THE EFFECTIVENESS OF THE PARELLI HORSENALITY APPROACH IN

DETERMINING SUITABILITY IN THERAPEUTIC RIDING PROGRAMS

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A Thesis

Presented to

The Faculty of the Department Agricultural Sciences and Engineering Technology

Sam Houston State University

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In Partial Fulfillment

of the Requirements for the Degree of

Master of Science

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by

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May, 2017

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ABSTRACT

Ramagli, Lori Elizabeth, *The effectiveness of the Parelli horsenality approach in determining suitability in therapeutic riding programs.* Master of Science (Agriculture), May 2017, Sam Houston State University, Huntsville, Texas.

Increased awareness of mental and physical disabilities have been observed within the US. With this increased awareness, there is a need for therapies to assist these individuals, and help maintain normality in everyday lives in our growing society. Conventional therapies only target only physical or emotional disabilities, but modern day treatments have incorporated animal assisted therapies, like therapeutic riding, to aid in both. When utilizing animals for therapy, there will always be some variety of complications. In particular, burn out rates are one of the number one problems in equine assisted therapy programs today. The objective of this study was to utilize the Parelli Horsenality profiling system as an indicator to determine which horsenality characteristics are most influential when identifying a long-term, safe therapeutic riding horse. To do this, all horses (n=13) were evaluated for both long term and short-term suitability as a therapeutic riding horse based on handler evaluation and behavior during active lessons at Panther Creek Inspiration Ranch (PCI). The long-term tier scoring system was used from 1 to 4, one being the most desirable horse for therapeutic riding and 4 being an undesirable horse for therapeutic riding from PCI instructors that have worked along side the horses for a long period of time. A short-term obedience score was used to evaluate during active lessons via ground study observations. Horses are evaluated through a 100-question exam to determine horsenality traits and their prominence through a stepwise regression using the traits to predict the short and long-term evaluations. From the regression, it was shown that only 5 (bracy, tense, shy, non

responsive, easily board) of the 40 Parelli characteristics were important when

determining if a horse will be a resilient, safe, and long term therapy horse for a

therapeutic riding programs. With these 5 traits, programs will be able use the Parelli

Horsenality Profile to simplify the process of finding a suitable, durable, horse for a

therapeutic riding program.

KEY WORDS: Therapies, Disabilities, Rehabilitation, Animals

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

CHAPTER I

Introduction

Therapeutic riding has been around for many years and is one of the few therapies that targets both the physical and mental well-being of the rider. Allowing for emotional connection as well as developing physical strength, the benefits are numerous to this modern day remedy. While, this option benefits various types of individuals, one common disorder that can be treated with therapeutic riding is autism spectrum disorder (ASD). This disorder in particular affects more than 3.5 million lives each year in the U.S.

This disorder is a mental condition with complex disorders in brain development and represents one of the largest populations who participate in therapeutic riding in the U.S. (Buescher *et al*., 2014). These disorders are categorized in varying degrees by levels of difficulty. Specific attributes that are affected are intellectual disability, difficulties in motor coordination, and physical health issues. The occurrence and/or awareness of this disorder is on the rise, as the prevalence of parent-reported ASD among children aged 6–17 was 2% in 2011–2012, a significant increase from the 1.16% in 2007 (Blumberg *et al*., 2013). This statistic has gradually increased over the years for reasons unknown, so the importance of awareness and how to manage and assist these individuals with such disorders is imperative.

There are numerous varieties of autism and they are categorized into particular groups. Physical disabilities, typically exhibited from infancy, impede the development of motor skills such as balance and coordination and form the first of these two groups (IABA, 2016). These children are delayed in sitting, crawling, or even walking. Parents

observe the lack of physical activity before delays in social and communication skills present themselves (Autism Speaks, 2016). Additionally, the second of these two groups are Intellectual Disabilities, which comprise 50% of ASD individuals. Many of these individuals fail to develop valuable speech and cognitive understanding, while the remainder are simply delayed in language development and use. Recently, researchers have struggled to establish common genetic or neurodevelopmental pathways for intellectual disabilities and ASD, but these two disorders appear to have direct effects on each other.

So, why do we focus on different therapies for these children? With the rising numbers of Americans being diagnosed each year with different varieties of autism, we focus on different beneficial therapies for the purpose of allowing these children to function well in the real world. Without efforts to help gain their physical and emotional needs up, these individuals would struggle to co-exist with the rest of the world.

However, autistic children are not the only people who suffer from emotional and physical disabilities. The thousands of disabled veterans that suffer from physical injuries and the emotional trauma of war are but one example of another group that faces similar challenges as ASD individuals. The most common disability seen from veterans is Post-Traumatic Stress Disorder (PTSD). Approximately 5.2 million people, suffer from PTSD during the course of a year, and an estimated 7.8 million Americans will experience some form of PTSD at some point in their lives (NIMH, 2016). This condition develops after a person has experienced or witnessed a traumatic event. This condition can be long lasting and side effects of this disorder are related to fear, increased stimulation, distrust, helplessness, anger, and sadness (DVA, 2011). According to Dr. Cynthia Dunn, a

psychologist at the Lexington VA, veterans tend to withdraw from social activities and tend to assert more secluded tendencies which can lead to suicidal concerns (DVA, 2011). In addition to emotion trauma, veterans may experience physical disabilities from war. Many veterans have lost extremities as a result of these heinous acts against humanity, leaving them permanently debilitated, something of which they knew nothing of prior to war. This dramatic lifestyle change challenges these individuals and requires rehabilitation to obtain normality in everyday tasks such as walking or getting dressed. It also establishes both a lack of trust and attachment to other individuals (Donnellan *et al*., 2005).

While veterans and ASD individuals form the majority of therapeutic riding clients, many people that were born with genetic defects such as myotonic dystrophy, cerebral palsy, and scoliosis have numerous limitations and are affected daily as well. These limitations can be limited to but not excluding: balance, muscle weakness, and coordination, but many overlook the mental conditions that these individuals struggle to overcome everyday. Incorporating a rehabilitation therapy that touches on both mental recovery as well as physical recovery is therefore in high demand and over the last few decades, people have resorted to animal assisted therapies like therapeutic riding as the answer for this.

CHAPTER II

Horseback Riding for Therapy

2.1 Horse Behavior and Psychology

To understand therapeutic riding one must first understand the natural tendencies of the horse and why they behave the way that they do. Horses have roamed the earth dating back as far as 3000 B.C. Behavior studies strongly support the idea that domestication was not due to human intervention. Rather, it is believed that a longer, slower process of mutual adaptation occurred in which horses that began to congregate around the first permanent human settlements benefited from the arrangement (Budiansky, 2003). Additionally, horses are social animals, instinctively given the potential to understand signals of dominance and submissions, which is why humans and horses have been so successful in coexisting with one another.

By nature, horses are considered to be a prey animal. When put in a trying situation and a decision of fight or flight has to be made, they commonly choose flight in order to survive. Flight is the primary choice for these animals because they lack anatomic resources to fight effectively. These animals do not have sharp teeth or claws for protection, their legs and speed are their best resource. This essential instinct is the foundation of understanding horse behavior. It has only been in the last ten years that basic science has begun to focus intensively on the horse, and as a result, this plethora of research has focused on the evolution, behavior, perception, learning, and genetics of horses and has provided insights into their true nature (Waran, 2002). Horses tend to group events into two different scenarios: things that will harm them, and things that will not. Although this flighty behavior is deeply engraved in their genetic makeup, they can

be desensitized to many things. Yet, because of this binary perception, any kind of domestication and training needs to be a positive experience for them. This positive experience ensures that training exercises are not viewed as something that will harm the animal and viewed as a positive experience by the horse. This behavior has been hypothesized as trial and error learning, meaning a species response to a situation that it finds most satisfying will be most closely linked to the situation and most readily invoked when the situation comes up again (Leblanc *et al.*, 2013).

Additionally, horses are herd animals. They thrive and find the most security in herd settings. These herds establish hierarchy through dominance. That dominance can be asserted by running off other horses, dictating direction of another horse, or ensuring that another horse cannot move at all (Budiansky, 2003). Horses do not follow a leader in their herd because of size, sex, or strength, but by acts of dominance and attitude (Waran, 2002). However, these social structures allow for control, order, and trust within the herd and improve the stability and security of the herd. A horse's ability to be a leader is as inherent as its aptitude to be a follower. Additionally, horses are able to use what they learn, and retain it. Thus making them useful for therapeutic work.

Equine ethology, the objective science of horse behavior, has been a vital asset to understanding equine behavior. This analysis has dated back since horses were first domesticated. The equine brain is roughly 400 to 700 grams in weight and has significant complexity to its lobes, folds, and grooves within its structure (Hanggi, 2001). Many researchers have confirmed it is not the size of the brain that equates an animal to intelligence, but the complexity and size of its structured parts. Recent scientific research, much of it based on Equine Research Foundation (ERF), shows that horses are able to

form categories and generalize easily. They can sort geometric shapes such as triangles or varied figures with open centers, into specific classes (Hanggi, 2001).The ability horses have to learn, obtain, and retain information enables them to connect through verbal or physical cues. This expression extends to human as well and has sparked and intrigued new research around the world each year.

One such study focused on the differences in grouped horses compared with isolated horses. From this study researchers were able to illustrate that group-stability, in which individuals take each other into account to avoid tension, offers a better understanding of cognitive behavior and thus a better cognitive experience (De Giorgio *et al*., 2012). Equine ethology also has shown that horses readily form attachment bonds and need the company of their own species, so isolation tends to be detrimental to a horse's well-being (Wheeler et al., 2013). Social cognitive abilities in horses are even more interesting when applied to the horse-human relationship. There is evidence that horses can detect human cues and attentional states (Krueger *et al*., 2011). Using these cues, equitation science has described an approach to horse training and riding that focuses on embracing the cognitive abilities of horses, their natural behavior, and training human riders to use signaling and rewards for optimal effect. Utilizing this continual exploration of the equine the brain can help us to form a solid foundation for understanding how horses can learn and form relationships with humans in our therapeutic riding programs.

2. 2 Therapeutic Riding

There are numerous ways that horses have been utilized over the years; many of those ways include aiding people with physical, occupational, or their cognitive needs. The American Hippotherapy Association (AHA) has defined hippotherapy as a term that

refers to the use of the movement of the horse as a strategy by Physical Therapists, Occupational Therapists, and Speech-Language Pathologists to address impairments, functional limitations, and disabilities in patients with neuromusculoskeletal dysfunction. This strategy is used as part of an integrated treatment program to achieve functional outcome. (AHA, 2000). Horses assist greatly in this lesson type through the horse's forward body movement while the individual is on horseback. Therapeutic riding, another equine assisted therapy, is attributed to the efforts of Dr. Chassaign in the 1870's. His research concluded that patients with neurological disorders showed marked improvement in posture, balance, joint movement, and psychological well-being. Therapeutic riding consists of utilizing equine assistance for physical and cognitive needs for numerous types of individuals without certified therapists (Trotter, 2013). From special needs children, to wounded warriors, therapeutic riding aids in rehabilitation and education for both rider and horse. Studies have shown that these types of programs resulted in many benefits for veterans, including an increase in balance, muscle strength, and self-esteem (Asselin *et al*., 2012).

Another important beneficial effect of therapeutic riding probably comes from enjoying outdoor activities, which motivate children actively involved with the tasks of trunk control on horseback. When the task is meaningful and the goal is clear, riders are motivated to reach the goal (Davis and Burton, 1991). Focusing primarily on the physical, the benefits from riding are ceaseless. Some riders have limitations such as the inability to walk. They may also lack balance, and are not in a position to actively build muscles on their own with other activities. Riding engages muscle movement, balance, and rhythm and significant improvements in balance and postural control were found in

many studies (Berg and Causey, 2014.) Even for some riders who cannot walk, the

activity is very therapeutic, as many muscle groups throughout the body are utilized.

Neck muscles are activated and coordination is used when the rider has to lift his/her

head to see which direction the horse is traveling. Handling the horses face by reining

contact allows arm muscles to be strengthened as well as improving hand-eye

coordination (Hemingway *et al*., 2015). Riding a horse in an arena where there are

numerous slopes allows for overall core and balance. Additionally, simply sitting

properly on a horse will stimulate core muscles, and with obstacles such as trail riding the

rider can further engage their core. Test subjects regularly score well above their initial

testing score after the riding therapy (Biery and Kauffman, 1989)**.** This supports previous

observations that therapeutic riding does have a positive effect on balance. It also

suggests that the specific postures used frequently stressed lateral and diagonal positions

combined with the horse's movement, contributed to these increases in positive benefits

for balance (Biery and Kauffman, 1989)**.** Persons who are non-ambulatory are able to feel

the horse's movements as it walks. Additionally, having the horse do something that the

rider physically cannot do allows the rider to feel more capable. Many studies have

shown improvements within these different physical functions that are necessities to

improve quality of life. The results of a study done at the National Cheng Kung

University indicated that therapeutic horseback riding improved the gross motor function

as measured with total scores of all sectored children with cerebral palsy (Cherng *et al*.,

2004). Essentially, riding engages numerous muscle groups and overall benefits the rider

more than just a singular activity that only utilizes one muscle group. Furthermore,

therapeutic riding offers emotional benefits. The formation of an emotional bond from

human to horse is associated with significant improvements in humans' emotional health in equine-assisted therapies (Dearaugo *et al*., 2014). For some individuals, developing relationships and responsibility with other people is difficult. Whether children or adults, all ages can gain a sense of responsibility taking care of this horse, and can improve their self-confidence. Extrapolated from research studies regarding human attachment, the attachment between humans and their companion animals is predicated on the same four premises for attachment, namely proximity seeking, safe haven, secure base, and separation distress (Payne *et al*., 2016). Animals are known to present characteristics of unbiased affection; oftentimes thought that there is no motives or agendas driving said sediments. This behavior allows people to safely form a bond with an animal and establish a level of trust. This understood interaction is important for emotional growth, especially for someone deficient in emotional support.

2. 3 Horses and Therapeutic Riding

As previously mentioned, horses, when frightened will primarily choose to have the flight response (WAW, 2016). This natural response can make it is quite difficult to choose a horse that would be appropriate for therapy programs since the actions of the rider may be unpredictable. This is why finding horses that are suited for this therapy is an ongoing problem. Just like many other species, horses have their own character traits. From submissive and playful to bossy and pushy, they have a mind of their own (Walker, 2008). Given these character traits and the demands asked of them from therapeutic riding programs, not all horses may be suited for the stresses of this type of program. As seen in humans, the temperament that is right is one sphere of activity is not necessarily right for another. So in a horse, as with man, the right temperament is the one which

suits its environment (Williams and Treadgold, 1978). Burning out is one of the biggest problems seen amongst these programs. Burn out can be speculated directly and correlated with temperament. Therefore, the importance of a good temperament is imperative for longevity in assistance animals. Matching a rider with a horse is also important in these programs. One theory is that, opposites attract. High strung riders may not be suitable for high strung horses. Typically, a high strung rider would do better with a docile animal. However, exceptions to this theory exist. Counter intuitively, a high strung rider may do better on a high strung horse because of how well they understand each other's behaviors and they work it out together. Because this can work both ways, having a horse that is essentially "bombproof" is critical. These implications are important when finding matches so that turnover rates of horses do not increase for the safety of both horse and rider.

2.4 Horsenality

Horses, like humans, have individual "personality" traits. Understanding these traits are essential in order to understand horses behavior. There are a number of character traits that can easily have multiple interpretations, yet can be clearly defined and applied when studying behaviors. One example of these traits is shy. Shy is defined as one being reserved and having or showing nervousness in the company of others (Merriam-Webster, 2005). When experiencing a shy horse, these horses do not engage with others and are very hesitant when asked to work. These horses are typically secluded and do not possess dominant like behaviors (Waring, 1984). Therapy programs could benefit from shy horses because they are more likely to stay focused within the lesson and not be inclined to be concerned about other horses and people. Understanding

different personality traits helps individuals better establish a relationship with the equine species, more specifically when identifying a horse's work ability.

Theses character traits are defined by brain function, and there are two sides of the brain, the left hemisphere and the right hemisphere. These sides focus on different cognitive reactions and also contribute to character traits as well. Individuals that are more left-brain dominant are very analytical whereas right brain dominant individuals are very intuitive. This, as well, can be scaled over into the equine world. Left-brain dominant horses tend to be confident, pushy, and dominant horses. Inversely, right brain dominant horses tend to be more shy, reactive, spooky, and unconfident (Parelli, 1993).

So, why is this relevant? Every horse has its own unique set of character traits, and they will react differently to varied stimuli and tasks. For example, one horse may excel with an exercise or performing maneuvers, while another horse may not perform as well. Considering horse's personality, or more correctly horsenality, may give better indication as to its suitability for different types of work, more specifically a therapeutic riding program. Horsenality may aid our understanding of a horse's actions and decisions when placed in trying situations. Pat Parelli, the respected creator of natural horsemanship and the Horsenality Profile, trains people by educating them on how to interact with horses in a positive and safe way. In developing the horsenality profile, the Parelli family investigated the initial work of Glynn Braddy, a teacher who wrote the *Elements of Man*. His intriguing human model described different personalities, strengths, weaknesses, core beliefs, communication keys, and health to develop personality traits for people. This model allowed the Parelli's to have further insight on how the inner workings of humans could potentially be interfaced with horses (Wheeler

et al., 2013). This was then applied as an approach utilizing four primary

Horsenality types: left brain-introvert, right brain-extrovert, left brain- introvert, and right

brain introvert (Figure 1). Left-brain introverts are playful characters that need to be

stimulated and interested. These horses are obsessed with learning and constantly need

variety to keep them interested. Next, are left-brain extroverts, who are very intuitive.

These horses typically know what you want and may appear physically lazy but they are

not mentally lazy. Right brain introverts are shy, timid, avoid pressures by retreating into

themselves (Parelli, 1993). These horses succeed if one first goes slowly, allowing their

personality to emerge on its own. This establishment of trust is important for

human/horse relationships and interactions. Once this happens, this horse will offer you

more and be a very useful horse. Lastly, right brain extroverts are the ones that need

constant reassurance. This horse is easily confused, and is fearful. This type of horse

appreciates simplicity, which allows them to be more relaxed and motivated. Looking at

the personality type will allow the leader to match the horse's needs.

There are 40 characteristics on the horsenality scale (Figure 1), and understanding

what these traits mean for a therapy horse is essential for the success of a happy, safe,

horse for these special needs individuals. One example being an excessively playful,

outgoing, and rambunctious horse. With personality traits like these, this warrants

concern when a special needs individual is on their back. Non-responsive horses, another

trait identified in the Parelli profile, means to not respond to something or someone. If a

horse does not respond to cues by an instructor and/or rider, this horse cannot actively

engage within the lesson. These types of horses would ultimately not be very useful,

especially with more advanced riders. This trait, although seems similar to a shy horse, is

dissimilar because a shy horse has potential to warm up to a particular person or environment. A shy horse is very alert and aware of their surroundings and because they are not dominant or controlling, they have the capability of being a supreme follower. A non-responsive horse is not aware of their surroundings and therefore they have a reduced potential for interactions and improvement. Additionally, ensuring rider safety is completely up to the horse's temperament. Buck/Charge is another commonly seen trait characterized by the Parelli profile. Bucking is a natural behavior that can be seen during play, aggression, and can be a means of avoiding something frightening or that causes discomfort. A horse might even begin bucking because of overt pain such as back muscle soreness (McDonnell and Diehl, 1990). Although most might see a horse that bucks or charges to be ornery, if analyzed further into the cause of this particular behavior and dissected into why a horse would buck in the first place, it changes perspective. Horses buck for reasons other than feeling attacked or harassed. If one considers bucking as an activity drive that can be channeled into desired behaviors, then it can be a benefit to a therapeutic riding program. Instead of viewing bucking as disobedience or orneriness that is undesirable it may need to be viewed as another dynamic, athletic movement similar to jumping a high fence or doing a sliding stop (Hill, 2006). Instead of discouraging a trait like this it may be more important to develop control over it so it can be called upon at a later time (Meredith, 2005). While many other traits have been identified, these few examples may give some insight into how they may be problematic, or positively utilized in a therapeutic riding program.

The full list of these characteristics on the Parelli horsenality scale include: impulsive, can't stand still, fractious, over reactive, hyper alert, tendency to bolt,

forwardaholic, flighty, high- headed, bracy, tense, can't think, distrustful, unpredictable, tendency to kick, freezes then explodes, compliant, shy, hesitant, shut down, low key, non-responsive, unmotivated, disinterested, food focused, stubborn, tendency to buck, argumentative, pushy, easily bored, willful, bossy, naughty, mouth, playful, tendency to bite, mischievous, charismatic, exuberant, and energetic. Each of these characteristics are located on the Parelli profile and divided into four sections to accompany the portion of the brain it applies to and whether it is an introverted or extroverted characteristic. The Parelli system determines a horsenality type from these 40 traits by answering a 100-question questionnaire on the responses of the horse when placed in hypothetic situations. Based on the horse's responses to different situations, a determination of how they strongly each of the 40 traits are exhibited and determination of overall horsenality type will be made. Using this technology to find correlations between traits and what distinctive combinations of these characteristics are optimal in a therapeutic riding horse will better assist therapeutic facilities in finding horses that best fit their program and ensure that the best horses available will be able to help with this growing need.

CHAPTER III

Methodology

3.1 Objective

The objective of this study was to determine which traits on the Parelli

Horsenality profile are most influential when determining the suitability of a horse for a

therapeutic riding program. Traditional visual studies have shed some light on

characteristics that have been stable across different situations, but improved methods

have developed over time to establish a better understanding of horse behavior. The

Parelli method involves questioning the handlers of a horse to provide reliability when

comparing the results to artificial reactivity tests. By establishing the correlation between

of these traits and determining which combination of these characteristics one would look

for in a therapeutic riding horse, therapeutic riding programs will be able to better

identify horses for their longevity and suitability that will best fit their growing industry.

3.2 Materials and Methods

Thirteen horses were observed at Panther Creek Inspiration (PCI) Ranch in

Spring, Texas. These horses varied in size, breed, gender, program exposure, and ranged

in age from 9 to 27 years old. In order to evaluate the horses in both a short and long term

setting, two scoring systems were formulated for a long-term suitability and a short-term

suitability.

For short term suitability, horses were observed intermittingly during their

designated lesson time over a four month period with four evaluations recorded for each

horse, allowing for a non-bias evaluation of their behavior and possible suitability as a

therapeutic riding horse. This measure was used to simulate the amount of time and

observation that a horse might receive when being considered for a therapeutic riding program. This short-term suitability value was referred to as an obedience score. During these lessons, a 5-point Likert scale was used to assign an obedience score of the lesson and was scored in 0.5 increments from completely disobedient (1), distracted (2), acceptable (3), compliant (4), and completely obedient (5). Throughout the lesson, general comments were recorded in order to assign a horse's obedience score at the conclusion of the lesson. An animal that was considered completely disobedient was consistently unwilling and noncompliant with the handler and rider. This horse was cued on numerous occasions and continually disobeyed. A completely disobedient horse was more concerned with everything but the lesson. This lesson would be considered very unsuccessful. Distracted horses were physically present, but tend to ignore cues more than twice during a lesson. This horse was gazing around, and unfocused, seemly separated from the handler and rider. An acceptable horse allows for admissible behavior during the lesson. The horse was responsive to cues regularly from the handler but occasionally required repetition. This horse tolerated the rider well without defiance and overall had a successful lesson. Compliant horses were more inclined to conform to the task and handler. This horse performed tasks with little to no repetition and willingly did what is asked of them. Lastly, completely obedient was the ideal standard for a therapy horse. This horse was in tuned with both rider and handler with no repetition needed. Within the performance sheet, general comments were recorded to validate why a certain obedience score was given.

In addition to short term suitability, four PCI ranch therapeutic instructors (n=4) that were actively involved with daily work with the horses, provided tier scorings on

each horse to give a better idea of the long term success of a horse in a therapeutic riding program. These tier scores were collected and averaged to use a single score for each horse. Tiers were scored on a scale from 1 to 4 with tier 1 horses considered to be the best horses. Tier 1 horses could be utilized at all times for any rider. These horses showed no signs of temperament and did not need long amounts of rest to produce a successful lesson. Tier 2 horses could be used a majority of the time and most riders were able to use these horses. These horses can be occasionally temperamental and they require some days off for optimal performance. Tier 3 horses were very limited. These horses were only used with certain children and required most of the time off to not get over worked. Lastly, Tier 4 horses were horses that were not fit for a therapeutic riding program. These horses did not tolerate side walkers or leaders and were not patient with the hander or the rider. The horses were even more limited and very few riders were able to utilize these horses. A higher tier number corresponded to a more poorly behaved horse, while a lower tier values corresponded to a better-behaved horse.

Once the short term obedience score and long term tier scores were obtained, the manager of PCI Ranch was asked to complete a Parelli Horsenality Profile for each horse. The prominence of each of the Parelli horsenality traits were determined using a 100 question test with questions that focused primarily on how a horse is likely to respond in different situations. The profile then identifies 40 different character traits ranging from playful, charismatic, and friendly, to impulsive, tense, and timid. These traits were ranked in strength from zero to three where zero would indicate a trait that is not prevalent in that horse and three would indicate a trait that is a strongly displayed in that horse.

These traits were analyzed using a stepwise regression to predict Tier and obedience scores as well as determine which traits are most important in selecting a suitable horse for therapeutic riding programs. By evaluating and eliminating the less influential traits, one can focus on a few key traits when trying to identify a horse for a therapeutic riding program. Additionally, the relationships between each of the 40 Parelli traits, Tiers, and obedience scores were analyzed using the Proc Corr procedure in SAS to better understand how some traits may be similar to others in the Parelli Horsenality test. Some of these closely related traits (Table 1) may be interchangeable due to similar definition and relative values.

3.3 Results

Results from the stepwise regression yielded two models. The first model, for prediction of Tier scores, was used as an indication of long-term suitability of a horse for therapeutic riding, while in contrast, the second model, for prediction of obedience scores collected during on-site observation, used as an indication of short term suitability of a horse for therapeutic riding.

In the prediction of Tiers, 8 of the 41 variables included in the analysis were found to be significant ($P < 0.05$) and incorporated into the model. These variables included age, bracy, tense, shy, non-responsive, buck/charge, pushy, and easily bored and had an overall $R^2 = 1.00$. From this analysis, the following model was generated for prediction of the long term suitability of a horse for therapeutic riding in the form of Tiers.

Tier = Age(0.07) + Bracy(0.10) + Tense(1.60) + Shy(-0.03) + Nonresponsive(0.13) +

Buck/Charge(-0.23) + Pushy(0.90) + Easily Bored(0.87) + 0.17.

In the prediction of obedience scores, 5 of the 41 variables included in the

analysis were found to be significant and incorporated into the model. These variables

included age, fractious, unmotivated/lazy, disinterested, and energetic, for an overall R^2

of 0.9844. From this analysis, the following model was generated for prediction of the

short term suitability of a horse for therapeutic riding in the form of obedience score.

Obedience Score = Age(-0.14) + Fractious(-0.38) + Unmotivated/Lazy(-2.45) +

Disinterested(-0.48) + Energetic(-0.94) + 8.956.

While each of these two models were generated to predict short and long term

measures of suitability, and both had excellent R^2 values, the limited number of animals

in the study shifts the focus from the models themselves to which horsenality traits were

most influential by being included in the models. By focusing on the traits that make, or

do not make, a good therapeutic riding horse one can better select a horse for these

programs (Table 2).

3.4 Discussion

The objective of this study was to determine which traits on the Parelli

Horsenality profile are most influential when determining the suitability of a horse for a

therapeutic riding program. The Parelli method offers insight into the character traits of

an individual horse while gauging a horse's behavior. By establishing correlations

between individual horsenality traits (Table 1), one can get a better understanding of how

one trait is related to another. This, in turn, allows for better determination of which

horse(s) would best fit a therapeutic facilities program by identifying the most important traits of the Parelli scale.

Being able to identify character traits through a system like the Parelli horsenality profile is useful when determining the suitability in horses for therapeutic riding and is particularly relevant in preventing turnover of horses. When a horse possesses undesirable traits portrayed in these models (Table 2), they can be easily identified, and removed from, or not considered for the program at all.

When assessing the important traits of the tier scores values, these traits are individually broken down to justify why these qualities are implied as desirable or undesirable using a stepwise linear regression system. One example of this is Buck/Charge, which was identified as desirable and had a low correlation to any of our fear-based traits. This illustrates that a horse with a small amount of buck/charge is not necessarily a negative quality to have because it is not likely a reaction to fear, but of an active horse. In her "Equid Ethogram," Sue McDonnell, head of the equine behavior program at the University of Pennsylvania's School of veterinary medicine, lists bucking in the locomotor play section. Riders have certainly experienced a horse that will occasionally buck from apparent joie de vivre or excess energy during a ride (McDonnell, 1990). Tense, another influential trait, means to tense up and freeze, become stiff. Horses that tense up during encounters with people or other things typically are intimidated and tend to do brash things that are not safe for a disabled person to ride. Horses should be conformable and relaxed; when they are tense they can be unpredictable. Similarly, pushy horses are very trying and will test the rider's and instructor's limits. These horses are unpleasantly self-assertive and overbearing, these are signs of disrespect and that makes

these horses difficult to manage in a therapeutic riding programs. Finally, easily bored horses are subjects which are not mentally or physically engaged. These horses will find something else to do in order to entertain their boredom. They tend to not stay in tune with the rider and instructor, therefore making it difficult to have a successful lesson, especially for advanced riders.

Age was another variable that was influential in our findings. The long-term and short-term scores were in agreement that a younger horse was better for a therapeutic riding program. However, it is important to remember that the horses used in this study varied in age range, 9 yr being the youngest horse and 27 yr being the oldest. So, while both long term and short term scores confirmed that younger horses were better suited for therapeutic programs, it is important to remember that young in the current study may not be considered young in other equine areas. Taking this into consideration, what is too young to be categorized as desirable should be evaluated as well. Having a younger horse could be thought of as beneficial for the energy and drive to want to work. While not included in this study, it is hypothesized that extremely young horses are not ideal for therapy programs due to their rambunctious behavior. Younger horses behaviors are harder to predict which can be a safety concern for these clients in need. Researchers in southern France that studied juvenile horse behaviors and made note of every bite, kick, chase and threatening gesture made by individual yearlings and two-year-olds during a behavioral study. When the frequency of a young horse's aggressive moves was matched to the age composition of its herd, a striking pattern emerged (Bourjade *et al*., 2009). Older horses tend to be more indolent and predictable. This is likely due to older horses having had many years of desensitization, which allows them to be more docile.

Although, too old of a horse needs to be considered as well. After certain ages, geriatric horses develop a series of health issues and their desire to work decreases. Owners were able to identify many clinical signs of disease, with 83% of horses having at least one reported clinical sign of disease. Muscle stiffness (33%), lameness (28%), ocular discharge (22%), change in hair coat (22%) and skin problems (21%) were the most commonly reported signs. Increasing age was a risk factor for the presence of clinical signs of disease (McGowan *et al*, 2010).

In addition to age, when assessing the significant traits of the obedience scores values, there were four traits of importance; fractious, unmotivated/lazy, disinterested, and energetic. Fractious, defined as irritable and short-tempered, can be dangerous and a major concern for therapy programs when their horses possess these traits. These horses can be moody and aggressive and this is highly unacceptable when disabled riders are on their backs. Unmotivated/lazy horses are characterized as unwilling to work. If these horses were not willing to engage in activities or with people they would not be effective to serve in these types of programs. Disinterested horses are not influenced by others and are completely detached from the task being asked of them. Lastly, energetic was the final influential trait identifying when predicting Obedience score. Initially this trait may seem positive, but it may not always be positive for candidates for these special programs. Energetic horses are lively and frisky, but if too much of either can be problematic. Riders with a nervous energy could interact negatively with an energetic horse and negate the point of the program. With these significant variables at such high predictability rates, it suggests that the remainder of the characteristics on the horsenality chart were less relevant and can be ignored in order to simplify the process of selecting a

suitable therapeutic riding horse. If horses score highly on any of the influential traits, it can be reasonably estimated for this prediction that the horse in question would not be suitable for therapeutic riding programs. When a client receives their full record and chart on their tested horse, they can evaluate the characteristics by looking at how high or low that particular horse scores on the significant traits. Based off this data, they are able to sort out the irrelevant traits and primarily focus on the significant ones that deem a horse suitable for these programs. However, with two models and 12 horsenality traits identified, it may still be a daunting task to identify a suitable horse. In order to simplify the process, two forced regressions were run to determine if the traits identified as influential in one analysis (short or long term) could accurately predict the other. This would allow for a single model and a single set of traits to be identified for selection of a therapeutic riding horse. To do this, the 8 traits identified in the tier analysis (age, bracy, tense, shy, non-responsive, buck/charge, pushy, and easily bored) were used to predict Obedience score and the 5 (age, fractious, unmotivated/lazy, disinterested, and energetic) identified in the Obedience score analysis were used to predict Tier. The results of this analysis (Figure 2) show that when using the traits found in the original Obedience score formula to predict Tiers, there is a sizeable drop in R^2 value from 0.9844 to 0.7482. In contrast, when using the traits found in the original Tiers formula to predict Obedience score, there is a relatively small drop in R^2 value from 1.00 to 0.9953. This indicates that the traits included in the original Tier formula (age, bracy, tense, shy, non-responsive, buck/charge, pushy, and easily bored) are able to accurately predict both long and short term suitability of horses in a therapeutic riding program. However, one problem can be seen with the analysis. In the prediction of Tiers, pushy is seen as an undesirable trait

and buck/charge was seen as a desirable trait. Yet, in the prediction of Obedience score pushy is seen as a desirable trait while buck/charge was seen as an undesirable trait. In all, this makes both pushy and buck/charge unreliable characteristics when choosing a therapeutic riding horse. The five remaining traits are consistent, with a horse that is too old (age), bracy, tense, nonresponsive, and/or easily bored seen as undesirable characteristics while a horse that is shy is a desirable characteristic. Because these 5 remaining traits are consistent in predicting both long and short term suitability it makes them more reliable and an ideal starting point when choosing a horse for a therapeutic riding program. Therefore, a potential horse for a therapeutic riding program should be evaluated on how they score in age, bracy, tense, non-responsive, easily bored and shy as an initial evaluation for entrance into that program. With these advancements in technology we can use systems such as the Parelli horsenality profiles to test out candidates for therapy programs and allow programs all over the United States to ensure that horses suited for therapeutic riding that will be successful for a long duration in their therapeutic riding programs.

3.5 Implications

While this research is basic in nature, it still yields important findings within the behavioral industry. Being able to identify how certain personality traits in the Parelli Horsenality profile affect the suitability in therapy horses should help therapeutic riding programs better select horses for their programs and have positive benefits by reducing burn out and turn over rates. Therapeutic programs that are seeking therapy horses for their program could reasonably obtain a profile of the horses they are interested in before purchasing and use these profiles to determine if that horse would be a good fit for their

program. These profiles will come with a detailed scale to analyze where their horse lies within each of the 40 traits provided. The individuals reviewing the profiles would be about to look the five influential Parelli characteristic traits horse and can quickly deem a horse suitable or not suitable for their program. The ability to identify and group together traits that are similar enables investors a more fundamental understanding of the profile results they obtain on the horses they get tested. Additionally, because horse and rider pairs are so important from a mental standpoint as well as a safety perspective, utilizing this system may be an added tool to help when matching a horse to a rider for these programs. As a result of this research, further study can be done on a larger scale of test subjects to gain a more reliable formula for a more accurate prediction of the suitability of a horse for therapeutic riding as well as validation of that formula on a novel population to check accuracy. Further assessment on this theory utilizing horses rejected from programs before being profiled can also better our understanding of the horsenalities needed for therapeutic riding.

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APPENDIX
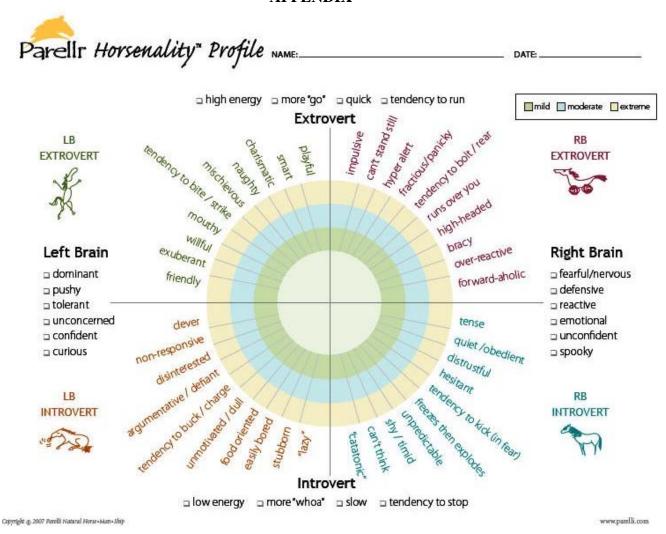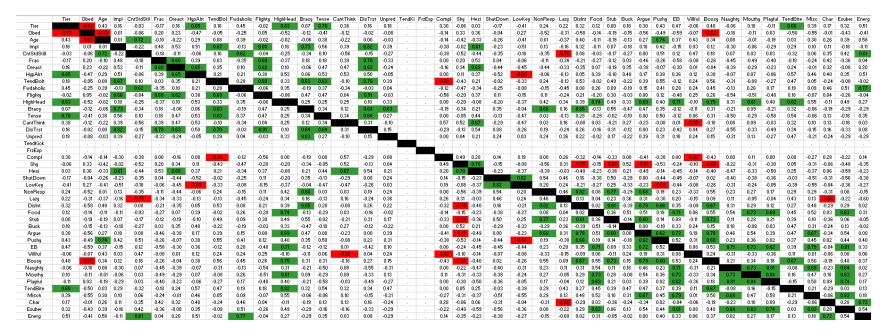

Figure 1. Blank Example Parelli Horsenality Profile constructed by Pat and Linda Parelli

	Tier	Obed	Age	Impl	CntStdStill	Frac	Oreact	HypAlrt	TendBol	Fwdaholic	Flighty	HighHead	Bracy	Tense	CantThink	DisTrst	Unpred	TendKi	FrzExp	Compl	Shy	Hesi	ShutDown	LowKey	NonResp	Lazy	DisInt	Food	Stub	Buck	Argue	Pushy	EB	Willful	Bossy	Naughty	Mouthy	Playful	TendBite	Misc	Char	Exuber	Energ
Tier		-0.83	0.43	0.16	-0.03	-0.17	0.16	0.65	0.18	0.45	-0.02	0.63	0.07	0.70	0.38	0.16	0.18	.	.	0.30	-0.06	0.03	-0.17	-0.41	0.24	0.22	0.32	0.12	0.00	0.18	0.30	0.43	0.47	-0.06	0.48	-0.06	0.10	-0.11	0.66	0.39	0.17	0.32	0.51
Obed	-0.83		-0.63	0.01	-0.06	0.20	0.23	-0.47	-0.05	-0.25	0.05	-0.52	-0.12	-0.41	-0.12	-0.02	-0.08	.	.	-0.14	0.33	0.36	-0.04	0.27	-0.52	-0.31	-0.58	-0.14	-0.19	-0.15	-0.56	-0.49	-0.59	-0.07	-0.62	-0.18	-0.11	0.03	-0.50	-0.55	-0.01	-0.43	-0.41
Age	0.43	-0.63		0.01	0.72	-0.10	-0.22	0.29	0.08	0.39	-0.02	-0.02	-0.06	0.38	-0.22	0.00	-0.03	.	.	-0.14	-0.42	-0.33	-0.26	-0.41	0.01	-0.37	0.40	-0.11	-0.19	-0.13	0.27	0.74	0.37	0.43	0.34	0.08	-0.01	-0.19	0.03	0.30	0.26	0.39	0.58
Impl	0.16	0.01	0.01		-0.22	0.48	0.53	0.51	0.67	-0.13	0.68	0.18	0.73	0.56	0.39	0.82	0.39	.	.	-0.30	-0.02	0.61	-0.23	-0.51	0.13	-0.16	0.32	-0.11	0.07	-0.18	0.18	0.18	0.42	0.03	0.12	-0.30	-0.06	-0.29	0.29	0.10	0.11	-0.16	-0.11
CntStdStill	-0.03	-0.06	0.72	-0.22		-0.18	-0.11	-0.06	0.10	0.62	-0.04	-0.25	-0.34	0.10	-0.56	-0.15	-0.27	.	.	-0.38	-0.52	-0.44	-0.35	-0.18	-0.35	-0.75	0.08	-0.03	-0.17	-0.27	0.00	0.51	0.12	0.47	0.18	0.07	0.03	0.03	-0.32	0.06	0.35	0.42	0.61
Frac	-0.17	0.20	-0.10	0.48	-0.18		0.60	0.39	0.03	-0.35	0.69	-0.37	0.18	0.18	0.39	0.70	-0.33	.	.	0.00	0.20	0.53	0.04	-0.06	-0.11	-0.34	-0.21	-0.27	-0.12	0.03	-0.46	-0.26	-0.58	-0.08	-0.45	-0.49	-0.40	-0.18	-0.24	0.42	-0.36	0.04	0.20
Oreact	0.16	0.23	-0.22	0.53	-0.11	0.60		0.65	0.35	0.10	0.62	0.10	-0.06	0.47	0.47	0.63	-0.24	.	.	-0.16	0.34	0.69	-0.44	-0.45	-0.44	-0.33	-0.35	0.07	-0.19	0.35	-0.38	-0.07	-0.30	0.01	-0.04	-0.39	-0.29	-0.23	0.24	-0.01	0.32	-0.08	0.20
HypAlrt	0.65	-0.47	0.29	0.51	-0.06	0.39	0.65		0.21	0.21	0.38	0.53	0.06	0.53	0.53	0.50	-0.05	.	.	0.00	0.11	0.37	-0.52	-0.69	-0.06	-0.13	0.05	0.39	-0.10	0.48	0.17	0.38	0.36	0.12	0.38	0.07	0.07	-0.06	0.57	0.46	0.40	0.35	0.51
TendBolt	0.18	-0.05	0.08	0.67	0.10	0.03	0.35	0.21		0.28	0.69	0.33	0.63	0.63	-0.10	0.70	0.39	.	.	-0.64	-0.43	0.21	-0.02	-0.33	0.24	-0.13	0.53	-0.02	0.49	-0.22	0.39	0.55	-0.12	0.24	0.56	-0.31	-0.08	-0.27	0.47	0.05	-0.24	-0.08	-0.02
Fwdaholic	0.45	-0.25	0.39	-0.13	0.62	-0.35	0.10	0.21	0.28		-0.06	0.35	-0.19	0.37	-0.34	-0.03	0.04	.	.	-0.12	-0.47	-0.34	-0.25	-0.08	-0.15	-0.45	0.08	0.26	0.09	-0.19	0.15	0.41	0.28	0.24	0.45	-0.13	0.26	0.17	0.19	0.09	0.46	0.51	0.77
Flighty	-0.02	0.05	-0.02	0.68	-0.04	0.69	0.62	0.38	0.69	-0.06		-0.06	0.47	0.47	0.04	0.91	-0.03	.	.	-0.56	-0.20	0.37	0.11	-0.15	0.11	-0.24	0.21	-0.20	0.30	-0.03	0.00	0.12	-0.48	0.25	0.26	-0.54	-0.51	-0.48	0.18	-0.07	0.04	-0.26	-0.04
HighHead	0.63	-0.52	-0.02	0.18	-0.25	-0.37	0.10	0.53	0.33	0.35	-0.06		0.25	0.25	0.25	0.10	0.33	.	.	0.00	-0.20	-0.08	-0.20	-0.37	0.42	0.34	0.39	0.74	0.49	0.33	0.69	0.40	0.71	-0.10	0.75	0.31	0.61	0.40	0.82	0.55	-0.11	0.49	0.27
Bracy	0.07	-0.12	-0.06	0.73	-0.34	0.18	-0.06	0.06	0.63	-0.19	0.47	0.25		0.34	0.12	0.64	0.63	.	.	-0.19	-0.34	0.21	0.35	-0.04	0.66	0.16	0.65	-0.13	0.55	-0.47	0.47	0.35	-0.12	-0.11	0.31	-0.21	0.09	-0.21	0.32	-0.06	-0.19	-0.29	-0.29
Tense	0.70	-0.41	0.38	0.56	0.10	0.18	0.47	0.53	0.63	0.37	0.47	0.25	0.34		0.34	0.64	0.27	.	.	0.00	-0.05	0.04	-0.13	0.28	-0.13	0.03	-0.13	0.28	0.00	0.50	-0.12	0.06	0.31	-0.50	-0.29	-0.58	0.54	-0.06	0.13	-0.16	0.13	-0.16	0.35
CantThink	0.38	-0.12	-0.22	0.39	-0.56	0.39	0.47	0.53	-0.10	-0.34	0.04	0.25	0.12	0.34		0.31	-0.10	.	.	0.57	0.52	0.67	-0.29	-0.47	0.03	0.16	-0.08	0.03	-0.21	0.27	-0.23	-0.08	0.01	-0.65	-0.18	0.08	0.09	-0.03	0.32	0.10	0.13	-0.16	0.03
DisTrst	0.16	-0.02	0.00	0.82	-0.15	0.70	0.63	0.50	0.70	-0.03	0.91	0.10	0.64	0.64	0.31		0.15	.	.	-0.29	-0.13	0.54	0.08	-0.26	0.19	-0.24	0.26	-0.13	0.28	-0.10	0.00	0.23	-0.42	0.04	0.27	-0.55	-0.33	-0.49	0.34	-0.15	0.16	-0.33	0.08
Unpred	0.18	-0.08	-0.03	0.39	-0.27	-0.33	-0.24	-0.05	0.39	0.04	-0.03	0.33	0.63	0.27	-0.10	0.15		.	.	0.00	0.04	0.21	0.24	0.03	0.24	0.36	0.22	-0.02	0.17	-0.22	0.39	0.31	0.10	0.24	0.15	-0.31	0.13	-0.27	0.47	-0.21	-0.24	-0.29	-0.29
TendKick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FrzExp	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Compl	0.30	-0.14	-0.14	-0.30	-0.38	0.00	-0.16	0.00	-0.64	-0.12	-0.56	0.00	-0.19	0.00	0.57	-0.29	0.00	.	.		0.49	0.20	0.14	0.19	0.00	0.26	-0.32	-0.14	-0.33	0.00	-0.41	-0.38	0.00	-0.62	-0.43	0.00	0.11	0.00	0.00	-0.27	0.28	-0.22	0.14
Shy	-0.06	0.33	-0.42	-0.02	-0.52	0.20	0.34	0.11	-0.43	-0.47	-0.20	-0.20	-0.34	-0.05	0.52	-0.13	0.04	.	.	0.49		0.70	-0.15	-0.08	-0.56	0.31	-0.75	-0.15	-0.64	0.52	-0.61	-0.53	-0.24	-0.10	-0.66	-0.22	-0.31	-0.30	0.05	-0.31	-0.06	-0.48	-0.35
Hesi	0.03	0.36	-0.33	0.61	-0.44	0.53	0.69	0.37	0.21	-0.34	0.37	-0.08	0.21	0.44	0.67	0.54	0.21	.	.	0.20	0.70		-0.23	-0.37	-0.39	-0.03	-0.40	-0.23	-0.36	0.21	-0.49	-0.14	-0.45	-0.14	-0.40	-0.47	-0.33	-0.50	0.25	-0.37	0.06	-0.59	-0.23
ShutDown	-0.17	-0.04	-0.26	-0.23	-0.35	0.04	-0.44	-0.52	-0.02	-0.25	0.11	-0.20	0.35	-0.13	-0.29	0.08	0.24	.	.	0.14	-0.15	-0.23		0.82	0.54	0.46	0.16	-0.38	0.50	-0.29	0.00	-0.44	-0.45	-0.07	0.02	-0.40	-0.38	-0.36	-0.03	-0.51	-0.31	-0.56	-0.38
LowKey	-0.41	0.27	-0.41	-0.51	-0.18	-0.06	-0.45	-0.69	-0.33	-0.08	-0.15	-0.37	-0.04	-0.47	-0.47	-0.26	0.03	.	.	0.19	-0.08	-0.37	0.82		0.20	0.24	-0.21	-0.27	0.25	-0.33	-0.23	-0.80	-0.44	-0.08	-0.26	-0.31	-0.24	-0.05	-0.39	-0.55	-0.04	-0.36	-0.27
NonResp	0.24	-0.52	0.01	0.13	-0.35	-0.11	-0.44	-0.06	0.24	-0.15	0.11	0.42	0.66	0.03	0.03	0.19	0.24	.	.	0.00	-0.56	-0.39	0.54	0.20		0.46	0.13	0.04	0.23	0.36	0.31	-0.30	0.20	-0.15	0.09	0.11	-0.05	-0.04	0.43	0.13	-0.63	-0.22	-0.60
Lazy	0.22	-0.31	-0.37	-0.16	-0.75	-0.34	-0.33	-0.13	-0.13	-0.45	-0.24	0.34	0.16	-0.13	0.16	-0.24	0.36	.	.	0.26	0.31	-0.03	0.46	0.24	0.46		0.13	0.04	0.23	0.36	0.31	-0.30	0.20	-0.15	0.09	0.11	-0.05	-0.04	0.43	0.13	-0.63	-0.22	-0.60
DisInt	0.32	-0.58	0.40	0.32	0.08	-0.21	-0.35	0.05	0.53	0.08	0.21	0.39	0.65	0.28	-0.08	0.26	0.22	.	.	-0.32	-0.75	-0.40	0.16	-0.21	0.82	0.13		0.02	0.61	-0.39	0.78	0.66	0.35	-0.09	0.67	0.31	0.29	0.12	0.27	0.48	-0.29	0.29	0.02
Food	0.12	-0.14	-0.11	-0.11	-0.03	-0.27	0.07	0.39	-0.02	0.26	-0.20	0.74	-0.13	-0.29	0.03	-0.16	-0.02	.	.	-0.14	-0.15	-0.23	-0.38	-0.27	0.08	0.04	0.02		0.36	0.51	0.51	0.19	0.71	0.06	0.55	0.54	0.73	0.69	0.45	0.52	0.03	0.63	0.31
Stub	0.00	-0.19	-0.19	0.07	-0.17	-0.12	-0.19	-0.10	0.49	0.09	0.30	0.49	0.55	-0.02	-0.21	0.31	0.17	.	.	-0.33	-0.64	-0.26	0.50	0.25	0.23	0.61	0.36		-0.14	0.60	0.14	0.09	-0.11	0.73	0.11	0.28	0.21	0.39	0.10	-0.36	0.06	-0.05
Buck	0.18	-0.15	-0.13	-0.18	-0.27	0.03	0.35	0.48	-0.22	-0.19	-0.03	0.33	-0.47	-0.10	0.27	-0.12	-0.22	.	.	0.00	0.52	0.21	-0.29	-0.33	-0.29	-0.36	-0.39	0.51	-0.14		0.00	-0.18	0.33	0.24	0.15	0.18	-0.08	0.03	0.47	0.31	-0.24	0.13	-0.02
Argue	0.30	-0.56	0.27	0.18	0.00	-0.46	-0.38	0.17	0.39	0.15	0.00	0.69	0.47	0.00	-0.23	0.00	0.39	.	.	-0.41	-0.61	-0.14	-0.44	-0.69	0.68	0.31	0.78	0.51	0.60	0.00		0.52	0.31	0.60	0.23	0.36	0.02	0.37	0.45	0.02	0.44	0.40
Pushy	0.43	-0.49	0.74	0.42	0.51	-0.26	-0.07	0.38	0.55	0.41	0.12	0.40	0.35	0.50	-0.08	0.23	0.31	.	.	-0.38	-0.53	-0.14	-0.44	-0.45	0.19	-0.30	0.66	0.19	0.14	-0.18	0.52		0.31	0.69	0.23	0.36	0.02	0.37	0.45	0.02	0.44	0.40
EB	0.47	-0.59	0.37	-0.15	0.12	-0.58	-0.30	0.36	-0.12	0.28	-0.48	0.71	-0.12	0.32	0.34	-0.42	0.10	.	.	0.00	-0.24	-0.45	-0.45	-0.44	0.23	0.20	0.35	0.71	0.09	0.33	0.72	0.52		0.08	0.53	0.71	0.73	0.62	0.39	0.79	-0.04	0.81	0.33
Willful	-0.06	-0.07	0.43	0.03	0.47	-0.08	0.01	0.12	0.24	0.24	0.25	-0.10	-0.11	0.06	-0.65	0.04	0.24	.	.	-0.62	-0.10	-0.14	-0.07	-0.08	-0.33	-0.15	-0.09	0.06	-0.11	0.24	0.19	0.31	0.08		0.24	-0.31	-0.33	-0.36	0.11	0.01	-0.06	0.08	0.06
Bossy	0.48	-0.62	0.34	0.12	0.18	-0.26	-0.04	0.38	0.56	0.45	0.26	0.75	0.31	0.31	-0.18	0.27	0.15	.	.	-0.43	-0.66	-0.40	0.02	-0.26	0.55	0.09	0.67	0.55	0.73	0.15	0.79	0.69	0.53	0.24		0.21	0.34	0.18	0.67	0.50	-0.19	0.48	0.37
Naughty	-0.06	-0.18	0.08	-0.30	0.07	-0.45	-0.39	-0.07	-0.31	-0.13	-0.54	0.31	-0.21	-0.50	0.08	-0.55	-0.31	.	.	0.00	-0.22	-0.47	-0.40	-0.31	0.23	0.11	0.31	0.54	0.11	0.18	0.46	0.23	0.71	-0.31	0.21		0.73	0.81	-0.08	0.68	-0.23	0.64	0.02
Mouthy	0.10	-0.11	-0.01	-0.06	0.03	-0.06	0.07	-0.08	0.26	-0.51	0.61	0.09	-0.29	0.09	-0.33	0.13	.	.	.	0.11	-0.31	-0.33	-0.38	-0.24	0.27	-0.05	0.29	0.73	0.28	-0.08	0.53	0.36	0.02	0.73	0.73		0.84	0.16	0.47	0.10	0.63	0.17
Playful	-0.11	0.03	-0.19	-0.29	0.03	-0.40	-0.23	-0.06	-0.27	0.17	-0.48	0.40	-0.21	-0.58	-0.03	-0.49	-0.27	.	.	0.00	-0.30	-0.50	-0.36	-0.05	0.17	-0.04	0.12	0.69	0.21	0.03	0.39	0.02	0.62	-0.36	0.18	0.81	0.84		-0.15	0.58	0.09	0.74	0.17
TendBite	0.66	-0.50	0.03	0.29	-0.32	-0.18	0.24	0.57	0.47	0.19	0.18	0.82	0.32	0.54	0.32	0.34	0.47	.	.	0.00	0.05	0.25	-0.03	-0.39	0.29	0.43	0.27	0.45	0.39	0.47	0.47	0.37	0.39	0.11	0.67	-0.08	0.16	-0.15		0.21	-0.29	0.03	0.13
Misch	0.39	-0.55	0.30	0.10	0.06	-0.24	-0.01	0.46	0.05	0.09	-0.07	0.55	-0.06	-0.06	0.10	-0.15	-0.21	.	.	-0.27	-0.31	-0.37	-0.51	-0.55	0.29	0.13	0.48	0.52	0.10	0.31	0.67	0.45	0.79	0.01	0.50	0.68	0.47	0.58	0.21		-0.06	0.83	0.18
Char	0.17	-0.01	0.26	0.11	0.35	0.42	0.32	0.40	-0.24	0.46	0.04	-0.11	-0.19	0.13	0.13	0.16	-0.24	.	.	0.28	-0.06	0.06	-0.31	-0.04	-0.31	-0.68	-0.29	0.03	-0.36	-0.24	-0.34	0.02	-0.04	-0.06	-0.19	-0.23	0.10	0.09	-0.29	-0.06		0.28	0.72
Exuber	0.32	-0.43	0.39	-0.16	0.42	-0.36	0.35	-0.08	0.51	-0.26	0.49	-0.29	-0.16	-0.16	-0.33	-0.29	-0.29	.	.	-0.22	-0.48	-0.59	-0.56	-0.36	0.08	-0.22	0.29	0.63	0.06	0.13	0.54	0.44	0.81	0.08	0.48	0.64	0.63	0.74	0.03	0.83	0.28		0.54
Energ	0.51	-0.41	0.58	-0.11	0.61	0.04	0.20	0.51	-0.02	0.77	-0.04	0.27	-0.29	0.35	0.03	0.08	-0.29	.	.	0.14	-0.35	-0.23	-0.38	-0.27	-0.15	-0.60	0.02	0.31	-0.05	-0.02	0.00	0.40	0.33	0.06	0.37	0.02	0.27	0.17	0.13	0.18	0.72	0.54	

Table 1. Correlations between long term Tiers, short term Obedience Score, and Parelli Horsenality character traits. Characteristics abbreviated both horizontally and vertically are spelled out for clarification. Tier, Obedience Score, Age, Impulsive, Can't stand still, Fractious, Over reactive, Hyper alert, Tendency to Bolt, Forward-aholic, Flighty, High-headed, Bracy, Tense, Can't think, Disinterested, Unpredictable, Tendency to kick, Freeze/then explode, Compliant, Shy, Hesitant, Shut down, Low key, Non responsive, Lazy, disinterested, Food motivated, Stubborn, Buck/charge, Argumentative, Pushy, Easily Bored, Willful, Bossy, Naughty, Mouthy, Playful, Tendency to Bite, Mischievous, Charismatic, Exuberant, and Energetic.

Trait	Tier	Obedience Score
Age	Undesirable	Undesirable
Fractious	N/A	Undesirable
Unmotivated/Lazy	N/A	Undesirable
Disinterested	N/A	Undesirable
Shy	Desirable	N/A
Bracy	Undesirable	N/A
Tense	Undesirable	N/A
Non- Responsive	Undesirable	N/A
Buck/Charge	Desirable	N/A
Pushy	Undesirable	N/A
Energetic	Undesirable	N/A

Table 2. List of influential horsenality traits from the stepwise regression predicting Tier or Obedience score classified as either desirable or undesirable based of parameter estimate generated when calculating the appropriate models.

A) Tier = Age(0.07) + Bracy(0.10) + Tense(1.60) + Shy(-0.03) + Nonresponsive(0.13) + Buck/Charge(-0.23) + Pushy(0.90) + EasilyBored(0.87) + 0.17.

    a. R^2 of 1.00

B) Obedience Score = Age(-0.14) + Fractious(-0.38) + Unmotivated/Lazy(-2.45) + Disinterested(-0.48) +   Unenergetic(-0.94) + 8.956.

    a. R^2 of 0.9844

C) Obedience Score = Age (-0.22) + Bracy (-0.09) + Tense (-1.12) + Shy (0.01) + NonResponsive (-1.51) + BuckCharge (-0.49) + Pushy (1.02) +EasilyBored (-0.75) + 7.42951

    a. R^2 of 0.9953

D) Tier = Age (0.04) + Fractious (0.19) + UnmotivatedLazy (1.59) + Disinterested (0.15) + Energetic (0.90) - 1.10132

    a. R^2 of 0.7482

Figure 2. Tier and Obedience formulas first as originals, than the trait values were used inversely for comparison. A.) Original stepwise regression formula using parelli traits to predict Tiers; B.) Original stepwise regression formula using parelli traits to predict Obedience score; C.) Obedience score predicted using traits found to be influential in the original tier regression (A); D.) Tiers predicted using traits found to be influential in the original Obedience regression (B)

VITA

Lori Ramagli

<u>**Relevant Experience:**</u>

North Houston Veterinary Specialist, Katy, TX, June 2015- Present

- *Veterinary technician, <u>Shift Lead</u>- Triage nurse/ICU nurse/Surgery nurse*
- Triaged critical and all emergency cases, performed CPR if necessary
- Completed all necessary diagnostic work ups and outpatient treatments
- Provided treatments for all patients in ICU
- Ran anesthesia, assisted in all minor surgeries performed by ER doctors

Red Horse Reining Stables, Montgomery, TX, July 2016-Present

- *Performance horse barn manager*
- Exercised all performances via hot walker and or by horseback
- Turned out horses for mental stimulation
- Managed all barn ordering for supplies and feed
- Cleaned and maintained the organization and cleanliness of the facility
- Administer medications to horses and

Sobral Performances Horses, Montgomery, TX, July 2016- September 2016

- *Reining trainer assistant*
- Exercised all performance horses via hot walker and or by horseback
- Saddled horses for clients and the trainer
- Worked horse shows as groom for both trainer and clients
- Broke colts

Animal Emergency and Referral Center of West Houston, Houston, TX June 2012-May

2015

- *Veterinary technician- Triage nurse/ICU nurse*
- Treated every critical care case admitted to the ICU
- Ran blood and plasma transfusions
- Performed numerous catheter placements as well as administered injections
- Worked up patients on an outpatient basis

Houston Humane Society Vet clinic, Houston, Texas October 2008- January 2012,

- *Veterinary technician* (May 2009-January 2012)
- Volunteer (October 2008-May-2009) 200+ hours
- Administered over 50 vaccines a day
- Drew blood and ran heartworm tests and placed catheters
- Treated numerous victims for Parvo
- Staple and suture removals
- Insert microchips to aid in the finding of lost animals.

Education

January 2015-Present   **Masters**, Sam Houston State University, Huntsville,

Texas

January 2012-2014   **Bachelors**, Sam Houston State University, Huntsville,

Texas

August 2009-December 2011   University of Texas at San Antonio, San Antonio,

Texas

August 2005- June 2009   Elkins High School, Missouri City, Texas

Relative Volunteer Experience:

- TAMU Veterinary Emergency Response Team
- TVMRC Member
- Waller Equine Hospital, Waller, TX,
- Sam Houston State Graduate School Equine Research Trials
- Horse Connections Therapeutic Riding Center, Boerne, Texas
- Houston Humane Society

Awards

April 2015   : Top Hand award, Colt breaking and behavior course

May 2014   : Deans List

2008-2009   : Teen Volunteer of the year award, Houston Humane Society