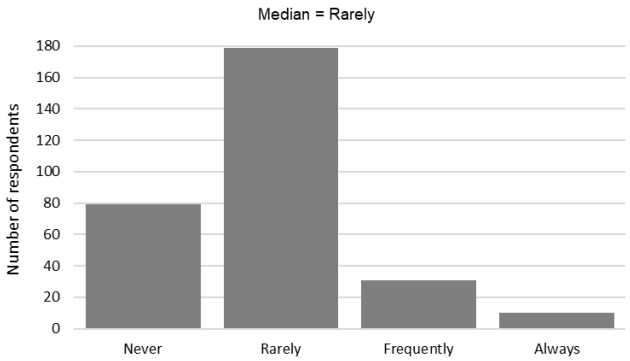
7(b) Post PR: Horse is avoidant for example turns head away from you, avoid being touched, stand at the back of the stable etc.



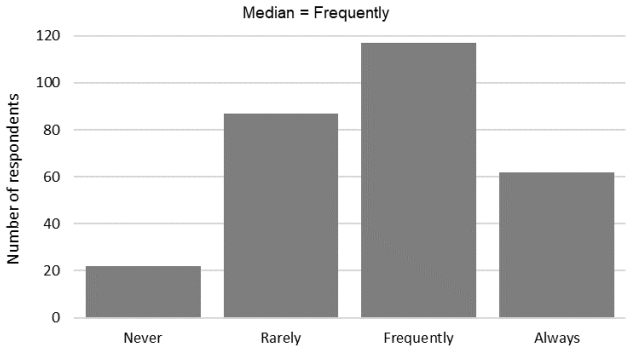
8(a) Pre PR: Horse is reluctant to follow you away from preferred places and things such as companions or grass.



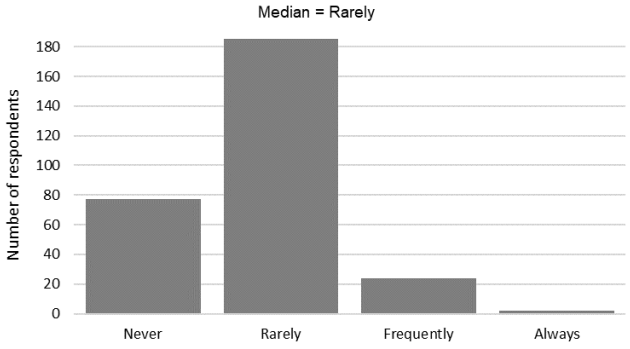
8(b) Post PR: Horse is reluctant to follow you away from preferred places and things such as companions or grass.



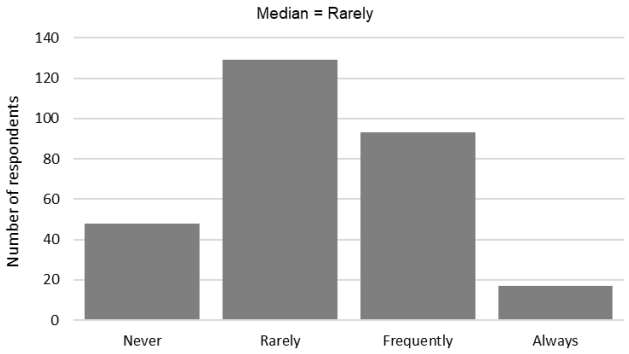
9(a) Pre PR: Horse is easily threatened by novel objects and may be difficult to lead or ride past said novel object.



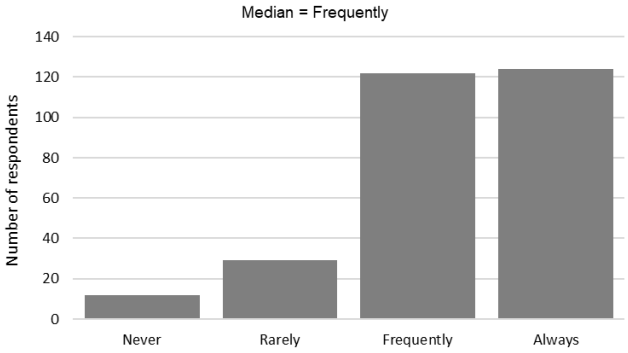
9(b) Post PR: Horse is easily threatened by novel objects and may be difficult to lead or ride past said novel object.



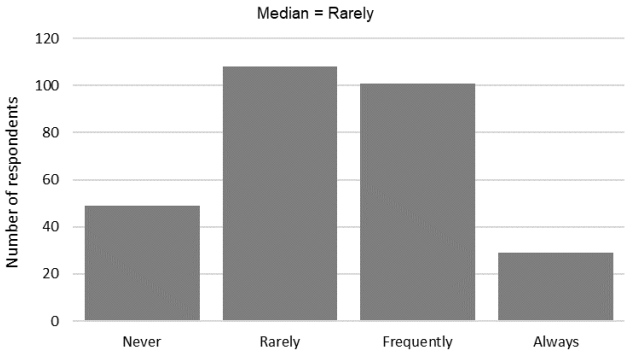
10(a) Pre PR: Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.



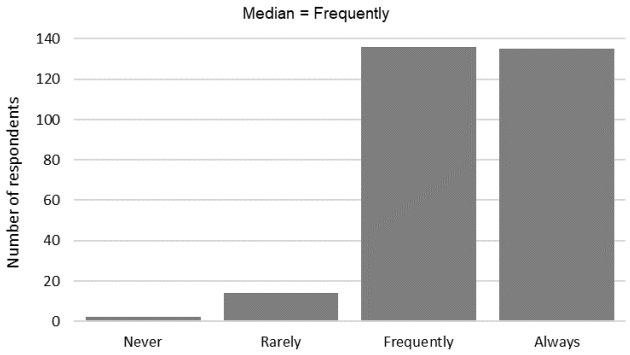
10(b) Post PR: Horse engages in affiliative behaviours with you such as come up to you when you arrive, choose to graze by you when able and attempt mutual grooming.



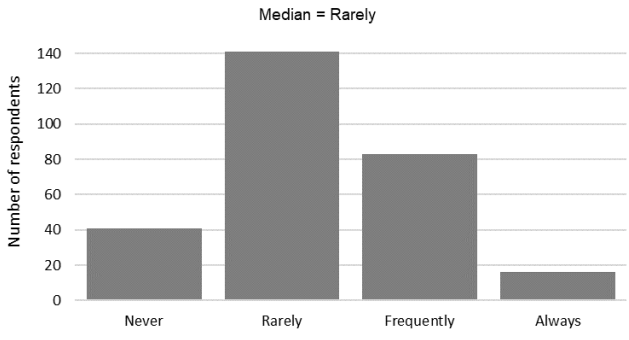
11(a) Pre PR: Horse is curious and eager to explore novel objects and places.



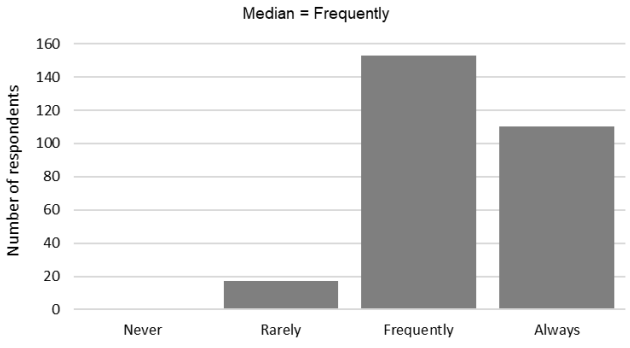
11(b) Post PR: Horse is curious and eager to explore novel objects and places.



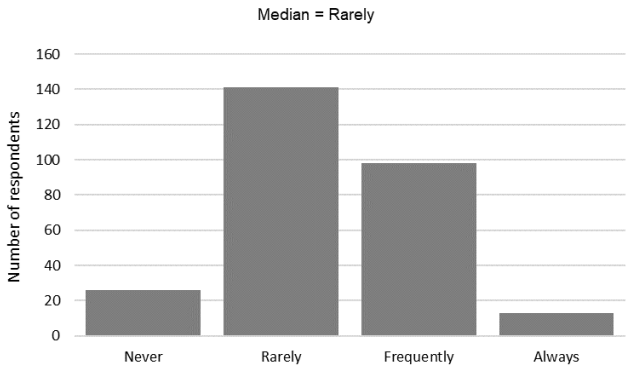
12(a) Pre PR: Horse recovers quickly from a threatening event for example, goes back to being relaxed and responsive to cues after spooking.



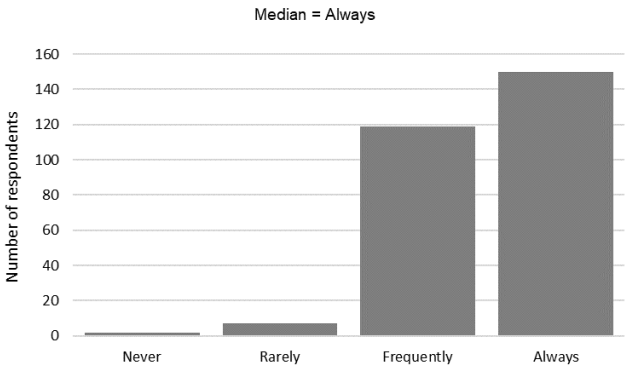
12(b) Post PR: Horse recovers quickly from a threatening event for example, goes back to being relaxed and responsive to cues after spooking.



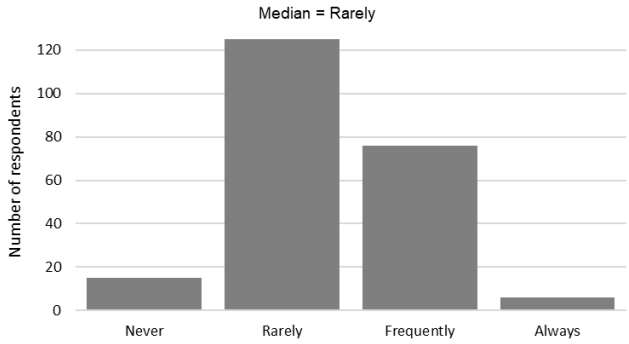
13(a) Pre PR: Horse learns new wanted behaviours quickly.



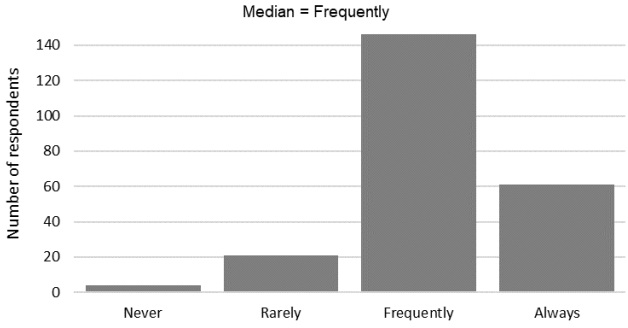
13(b) Post PR: Horse learns new wanted behaviours quickly.



14(a) Pre PR: Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.



14(b) Post PR: Horse generalises learned behaviours to new situations quickly such as from the ground to the saddle or from you to a new handler.



APPENDIX C: Examples of respondents' answers per identified themes.

Theme	Examples
Food anxiety/ aggression	"He has stopped mugging me and biting me to get treats. He came from a riding school so he used to bite/mug the kids then they would reinforce it by then giving food, but this stopped in about 10 mins after teaching him "manners" (keep head in middle of chest)" "My horse is more polite when I have food in my pocket in the pasture than most of his herd members who sometimes come up to me. The other horses immediately try to turn my pockets upside down (note: I never give these horses any food, very rarely even give them attention) and can be mouthy by grabbing my jacket for example. My horse on the other hand, doesn't do any of that." "My horse was previously starved before I got her and therefore was aggressive around food at first. Since R+ training she is now polite, gentle and will wait to eat her feed/treats until cue is given. She is also more relaxed around food in general."
Horse emotional well-being	"My horse was going to be euthanized due to his explosive behaviour. He was terrified of people and lots of objects (...)." "Horse displayed aggressive behaviours such as biting and was reluctant to lead without pulling back or trying to run away before positive reinforcement but after biting has nearly become non-existent and he leads around the field at liberty even choosing to walk away from other pony when asked to begin training. Also now stands calmly and patiently where before he would dance on the spot or pull." "The horse seems more confident and calmer in general. A lot of the problem behaviours he had went away and I did not train specifically for that. I trained different behaviours - e.g., mats - that had nothing to do with the problem behaviours."
Engagement in training	"Enjoyment of being ridden and developing a pleasure in moving (hated being ridden and would not go forward unless threatened with punishment)" "More engaged in training, more willing to do things and try out new things". "My horse is much more motivated and does NOT want to stop a training session."
Self-development	"I found out that my horse loves to play and interact in ways that I would never have tried before PR." "I feel it has encouraged me to observe my horse's behaviour more and analyse the clues for communication instead of brushing it off as irritating / cheeky etc." "I increased my knowledge in assessing my horse's emotional state. So I'm more aware now when my horse is stressed. I now can read the calming signal my horse is sending. That's why I can see more "tuning the head away" now. But I guess my horse showed this behaviour before PR, I only wasn't able to see it."

Human emotional well-being	“I smile more. I used to get so frustrated during NR training, sometimes even to the point I would cry on the spot. Now, I laugh and smile so much more and am less frustrated when things do not go as planned. My horse obviously prefers to be around me when I carry good energy with me, well, more so than when I am in an awful mood.” “In general, a much happier horse even though it's nowhere near perfect, I myself am much more inclined to celebrate the small victories instead of focusing only on the massive goals” “I feel much more comfortable and positive during training and being with my horse”
Safety	“My hands and wrists are happier with PR training. NR can require a lot of pulling and when my horse runs off and pulls loose, I would always get burns and blister on my hands, (...) My wrists are also a bit weak and so all of that reliance on strength wasn’t great.” “I feel a lot safer using positive reinforcement. Before I started using it, my horse was bolting often. Now he does not.” “My horse was dangerously herd bound and would run you over and completely ignore you”.
Relationship	“The relationship I have with my horse now is like one I no other I have had. Clicker training and R+ has made training a conversation and my horse is so pleased that we are both able to listen and understand.” “The other day in the field he spooked when the gate blew in the wind, and he immediately ran over to me. He would not have done that before. So now I think he associates me with good stuff rather than as a threat.” “I have found that my horse finds "comfort" in me, not being too stressed when leaving his paddock mate and working with me” “My horse changed personality and is more friendly. He finds me comfortable and always come to me even if he has hay. He trusts me, is more confident.”
Communication	“Autonomy and the right to consent made all the difference. His emotional communicational state improved tremendously. First, I would have described him as ‘bitter’ and depressed, now he is curious, eager and motivated. First, he kept to himself, now he’s engaging in dialogue with me.” “My horse suffers from PSSM2 and has chronic pain so using start button behaviours gives her more control over care situations which she would consider aversive such as rug changes due to needing to keep muscles warmer blood draws to monitor health progress.” “I have started to listen to her more, and I think she feels that she has a voice now. Before I would do things anyway, because she "needed exercise" or because "it was planned", now I let her (and her pony friend) have a choice and I feel they like doing things with me more now than before.”