

**WORKING EQUIDS: A CASE STUDY INVESTIGATING IF LOCUS OF
CONTROL AFFECTS WELFARE IN CENTRAL AMERICA**

by

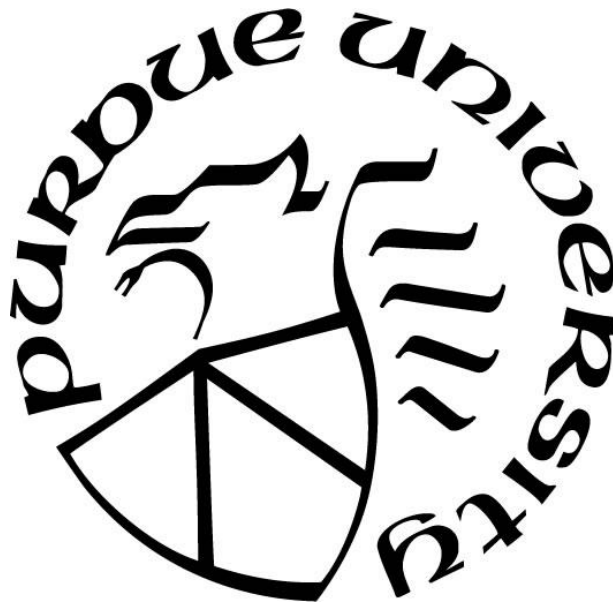
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A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science



Department of Youth Development & Agricultural Education

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“The earth would be nothing without the people, but the man would be nothing without the horse.” -Author Unknown

Dedicated to all those who stand proud alongside their equids, working to make something beautiful out of every situation.



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ABBREVIATIONS

ANAW	African Networks for Animals Welfare
AWIN	Animal Welfare Indicators
BCS	body condition score
BCoS	body coat score
BLS	body lesion score
BS	behavior score
D	donkey
F	mare
G	altered male
GHS	general health score
H	horse
HS	hoof score
HSI	Humane Society International
LOC	Locus of Control
M	mule or hinny, also male
OIT	Organismic Integration Theory
TWS	total welfare score
SDT	Self-Determination Theory
SPANNA	Society for the Protection of Animals Abroad
NGO	Nongovernmental Organization
WHO	World Health Organization

GLOSSARY

Amotivation- a state of lacking any motivation to engage in an activity, characterized by a lack of perceived competence and/or a failure to value the activity or its outcomes (Ryan et al., 2000).

Alopecia - the partial or complete absence of hair from areas of the body where it normally grows; baldness (Merriam-Webster, 2017).

Equid – any of a family (Equidae) of perissodactyl mammals consisting of horses, asses, zebras, and extinct related animals (Merriam-Webster, 2017).

Equine – of, relating to, or resembling a horse or the horse family (Merriam-Webster, 2017).

Equitarian Initiative- prepares volunteer veterinarians worldwide to deliver health care and education to improve the health, nutrition, productivity, and welfare of horses, donkeys, and mules, and to empower their care providers for sustainable change (Equitarian Initiative, 2018).

External Locus of Control – The belief that fate, chance, or other outside forces dictate the outcomes of their lives; that their efforts do not affect the outcomes of the future (Lefcourt, 1982).

Extrinsic motivation-refers to the performance of an activity in order to attain some separable outcome (Ryan et al., 2000).

External Regulation- the least autonomous in regard to motivation, describes individuals as having externally regulated behavior often through tangible rewards or threats of punishment (Ryan et al., 2000).

Identified Regulation- if an outside goal or objective is personally valued by the individual then they consciously accept the value as their own (Ryan et al., 2000).

Internal Locus of Control - The internal subset of Rotter's theory is built off an individual's belief that decisions, efforts, and actions in the present will inevitably dictate the outcome of their future (Lefcourt, 1982).

Intrinsic motivation- refers to doing an activity for the inherent satisfaction of the activity itself (Ryan et al., 2000).

Integrated Regulation- Individual's identify the importance of a behavior or action and harmonize said behavior with their own personal values, goals, and needs (Ryan et al., 2000).

Introjected Regulation- This style of regulation demonstrates partial internalization of causality by the individual, but the individual does not recognize the decisions as their own (Ryan et al., 2000).

Learned Helplessness- A mental state in which an organism forced to bear aversive stimuli, or stimuli that are painful or otherwise unpleasant, becomes unable or unwilling to avoid subsequent encounters with those stimuli, even if they are "escapable," presumably because it has learned that it cannot control the situation (Britannica, 2018).

Organismic Integration Theory (OIT)- designed to detail the different forms of extrinsic motivation and the contextual factors that either promote or hinder internalization and integration of the regulation for these behaviors (Ryan et al., 2000).

Self-Determination Theory (STD) - an approach to human motivation and personality that uses traditional empirical methods while employing an organismic metatheory that highlights the importance of humans evolved inner resources for personality development and behavioral self-regulation (Ryan et al., 1997).

ABSTRACT

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Title: Working Equids: A Case Study Investigating if Locus of Control Effects Welfare in Central America

Major Professor: Colleen M. Brady

Developing countries lack the resources and technological advancements commonly used by developed countries for production and must rely on manual or animal labor to aide in the creation, collection, and distribution of products for income. In Haiti and Honduras, the leading role of a working equid is to provide transportation for families and products to and from marketplaces. It is not uncommon for one equid to carry loads three times its body weight and make up to six trips, accumulating up to fifty miles per day, to and from its home. With extreme environmental and physical constraints placed on these working equids, equid health and performance decrease significantly. With little income to feed a family, equid owners may neglect seeking medical attention or additional costs related to their working equid. Promotion of the longevity and overall health of the equid is often overlooked, as the animal is overworked, thus further damaging its welfare. Studies divulge serious welfare concerns for the estimated 112 million working equids in developing countries where the equids have minimal access to clean water, limited grazing opportunities, poor body condition scores, facial and body wounds, and psychological fear associated with human-equid interactions.

The research team sought to identify if equid owner's locus of control was a variable contributing to the physiological and psychological welfare of working equids. The locus of control theory employed in this study was developed by Julian Rotter in 1966 and represents Rotter's belief that man has the capability to determine his fate based on actions and reactions to his environment. This theory identifies that an individual can possess either an internal or external locus of control, which inevitably dictates the decisions they make in their life. An individual who possesses the quality traits of an internal locus of control is said to believe that their personal abilities, efforts, and or actions determine the outcome of their life. Rotter also identifies the characteristics of individuals who possess an external locus of control. Those with an external locus of control believe that fate, luck, chance, or other outside forces dictate the

outcomes of their life. Identifying an owner's locus of control, as a potential factor affecting overall welfare of working equids in developing regions of the world, may assist future research teams in understanding the underlying causes of lower welfare scores seen in these regions.

This study took place over the span of one year, in 2017, beginning with a pilot test in Haiti on a sample of 10 Milot equid owners and their associated working equids (n=10). Information on research tools administered in Haiti allowed the research team to revise all research tools and implement the study on 65 Honduran equid owners and their associated working equids in October of 2017 (n=65). The results of this study identified a relationship between working equid behavior scores and owner locus of control, indicating that owners with external locus of controls had equids with lower behavioral scores. Additionally, a significant positive relationship was found between anterior knee lesions and owners exhibiting external locus of controls.

While no significant relationship between owner locus of control and total equid welfare score could be determined, the research poses many benefits for future studies focusing on equid welfare and owner interactions to NGO's, research teams, and medically trained personnel interested in the improvement of working equid welfare. Implementation of the locus of control survey into educational intervention strategies will provide educators and non-governmental organizations with individualized information regarding potential populations and allow those educators to tailor their material to suit each demographic in a meaningful and personally relatable way.

CHAPTER 1: INTRODUCTION

Objectives of the Study

The overall objective of this research is to explore potential relationships in individuals' locus of control as a potential variable contributing to the status of their working equid's welfare. The objective is to expand the base of knowledge concerning the psycho-social factors impacting the welfare of working equids.

The specific objectives were to:

1. Administer Julian Rotter's locus of control assessment to identify perceptions of owner locus of control as it pertains to working equid welfare
2. Identify whether there is a relationship between owners' perceived locus of control and equid welfare
3. Disseminate data and results for future studies focusing on equid welfare and owner interactions to NGO's, research teams, and medically trained personnel interested in the improvement of working equid welfare

Thesis Statement

This study explores the status of working equid welfare in Central and Latin American communities through the identification and analysis of owners' locus of control. The research investigates how equid owners' locus of control affects the physiological and psychological welfare of working equids.

Statement of the Problem

It is estimated that 112 million working horses, donkeys, and mules reside in developing regions of the world where their role is to provide essential resources to their owners' livelihoods and well-being (Upjohn, 2014). With continual increase in human populations seen throughout the globe, there is an increased demand for crops, minerals, resources and labor. To meet the growing demands of the world, advancements in efficiency and technology allow more developed countries to contribute vast quantities of resources to the market in an inexpensive and efficient manner. Developing countries lack the resources, commonly used by developed

countries, and must rely on manual labor. Individuals often utilize the equid species' strength and size to assist in labor, production, and transportation; without assistance from these working equids, those who reside in developing countries lose production efficiency and ensuing income. There has been growing concern for the health and welfare of these working equids. Studies, conducted by The Brooke, divulge serious welfare concerns for the estimated 112 million working equids in developing countries where the equids have minimal access to clean water, limited grazing opportunities, poor body condition scores, facial and body wounds, and psychological fear associated with human-equid interactions (Upjohn, 2014). Additional studies have been dedicated to the investigation of identifying the underlying causes of poor equid welfare in developing countries. The Brooke Hospital for Animals, located in London, has contributed significantly to the accumulation and interpretation of working equid welfare data. Statistical analysis of the data collection reveals nine different developing countries where individuals actively utilize working equids. Studies identify abnormalities in gait and sole bruising as well as joint/tendon swelling to be the most prevalent cause of lameness seen in working equids (Burn, et al., 2010). Other welfare issues such as faecal soiling, low body conditions, ectoparasite prevalence and immediate subcutaneous deep tissue wounds were seen (Burn, et al., 2010). Interventions designed to improve working equid welfare have been conducted in numerous developing countries. In addition to intervention projects, there are numerous veterinary and non-governmental organizations dedicated to the improvement of working equid welfare. While there is a plethora of research on improving working equid welfare, there is a paucity of research dedicated to the mindset and perceptions of working equid owners. "Owners do not recognize the causes of poor welfare and attribute behavior change to anthropomorphic analogy, such as laziness" (Swan, 2006). To advance the improvement of working equid welfare on a global scale, a comparison of baseline data of owner mindset, locus of control, and overall welfare of working equids must be established and evaluated. Working equid owner mindset and locus of control should be acquired as they relate to an individual's country of residence in association with the use of the equid in a manner that reflects individual livelihoods.

Study Significance

To advance the improvement of working equid welfare on a global scale, an understanding of human psychological characteristics underlying their behaviors must be established and evaluated.

The locus of control theory employed in this study was developed by Julian Rotter in 1954. The concept of locus of control (also referred to as perceived control) was designed to counter the work of behaviorist B.F. Skinner's indication that man must relinquish notions of freedom and self-determination (Skinner, 1971). Locus of control represents Rotter's belief that man has the capability to determine his fate based on actions and reactions to his environment (Lefcourt, 1982). Rotter's theory identifies an individual having either an internal or external locus of control, which inevitably dictates the decisions they make in their life (Rotter, 1966). An individual who possess the quality traits of an internal locus of control is said to believe that their personal abilities, efforts, and or actions determine the outcome of their life. Rotter also identifies the characteristics of individuals who possess an external locus of control. Those with an external locus of control believe that fate, luck, chance, or other outside forces dictate the outcomes of their life (Rotter, 1966). Identifying an owner's locus of control, as a potential factor effecting overall welfare of working equids in developing regions of the world, may assist future research teams in understanding the underlying causes of lower welfare scores seen in these regions.

Purpose of the Study

The purpose of this study is to ascertain relationships between working equid owner's locus of control and equid welfare, to have the ability to identify an additional variable associated with the overall condition of working equids.

Hypothesis

It is hypothesized that working equid owners who exhibit more external loci of control traits (which consist of beliefs, opinions and overall actions being dictated by outside forces such as luck, chance or fate (Rotter, 1966)) will have working equids that display a lower overall welfare score.

Research Questions

The subsequent research questions guided this study:

RQ1. To what extent can working equid owner locus of control be determined through oral interview methods?

RQ2. How does an owner's locus of control impact the welfare status of the working equid?

- a. Are there similar trends in owner's locus of control and the welfare of their working equids amongst members of the same community?
- b. Are physiological or psychological indicators, of the working equid, associated with owner locus of control?

RQ3. Does the equid owner's locus of control effect the prevalence of health concerns seen in the working equid?

- a. Are there specific regions of the working equid's body more prevalent to lower welfare scores whose owners exhibit a tendency towards a more external locus of control?

Assumptions of the Study

The researcher made various rudimentary assumptions prior to the commencement of this study regarding the assessment methods and procedures employed. The following statements are assumed:

- The validated use of Julian Rotter's Locus of Control survey, in the context of this study, was conveyed in a culturally sensitive and appropriate manner
- Individuals who participated in this study presented at least one equid to the research team, for assessment, during the period of data collection
- All translations from English to the participants native language were understood

Limitations of the Study

There are some limitations identified within this study. The primary limitation of this study focuses on the accessibility to working equid owners. To accommodate the lack of accessibility of working equids and their owners, a convenience sample was drawn from the

population of residents in the area at the time the study was conducted. An additional limitation to this study was the availability of communities with working equids. As a solution, the research team partnered with Equitarian Initiative, a non-profit organization dedicated to the improvement of global working equid welfare, in addition to Purdue University Study Abroad Programs. By partnering with the Equitarian Initiative and Purdue University, the research team was able to travel to developing regions of the world where there was a higher concentration of working equid owners so that a larger convenience sample could be drawn. The final limitation noted in this research study was the financial obligation of the research team. To acquire necessary funding for international travel, translators, and other necessary provisions the research team applied for international grants and scholarships. With the support of an internal seed grant, the research team was able to select developing locations, within a specific budget, in the Western Hemisphere and travel to those sites to conduct the study.

CHAPTER 2: REVIEW OF LITERATURE

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- a. Are there specific regions of the working equid's body more prevalent to lower welfare scores whose owners exhibit a tendency towards a more external locus of control?

Introduction

History shows continuous ebbs and flows in the tides of society where man has conquered and built civilizations, tended to the land, and produced goods for market. Throughout the development of cities around the world, the equid can be seen alongside man. With the equid's strength, power and endurance, societies have been able to grow and reap profit from their labor. The role of the equid, in the development of civilization, was to act as a form of transportation of both human and agricultural products for market as well as pull plows, carts, and carry materials to and from work sites (Bowling et al., 2000). Larger heavier breeds were developed specifically for agricultural related work. Due to their immense size and weight, draught type breeds were crucial for the movement and use of larger machinery. As centuries passed, some countries developed more advanced technology and machinery began to overshadow the work required of equids, causing a decrease in their desirability. While developed countries became more advanced and could afford more technologies to advance their

presence in global markets, developing regions of the world that lack the resources to advance still rely heavily on the power of equids to conduct day to day activities.

The World Health Organization (WHO) recognized working animals to provide an essential resource to their owner who lives in poverty (Perry et al., 2002). While they provide a means to income and production efficiency, working equids are living with impoverished owners in challenging environmental and/or climatic conditions along with difficult terrains which is a cause for concern in the equids' overall welfare (Pritchard et al., 2005). Although much research has been conducted on the physical welfare status of this population of animals, little research has investigated the human behavior component of this issue. To advance the improvement of working equid welfare on a global scale, an understanding of human psychological characteristics underlying their behaviors, as a variable associated to working equid welfare, must be established and evaluated.

Locus of Control

The concept of locus of control (also referred to as perceived control) was first identified, and later validated, by psychologist Julian B. Rotter in 1954. Designed to counter the work of behaviorist B. F. Skinner and the indication that man must relinquish the notions of freedom and self-determination (Skinner, 1971), Rotter establishes the theory that man must perceive himself as the determiner of his fate (Lefcourt, 1982). Locus of control employs two contrasting variables, internal versus external loci of control, used to identify an individual's perceived control in life. This perceived locus of control can differ in the extent to which individuals view rewards, punishments, or events in the lives caused in response to individual actions or factors beyond their control (Rotter, 1966).

Internal Locus of Control

The internal subset of Rotter's theory is built off an individual's belief that decisions, efforts, and actions in the present will inevitably dictate the outcome of their future. This dimension of the theory describes an individual's manner to accept responsibility for not only their actions but their experiences as well. Lefcourt (1982) further describes the characteristics of an internal locus of control as those who perceive themselves as active determiners of their fates. Internally controlled individuals are more readily willing to accept responsibility for their

outcomes and, therefore, exhibit individualism towards their actions and are less likely to show obstinance to others.

Those who can find satisfaction and value from their actions also exhibit the ability to resist influence. Characteristics associated with internal individuals focus on the value of self and exhibit a tendency to exude confidence in decision-making. Several studies on this aspect of internal locus of control have been explored and have found significant social and personal factors to have an influence on an individual's perceived control. Strickland (1962) identified internal-external differences in subjects using verbal conditioning paradigms. Strickland found that internals aware of a reinforcement contingency displayed significantly less conditioning than the internals who were not aware of the reinforcement. This finding suggests individuals with an internal locus of control tend to be more resistant to outside influences. Additional studies conducted by Getter (1966) and Gore (1962) suggest comparable results indicating internals are more prone to unconsciously react against covert or subtle influence attempts (Biondo, 1971). Resistance to influence can be attributed to internals' resistance towards conformity or control by others.

Correspondingly, evidence suggests internals tend to desire control in situations. A 1968 study conducted by Julian and Katz analyzed subjects' ability to control outcomes. In this study, subjects were placed into chance and skill-based scenarios where they could either earn a reward for themselves or rely on a more qualified and competent individual to accomplish the task in their place. In chance and skill scenarios, internals preferred to rely on themselves to complete the task. Based on the results obtained by this study, Julian and Katz concluded that internal individuals would rather keep control than to relinquish their power in the presence of a reward.

In addition to the characteristic of influence resistance, internal individuals exhibit more strategic cognitive activity. Lefcourt (1982) identifies internal individuals as having more cautious and calculative choices, taking time to plan their actions and involvements. "[Otherwise] the probability of internals being able to regulate their experiences would be lessened. This loss, in turn, would diminish the degree to which they are able to remain actors rather than pawns of fate. Such self-direction should entail more active cognitive processing of information relevant to the attainment of valued ends and should be reflected in the types of strategies that characterize an individual" (Lefcourt, 1982).

Seeman and Evans (1962) were the first researchers to associate internal locus of control to cognitive activity. Derived from Rotter's original Internal-External (I-E) scale, originally designed to analyze an individual's locus of control through a series of forced response questions, a twelve-item measure of powerlessness was developed to predict the level of knowledge about tuberculosis among subjects suffering from that disease. The study supported the correlation between internals and a more involved cognitive activity. This relationship is derived from the theory that internals believe they can act on their behalf therefore needing more information to develop an educated response. Additional research conducted by Seeman (1963) on reformatory inmates regarding powerlessness further informed researchers of its relevance to locus of control. It was concluded that an individual's sense of powerlessness dictates their mental attention and retention rates. It is important to note that in this study, information gathering, and retention rates of subjects was strongest when the information provided held personal relevance or would lead to a reward; in the case of the reformatory inmate study, internal individuals had stronger attention and retention rates when it pertained to information that would allow the inmates to be paroled sooner.

In the previous sections we explored the nature of internals' adaptability to immediate gratification but have not explored areas of strategic planning and achievement-related behavior. Unlike cognitive activity, which is argued to be a form of common sense in individuals, achievement-related behavior requires the individual to entertain the idea that their actions will have a positive impact on their life with little to no sacrifices involved. While sacrifices are a negative product of internals' actions, if presented with a situation in which the internal is challenged they will positively thrive in the presence of the constructive criticism and feedback. This concept of deferred gratification suggests that individuals with an internal locus of control trust the unreliability of the future based on the actions they take. To achieve the long-term goal, one must be comfortable and feel secure in their decisions. To expand on the theory of deferred gratification, Bialer (1961) tested the responses of a series of children when given the opportunity to receive a reward right away or defer the reward to the next day. With an adapted locus of control scale, Bialer identified children who chose to defer their reward were associated with an internal locus of control. "The more mature child, aware that his own efforts can forestall failure, and being able to maintain the tension generated by the postponement of immediate need satisfaction, should therefore choose to defer his gratification" (p. 306). This

theory of deferred gratification is also associated with persistence. Studies provide evidence that relates locus of control to persistence at an arduous task rather than quitting after initial failure whereas an individual that displays qualities of an external locus of control would not be inclined to complete the challenging task.

External Locus of Control

To contrast the qualities and traits displayed by an internal locus of control, Julian Rotter established the identification of external locus of control. Individuals' who possess cognitive stress due to environmental factors, personal beliefs, or external forces are known as externals. Externals' commonly feel overwhelmed or out of control of the events in their lives. To the individuals who live in a situation in which they are continuously bombarded with adverse circumstances, life does not appear to be subject to their control (Lefcourt, 1982). In other words, externals believe that fate, chance, or other outside forces dictate the outcomes of their lives; that their efforts do not affect the outcomes of the future.

It has been hypothesized that the lack of control seen in externals can be positively associated with oppressed and/or deprived individuals. A study conducted by Battle and Rotter in 1963 assessed the differences in perceived control from a sample of eighty-six eighth grade children that were selected based on their sex, social class, and race. The study indicated that lower-class black children exhibited traits of an external control versus the middle-class blacks or lower-class white children. It is not uncommon for individuals of impoverished peoples, displaced persons, or members of denigrated minority groups to exhibit signs of learned helplessness due to their situations. This fatalistic outlook on life is prototypic of this deprived class of individuals. Gurin, Gurin, Lao, and Beattie (1969) further advanced the position of fatalistic individuals and found Negroes who blamed "the system" for negative events on their personal life or overall difficulties were also more likely to exhibit extroverted behavior, unlike internals who would be self-blaming in the same situation. "These authors contended that to belong to a poor and socially denigrated minority means that one must inevitably experience difficulties and assaults upon his sense of dignity, and that it is to be expected that a person will not therefore blame himself for his fate" (Lefcourt, 1982). While researchers have identified minority groups and impoverished individuals as candidates possessing external locus of control,

the external fixations are not limited to a specific class of individual but rather anyone who quail away from difficult tasks or failure.

Individuals' who attribute outcomes as a response to one's personal endeavors or efforts, those outcomes are deemed self-relevant; essentially individual successes or failures are meaningful for learning and future improvement. For those individuals' who attribute outcomes as a response to external events, then those outcomes can be brushed off and have little to no self-importance in respect for self-regard. A 1971 study conducted by Phares, Wilson, and Klyver explored the results of previous studies of externals tendencies toward defensiveness and retention of more negative information. While past studies failed to clearly support the hypothesis regarding internals' sensitivities to failure, Pharse and his associates were able to identify characteristics of externals' predisposition to blame external factors for their failure. To test the theory that external individuals blame outside forces more frequently than internals, both internals and externals were given an insoluble puzzle among legitimate puzzles. While attempting to complete the puzzles, subjects were exposed to "fair" and "distracting" conditions. Under fair conditions, subjects were asked to complete a puzzle in the presence of a silent researcher while in distracting conditions subjects were asked to complete a puzzle while being distracted with chatter from the researcher. Results indicated externals were more prone to blaming the presence of the silent researcher as reasons for their failure to complete the puzzle under fair conditions. From this experiment, and other similar experiments, a conclusion can be drawn that externals are more likely to place judgement and blame on other persons or environments for their failures than internals.

In association with externals' tendencies of learned helplessness and blaming others, studies have identified those who possess external traits have a decreased capacity to cope to stressful situations. In an all-encompassing review of literature on stress related experiments targeting task performance and social behavior, Cohen (1980) identified a strong demonstration that increased control over a stressor decreases the shortfalls in post-stimulation performance. Numerous investigations have been concerned with the degree in which internals versus externals manage stress. A 1977 study tested the effects of stress on locus of control by analyzing how cardiac patients reacted and responded to a variety of medical procedures administered while in intensive care. The specific measurements used to analyze patients' locus of control was their response levels to treatment as active or passive with and without

distractions. Based on medical diagnostic exams and overall recovery rates, externals were found to have worse prognostic ratings, more depressed, less cooperative, and remained in the hospital longer than internals (Cromwell et al., 1977). While it is difficult to draw concrete conclusions from data such as the study explored above, the hypothesis that internals behave in such a way that does not intensify their conditions can be drawn from the data. Internals higher levels of cooperativeness and decreased depressive tendencies suggested that internals more actively struggle for survival than externals. While there are many limitations to studies regarding stress related coping methods in cardiac patients, further research has been conducted to further understand stress as a variable to locus of control. A general conclusion can be made from these experiments, found in Lefcourt's 1982 book, stating that "internals may come to feel anxious about failures and disappointments...because they more readily attribute causes for those failures to themselves. But among low stressed subjects, who are assumed to have had more positive experiences, externals may be less certain about the causes of their successes and thus derive less pleasure from them than do internals, who may more readily make internal attributions for those successes" (p. 107). The research regarding stress, learned helplessness, and lack of control in life are a few variables that have been identified in an effort to better understand how people wrestle with adversaries in life, but other outside forces such as social antecedents can also affect an individual's perception of control.

To fully understand an individual's perception for control of their personal life, one must identify what influential factors assisted in the development of their current perceptions. Researchers believe family determinants of locus of control are considered an influential factor leading to a specific perception in young children. Parental reinforcements including positive interactions, consistent discipline, and decreased rejection rates were identifiable variables that suggest a child's perception of locus of control can be related to the degree in which parents are involved in their child's daily activities. Maintaining positive and supportive relationships between parent and child fosters a child's behavior and thought process towards an internal locus of control than a relationship branded by punishment, aggression, and criticism (Katzovsky et al., 1967). Further research regarding parental influence on perceived locus of control and social antecedents identify significant family trauma such as divorce or death in the family can lead a young influential mind to gravitate towards a more external locus of control.

Changes in Locus of Control

Previously, we explored the potential variables that can shape an individual and dictate whether they fall with an internal or external locus of control category. It is crucial to note that the previously discussed studies and theory focus on identifying and defining the differences between an internal versus external locus of control. Clearly Rotter's theory does not force individuals to conform to a specific perception, but rather identify the two extremes. Most people fall between the extremes, forming a continuously fluctuating distribution of locus of control perceptions. Locus of control can change over time but is thought to be a relatively enduring dispositional characteristic (Findley et al., 1983).

Although studies and researchers report empirical evidence that suggests locus of control is an identifiable characteristic to be revealed within individuals, it is a construct in social learning theory that allows researchers to measure and interpret attributions made by individuals in response to inquiries about causality (Lefcourt, 1982). The question remains, if individuals perceived locus of control represents enduring dispositional characteristics is there the possibility of change from one perception of control to the other? A shift from an external control to a more internal control would be a goal for individuals to achieve more satisfaction from life, but what influences that shift in perceived control? In this section we will explore three potential influences (natural, accidental, and deliberately contrived actions) that may act as pivotal factors to elicit a change of an individual's locus of control.

Deliberately Contrived and Behaviorally Assessed Changes

In numerous studies pertaining to behavior modification and psychotherapy, Rotter's locus of control scale has been the primary assessment tool utilized to identify stagnant control in individuals. Gunars Reimanis (1971) entertained the theory of deliberately changing a person's locus of control among students of varying age groups. This idea was tested in three separate experiments but did not present any concrete results. While there were signs that suggested a deliberate change in locus of control had occurred, limitations to the study prevent any clear conclusions. Other studies sought to validate Reimanis' theory regarding the deliberate change of an individual's locus of control. Those studies found that people have the inclination to

change their perceptions of control if they are exposed to experiences that meaningfully alter the contingencies between actions and the perceived outcomes of their actions.

Natural Change

One of the first factors to consider regarding a change in locus of control is age. Lefcourt examines this variable by considering children participating in role playing activities. When given the option, younger children select the role of an adult or person in charge with the justification that it is more enjoyable to give orders than to receive them. To be young and subject to both older children and adult commands creates a sense of inferiority amongst young children, which in turn creates feelings of helplessness leading to external perceptions. To be associated with older individuals', children feel a sense of satisfaction; observing children modeling their older peers enforces the value of age and the credence that as one becomes older, obtaining desired pleasures becomes attainable.

In addition to chronological age of an individual, other factors such as increases in mental age and duration of time spent in professional positions facilitating effectiveness can contribute to overall feelings of determination and self-control regarding events surround their life. To explore the topic of impactful life events, researcher Ronald Smith (1970) explored how the influence of impactful crises can affect an individual's locus of control. In this study, Smith studied the locus of control scores of clients who appeared at a crisis intervention center. The basis for selecting clients of an acute crisis intervention center as his sample was justified by the impression that an acute crisis entails temporary feelings of overwhelming loss of control by negative influences. During the acute crisis Smith reasoned that these individuals would experience momentary helplessness or other external indicators. However, as the crisis diminishes, a return to a more internal control would be apparent. Smith found that external locus of control characteristics did decline with the disappearance of the crisis. As predicted, acute crises are exemplified by feelings of helplessness as a form of coping mechanism in the presence of notable events.

Self Determination Theory

Ryan et al. (1997) contribute more recent justifications to an individual's potential for behavior modification through self-determination. "Self-Determination Theory (SDT) is an

approach to human motivation and personality that uses traditional empirical methods while employing an organismic meta-theory that highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation" (Ryan et al., 1997). This theory explores an individual's innate tendencies towards growth-essential for constructive social development and personal well-being-based on the imperial needs of competence, relatedness, and autonomy. Figure 2.1, below, illustrates the three characteristics that make up SDT.

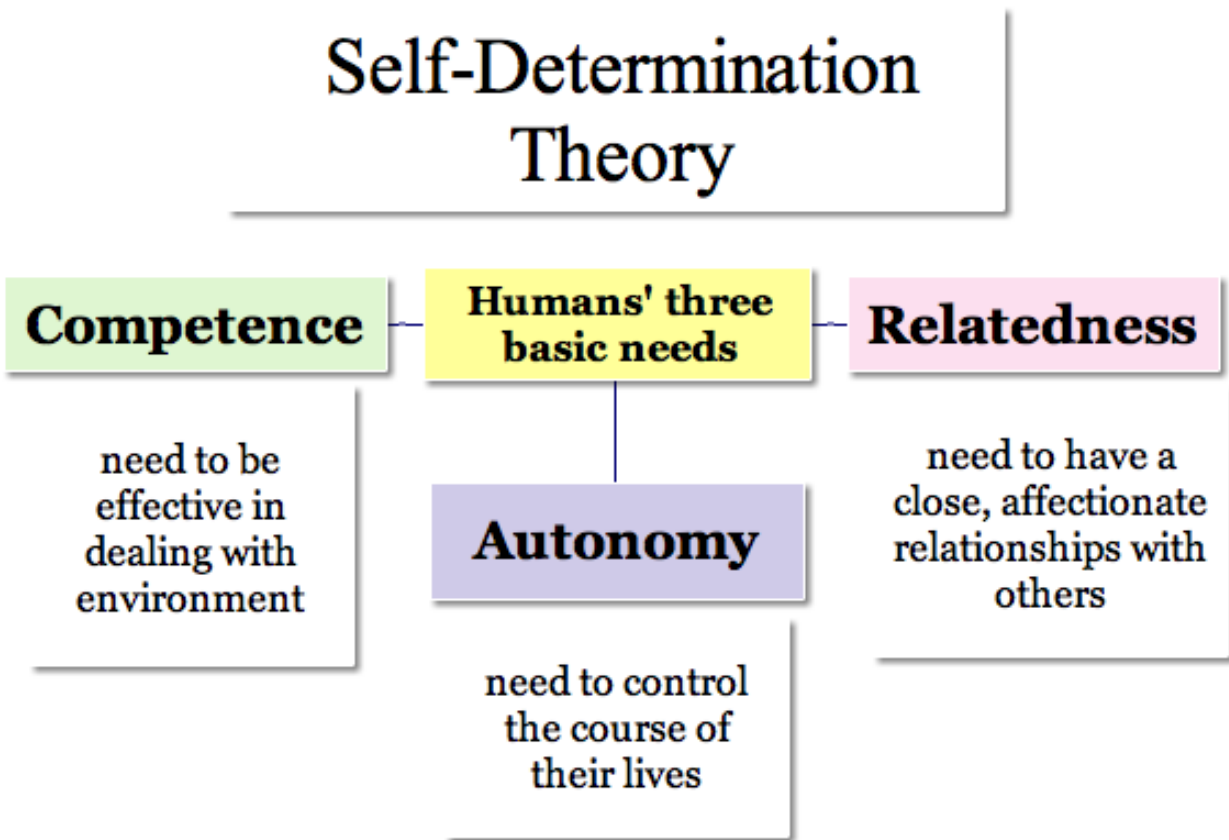


Figure 2.1 Self-Determination Theory (SDT) (TRAN, 2017)

Rotter's theory of internal control can be paired with an individual's capacity for intrinsic motivation, or tendency to seek out challenge to extend one's capacities (Ryan & Deci, 2000). Congruently, the relationship between Rotter's theory of external control can be compared with one's extrinsic motivation. Extrinsic motivation is characterized as an individual's propensity to complete a task for a reward for completing a task rather than the inherent satisfaction for completing said task. Unlike Rotter's theory of control, the SDT incorporates the extreme

known as “amotivation” which recognizes individuals’ complete lack of internal or external motivation to complete a task.

“Within SDT, Deci and Ryan (1985) introduced a second sub theory, called Organismic Integration Theory (OIT), to detail the different forms of extrinsic motivation and the contextual factors that either promote or hinder internalization and integration of the regulation for these behaviors” (Ryan & Deci, 2000). Figure 2.2, illustrated below, characterizes the depiction of the combined taxonomies of Locus of Control, SDT, and OIT arranged from left to right by degree in which motivation emanates from the individual.

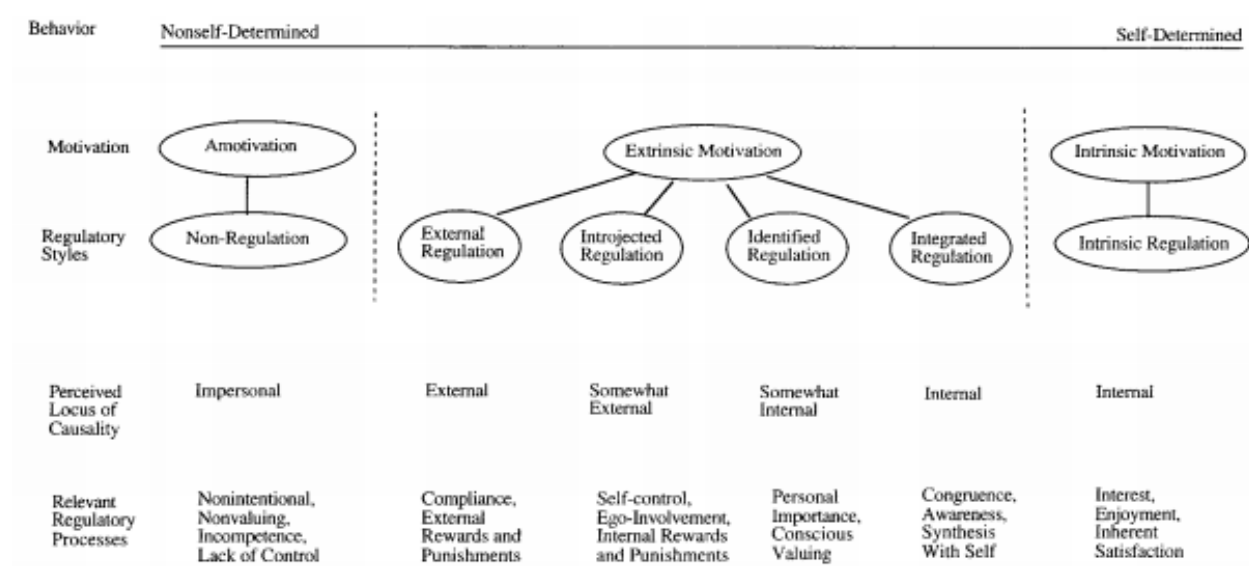


Figure 2.2 The Self-Determination Continuum Showing Types of Motivation with Their Regulatory Styles, Loci of Causality, and Corresponding Processes (Ryan & Deci, 2000, p. 72)

At the far left of figure 2.2 is amotivation. Amotivation is an individual’s lack of intent to act, regardless of internal or external drivers of motivation. Moving to the right of the figure there is the broad category of extrinsic motivation which consists of four regulatory drivers (1) external regulation (2) introjected regulation (3) identified regulation and (4) integrated regulation. External regulation, which is the least autonomous regarding motivation, describes individuals as having externally regulated behavior often through tangible rewards or threats of punishment. Those who have these traits are generally described as having an external perception of causality or control. Following external regulation is the regulatory style known as introjected regulation. This style of regulation demonstrates partial internalization of causality

by the individual, but the individual does not recognize the decisions as their own. Actions and behaviors performed by the individual are defended as being taken to avoid guilt and to attain a feeling of pride or worth towards society.

While still falling under the category of extrinsic motivation, identified regulation is characterized as having a more autonomous nature. Identified regulation has a somewhat internal perception of causality or control because if an outside goal or objective is personally valued by the individual then they consciously accept the value as their own. Finally, those characterized as exhibiting traits of an integrated regulation identify the importance of a behavior or action and harmonize said behavior with their own personal values, goals, and needs. While integrated regulation sounds incredibly like individuals having intrinsic motivation, the key difference is that those with integrated regulatory behavior perform actions to attain personally significant results rather than performing the action because they see it as inherently enjoyable. At the far right of figure 2.2, is intrinsic motivation. Intrinsic motivation is directly associated with an individual's perceived locus of causality or control. Those who possess this motivation are said to participate in tasks because they are enjoyable and interesting and do not seek either a positive or negative reinforcement because of completing the task.

Internal-External Locus of Control Scale

We have discussed and analyzed Rotter's locus of control theory to be roughly defined as a theoretical concept that analyzes how individual perceptions may vary from reactions contingent upon personal behavior and attributes versus the level of perception in which reward is based on independent forces outside of personal control. Social learning theory provides researchers with the conceptual and theoretical frameworks necessary to analyze complex social behaviors and perceptions of control. Expectancy theory allowed Rotter to build his theory of locus of control based on the knowledge that the social learning theory identifies "reinforcement acts to strengthen expectancy that a particular behavior or event will be followed by that reinforcement in the future. Once an expectancy for such a behavior reinforcement sequence is built up the failure of the reinforcement to occur will reduce or extinguish the expectancy" (Rotter, 1966). A general hypothesis was then developed that when reinforcement is seen as not dependent upon individual actions or behaviors, then the manifestation of the reinforcement will

not increase as much as when the reinforcement is believed to be dependent upon behavior or action.

The initial attempt to measure the general differences in expectancy, or belief in external control, was tested by E. J. Phares in 1957. Phares studied the effects of chance and skill on expectancies for reinforcement, where he developed a twenty-six item Likert-type scale identifying thirteen external based attitudes and thirteen internal based attitudes. Phares work indicated externally directed attitude items gave lower predictions that external individuals would behave in an analogous manner as all subjects placed in a chance situation. This finding identified that externals showed more unusual shifts of expectancy than did internal subjects (Phares, 1957). Future studies were developed from the work of E. J. Phares which allowed for a more encompassing survey to analyze individuals' perceptions of control. After numerous studies and multiple renditions of this control survey, Julian Rotter and associates developed subscales for different areas of the tool. These subscales, constructed as a forced-choice questionnaire, target areas of achievement, affection, and general social and political attitudes in combination with control for social desirability (Rotter, 1966).

Initially re-designed as a sixty-item questionnaire, the locus of control survey tool sought to identify an individual's perception of control. Analysis of the survey questions indicated that the subscales did not generate separate predictions of control. Instead, researchers found that achievement-based items were highly correlated with social desirability. It was also found that other subscales were highly correlated. Due to this information, Rotter and associates abandoned specific items within the scale. The final scale, presented in Appendix A, was decreased to twenty-three forced choice responses with an additional six filler items to make the purpose of the questionnaire more ambiguous to participants. This version has also been revised so that the questionnaire items are appropriate for non-college adults and upper level high school students.

International Applications of Locus of Control

It is a major concern to apply theories and assessment tools, predominantly developed in North America, to an international setting. Critics argue that individuals of differing countries, where sex, political views, and social class are treated differently, evoke different responses to the North American made internal-external survey tool due to differing beliefs and core values.

Additionally, common phrases and similar-sounding concepts found in differing languages carry an array of meaning that may go un-acknowledged by the researcher.

Researchers have studied the impact of cultural divergences in endorsement of individualistic values in addition to cultural differences seen throughout the world. J. W. Berry (1989) delineated contrasting research approaches with a cross-cultural lens. The study outlined an approach to compare the adequacy of “imposed etic”, strategies designed in one culture and applied to another, in contrast to “derived etic” also referred to as universal generalizations. To parallel the work of Berry, further studies have explored the application of the Internal-External scale to collectivist cultures. Rotter’s I-E scale was designed with individualistic themes, assuming each person sought to define their individualistic nature through actions and behavior. Hofstede (1980) identified the contrasts of Rotter’s I-E scale in collectivistic cultures where identity is dependent upon membership of a communal group, where one has little or no choice over their life events. By considering the culture of the country, generalizations regarding the scale can be made. The simplest generalization that can be drawn from this concept is that respondents from Western civilizations, where individualistic culture is the norm, will drift towards a more internal control whereas those residing in other countries will exhibit more external traits. Unfortunately, this is a hazardous generalization to conclude since Rotter’s items may be incomprehensible in some settings due to the relevance of specific topics. The design of Rotter’s scale was based on Western beliefs and culture and may fail to acknowledge sources of control, such as magic, that is deemed an important source of control for some cultures (Smith et al., 1995). An additional problem associated with Rotter’s scale was identified by Markus and Kitayama (1991) regarding the self-concept of collectivistic cultures. “Members of collectivist cultures define their identity much more in terms of invariant group memberships, and the views they express about themselves and others are designed to preserve the harmony of their relations with those others. Their responses to the many Rotter items that refer to luck, chance, fate, and success may be guided not by their private opinions as to how much influence they have on events, but by the way they wish to present themselves to others” (Markus et al., 1991). Cultural qualities such as modesty-bias, more widely recognized as self-serving bias, and a lower frequency of mobility among groups are factors that have been identified as variables contributing to the variation seen in Rotter’s I-E scale in non-Western civilizations. While limitations have appeared in Rotter’s I-E scale, having a forced-response format, rather than a

Likert-scale questionnaire decreased the variances in compliant response bias from non-Western cultures (Smith et al., 1995).

Cross-Cultural Studies: Locus of Control

While there are implications to the I-E scale, researcher Dyal (1984) sought to conduct an extensive literature review on the topic of cross-cultural locus of control. Results could be summarized into three categories related to perceptions of locus of control which included (1) examination of mean differences in externality; (2) using factor analysis to compare internal structures of the locus of control items; and (3) examination of external associates pertaining to locus of control.

Jensen and associates conducted the largest country study regarding cross-cultural locus of control application where 11,000 adult men and women from nine Western European nations (Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Spain, and the United Kingdom) were analyzed based on their locus of control responses. An additional five separate studies were conducted, and I-E scores were analyzed from Japan, Mexico, Thailand, Turkey, United States of America, and Yugoslavia in addition to forty other developed and developing regions of the world (Smith et al., 1995). These studies recorded the quantity of mean differences between country sample I-E scores. It was found that Oriental Asians, especially those of Japanese descent, tend to possess more external perceptions than those of North American Caucasians (Dyal, 1984). Studies conducted in the United States of America (Cherlin & Bourque, 1974; Viney, 1974; Reid & Ware, 1973) and other countries such as Venezuela and Columbia (Escovar, 1981), India (Tyler et al., 1989), Poland (Tobacyk, 1978), Australia (Ashkanasy, 1985; Watson, 1981), and Jamaica (Jones et al., 1979) revealed that the personal and socio-political factor structures overlapped. These analytic results provided evidence in terms of the uniformity in which I-E scale items are interpreted among varying cultural and geographical locations. To combat cross-cultural variability, multidimensional scaling (MDS) techniques can be employed to recognize variance presented due to cross-cultural analysis (Smith et al., 1995). These dimensions can be broken into three categories which include (D1) Personal-Political; (D2) Individual-Social; and finally (D3) Luck.

Hofstede (1980) utilized MDS techniques to determine if responses differ between samples due to influences and aspects of respondent's natural culture. It was found that cultures

influenced by modernity and religious affiliations are significantly associated with D2 (Individual-Social). Individuals categorized as externals were found to be natives of more collectivist nations while internals were associated with individualistic nations with higher literacy rates, income per person, and proportion of Christians residing within the population. In relation to analyzing cross-cultural comparisons of perceived control, researchers must consider all confounding variables pertaining to influences affecting the judgement and beliefs of respondents. When comparing the perceived mindset of one country, rather than a cross-cultural analysis, it is important to understand and incorporate cultural beliefs and tendencies into the I-E scale to avoid confusion among respondents.

Locus of Control and Equid Welfare

Locus of control has unlimited potential as it pertains to conceptually understanding how individuals perceive control and inevitably the decisions made based on their perceived control. The welfare of animals has always been a topic of concern across the globe, especially with the working equids found in developing regions of the world. The World Health Organization (WHO) defines working animals as animals that provide a vital resource for impoverished owners (Perry, 2002). It is estimated that 112 million working horses, donkeys, and mules reside in developing regions of the world whose role is to provide essential resources to their owners' livelihoods and well-being (Upjohn, 2014). With continual increase in human populations seen throughout the globe, there is an increased demand for crops, minerals, resources and labor. To meet the growing demands of the world, advancements in efficiency and technology allow more developed countries to contribute vast quantities of resources to the market in an inexpensive and efficient manner. Developing countries often lack the resources, commonly used by developed countries, and must rely on manual and animal labor. Individuals often utilize the equid species' strength and size to assist in labor, production, and transportation; without assistance from these working equids, those who reside in developing countries lose production efficiency and ensuing income.

Studies divulge serious welfare concerns for the estimated 91.8 million working equids in developing countries where the equids have minimal access to clean water, limited grazing opportunities, poor body condition scores, facial and body wounds, and psychological fear associated with human-equid interactions. There have been numerous studies dedicated to the

investigation of the underlying causes of poor equid welfare in developing countries. The Brooke Hospital for Animals, located in London, has contributed significantly to the accumulation and interpretation of working equid welfare data. Statistical analysis of the data collection comprises nine different developing countries where individuals actively utilize working equids. Studies identify abnormalities in gait and sole bruising as well as joint/tendon swelling to be the most prevalent cause of lameness seen in working equids. Other welfare issues such as faecal soiling, low body conditions, ectoparasite prevalence and immediate subcutaneous deep tissue wounds were seen (Burn, et al., 2009). Interventions designed to improve working equid welfare have been conducted in numerous developing countries. In addition to intervention projects, there are numerous veterinary and non-governmental organizations dedicated to the improvement of working equid welfare. While there is a plethora of research on improving working equid welfare, there is a paucity of research dedicated to behavioral perceptions of control in working equid owners. “Owners do not recognize the causes of poor welfare and attribute behavior change to anthropomorphic analogy, such as laziness” (Swan, 2006).

To explore additional variables pertaining to welfare, researchers have begun the preliminary exploration of locus of control as a contributing human factor associated with the deprived welfare status of working equids in developing regions of the world. “It is hypothesized that this variable is of major significance in understanding the nature of learning processes in various kinds of learning situations and that consistent individual differences exist among individuals in the degree to which they are likely to attribute personal control to reward in the same situation” (Rotter, 1966).

The Role of Equids in Developed Countries

As times change, so does the role of equids in society; this can be seen more predominantly in developed countries such as the United States of America and select European countries. As modern technologies emerged, specifically the invention of the motor, efficient production of agricultural crops and products became possible and the need for the equid decreased. Two major developments in society aided in the salvation of the equid industry: an increased standard of living and higher average family incomes. With residents of developed countries living more comfortably and having additional money to spend on hobbies, the equine

industry took a turn from utilitarian production to a highly recreational sport (Centers for Epidemiology and Animal Health (U.S.), 2007). According to the American Horse Council (AHC) an estimated 9.2 million equids populated the United States of America in 2003 (AHCF, 2005). In previous census surveys, only 6.9 million equids were documented in the United States. This vast increase in population numbers represents a 33% overall herd increase over one decade. The increasing numbers of developed countries' equine herds can be associated with the growing equine economy where equids are bought, sold, and bet upon by affluent individuals in four major categories: racing, showing, recreation, and other as represented by Table 2.1 (AHCF, 2005). It is important to note that recreational equid activities have the largest populations of both equids and participants; this population difference can be associated back to the improvement to individuals' standard of living and increased average incomes.

Table 2.1

Number of Equids & Participants by Activity (American Horse Council, 2005)

Activity	No. of equids	No. of Participants
Racing	725,000	941,400
Showing	1,974,000	3,607,900
Recreation	2,970,000	4,346,100
Other ¹	1,262,000	1,607,900
Total	6,931,000	7,062,500²

¹ Includes farm and ranch work, police work, rodeo and polo.

² The sum of participants by activity does not equal the total number of participants because individuals could be counted in more than one activity.

Economic Contributions of the Equine Industry

Reviewing the 2002 American Horse Council Foundation demographic report, statistics identify approximately 7.1 million Americans were involved in an equestrian related sport or activity that produced 619,400 full-time employment positions directly within the industry. Additionally, the equine industry contributed products and services worth \$25.3 billion with a total impact of \$112.1 billion on the United States gross domestic product (GDP) (AHCF, 2005). A comparison between the 2002 and 2016 report was done to determine if there were any significant changes in the economic impact of the equid industry. The 2016 AHCF economic report identifies an increase in the direct economic impact to the United States economy from

\$25.3 billion to \$39 billion in total revenue (AHC, 2005). As of 2016, the United States equine industry supports 1.4 million full-time employment positions as opposed to the 619,400 full-time positions seen in 2002.

Other developed countries such as Germany, France, Great Britain, The Netherlands, Sweden, Denmark, Italy, and Belgium reflect similar shifts in equid responsibilities from production to recreation. Breed registries and reproductive business have begun to flourish in these developed countries where individual purchasing power has increased over the past few decades. Germany has seen similar economic contributions from the equid industry as the United States. The German Horse Riders Association estimates that equestrian sports supply approximately 5 billion euro to the GSP, including 2.6 billion euro in expenses during equestrian related activities and generates over 300,000 jobs. While not all countries can be accurately represented, it is estimated that 80% of all equestrian related sports are concentrated in Europe (Haring, 2012).

The Role of Equids in Developing Countries

While developed countries such as North America and Europe participate in equestrian related sport and leisure activities, developing countries continue to utilize the brute strength and endurance of the equid species for agricultural and industrial related work. Much of agriculture related responsibilities, such as plowing and transport of products, are possible due to the availability of animal power over motor power in these developing regions of the world. In addition to availability, animal power is cheaper to employ than mechanized power.

Draught type equids provide an estimated 80% of the power input on farms in developing countries; unfortunately, it is common for these animals to be neglected necessary resources such as food, water, shelter, and appropriate equipment due to the owner's lack of money and resources (Guyo, 2015). Of the 80% of working equids in developing countries, approximately 21 million were in Central and South America (Wilson, 2007). Specific countries include Mexico, Brazil, Argentina, Columbia, Peru, Chile, Uruguay, Venezuela, and Bolivia. Other countries with large equid populations, in relation to a large human population, can be seen in China (8.9 million), Mongolia (3.1 million), Ethiopia (2.7 million), the Russian Federation (1.7 million), India (1.0 million), Kazakhstan (900,000), and Kyrgyzstan (300,000) (Wilson, 2007).

Specific countries, such as the Caribbean countries of Haiti and the Dominican Republic, face different environmental issues that limit both production yield and productivity of working equids than milder climate countries. Factors such as the time of day, crop season, and role of the equid all play a part in determining the hours per day an equid is needed. In more tropical countries heat stress, fatigue, and increased respiration due to increased body temperature are common in working equids. These animals are often engaged in challenging manual labor for eight to twelve hours a day. If the equid's role is to act as the owner's main source of transportation, it is not uncommon for the equid to pull the cart carrying at least three to four individuals per trip continuously for six to seven hours per day (Wilson, 2007). Cart equids are also expected to pull products to market which can weigh over three times their body weight. Due to the lack of proper housing dedicated specifically for animals, owners often let their working equid loose to graze in the surrounding areas without grooming away sweat or equipment marks. Typically, when these animals are turned out, they are left to browse and feed on whatever is available to them, which includes garbage (Wilson, 2007). Shortages in feed, difficult terrain, dehydration, malnutrition, inappropriate equipment, and disease are the major constraints seen in developing countries that limit the productivity and performance of equids. Individuals of developing countries often are unable to spend money on the care and upkeep of their equid partners because their daily wages can barely support their family without the addition of caring for an animal.

The lack of financial obligation to the equid in developing countries limits the animals use and lifespan. It is less likely for equid owners to pay for an "invisible disease", such as blood protozoa or internal intestinal parasites, because the owner cannot see the problem directly (Guyo, 2015). Owners are more inclined to spend money on visible wounds or conditions; but without treatment of both internal and external diseases and parasites, the typical working equid lifespan is decreased from thirty to six years of age (Wilson, 2007). There has been growing concern for the health and welfare of these working equids. Numerous studies have been dedicated to the investigation of the underlying causes of poor equid welfare in developing countries. The Brooke Hospital for Animals, located in London, has contributed significantly to the accumulation and interpretation of working equid welfare data. Statistical analysis of the data collection comprises nine different developing countries where individuals actively utilize working equids. Studies identify abnormalities in gait and sole bruising as well as joint/tendon

swelling to be the most prevalent cause of lameness seen in working equids. Other welfare issues such as faecal soiling, low body conditions, ectoparasite prevalence and immediate subcutaneous deep tissue wounds were seen (Burn, et al., 2009). Interventions designed to improve working equid welfare have been conducted in numerous developing countries. In addition to intervention projects, there are numerous veterinary and non-governmental organizations dedicated to the improvement of working equid welfare.

Organizations for Working Equids

While hundreds of organizations and government branches have been created to support the growing populations in developing regions of the world stricken by food insecurity, disease, poverty, and crises there have not been as many organizations dedicated to animal welfare in these areas, specifically working equids. There are a few charities that have made it their mission to improve the lives of working equids and the people who rely on them such as The Brooke, The Donkey Sanctuary, Equitarian Initiative, the Society for the Protection of Animals Abroad (SPANNA), and World Horse Welfare. It is important to note that the charity organizations listed above are only a few of the organizations dedicated to the improvement of working animal welfare in developing regions of the world but are specifically implementing veterinary and educational interventions in developing regions of the world to combat poor working equid welfare.

The Brooke

The Brooke Hospital is an international animal welfare charity devoted to increasing the quality of life in working horses, donkeys, and mules. Their work expands through Africa, Asia, Latin America, and the Middle East with the goal of reducing the population of vulnerable working equids through the achievement of global impact and sustainable improvement. With humble beginnings, The Brooke Hospital has grown from its 1934 origins as a hospital for ex-warhorses to the global charity it is today. There has been a plethora of research studies conducted via The Brooke which has covered areas including, but not limited to, relationships between behavior and health in working equids, heat stress and dehydration, and infectious diseases of working equids in developing regions of the world.

A study conducted by researchers associated with The Brooke analyzed the overall response rates and behavioral welfare indicators of 5481 donkeys, 4504 horses, and 858 mules across nine developing countries over a four-year period (Burn et al., 2010). The goal of this study was to identify additional areas in which working equids may be suffering, whether through pain, weakness, exhaustion, or depression. With little information regarding an animal's subjective experiences associated with physical and mental stressors, this 2010 study was implemented to identify target problems likely to cause the greatest suffering as perceived by the working equid. These perceptions would cause notable deviations from normal behavior and work efficiency. Results identified 13% of the working equids in the study showed signs of apathy, unresponsiveness, and depression in correlations to human-interaction tests. The results identified from this study led researchers to recommend the addition of behavioral tests into welfare assessments as an additional variable to further identify individual animals with negative welfare. Burn et al. discusses that equids with more severe and numerous physical afflictions enter a state of behavioral unresponsiveness. This unresponsiveness suggests the equid's basic resources are thinned to the limits of necessity and that their overall fitness is compromised. The lack of response seen in the equids can be related to their nature, as a prey species, in an attempt to conserve all possible energy at the risk of not responding to their surroundings in the appropriate manner (Burn et al., 2010).

While the majority of working equid related research is conducted utilizing quantitative design methods, additional studies have been implemented to assess the applications of a mixed methods approach. A 2009 cross-sectional survey was implemented in Lesotho by associates of The Brooke. This survey was part of an impact assessment study of farrier and saddler training programs which were comprised of 245 horses and 237 owners. Using face-to-face structured questionnaire survey methods focusing on knowledge and practices related to equine husbandry and healthcare, researchers were able to identify priority issues in husbandry practices, health, and welfare. It is important to note in this study that key differences emerged through the application of the two different research approaches. Quantitative approach methods identified objective data of problem frequencies, subject to country-related limitations, whereas the qualitative participatory approach provided a deeper insight on local issues and how owners prioritized problems affecting both them and their equid (Upjohn et al., 2013). In summary, results and conclusions drawn from this study identified welfare concerns in priority areas such

as the equids mouth, feet, and limbs in addition to malnutrition, disease prevalence, and general horse husbandry. While conclusions drawn from the quantitative approach methods share similarities to other studies conducted across the world, the incorporation of qualitative components provide insight to the overall concern of working equid welfare by identifying community ownership and grounded researcher appreciation of local conditions as key traits with the potential to optimize success and sustainability of working equid welfare interventions that are not directly addressed as part of the classical approach (Upjohn et al., 2013).

Significant studies related to the overall health and welfare of working equids in developing regions of the world typically consist of the equid's contributions to either the owner, which is typically a male figure, or the overall impact of the equid's contributions to a family unit. Cultural and social dynamics found in developing regions consist of a hierarchal system of gender inequality where respected leaders or elders are men. Specific roles and obligations within communities are separated based on gender where the expected roles of men are to provide income for families through businesses, political positions, and management of agricultural productions. Women are considered caregivers and are responsible for the care and upbringing of children in addition to other household tasks such as cooking and cleaning. Due to the dramatic gender inequality seen in these developing regions, research often inadvertently overlooks the impact of working equid welfare on women in society.

As part of the overall intervention strategies of The Brooke charity, a qualitative study across four countries was conducted to collect information regarding the impact of working equids in the livelihoods of women. The goal of this study was to collect information that could later be used as a tool in designing training interventions and as "evidence to underpin advocacy activities aimed at improving recognition of the value of working equids, as assets for women, by policy makers and implementers" (Valette et al., 2014). Women are often overlooked in developing regions of the world as contributing members of society; as part of an investigative study, the Brooke conducted a non-invasive study on the relationship of working equids and women in equid owning communities of Ethiopia, India, Kenya, and Pakistan (Valette et al., 2014). The study found that working equids in these communities were a major contribution to the efficiency and completion of daily household chores such as collecting water from local sources, transporting goods, as well as aided in the generation of income via market sales and trade. The additional income generated with the assistance of working equids, in these

communities, provided families with additional income that supplemented expenses including school fees, healthcare, and medical care for other livestock. It is critical to note that working equids in these communities are considered precious and necessary by women. Interviews conducted by associates of The Brooke (2014) enforce this crucial partnership:

The donkey affects each and every aspect of my life as a woman. On a typical day the donkey fetches water, which I use to do the laundry, to do the dishes, to clean the house and for bathing. It also fetches sawdust which I use to cook all meals, then I hire it out and it brings an income on a daily basis that I use to buy flour for the evening meal. In other words, I eat, drink, dress, live off the donkey and more so as a woman and one not employed, I work hand in hand with the donkey. Basically, the donkey is like me but, to put it plainly, the donkey is me. (Lucy Waititu, 23 years old, Kamuchege, Mwea, Kenya)

When a working equid cannot perform to its maximum potential or is stricken with an illness the unusable equid creates major consequences for the family, especially women, in terms of economic impact. Without a working equid, women who utilize the animal are forced to take drastic measures to save costs. Typically, these coping strategies include removing erroneous expenses such as education or nutritious, costlier, foods.

While working equids are commonly associated with women in these developing communities, survey results show that most women surveyed lacked access to equid specific knowledge and skills training. The Brooke's study of working equids' significance to women in developing regions suggests that while there are resources available to increase skills-training and basic husbandry knowledge, those who actively associate with working equids are often not receiving this knowledge. Cultural barriers may be a factor influencing or limiting the access to education training and husbandry for working equids, to some extent, but future projects dedicated towards the advancement of working equid welfare has the potential to tailor intervention strategies for female working equid owners and users (Valette et al., 2014).

The Donkey Sanctuary

Founded in 1969, the Donkey Sanctuary (DS) is an international charity organization dedicated to the transformation of the quality of life for working donkey, mules, and people worldwide. Like studies conducted by The Brooke, DS works toward the advancement of health

and longevity in working donkeys and mules in poverty-stricken countries such as India, Nepal, Cyprus, and Mexico by providing health care and education to owners. The foremost mission of DS is to provide preventative medical treatment to donkeys and mules in need and have published work related to intervention strategies regarding common infectious disease and cardiovascular disease.

Equitarian Initiative

Equitarian Initiative is a proactive non-profit organization dedicated to training volunteer veterinarians worldwide to provide care and education to working equids and their owners worldwide. Unlike the Brooke and Donkey Sanctuary, Equitarian Initiative directs its efforts to promoting global working equid welfare through direct aid, collaboration with local veterinarians, education, and public awareness. By collaborating with veterinarians, from diverse backgrounds, Equitarian Initiative works synergistically with other international charities to enhance educational opportunities administered to developing communities and provide basic health care in areas of need.

The Society for the Protection of Animals Abroad (SPANA)

Similar in ethics as Equitarian Initiative, the Society for the Protection of Animals Abroad (SPANA) has a mission since 1923 to improve the welfare of working animals in the world's deprived communities such as Ethiopia, Mauritania, Tunisia, and Botswana. SPANA employs local and international veterinarians to provide free veterinary care to animals as well as report to locations when emergencies arise. While providing necessary treatment and medicine for suffering animals, SPANA trains communities through training and education of humane care for animals and develop positive beliefs and respect towards working animals.

In combination with outreach projects, SPANA partners with universities and community groups to provide opportunities to veterinary students and industry professionals so that they may further develop their skills with the overarching goals of sustainable global improvement of animal welfare. Current projects are concentrated in Ethiopia, Kenya, Morocco, Tunisia, and Zimbabwe. While end results have not been published at this time, SPANA has released information regarding their research progress. In Ethiopia, interviews are being conducted to identify reasons why Ethiopian cart horses are being abandoned by owners. This work is said to

provide critical information that will help SPANA develop informed solutions to the widespread problem of abandonment.

Research teams have been working on a project that has the potential to target animal welfare issues at one of the sources of the issue: a lack of education and knowledge on the subject. SPANA has been working in collaboration with African Networks for Animals Welfare (ANAW) for the past four years to develop schools-based clubs (PAWS Clubs) in Kenya. In 2016, SPANA began to evaluate the impact of the PAWS Clubs on Kenyan children's perceptions of animals. The results validate the significance these educational clubs have on the positive and empathetic emotions displayed by children on animals that will guide their behavior and care towards animals into the future (Kicker, 2016).

World Horse Welfare

Founded in 1927, World Horse Welfare has dedicated ninety years to be a non-profit international charity organization dedicated improving the lives of horses around the world. The organization is built off the belief that there is an irreplaceable partnership between horses and humans that is the foundation of society where humans have an obligation to take full responsibility for their horse's welfare. Their mission is to work toward long-lasting change by targeting animal welfare issues at the source of the problem by taking practical approaches at improving both the welfare of the horse and the knowledge of its owner.

Human Factors: Intervention Strategies Targeting Equid Owners

Improving the health and welfare of working equids has been an on-going priority for international non-profit organizations. Intervention strategies are targeted toward immediate care and medical treatment of equids in need; typically, these areas are selected based on high density populations of working equids in relation to community members. There are many owners who do not have the opportunity to utilize the medical care and education provided by these non-profit organizations due to logistical or financial constraints (Letsoalo et al., 2000). An extensive literature review, conducted by associates of The Brooke, identified themes associated with the barriers owners face when seeking aid. These barriers identified include "availability, affordability and owner knowledge constraints relating to feed and nutrition, hydration, sustainable equine working capacity, effective disease prevention, health

management, and the need for ancillary services” (Upjohn et al., 2014). With critical barriers identified, future research plans can be formulated to accommodate themes in rural settings that are culturally sensitive and focus on appropriate topics driven to target local adoption of suitable and sustainable managerial practices.

Most research conducted in developing regions of the world, in relation to working equid welfare, is focused on animal-based outcome measures. Results disseminated from animal-based outcome projects focus on improvements to the working equids but not necessarily to the improvement of owner understanding and replication of the interventions provided by non-profit organizations. An intervention of working equid owners in India, conducted by Murthy and Lal (2006), aimed at identifying specific areas of impact intervention projects had on working equid owners in terms of changes made by owners after the intervention and financial effect these changes had on owners. Collected data was compared with owner recollection of intervention strategies; owner recall bias was noted as a limitation to the study. Of the 571 owners surveyed 93% were aware of NGO’s presence in their community but only 60% reported making use of the NGO’s resources and services. This study identified a major issue with the adoption rates of interventions specifically designed to improve the welfare of working equids and owner livelihoods; but the question remains as to why there is a paucity of owner willingness to utilize the resources and change their behavior. “[This data] represents a key element of the process of defining the theory of change underpinning the intervention and to understanding potential for impact in target communities” (Upjohn et al., 2014). This lack of owner willingness to adopt practices of equid management that are a deviation of cultural practices and beliefs creates a divide between intervention teams and communities. This divide needs to be addressed in such a way that intervention teams and NGO’s can tailor projects to accomplish their established objectives while adapting to the unique communal and personal traits of each developing region.

The work reported by Degefa et al. (2010) in Ethiopia attempts to address the issue of owner willingness to adopt new practices. As part of a larger intervention project addressing hoof-related problems, researchers conducted a participatory welfare needs assessment that identified areas of improvement within community owners. Based on the needs assessment, a community-developed feeding and wound management program was held. The pilot consisted of 33 urban working equids and two local farriers to provide both care and education to the community regarding improved foot care and farrier techniques. Follow-up assessments were

taken every three months for one year which showed significant advancements in the overall health and wellness of working equid hooves in addition to owner recognition of these positive changes.

Similar studies, directed at gaining a better understanding of equine knowledge transfer about wound management, were conducted in Ethiopia. Stringer et al. (2011) investigated the influence of three types of information transference among working equine owners. Owners were exposed to one of three educational strategies (1) an educational audio programme (2) a village discussion or (3) a diagrammatic hand-out. Knowledge retention was analyzed via pre and post intervention assessments and compared to a control group who did not receive any form of educational material regarding wound management. While all intervention strategies improved overall knowledge of wound management, in comparison to the control, researchers noted the strategy with the greatest impact was village discussion groups. The village discussions had provided owners with the opportunity to converse with other owners regarding relevant personal issues, seen in their working equid, as well as analyze posters, diagrams, demonstrations, and a question and answer session. Though no method could be applied to other developing regions, this investigation provided fundamental information for future projects to investigate the prominence of imparted knowledge. With this knowledge, a new variable may be identified that could further influence a change in behavior, through education and communication, to improve welfare at the individual equid level (Stringer et al., 2011).

CHAPTER 3: AN EXPLORATION OF THE RELATIONSHIP BETWEEN MINDSET, LOCUS OF CONTROL, AND WORKING EQUID WELFARE IN HAITI

Purpose of the Study

The purpose of this study is to ascertain relationships between working equid owner's locus of control and equid welfare, to have the ability to identify an additional variable associated with the overall condition of working equids.

Objectives of the Study

The overall objective of this research is to explore potential relationships in individuals' locus of control as a potential variable contributing to the status of their working equid's welfare. The objective is to expand the base of knowledge concerning the psycho-social factors impacting the welfare of working equids.

The specific objectives were to:

1. Administer Julian Rotter's locus of control assessment to identify perceptions of owner locus of control as it pertains to working equid welfare
2. Identify whether there is a relationship between owners' perceived locus of control and equid welfare
3. Disseminate data and results for future studies focusing on equid welfare and owner interactions to NGO's, research teams, and medically trained personnel interested in the improvement of working equid welfare

Hypothesis

It is hypothesized that working equid owners who exhibit more external loci of control traits (which consist of beliefs, opinions and overall actions being dictated by outside forces such as luck, chance or fate (Rotter, 1966)) will have working equids that display a lower overall welfare score.

Research Questions

The subsequent research questions guided this study:

RQ1. Can a relationship between working equid owner mindset and locus of control be determined?

RQ2. Is there significant relevance in individual mindset and locus of control that has an impact on the welfare status of said individual's equid?

RQ3. Does the equid owner's mindset and locus of control affect the prevalence of health concerns seen in the working equid?

Instructional Review Board Approval

Research conducted at Purdue University that involves human participants requires approval by the Committee on the Use of Human Research Subjects prior to data collection. Following the mandatory training in human research protocol by all researchers, an exempt research request was submitted to the review board for investigation of the study topic and methods utilized. Final approval for the study with IRB protocol #1611018470 was approved on December 09, 2016. The approval can be found in Appendix B.

Introduction to Haiti

Haiti is a small country in the Caribbean Sea located on the Island of Hispaniola. Haiti takes up one third of the Island of Hispaniola and shares its Eastern boarder by the Dominican Republic, as seen below in Figure 3.1.



Figure 3.1 Map of the Island of Hispaniola (Google Maps, 2017)

Geography

This small Caribbean country covers a total of 27,750 square kilometers of land and a total of 1,771 kilometers of coastline (World Factbook, 2016). The sum of the total area owned by the country of Haiti, land and sea, is equivalent to approximately 29,521 square kilometers which is recognized as the country of Haiti (World Factbook, 2016). The description of the land can be described through the derivation of the indigenous Arawak place-name *Ayti*, which translates to “mountainous land” (Haiti, 2016). Four major mountain ranges make up the backbone of the country. Cordillera Septentrional, Massif Du Nord, Matheux Mountains, and Massif de la Selle divide the land into hard un-farmable limestone mountain faces and plateaus’ (Haiti, 2016). Most rivers found in Haiti are small and un-navigable due to the limited rainfall received each year to replenish the rivers.

The country is exposed to tropical weather year-round in the Caribbean. This tropical weather causes Haiti to experience extended periods of dry acrid heat, torrential rain, and hurricanes. Much of the year is dry and hot, with little rainfall. According to the U.S. Agency for International Development, the rising temperatures and increasingly erratic rainfall patterns have caused a three-year drought in some regions of the country while others struggle with flash flooding caused by heavy downpours (USAID, 2016). From the months of June through November, Haiti is bombarded with hurricanes, cyclones, torrential rains, and extreme

flooding. The extreme erosion and deforestation, seen throughout the country, contributes to the damage inflicted by these tropical storms. With only 3% of the country covered in forest and vegetation, mudslides and overflowing rivers wreak havoc on both rural and urban communities. In addition to hurricanes and floods, Haiti has suffered from multiple earthquakes. A major fault line is located directly under the country that crosses the southern peninsula of Haiti and passes south of the capital of Port-au-Prince (Haiti, 2016). The fault line was responsible for the most recent earthquake of 2010. The earthquake reached a magnitude of 7.0 on the Richter Scale destroying most of the country's capital, killing 300,000 residents and displacing an additional 1.5 million (World Factbook, 2016). Post-earthquake, the people of Haiti have struggled with rebuilding in addition to an increase in the spread and prevalence of Cholera, causing illness and disease to decrease the country's total population.

History of Haiti and its People

Haiti was native to the Taino and Ciboney people from 5000 BCE until the discovery of the island by Christopher Columbus in 1492 (World Factbook, 2016). Spanish settlers soon took over the island, enslaving the native Taino and Ciboney and forcing the people to mine for gold and other resources. Within twenty-five years after the introduction of Spanish settlers, European diseases and brutal working conditions enforced by the Spaniards virtually annihilated all indigenous populations. The importation of cattle, swine, and equine livestock severely altered the landscape of the country, causing grass and other natural forages to be severely depleted. By the early seventeenth century, the Spanish had exhausted the gold mines and left the island.

In 1697, Spain ceded to French powers on the western third of the island, which was later known as Haiti (World Factbook, 2016). The colonies whom resided within current day Haiti developed an industry grounded on forestry and sugar production, which became one of the wealthiest economic industries in the Caribbean. However, this successful industry could not function without the large amount of imported African slaves. Slaves toiled in the tropical heat tending over sugar fields and clearing forests for French profit. Hundreds of thousands of slaves died from tropical diseases, malnutrition, and dehydration; however, European investors and landowners would import new slaves to replace the dead. With the continual cultivation of the

land, Haiti suffered from deforestation and erosion which are two major forces that affect Haitian agriculture to this day.

By 1789 there were an estimated 556,000 individuals residing within Haiti; 500,000 of those individuals were imported African slaves and 24,000 *affranchis* (free mulattoes) (Haiti, 2016). Society was severely divided between the wealthy Caucasians and the poor Africans; this division in wealth and status led to the Haitian revolution. This revolution was a series of conflicts between slaves, *affranchis*, and colonists during a period of thirteen years. During the revolution, Frenchman Léger Félicité Sonthonax offered freedom to any slave who joined his army (Haiti, 2016). Sonthonax's decision to free slaves enlisted in his army, quickly led to the abolishment of slavery in Haiti.

While slavery was abolished, the country was still controlled by the French. In 1802, Jean-Jacques Dessalines and Henry Christophe led a black army against the French after his discovery of evidence suggesting Napoleon intended to restore slavery to the country (Haiti, 2016). After a prolonged struggle, the country of Haiti declared itself an independent nation in 1804. At that time Haiti became the first post-colonial black-led nation in the world (World Factbook, 2016). Since its declaration of independence, Haiti has suffered numerous revolutions and defended its shores from foreign invaders. The overall infrastructure of the country is in constant disarray. Political instability and violent riots towards the government often leave Haiti without a long-term president which has had a ripple effect on productivity and the economy of the country.

Equid Welfare in Haiti

Throughout time Haiti has suffered from an undeveloped government, acrid weather, and un-farmable land due to erosion and drought. Due to this, Haitian agriculture and livestock practices have been adapted to fit the demands of the land.

There has been a paucity of research or interventions conducted on the working equid population of Haiti. Upon further investigation as to why there was this scarcity, it was determined that no new NGOs and other agencies do not enter into Haiti due to two overarching factors; 1) Haiti has the largest population of NGO assistance per capita than any other country in the Western Hemisphere; it is not uncommon that rural Haitian communities utilize resources from overlapping NGO support, 2) The population of working equids is significantly lower in

Haiti than in other developing regions of the world. The lower equid population would still cost the NGO involved a significant amount of money to enter the area and provide services for an extended period; NGO review boards typically turn down low herd population countries for a larger herd population in other developing regions to assist and improve the livelihoods of as many individuals, and families, as possible (personal interview with The Brooke).

While most equid-based NGOs do not work in Haiti, World Horse Welfare has been involved in the country for the last four years working to create local welfare organizations and deliver community-based equid welfare programs. World Horse Welfare has been working in communities that need immediate assistance in husbandry and basic wound management skills. This need was analyzed based on the prevalence of open to air wounds, overall body condition score, and duration of use of the equid. Initially, World Horse Welfare established a partnership with Humane Society International (HSI) to establish a presence in communities and work toward the improvement of the working equids in Haiti.

World Horse Welfare identifies that there is little veterinary care available for working equids in Haiti in combination with a lack of knowledge seen in the owners regarding general veterinary care for their equids. It has been recognized that Haitian owners have had little to no access to educational resources or instruction on how to properly care for their working equids; as a result, Haitian equids continue to work in less than ideal conditions, pain caused by open wounds, long term muscular-skeletal conditions, and damaged feet (World Horse Welfare, 2017). These issues decrease the equid's quality of life and life-expectancy creating financial problems for their owners. Without the assistance from the working equid, an owner and their family must depend on human strength and labor to conduct the same responsibilities as their working equid decreasing efficiency and income. There is a need to identify new variables and resources that can improve working equid welfare in developing regions of the world, to increase the quality of living seen in both working equids and their owners. The following study was conducted to identify a new variable that contributes to the overall welfare status of working equids in developing regions of Haiti and Honduras.

Assumptions of the Study

The researcher made various rudimentary assumptions prior to the commencement of this pilot study regarding the assessment methods and procedures employed. The following statements are assumed:

- The information solicited from equid owners is accurate and understood
- The translator has accurately repeated the survey questions to the equid owner and all responses are correctly recapped back to the interviewer
- The target sample of working equid owners are available and willing to participate in the oral discourse survey
- Individuals interviewed at the base of the mountain represent the same population that is found at the mid-section of the mountain
- Horse owners interviewed in Milot are members of the Milot Horseman Association
- All individuals participating in the survey own an equid
- Individuals participating in the survey are native residents of Haiti

Research Design

The intent of this pilot study was to collect qualitative data regarding Haitian equid owners' mindset and locus of control. The study was designed to pilot test instrumentation designed to determine if a causal relationship could be drawn between owner characteristics of mindset and locus of control in relation to the overall welfare of their working equid.

Information and knowledge drawn from this pilot was interpreted to allow for the re-designed version of the oral discourse survey to obtain a more accurate understanding of owner behavior and the effect behavior has on working equid welfare in other developing regions.

This pilot test was accomplished through the administration of an oral discourse survey to a premeditated selection of Haitian equid owners residing in Milot, Haiti. Working equid ownership and Milot residency were recognized as the parameters of the research participants. Strategic categorization of survey tools focusing on the areas of mindset and locus of control were employed and justified by the work of Carol Dweck (2006) and Julian Rotter (1966). The work of Carol Dweck (2006) on Mindset identifies fixed and growth as the two forms of mindset an individual can possess. A fixed mindset specifically outlines that

individuals believe their basic quality traits, such as intelligence or talent, are permanent and cannot be improved upon through their actions. Whereas a growth mindset outlines those individuals who believe their basic quality traits can be developed and changed over time. In association with the work of Carol Dweck, additional survey tools created by Julian Rotter (1966) have been utilized for this research study. Rotter's locus of control theory distinguishes the variable differences between an external versus internal locus of control. Rotter identifies characteristics specific to each locus as either believing that personal outcomes are caused by luck or a plethora of other external forces, such as fate, chance, destiny or divine intervention (external), or that personal outcomes are contingent upon said individual's behavior and actions (internal). Dweck's mindset survey was combined with an adapted form of the locus of control survey within this study. The decision to adapt the locus of control survey was due to the confines of the sample population presented while in country. Limited time was available for each oral discourse survey; this was observed by the research team upon arrival. It was noted that owner's income was dependent on the time spent attracting potential clients to their equids through conversation and other attention-grabbing methods. Keeping time in mind, the research team designed a survey meant to collect the needed information in a minimal amount of time. Oral discourse survey methods were used, with the aid of a translator, where mindset and locus of control questions were interwoven to take on a conversational tone to obtain the necessary information from the equid owners of Milot, Haiti. The decision to create an oral discourse survey, with the mindset and locus of control questions integrated into a conversation regarding the owner's working equid, was based on Haitian Culture.

The presence of cultural diversity is prevalent in all aspects of society. When conducting qualitative research studies, it is imperative to design a study that seeks to identify and understand the respondent's worldview. "The danger with qualitative methods that do not make culture explicit is that culture can become transparent, lost in the pages of observations, interviews, and analyses of social processes" (Barnes, 1996, p. 430). The oral discourse survey, designed for the pilot study, was designed using a basic ethnographic approach. Immersion into the Haitian culture, prior to and during the duration of this study, allowed the researcher to have an adequate grasp of the cultural traditions, role of communication in community, and leadership roles between the sexes to create the oral discourse survey. Richard Steeves (1992) recognized the significance of communication across diverse cultures where words, narratives, and

explanations were utilized differently based on individual and communal understanding within those cultures (Steeves, 1992). While it is difficult to fully remove one's own cultural bias from a situation, it is crucial to be sensitive to the culture of the participant through the acknowledgement and understanding of that culture. The objective of the implementation of this oral discourse survey in Milot, Haiti was not to provide an absolute truth about the equid owning community but rather test the viability of the survey distribution methods to a non-English speaking community (Barnes, 1996).

Anonymous categorization of working equid owners of Milot, Haiti were coded to their associated working equid via unique characteristics, found on the animal, present at the time of data collection (i.e. saddle and coat color). To protect the anonymity of the individuals, no names were recorded; instead, participant responses were assigned a number that was related directly to their equid. To determine any form of relationship between an owner's mindset and locus of control in relation to their working equids overall welfare status, a validated survey tool known as the Animal Welfare Indicator (AWIN) welfare assessment tool was employed (Dalla Costa et al., 2016). This tool identifies key horse-based indicators including swollen joints, ocular and nasal discharge, body condition score, and lesion prevalence to determine the overall welfare of the equid. This pilot test was specifically targeted to develop a deeper understanding of working equid owners residing in or around Milot, where equids are employed by tourists on an as need basis. All working equid owners available to be surveyed at the time of data collection were included to create the sample of participants.

Methodology: Participant Survey

Methodological procedures for the oral discourse survey followed a specific sequence of questioning beginning with demographic questions and transitioning to mindset and locus of control survey questions. The oral discourse survey was designed based on cultural assumptions of conversational style interview practices to develop a working relationship with each participant. Participants were verbally asked for permission to record all survey responses which would later be transcribed using a transcription service. A written representation of the oral discourse survey was utilized by both translator and researcher which provided the team with instructional prompts to recite to the participant as well prevent the researcher from changing the

order of questioning from one participant to the next. The following sequence of questioning can be identified below:

1. The interviewer and translator approached an equid owner and requested permission from the owner to be a participant of a research study looking to develop a better understanding of their involvement with working equids.
2. After receiving verbal approval from the owner to participate in the study, the interviewer read the instructions related to the survey, identified the time it would take to conduct the interview, and asked if the owner could identify their equid(s) to the researcher.
3. The researcher began to ask the survey questions beginning with question 1 and progressing down the list of questions, holding a conversational tone with the participant. If the response was especially brief, the researcher encouraged the participant to elaborate their response.
4. Upon completion of the oral discourse survey, the researcher stopped the recording device and thanked the participant for their time.
5. At this time the researcher moved to the equid welfare portion of the survey and proceeded with the AWIN protocol procedure.

Methodology: Animal Welfare Indicator Worksheet (AWIN)

Methodological procedures for the AWIN welfare protocol were followed based on the Animal Welfare Indicator Protocol for horses (Dalla Costa et al., 2016). The specific parameters of this pilot study were followed, to test the efficiency and applicability of the AWIN welfare protocol, and are identified below:

1. The researcher began by asking the equid owner to identify their equid(s) and requested that the owner remove the saddle and any other equipment from the animal's body. Halters or ropes to secure the animal were permissible and excused from removal.
2. Starting with a general visual inspection of the equid, the observer stood a distance of 3m from the sagittal plane of the animal's body. The observer assessed and recorded the fat/muscle covering the neck, ribs, shoulder, back, abdomen, and pelvis as part of the total body condition score.
3. Moving to the posterior end of the equid, the observer assessed and recorded the fat reservoirs/deposits around the tail bone/caudal vertebra of the equid, assessed the shape

of the croup, and the visibility of the spine and hip bone as part of the total body condition score.

4. The observer recorded any hairless patches, scabs, skin lesions, wounds and or swellings (these sections are recognized as integument alterations). Starting with a general visual inspection from the side, the observer assessed eight regions of the equid body for integument alterations starting with the muzzle and continuing down the body to the head (including ears), neck (excluding withers), shoulder (including withers, excluding elbow), midsection (back, loin, flank, barrel), hindquarters (including croup, dock, excluding stifle), legs (including elbow, stifle, pastern, excluding coronet), and hooves (including coronet).
5. The equid's hooves were further observed on the ground, from both front and side views for cracks.
6. Hair coat condition was recorded based on texture, sheen, and length. The researcher then ran the tips of their fingers against the direction of hair to see if the equid was groomed recently.
7. Abnormal breathing was determined by assessing the equid for one minute under standard climate conditions at rest. A visual assessment was made, observing the animal for flared nostrils, audible breathing, heaving abdomen, and asynchrony between movements of the chest and abdomen.
8. Behavioral attributes were observed from the same position of 3 m away. The observer approached the animal, in the direction of the animal's head, with slow and calm steps. The animal's response to the observer was recorded.
9. Observations of the horse's reactions were observed for one minute and recorded based on the presence of stiff, backward turned ears, tension above the eye, orbital tightening, prominent strained chewing muscles, mouth strained, and chin pronounced, strained nostrils and flattening of the profile, aggressive displays of teeth, striking and or kicking of the front or hind legs.

Participants

The participants in this survey represent a convenience sample of equid owners whom are a part of the Milot Horseman's Association. Gabart Dolciné, Milot guide and area expert,

described the Milot Horseman's Association as a conglomerate of individuals consisting of both equid and non-equid owners from the areas of Milot, Dondon, and Vaseux (personal interview). According to Gabart, there were approximately 200 members in the Milot Horseman's Association during 2016. Of those members, 50% of the association were current equid owners while the remaining 50% were previous equid owners who did not currently own an equid.

Participants were selected based on their availability during working hours when tourism, and the associated need for equids, was low. Working equid owners established a presence on the Bonnet a L'Eveque mountain of Milot, where they, as well as their equids, stand from day to day attracting tourists to the novelty of a horseback ride up the mountain for a monetary fee. To ensure the data represent the population, all owners available to participate in the oral discourse survey were interviewed. Only participants who expressed a verbal agreement that they had the time and would like to participate in the study were surveyed. Those who did not express an interest to participate were thanked for their time and omitted from the pilot study.

Instrumentation

The process of data collection in this pilot includes numerical assignments of body condition score, which has been derived and adapted from the Henneke Body Condition Score scale (Henneke, 1983), and lesion prevalence as identified by the Animal Welfare Indicators (AWIN) assessment protocol for horses. The assessment utilized in this study consisted of seventeen welfare indicators designed to identify abnormal traits and symptoms displayed in key anatomical locations on the equid. Additional welfare qualities, including equid health and behavior, were recorded in detail where no numerical data was assigned. Single equid observations were conducted and analyzed based on the same criteria of gender, age, behavior, health, and body condition score. The full Animal Welfare Indicators assessment protocol can be viewed in Appendix C.

The oral discourse survey was designed around cultural norms present within the Haitian population. These norms consisted of, but were not limited to, verbal acknowledgment of individuals accompanied with personal introductions, exhibiting respectful tones when requesting responses regarding financial and educational status', and acknowledging the role of the individual within the community. The oral discourse survey consisted of demographic questions directed towards opening a dialog and creating a relationship between researcher and

owner, mindset questions designed by Carol Dweck, and Locus of Control questions designed by Julian Rotter. The intended survey questions, to be asked to Haitian equid owners, were developed by the research team prior to the trip. When in country, the researcher met with a local translator to discuss the procedures and protocols associated with the project; the researcher also spent time reviewing the script intended for local owners with the translator to cross-check that there were no grammatical confusion and that the translator understood his role in the pilot test.

Data Collection

Descriptive, comparative data collection took place on December 31, 2016 from 0900 to 1700 hours at the mid-point pavilion of the Bonnet a L'Eveque mountain of Milot, Haiti using mixed research methods. During the period given to collect data, researcher and translator surveyed a sample of 10 local equid owners and conducted a welfare assessment on 10 working equids around Milot and the surrounding areas. Initial solicitation of potential participants was requested based on face to face approach methods. Upon initial contact with equid owners and receiving permission from the owner to progress to the survey, the researcher and translator began the oral discourse survey. All oral discourse surveys were recorded via voice recorder and stored for future review. Owners were asked general demographic questions in combination with mindset based and locus of control-based questions drawn from a premeditated survey questionnaire to ensure consistency throughout the interview process. Each survey lasted approximately 45 minutes in length, excluding assessment of the owner's working equid. Upon completion of each oral discourse survey, the researcher would request permission to photograph and assess the overall welfare of the owner's working equid. Each equid assessment lasted approximately 5 minutes in length.

Participants surveyed, in this convenience sample, during this pilot study represented a small portion of the country of Haiti. Data collected and analyzed for this sample provided the research team with additional evidence to drive the hypothesis of this study. With a paucity of research around mindset and locus of control as it pertains to working horse welfare, the Haiti pilot test provided the team with critical information regarding the methodology and overall design of the project.

Data Analysis: Oral Discourse Survey

Conversations from each participant's oral discourse survey were transcribed using an outside source internet translation service known as Rev. The translations were identified based on the order in which they were conducted and labeled accordingly. Each translation was coded with the same unique numerical code as the associated equid welfare assessment so that both the owner's statements and welfare assessment would be a matched pair when analyzing the data received. Each code number represented a known working equid owner and their associated equid, but for organizational purposes and to ensure anonymity, names and other personal identifying information were omitted from all portions of data collection. Introductions between owner and researcher were established but no audio recording or written records of the introduction were made. Each participant translation was broken down into appropriate sections which included the demographic and information section, mindset questionnaire, and locus of control questionnaire sections.

Analysis of oral discourse survey translations were conducted using double-blind qualitative data analysis methods. When comparing themes present in the oral discourse survey, errors in the overall administration approach of this portion of the survey tool became apparent. The errors identified included singular responses and failure to elaborate on responses within the mindset questions of the survey, declining to respond to individual questions causing discrepancy in the participants overall survey results, and a lack of time to complete the survey during working hours. The research team was not able to identify significant trends in owner mindset due to numerous confounding variables that were presented during the time of data collection. Specific variables that were identified include but are not limited to time constraints placed on the research team during the time of data collection, inclement weather, and the nature in which questions were answered. To elaborate, the research team was not able to predict the nature in which participants would respond to open-ended survey questions which resulted in a lack of information collected. Haitian equid owners answered the oral discourse survey questions directly and simply. The research team did not anticipate one word yes or no responses from the equid owners. This type of response prevented the research team from developing any further conclusions regarding owner's mindsets. This information allowed the research team to address the issues stated above by revising the oral discourse survey to a more time efficient direct survey. Moving forward, the research team elected to remove Carol

Dweck's Mindset questions from the survey and focus on Julian Rotter's Locus of Control questionnaire. The decision to solely survey future participants to identify their locus of control was because the locus of control survey is a direct force-choice questionnaire. The demographic portion of the survey remained, minor edits to the demographic survey were made and are discussed in depth in Chapter 4.

Researchers were able to identify that there was a scarceness of literature validating the mindset survey in developing regions of the world. The mindset theory is still new to social research and much of the research has been focused on populations that have some form of formal education. It is not appropriate to assume that a developing region of the world has formal education to elicit a more elaborate response from the participant. Cultural barriers in communication were also a factor that limited the amount of information gained from the mindset portion of this survey. The major cultural barrier identified, that affected the results of this pilot test, was the discrepancy in translated information. "A language barrier between researcher and respondent disarms a researcher's ability to assess meanings, intent, emotions, and reactions and creates a state of dependency on the interpreter or translator" (Putsch, 1985). The in-field researcher did not have an adequate knowledge of the Creole language and relied on the assistance of a native translator. It could not be determined if the survey was translated verbatim to the participant, or if the translator adapted the questions.

There were 20 equid owners present on the day of data collection, upon which 50% of the present population was orally interviewed by the research team. Research observations identified the sample surveyed was 100% men above the age of 30. All participants surveyed displayed similar reactions to the interview process: a willingness to participate so long as there were no potential tourists looking to hire them for their services with their equid. If tourists became present in the area, the reaction from the equid owners was consistent throughout the group. Owners directed their attention to the new tourists in the area by displaying physical reactions of attention-grabbing behavior. These actions included the loss of eye contact between owner and interviewer, shifting weight from one leg to another, and speeding up their answers to one-word responses or beginning to answer questions before the entire question was read to the participant. These behaviors, seen in the participant were consistent with the introduction of new individuals to the village center and would increase when those individuals approached the equid herd. The table below exhibits a comprehensive record of the duration it took to complete each

interview. It is important to note that no interview exceeded twenty minutes, which contributes to the information elected to be gathered during the period the research team had with each participant.

Table 3.1
Comprehensive Record of Haitian Interview Duration

Participant	Time (min)
Owner 1	11:50s
Owner 2	9:31s
Owner 3	14:07s
Owner 4	15:36s
Owner 5	7:56s
Owner 6	12:17s
Owner 7	8:27s
Owner 8	9:15s
Owner 9	9:58s
Owner 10	10:08s

The duration of each interview, denoted above in table 3.1, represents the period in which owners were willing to participate in the survey. Note that the total survey time for owners 2, 5, 7, 8, and 9 were below ten minutes which indicated those owners became restless with the interview and increased their response speeds to shorten the duration of the interview. Observations showed that 50% of the sample was restless or exhibited behaviors such as distraction, short answers, or disinterest in the interview. These behaviors were considered as confounding variables of the study and provided the research team with pertinent information regarding the length of each survey question and speed in which the redesigned survey should be. The information presented in table 1 allowed the research team to concluded that the redesign of the survey tool should consist of shorter more direct questions that require a shorter response from the respondent as well as increasing the quantity of demographic questions to develop a more robust understanding of the participant and their history with working equids.

Conducting this pilot study on a sample of participants from a developing region of the world allowed the research team to draw the conclusion that Julian Rotter's Locus of Control survey can be administered in an oral format to individuals in developing regions. With this information in mind, the research team could expand the study to other populations in the developing world.

Further analysis of the oral discourse survey presented common themes in the locus of control portion of the survey. The research team identified success in this portion of the survey due to the nature of the questions presented to the participant. Rather than having an open-ended question, the locus of control portion of the survey was designed as yes-no force-choice response in which the frequency of yes versus no responses could be tabulated. The overall tabulation of yes versus no responses relate back to whether the participant had an external or internal locus of control. Data showed 80% of the sample had an internal locus of control with the remaining 20% of the sample displaying an external locus of control.

Data Analysis: Working Equid Welfare Assessment

The same numerical coding method (see Research Design for specific coding method) as the oral discourse survey was used to link the working equid to its associated owner via numerical record keeping. Descriptive statistics were used to analyze the frequency of specific welfare indicators. Frequencies were collected on specific behavioral variables including avoidance towards humans and the availability for social interaction between equids. Frequencies for overall body condition were separated into categories based on the presence of alopecia and swelling. Categorization of alopecia and skin lesions were further broken down into areas of the equid including muzzle, head and neck, shoulder, midsection, hindquarters, front legs, back legs, and coronary band. Additional frequencies of sex, body condition score, hair condition, and breathing were included in the analysis to ascertain the overall welfare status of each working equid.

Results drawn from the working equid welfare assessment revealed the herd population (n=10) consisted of 60% stallions, 20% mares, and 20% geldings. From that herd, 90% of the equids had a Body Condition Score (BCS) of 2 or lower. The Henneke body condition scoring system (1983), which is a universally used numerical scale designed to evaluate the amount of fat prevalent on the equid's body, evaluates six main points that are responsive to changes in

body fat on an equids' body. These points include the equid's loin, tail head, ribs, area behind shoulder, crest of the neck, and withers as exhibited in figure 3.2 below.

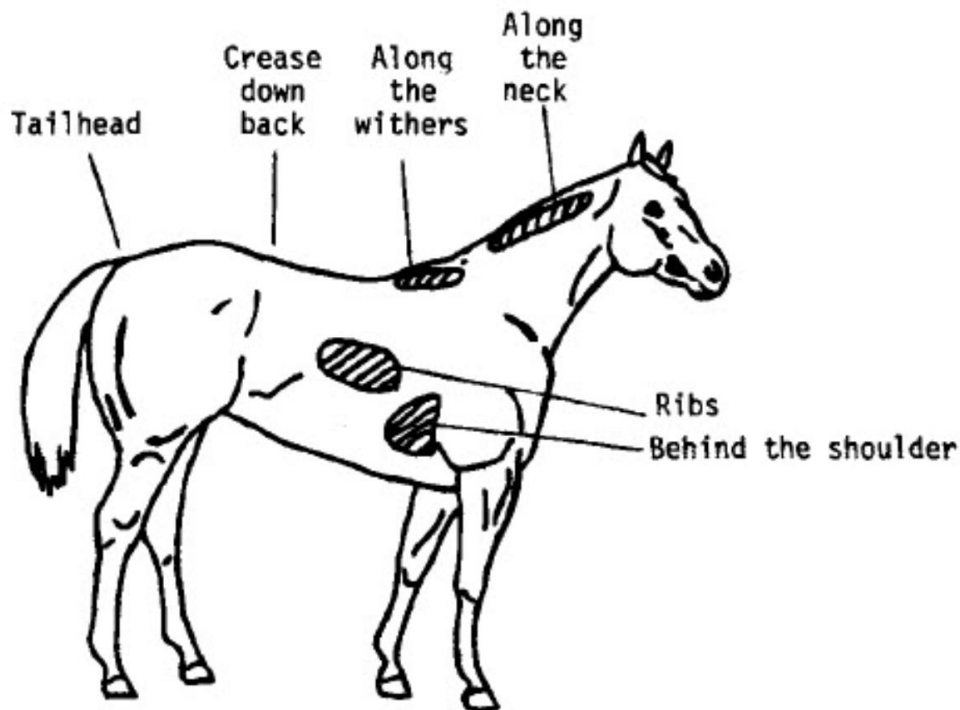


Figure 3.2 Points of Evaluation of the Horse Based off the Henneke Body Condition Scale
(Robin, 2009)

The equids that displayed a BCS of 2 or lower are described as very thin; where the six main points of response to body fat display emaciation, prominence of the spinous processes and tail head, as well as an accentuated shoulder and discernable ribs (Fluke & Brew, 2017). From the herd, 100% exhibited alopecia and skin lesions in at least one of the previously described locations of the body. Additionally, 100% of the population exhibited swollen joints in their limbs. Abnormal or labored breathing was seen in 40% of the herd; the symptoms included but were not limited to panting, shallow, and rasping breathing. In terms of avoidance behavior or aggression towards humans, 40% of the herd reacted to human approach. Reactions to approach included but were not limited to leaning away from the oncoming individual, exhibiting head shy behavior where the equid moved its head away from human interaction but not its body, ear pinning, presentation of teeth, as well as forward striking with the front limbs.

Comparison of alopecia and skin lesion prevalence can be seen in figure 3.3 below. It is important to note that the hindquarters, which included the rump tail head and flank, had the highest percent of prevalence in the herd for both alopecia and skin lesions. The data also presented information showing that 50% of the herd had alopecia surrounding the head and neck regions and 40% of the herd had skin lesion presence on the shoulder region.

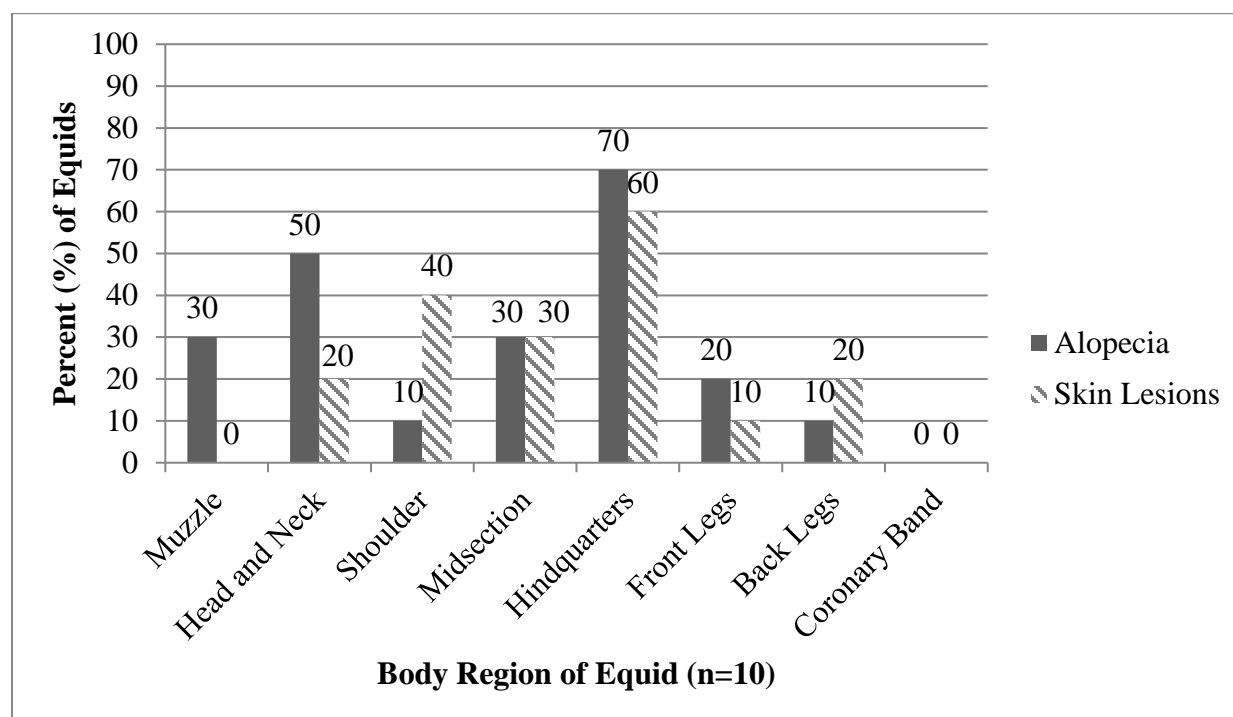


Figure 3.3 Alopecia and Skin Lesion Prevalence Results

Figure 3.4 below provides a graphical representation of the distribution of swelling based on body region of the equid. Data analysis of swelling prevalence in the herd of working equids show that there was significant swelling found in the back legs (100%) as well as the front legs (90%). Other major areas of swelling were in the hindquarter (80%) and shoulder regions (70%). While the frequency of swelling prevalence seen in the coronary band (30%) is lower than other regions of the body, coronary band swelling is present.

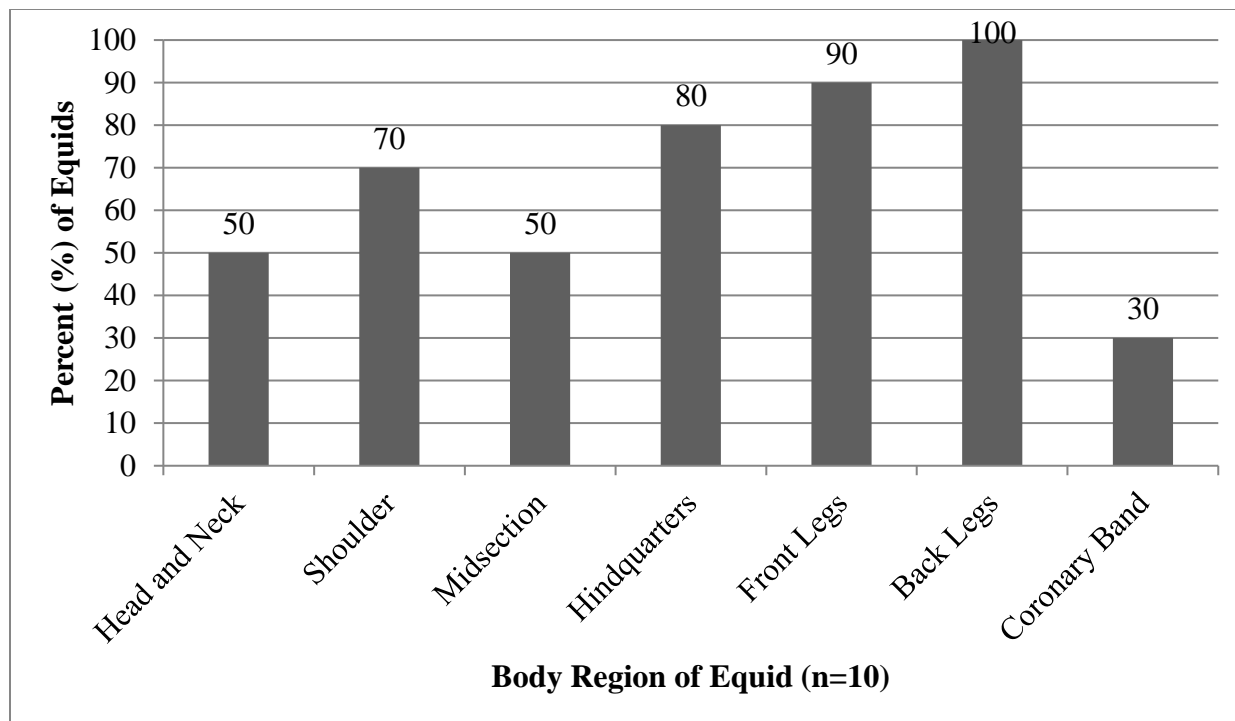


Figure 3.4 Results of Swelling Prevalence on the Equid Body

Discussion

Working conditions seen in Milot were variables that contributed to the overall BCS and swelling seen in the herd of working equids. Rocky terrain, steep elevation, and acrid temperatures combined with the frequency in which these equids were ridden could explain the swelling seen in the front and back limbs. Observations of the interactions between owners and equids revealed owners consistently whipping their equid to encourage it to move forward. These whippings were conducted with a vine or branch on various locations of the equid's body, typically in the hindquarters, midsection, shoulder, and neck regions. Whip marks were present on the equids bodies in the forms of swollen lines, small cuts, and raised tissue. There is potential that whipping the equid could have contributed to the small skin lesions and swelling seen in certain areas of the body. Alopecia and other skin lesions on the withers, back, and face could have been developed due to excessive friction on the equid due to saddle and halter use for excessive periods each day. These observations do not represent all potential variables that could be associated with the condition of the working equids; other variables, outside of the scope of this study, may include nutrition and health history in addition to confounding variables that have the potential to affect the equids performance and overall physical appearance.

Swelling in various locations of the body in the equid herd was the most prominent and consistent variable seen. Swelling could have been associated with numerous different variables interacting with each other. Observations of the environment were made which showed that the equids did not have access to a water source during working hours of the day which varied between 0800 and 1700 hours for a variable amount of time ranging from 1 to 8 hours a day. The environment in which the herd was located offered minimal shade and no pasture to graze. Equids were either tied to some form of anchor or left to roam amongst the herd. The terrain in which the equids were assembled was rocky, steep, wet. The clay sand mix became similar to a slurry mixture due to previous day's rainfall, combined with the addition urine and manure. Other confounding variables, such as nutrition and joint health, have the potential to affect the presence of swelling seen in the equid. The observations made above do not represent all the potential variables affecting the health and welfare of working equids but have been acknowledged as contributing factors to their overall condition seen during the period of data collection. This information allowed the research team to redesign the project's approach and methodology to further explore Locus of Control in participants of developing regions by expanding the Locus of Control survey to the full 29 question survey, designed by Rotter, and delegating a longer interview period to the Locus of Control portion of the survey.

Conclusions

The pilot study designed and tested in Milot, Haiti during the winter of 2016 provided the research team with noteworthy information regarding an owner's locus of control, or perceived control of their life, which elicits further study. With a sample of 10 working equid owners and 10 equids, the team tested the usability and practicality of an oral discourse survey designed to identify an owner's mindset and locus of control, while identifying there were cultural differences between the research team and participants. The oral discourse survey demonstrated strength in the locus of control portion of the survey while identifying weakness in the mindset section of the survey. This information allowed the research team to re-examine the overall applicability of the oral discourse survey in terms of practicality to complete in a timely manner, question comprehension and relatability, in addition to researcher approach, question phrasing, and question order.

Similar information was gained from this pilot in terms of the working equid welfare worksheet. The pilot of the working equid welfare worksheet allowed the research team to analyze the effectiveness of the worksheet and conclude that the AWIN welfare worksheet was not appropriate for this specific research project. The research team drew the conclusion that the AWIN worksheet required more time to complete than available. It was also determined that the survey could be interpreted differently from one researcher to the next. To avoid this, the research team made the decision to replace the AWIN worksheet with a different working equid welfare worksheet. The new equid welfare worksheet was designed by Ahmed Ali in conjunction with committee member, Dr. Camie Heleski, and field-tested in Egypt. This worksheet was designed to be conducted in a short matter of time under inopportune conditions in developing regions of the world. A detailed account of the welfare assessment for working equids will be described in detail in the upcoming chapter.

Amassing and analyzing the effectiveness of the pilot study in Milot, the research team redeveloped the oral discourse survey and adopted a different working equid welfare worksheet. The redevelopment of the oral discourse survey was based on results addressed above. The new survey focuses on locus of control as a potential variable that influences working equid welfare and has removed the mindset section from the survey. The decision to remove mindset from the project was due to the relevance it had to this project; while there is potential to study if mindset and locus of control are related and influence working equid welfare, the idea was too grand for the scope of this study. By focusing on the role locus of control, the research team will be able to identify more informative concrete results to identify if there is a relationship between an owner's locus of control and their equid's overall welfare.

The modified oral discourse survey and newly employed working equid welfare worksheet will be used in the data collection step of this project in rural Honduras during the fall of 2017.

Limitations

There are limitations identified within this study. The primary limitation of this study focuses on the accessibility to working equid owners in Northern Haiti. The country of Haiti is recognized as the poorest country in the Western Hemisphere where the availability and access to resources, such as electricity and money, is sparse. Individuals who utilize the equid species

for income are found in selective locations where tourism and consumerism is most prevalent. While this study seeks to target most working equid owners in Northern Haiti, there is no substantial means to contact all equid owners in areas outside of tourism areas. Another limitation can be identified within the response quality of individual equid owners. Haiti's history has always had a high saturation of non-governmental organizations providing relief aid, supplies, and job opportunities to residences. With the high prevalence of non-governmental organizations found in the country, stereotypes of wealth and solutions have been placed on international individuals whom have different ethnicities or dialects. Individual responses to the survey questions asked may be biased based the introduction of an international presence. The final limitation identified within this study focuses on the topic of time management. Working equid owners rely on the novelty of horse interactions from tourists to make a profit each day. Interrupting the working equid owner's daily routine, of targeting tourists, will cost them both time and money. To decrease the amount of time spent interacting with the survey, interview questions will be concentrated to decrease the time spent between researcher and respondent.

CHAPTER 4: AN EXPLORATION OF THE RELATIONSHIP BETWEEN LOCUS OF CONTROL AND WORKING EQUID WELFARE IN HONDURAS

Purpose of the Study

The purpose of this study is to ascertain relationships between working equid owner's locus of control and equid welfare, to have the ability to identify an additional variable associated with the overall condition of working equids.

Objectives of the Study

The overall objective of this research is to explore potential relationships in individuals' locus of control as a potential variable contributing to the status of their working equid's welfare. The objective is to expand the base of knowledge concerning the psycho-social factors impacting the welfare of working equids.

The specific objectives were to:

1. Administer Julian Rotter's locus of control assessment to identify perceptions of owner locus of control as it pertains to working equid welfare
2. Identify whether there is a relationship between owners' perceived locus of control and equid welfare
3. Disseminate data and results for future studies focusing on equid welfare and owner interactions to NGO's, research teams, and medically trained personnel interested in the improvement of working equid welfare

Hypothesis

It is hypothesized that working equid owners who exhibit more external loci of control traits (which consist of beliefs, opinions and overall actions being dictated by outside forces such as luck, chance or fate (Rotter, 1966)) will have working equids that display a lower overall welfare score.

Research Questions

The subsequent research questions guided this study:

RQ1. To what extent can working equid owner locus of control be determined through oral interview methods?

RQ2. How does an owner's locus of control impact the welfare status of the working equid?

- a. Are there similar trends in owner's locus of control and the welfare of their working equids amongst members of the same community?
- b. Are physiological or psychological indicators, of the working equid, associated with owner locus of control?

RQ3. Does the equid owner's locus of control effect the prevalence of health concerns seen in the working equid?

- a. Are there specific regions of the working equid's body more prevalent to lower welfare scores whose owners exhibit a tendency towards a more external locus of control?

Instructional Review Board Approval

Research conducted at Purdue University that involves human participants requires approval by the Committee on the Use of Human Research Subjects prior to data collection. Following the mandatory training in human research protocol by all researchers, an exempt research request was submitted to the committee for investigation of the study topic and methods utilized. Final approval for the study topic with IRB protocol #1708019493 was approved on September 07, 2017. Approval for this study can be found in Appendix D.

Introduction to Honduras

The country of Honduras is a Central American country with the Caribbean Sea to the North and Pacific Ocean to the South. Honduras shares its borders with the countries of El Salvador, Guatemala, and Nicaragua (Figure 4.1).



Figure 4.1 Map of Honduras and Bordering Countries (Google Maps, 2017)

Honduras' geography and climate represent that of a temperate Central American country, subtropical air flows across the lowlands while cooler breezes chill the mountains that stretch along most of the interior of the country. Due to the mountainous terrain, Honduras has a meek 28.8% of land dedicated to agricultural practices. A breakdown of that 28.8% shows that 9.1% of total land is arable land, 4% of the land is dedicated to permanent crops, and 15.7% of the land is allocated to permanent pastures (World Factbook, 2017). With so little land dedicated to agriculture, it is critical to understand how Honduran farmers and landowners utilize their land.

Honduras has been continuously expanding its urban population, causing extensive deforestation in result to the need for housing materials and space. Like the extreme deforestation seen in Haiti, the deforestation of Honduras is causing land degradation and soil erosion due to the increased need for developed land. In addition to deforestation and soil erosion, improper land practices have stripped the soil of nutrient and severely polluted sources fresh water with toxins and heavy metals (World Factbook, 2017). With the steady decline of farmable land seen in Honduras in combination with the rapid increase in population and need

for housing, it is critical for the country to have sustainable agricultural practices in order to sustain the growing country.

Honduran Agriculture and Working Equids

Ranked as one of the many developing regions of the world seen in the Western Hemisphere, Honduras relies heavily on the use of working equids. Approximately 62.5% of Hondurans live below the poverty line, while approximately 4 million Hondurans live in remote regions of the country (World Bank, 2017). People living in these remote communities rely heavily on the use of working horses, donkeys, and mules. With approximately 130,000 working horses, not including mules or donkeys, providing services such as collection and transportation of firewood, water, trash, and food stuffs to 80% of the country it is evident that these equids are fundamental in helping alleviate poverty, promote mobility and ensure food security to some of the most rural locations of one of the world's most impoverished countries (World Horse Welfare, 2018) and (Anderson, 2017). With the fundamental necessity of working equids in Honduras, proper health care and management practices are critical for both equid wellbeing but also for those who rely on the equid.

Numerous non-government organizations (NGOs) such as The Brooke Hospital for Animals, Donkey Sanctuary, SPANA, and Equitarian Initiative have been dedicated to the investigation, intervention, and overall improvement of working equid welfare health and wellbeing in these developing regions of the world. One such intervention project, directed by World Horse Welfare, sought to better understand owner knowledge of disease and disease prevention. The study was designed to assess and compare the level of awareness, local knowledge, and management practices of equid owners in Choluteca, Honduras to develop and enable effective disease surveillance and control guidelines for the equid owners to follow (Anderson, 2017). From the sample surveyed (n=130), results showed that most owners used their working equids to carry firewood (67%). Additional tasks such as transportation, carrying water, and working with cattle were also recorded. The study reported that much of the information displayed was from personal experience, family, and friends. While information sharing is a key strategy for delivering information to a larger population, it is imperative that the information being shared is accurate reliable and accepted by owners. This study demonstrates the need for higher owner awareness and understanding of management practices that could

promote the longevity and health of their working equid; the incorporation of the locus of control survey could provide the information needed to better understand owners' awareness and understanding of management practices. Local knowledge can be restricted simply due to a lack of knowledge and understanding, which leads researchers to a new facet of research in owner understanding to promote improved working equid welfare.

The Role of Working Equids in Honduras

A 2013 cross-sectional survey conducted by World Horse Welfare sought to gather information regarding Honduran knowledge and perceptions of the role of working equids in and around Choluteca. The study focused on the challenges faced by the owner and their families of working equids as well as if the owners felt the government was providing enough assistance to help the owners.

Public knowledge, gathered from residents of Honduras, considered L300 (\$15) per day as an insufficient financial amount to support a family. Actual income generated from equid services in Honduras was reported at L200 (\$10) per day (Warboys et al., 2013). This L100 (\$5) difference may not seem like a significant difference in revenue, for individuals residing in the rural regions of Honduras, L100 more a day could meet more of a family's basic needs.

With numerous NGOs focused on improving the health and wellbeing of working equids in rural communities of Honduras to increase family income, an opportunity to better understand working equid owner populations arises. There is a need for information in the academic and scientific community on how working equid owners can affect the overall welfare of their equid; through educational and social-psychological studies, new knowledge regarding owner understanding and education can be gained to identify novel variables that can help extinguish poor working equid welfare in rural communities of Honduras as well as other developing regions of the world.

Assumptions of the Study

The researcher made various rudimentary assumptions prior to the commencement of this study regarding the assessment methods and procedures employed. The following statements are assumed:

- The information solicited from equid owners is accurate and understood
- The translator has accurately repeated the survey questions to the equid owner and all responses are correctly recapped back to the interviewer
- The target sample of working equid owners are available and willing to participate in the oral survey
- Individuals interviewed during the duration of the data collection period are current equid owners
- Individuals interviewed during the duration of the data collection period are attending the Equitarian Initiative veterinary clinic with their equid
- Participants of this study are native residents of Honduras

Research Design

The intent of this study was to collect quantitative data regarding Honduran equid owners' locus of control and quantitative data regarding owners' working equids welfare to determine if a relationship could be drawn between an owner's locus of control and the overall welfare of their working equid. The survey design and working welfare assessment tool was adapted to fit the needs of the environment in which data collection was conducted. Additional information gained from the pilot study in Haiti, (refer to Chapter Three for specific details) directed the re-design of the oral survey and working equid welfare worksheet used in this study.

The survey was divided into four main categories: 1) general demographic information 2) general equid knowledge 3) sources of information/education to assist in equid ownership and 4) Julian Rotter's 1972 locus of control survey. The Locus of Control Survey identifies unique characteristics specific to the individual based on a 29-option forced-choice survey. The choices an individual select have an associated numerical value of 0 or 1. The tool is designed so that an individual can assess whether they have an internal (personal outcomes are contingent upon their behavior and actions) or external (personal outcomes are caused by luck or other external force)

locus of control. The overall survey administered had a total of 32 equid related questions and 29 locus of control questions for a grand total of 61 questions. An extensive literature review, in combination with the results gained from the pilot study, dictated the decision to keep all 29 loci of control questions rather than modifying the survey. This allowed the data to have a concise and exact locus of control measurement for everyone interviewed.

While the administration of the oral survey was underway international working equid welfare specialist, Dr. Camie Heleski, conducted working welfare assessments on the owner's equid(s). Based on the information gained from the pilot study, the decision to incorporate an expert of international working equids provided valuable assistance to decrease the time it took to collect data from each owner and their equid(s) in addition to increasing the reliability of the overall project. The working equid welfare assessment worksheet in this study was designed and implemented in Egypt as part of a project dedicated to identifying at risk equid populations using a tool designed to be practical, applicable, and suitable for fast-paced scoring environments. The checklist was classified into six categories: general behavior, general health, body lesions, coat health, body condition score, and hoof health (Ali et al., 2015).

Anonymous categorization of working equid owners from Honduras was coded to their associated working equid via numerical progression. Due to the large sample size, an adapted code was employed with the Honduran sample similar the Haitian sample. All equid worksheets were coded following a positive progressing decimal system. The first digit of the equid identification code matched the owner's digit; following a decimal, the next digit in the code represented the specific equid assessed. To protect the anonymity of the individuals, no identifiable information was recorded. Upon completion of both the oral survey and working equid welfare assessment, the researcher stapled the completed assessment tools together and placed them into a passcode encrypted lockbox.

Methodology: Welfare Scoring Checklist

Methodological procedures for the working equid welfare assessment replicated previous work conducted by Ali and associates (Ali et al., 2015). The specific sequence in which welfare parameters were measured was designed to maximize efficiency and accuracy while maintaining integrity from research bias. The specific parameters of this study were followed,

excluding steps observing skin tent testing capillary refill testing and rectal temperature, to the work conducted by Ali and associates (Ali et al., 2015) and are identified below:

1. The observer stood 3m away from the equid at an angle of 45° from the sagittal plane of the animal's body and maintained this position for 10s without disturbing the animal, to observe the animal's attitude. This was followed by counting of the respiratory rate and recording any change of the animal's attitude for a further 60s. The animal's state of alertness and respiratory rate were assessed after stopping their work to minimize uncertainty between depression and relaxation, as well as to prevent any increase in respiratory rate due to fear of observer approach and/or manipulation.
2. At the same distance, but at an angle of 20° from the sagittal plane of the animal's head, the observer approached the animal with slow and calm steps, stopping at about 30cm from the head. The animal's response to the observer was recorded, while any lesions on the animal's nasal bridge and mouth were recorded.
3. From the same position, the observer slowly raised her open hand toward the animal's chin and touched it, then recorded the animal's response.
4. The observer recorded any neck lesions and used the tips of her fingers against the direction of the equids hair to detect if the equid was recently groomed.
5. Lesions at the anterior aspect of the knee, firing lesions and tethering lesions along the inner aspects of the thighs were recorded, followed by gentle manual compression to detect pain and/or swelling of the forelimb tendons and fetlock joints. The same steps were followed for the hocks and hind tendons, and fetlock joints. Manual compression was performed to detect swelling of tendons and/or fetlock joints rather than visual observation, since swelling was not always visible, as in the case of donkeys with hairy legs.
6. The animal's hooves were observed on the ground from both front and side view.
7. The equid's BCS was recorded, as per Pearson and Ouassat (2000), firstly from the rear view while recording lesions at the hind quarters, withers and spine, followed by two side views while also recording lesions of the chest area/rib cage area.
8. In addition to the lesions listed above, any other lesions were also recorded, and any area of matted, scabby, scurfy skin throughout the equid's body, as per Upjohn et al. (2013). Presence of ectoparasites (ticks) was also recorded (Pritchard et al., 2005).

Methodology: Participant

Methodological procedures for the oral survey follow a specific sequence of questioning to attract and hold the participants attention. The ordering of the survey questions was designed to increase in cognitive difficulty as the survey progressed, starting with simple demographic questions and concluding with Rotter's (1972) force-choice locus of control survey. A survey worksheet was developed for the researcher to record all participant responses on and act as a guide for the researcher administering the survey. The physical copy of the survey provided the researcher with instructional prompts to read to the participant as well as prevent the researcher from changing the order of questioning from one participant to the next. The following sequence of questioning can be identified below:

1. The interviewer and translator approached a randomly selected equid owner and inquired if the individual was over the age of eighteen. If the individual was over the age of eighteen, the team requested permission, from the owner, to be a participant of a research study focused on equid owners.
2. After receiving verbal approval from the owner to participate in the study, the interviewer read the instructions related to the survey, identified the time it would take to conduct the interview, and asked if the owner could identify their equid(s) to the researcher. After successful identification of the owner's working equid the interviewer asked the participant if the research team could approach, and touch, the equid. The interviewer also asked the participant if they had any questions.
3. After answering any questions, the participant had, or if there were no questions, the researcher began to ask the survey questions beginning with question 1 and progressing down the list of questions in numerical order while filling out the survey with the participant's responses.
4. After question 13 the researcher paused to identify that the following set of questions focused on management practices and proceeded to question 14.
5. Like step 4, the researcher paused again to identify the following set of questions focused on how and where information was sought out regarding equid care and management and proceeded to question 27.
6. Following question 32 the researcher paused to thank them for their responses thus far. At this time the researcher read the instructions on how to respond to the locus of control

portion of the questionnaire, without mentioning that the section was looking for locus of control. Instead the researcher asked to simply select the statement to which the owner most agreed with and requested that each response was independent from previous responses.

7. After reading the instructions for the locus of control section of the survey, the researcher asked the participant if there were any questions. After answering any questions, the participant had, or if there were no questions, the researcher began reading both statements for each question, pausing after reading the second statement and circling the participant's response before proceeding to the next pair of statements.
8. Upon completion of the locus of control section of the survey, the researcher thanked the participant for their time and stored their responses for future data collection.

Methodological procedures for both working equid welfare assessment and oral survey were replicated for each participant of this study. Upon completion of the survey and welfare assessment, the researcher stapled the data sheets together and stored them in a lockbox for the remainder of the data collection period.

Participants

Researchers collaborated with the NGO Equitarian Initiative to solicit participants for this study. This study was accomplished through the administration of an oral survey to a premeditated selection of Honduran equid owners during a four-day period. A convenience sample of residential equid owners was drawn from the following four villages: Villecito, Aguaquire, Telmo Ruiz, and Altos De La Cruz. Village selection was decided by Equitarian Initiative associates, who recognized the previously listed villages as high impact areas previously familiar with the NGO. The team visited one village per day; upon arrival, stations were set up to provide veterinary care, hoof care, and instruction to all equid owners who chose to come to the location that day. Information regarding location, time of day, and services offered were distributed throughout the communities one month prior to Equitarian Initiative's in-country arrival. On the scheduled day of services, owners and equids would arrive throughout the day and be assigned a number. Each equid would be given the associated number of their owner in addition to a letter representing the order in which services would be provided if the

owner had more than one equid. The research team waited approximately one hour after the beginning of the day to approach owners. This hour delay was based on in-country observations of Equitarian Initiative's setup and registration process. It was determined that an adequate number of owners would arrive and be assigned a larger number the later they arrived; this number represented their position to see a veterinarian. In-field observations allowed the research team to determine that registration of owner 7 and equid 7a was an appropriate time to begin to reach out to owners for participation in this study. The approximate wait period for owner 7 was 45 minutes, which provided the research team with ample time to survey the owner and conduct a welfare assessment of their equid. Specific selection of owners for the survey was based on availability, position in the queue, willingness to participate, age of participant must have been 18 or older and be accompanied by at least one equid. Working equid ownership and native residency of Honduras were also noted as the parameters for participant selection. Only participants who expressed a verbal agreement to participate in both the survey and equid welfare assessment were included in this study. Those who did not express an interest to participate were thanked for their time and omitted from the study.

Instrumentation: Welfare Scoring Checklist

The process of data collection in this study was achieved through the implementation of two separate survey and assessment tools. This study utilized a welfare scoring checklist and associated scoring system that were designed to identify working equids with severe welfare status in an efficient and practical manner. The welfare checklist was divided into six key categories that pertain to the working equids' overall welfare. These categories consist of general behavior, general health, body lesions, coat health, body condition score, and hoof health (Ali et al., 2015). It is important to note that certain welfare parameters such as rectal temperature, skin tent testing, and capillary refill time were omitted from this study based on the conclusion that these welfare categories fell outside the scope of the study.

Instrumentation: Welfare Scoring System

The welfare scoring checklist analyzes the overall welfare of the working equid through different key attributes commonly associated with welfare. Each of the six categories of the welfare scoring checklist has two or more subcategories that focus on specific regions of the

equid's body, if applicable, or if the category can be described as normal or abnormal. Prior to completing the welfare scoring checklist, four descriptors for each individual equid were recorded: equid number (coded to match the owner of the equid), species (horse (H), donkey (D), or mule/hinny (M)), age (<5, 5-15, >15), and gender (intact male (M), altered male (G), or mare (F)). The estimation of the equid's age was done through questioning the owner on ownership history and age of equid at time of acquisition as well as confirmation by dentition if possible.

From the six categories of welfare analyzed in this study, a total of 18 parameters were established and assigned under the appropriate category; these parameters included: alertness, response to observer approach, chin contact, coat health, ectoparasites, recently groomed, lesions at neck and point of shoulder, lesions at sides of chest, lesions at withers and spine, lesions at points of hocks, lesions at nasal bridge and/or commissures of the lips, lesions at hind quarters, pain and/or swelling of the forelimbs and/or hind limbs tendons and/or fetlock joints, lesions at anterior aspect of the knee, other body lesions, firing lesions, tethering lesions, and hoof score (Ali et al., 2015). Specific values were associated with each parameter; e.g. if there was no lesion, no external parasites or no aggressive behavior present, the equid would be given a score of 1 for that parameter. If minor injuries parasites, or behavioral abnormalities were present, the equid would receive a score of 0.5 for the categories in which the issue was observed. Should the equid present major signs of injury, aggression or parasites, the equid would receive a score of 0 in the appropriate categories. To view the equid welfare checklist and its scoring system, please see Appendix E. Upon completion of the checklist, the equid specialist would add up the total score of each parameter and record the total sum at the bottom of the checklist. The values derived from the welfare scoring checklist were designed to represent a general health score (GHS), behavior score (BS), body condition score (BCS), body coat score (BCoS), body lesion score (BLS), and hoof score (HS) to provide a total welfare score (TWS). The TWS, along with the overall scores for each category were used to compare the equid's overall welfare with the scores derived from the participant's locus of control survey, described below.

Instrumentation: Participant Survey

In association to the welfare scoring checklist dedicated to analyzing the overall welfare of each participant's working equid, an oral survey was administered to the equid's owner. Demographic, equid use and purpose, equid management, how information is received and/or

sought out, and locus of control questions were asked from each individual participant. All participants received the same survey and were over the age of eighteen with at least one working equid. The survey for this study consisted of 61 items broken down into the five categories listed above.

Prior to the implementation of this participant survey, a pilot test was conducted on a different sample of equid owners residing in Milot, Haiti. The information and knowledge gained from the pilot study directed the design and implementation strategy used in this survey and can be referred to in chapter three. The 32 equid related questions were designed to inform the audience of the resources, knowledge, and management skills available and utilized by Honduran natives to establish background understanding of the country and its residents as it pertains to working equids. These 32 questions were coded so researchers could identify a demographic map of Honduras and compare the overall knowledge levels of management techniques between regions to identify trends where information and knowledge sharing may be high or low. The decision to use Rotter's (1972) locus of control survey was guided by an extensive literature review as well as testing the appropriateness of an adapted locus of control survey during the pilot test of 2016. These references dictated the decision to implement the full scale 29 forced-choice locus of control questionnaire. The locus of control survey was divided into three categories and is as follows: (D1) Personal-Political, (D2) Individual-Social, and (D3) Luck with 6 randomly distributed filler questions that do not relate to any specific category. The forced-choice responses are read to the participant; each pair of responses relates to the overall category of either personal-political, individual-social, or luck.

Locus of Control Scoring System

The locus of control survey assigned 1 point to specific responses seen in table 4.1 below; to view the complete survey please see Appendix A. If the participant selected a different response than those listed above, no point was given to the participant's overall locus of control score. The 23 selected responses represent the total locus of control survey omitting the 6 filler questions. Upon completion of the questionnaire, responses were reviewed, and appropriate points were allocated to each response pair. Individuals who scored a 12 or higher were described as having an external locus of control (E) while those who scored an 11 or lower were

described as having an internal locus of control (I). The scale increased in whole numbers with a potential for a maximum overall score of 23 (E) and a minimum score of 0 (I).

Table 4.1
Locus of Control Scoring System³

Statement Number	Point Awarded for Statement	Statement Number	Point Awarded for Statement
1a	0	15a	1
1b	0	15b	0
2a	1	16a	1
2b	0	16b	0
3a	0	17a	1
3b	1	17b	0
4a	0	18a	1
4b	1	18b	0
5a	0	19a	0
5b	1	19b	0
6a	1	20a	1
6b	0	20b	0
7a	1	21a	1
7b	0	21b	0
8a	0	22a	0
8b	0	22b	1
9a	1	23a	1
9b	0	23b	0
10a	0	24a	0
10b	1	24b	0
11a	0	25a	1
11b	1	25b	0
12a	0	26a	0
12b	1	26b	1
13a	0	27a	0
13b	1	27b	0
14a	0	28a	0
14b	0	28b	1

Table 4.1 Continued

	29a	1
	29b	0

³*Bolded items are worth one point in the calculation of the overall locus of control score.*

Data Collection

Quantitative, comparative data collection of working equid owners and their animals took place during a nine-day period from October 20 to October 29, 2017. Four days were dedicated solely to data collection in four locations along the northern and southwestern portions of Honduras. Data collection began at Villecito, denoted by V1 in figure 4.2 below, then continued to Aguaquire (V2), Telmo Ruiz (V3), and completing data collection at Altos De la Cruz (V4) using mixed research methods. Due to the small total population size of these villages, they are not recognized as established areas on the map below; the general area in which each village is located is denoted accordingly. The remaining five days of the data collection period were dedicated to travel between villages and coding data.



Figure 4.2 Data collection locations in Honduras

During the data collection period, the research team, which consisted of an interviewer, equid welfare specialist, and translator, surveyed a convenience sample of 65 local equid owners and conducted the associated welfare assessment on 65 working equids. Participant selection was based on availability, age, and willingness from the participant to be a part of the study. These factors produced varying sample sizes per town; this distribution of participants can be seen in table 4.2 below.

Table 4.2
Number of Respondent's per Village

Village	Number of Respondents (n)
Villecito	18
Aguaquire	14
Telmo Ruiz	18
Altos Dela Cruz	15
Total	65

Initial contact with potential participants was through face to face approach methods. Upon initial contact with equid owners and receiving permission from the owner to progress to the survey, the researcher and translator began the interview process. Starting with the demographic questions the researcher and translator asked each question to the participant and recorded each response. Upon completion of the demographic portion of the survey, the translator and researcher paused to elucidate the directions for the following section of the survey. At that time, the researcher and translator asked if the participant understood the directions and if there were any questions. If there were no questions the researcher and translator proceed to read each question's pair of statements and circle the statement in which the participant agreed with most; when questions became present, all questions the participant queried were answered prior to beginning the subsequent section of the survey. All surveys were pre-prepared and transported to each site, where the researcher filled in the appropriate responses and coded each survey according to the coding method in the Research Design section of this chapter. Each survey lasted approximately 15 minutes in length. Upon completion of the

survey, the owner was thanked for their time and given a hoof pick, that could be used on their equid as a token of the team's gratitude.

A working equid welfare checklist was completed simultaneously to the participant survey. The checklist was administered by the research team's working equid welfare specialist. The checklist addressed the overall condition of key physiological and psychological characteristics associated to welfare of a working equid. Each portion of the checklist was organized by area of the body or behavioral status of the equid. The specialist who conducted the assessment spent an average of 10 minutes on the assessment of the participant's equid and 5 minutes on tabulating the final welfare score value for the equid. At the culmination of the interview, the research team would ask the participant for permission to photograph the equid; if permission was given, the team took photographs of the animal within its environment as well as any major area on the body that showed a specific representation of the equid's overall health and condition.

Data collected and analyzed in this sample provided the research team with valuable evidence contributing to the overall purpose of this study. A further analysis of the data collected from Honduras is analyzed and discussed in the upcoming sections of this chapter.

Data Analysis: Oral Locus of Control Survey

Individual survey responses were recorded for each participant in this study and stored with the respondent's working equid welfare checklist for later review. Each participant and the equid selected by the owner for the study were given the same numerical value, which increased by a value of one per participant and equid pair. This numerical identifier represented the order in which the participant responded to the survey and how many owners had participated in the study. No participant information could be identified by the number of the survey; any identifiable information was omitted from this study.

Analysis of responses recorded from the oral locus of control survey were conducted using the Statistical Package for the Social Sciences 24 (SPSS 24). The research team conducted a Cronbach's alpha reliability test ($\alpha=0.78$) on the survey tool to measure the internal consistency of the tool implemented in this study. With the size of the sample ($n=65$), the Shapiro-Wilk Normality Test was conducted to determine if the data was normally distributed. The data was determined to be normally distributed, so parametric data analysis was performed. A Pearson

Correlation test was run to identify any strong linear relationships among the variables within the survey tool and working equid welfare worksheet. A one-way analysis of variance (ANOVA) was run to test if the study's hypothesis was accurate regarding the influence of owner's locus of control on the total welfare of the working equid. Frequencies, medians, and modes were used to develop an understanding of the demographic factors within the sample. A summary of the study's variables, in relation to each research question can be seen in table 4.3; for the comprehensive list of questions associated with the variable summary, please refer to Appendix F.

Table 2.3

Summary of Research Questions, Variables, and Statistical Analyses

Research Question (s)	Independent Variable(s)	Dependent Variable(s)	Statistical Analysis
1. To what extent can working equid owner locus of control be determined through oral interview methods?	Question 29 (LOC Survey)		Numeric Calculation of LOC
2. How does an owner's locus of control impact the welfare status of the working equid?	Questions 1-11 (Owner Demographics, Equid Workload Demographics)	Questions 12-28 (Equid Use, Veterinary Care and Hoof Management, Feed and Water Schedules, Knowledge and Learning)	Pearson Correlation
a. Are there similar trends in owner's locus of control and the welfare of their working equids amongst members of the same community?	Overall Locus of Control Score	Equid Checklist: Total Welfare Score (TWS)	Frequency, Mean
b. Are physiological or psychological indicators, of the working equid, are associated with owner locus of control?	Overall Locus of Control Score	Equid Checklist	Pearson Correlation, One-way analysis of variance (ANOVA)
3. Does the equid owner's locus of control effect the prevalence of health concerns seen in the working equid?	Overall Locus of Control Score	Equid Checklist	One-way analysis of variance (ANOVA)
a. Are specific regions of the working equid's body more prevalent to lower welfare scores whose owners who exhibit a tendency towards a more external locus of control?	Equid Checklist		Frequency

Results and Discussion

The following section reports the finding of the working equid owner survey tool employed in this study in addition to the demographic analysis of the sample. Data were collected from the following four villages during a nine-day collection period: Villecito, Aguaquire, Telmo Ruiz, and Altos De La Cruz.

Owner Demographics

There was a total of 65 (n=65) respondents with their associated equids, in this convenience sample. Of the 65 participants 18 individuals were surveyed in Villecito, 14 individuals were surveyed in Aguaquire, 18 individuals were surveyed in Telmo Ruiz, and 15 individuals were surveyed in Altos De La Cruz. Figure 4.3 represents the distribution of gender within this study. Note that only 3.1% (n=2) were female while the remaining 96.6% (n=63) of the sample were male.

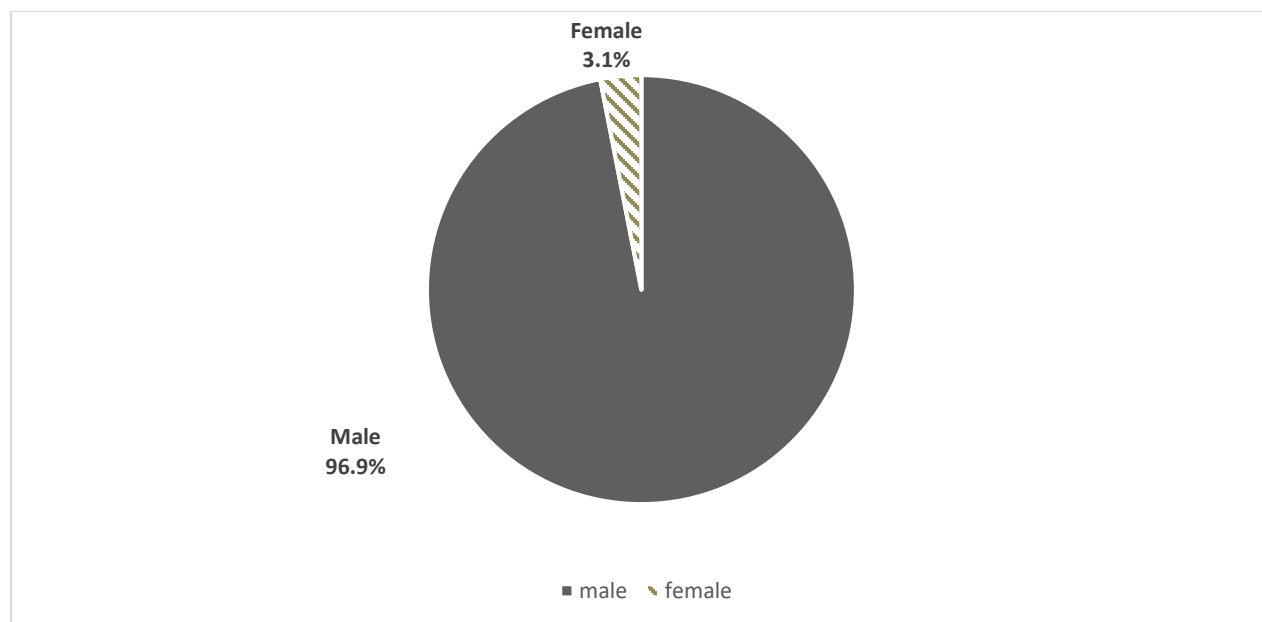


Figure 4.3 Distribution of Gender of Respondents in the Study

A distribution of age ranges can be seen in figure 4.4 below. The chart below represents a reasonably even spread of age ranges seen in the participants of the study. Only 10.8% (n= 7) of respondents associated with the 46-55 range; this had the lowest frequency of respondents associated within that age bracket. While most of the sample fell between the age ranges of 26-35 (27.7%, n=18) and 36-45 (26.2%, n=17).

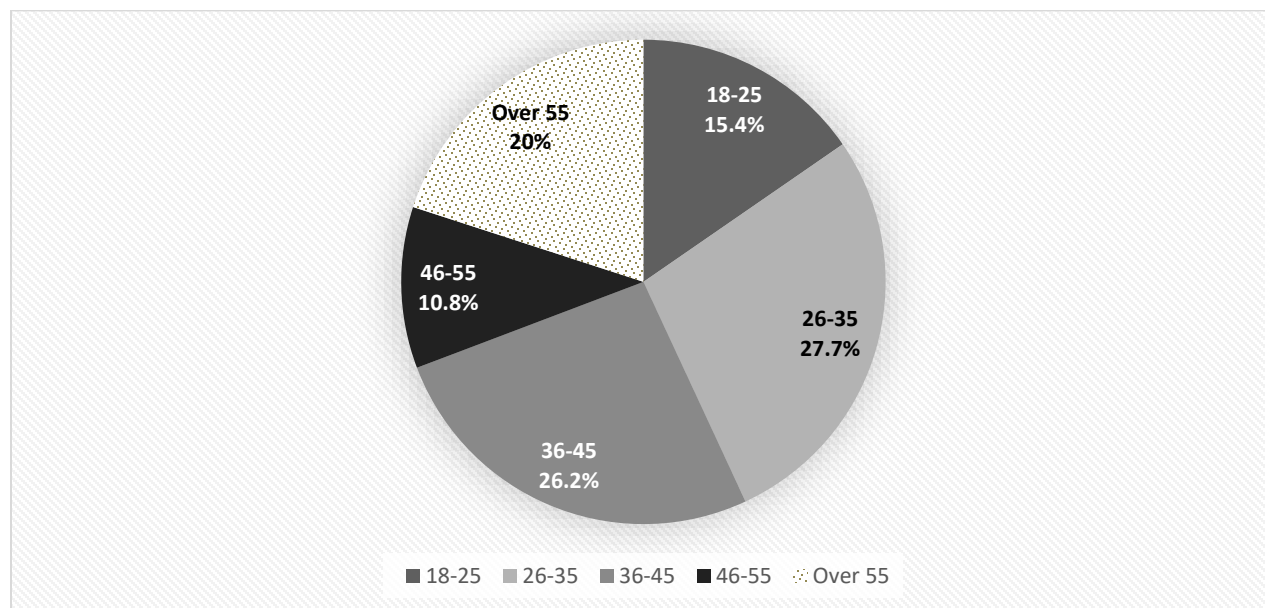


Figure 4.4 Distribution of Age of Respondents in the Study

Figure 4.5 reveals the demographic distribution of education level within the sample. Approximately 69.2% (n=45) of the sample identified that they had primary education, while the remaining 30.8% identified having either a general high school education (3.1%, n=2), academic secondary education (7.7%, n=5), vocational secondary education (1.5%, n=1), university first level (1.5%, n=1), or identified in the previous question that they did not attend school and were omitted from this question which is denoted by the term “skip” (16.9%, n=11).

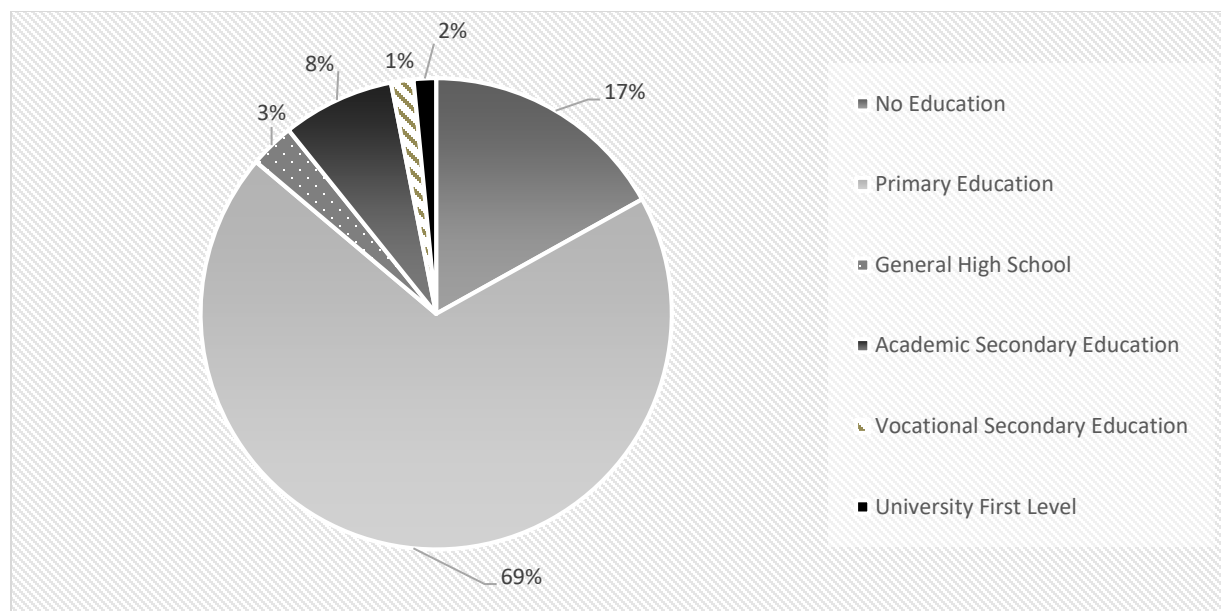


Figure 4.5 Educational Distribution of Respondents in the Study

Frequency analysis of the data identified 49.2% (n=32) of the sample had worked with an equid for more than 10 years; while the remaining 50.8% of the sample worked with an equid for less than 5 years (32.3%, n=21) or less than 1 year (18.5%, n=12) as depicted in figure 4.6 below.

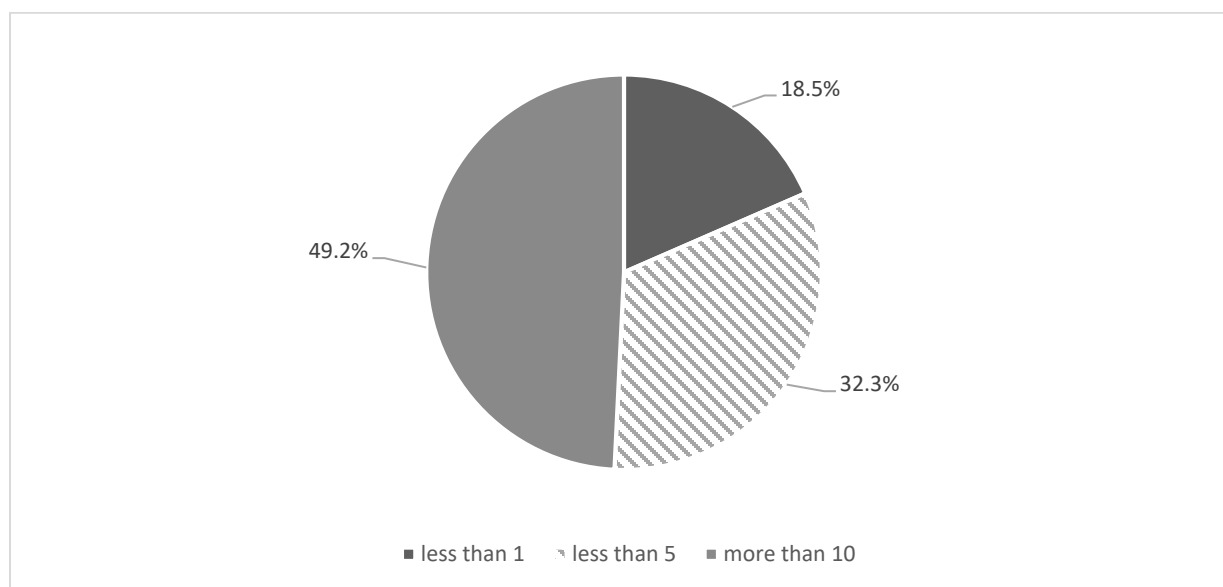


Figure 4.6 Participants Years of Equid Experience

Equid Workload Demographics

Table 4.4 divulges the total days per week the owners' equids were working. Most of the sample identified their equid worked 3-4 days a week (33.8%, n=22) followed by a 29.2% (n=19) response of 1-2 days/week and a 24.6% (n=16) response of working their equid daily.

Table 4.4
Weekly Workload of Equids

	<i>Frequency (n)</i>	<i>Percent (%)</i>
<i>Skip</i> ⁴	1	1.5
<i>1-2 days a week</i>	19	29.2
<i>3-4 days a week</i>	22	33.8
<i>5-6 days a week</i>	6	9.2
<i>Everyday</i>	16	24.6

⁴ Question skipped based on owner response to previous question

Table 4.5 below, provides further understanding of who utilizes these equids during working days. Most of the sample stated that no one else uses their equid during the week (70.8%, n=46). While 12.3% of the participants surveyed recognized their children (13.8%, n=9) as handlers of the equid.

Table 4.5
Additional Handlers of Owner's Equid

	<i>Frequency(n)</i>	<i>Percent (%)</i>
<i>Brother/sister</i>	5	7.7
<i>Children</i>	9	13.8
<i>Parent</i>	4	6.1
<i>Other relative</i>	2	3.1
<i>Other neighbors in the community</i>	1	1.5
<i>No one else</i>	46	70.8

Veterinary Care and Hoof Management

The study sought to identify the frequency in which equid owners in a working community utilized care and treatment from local and international veterinary services. Owners

were asked if and how often they utilize managerial treatments offered from veterinarians. When prompted, 58.5% (n=38) of owners said they vaccinated their equid at least 1 time/year (44.6% vaccinated 1 time/year, 29% did not vaccinate). Of the owners who vaccinated yearly, 4.6% (n=3) vaccinated their equid on a semi-annual vaccination schedule.

Additional questions were asked regarding the frequency in which owners' trim or care for their equid's hooves. From the sample, 52.3% (n=34) responded that the equid does not get its hooves trimmed. While most of the owners do not have their equid's hooves trimmed, 41.5% (n=27) utilize the workmanship of a farrier 1-2 times a year. When surveyed, 38.5% (n=25) of the owners stated that they provide water for their equids 2 or more times a day. Many other owners (32.3%, n=21) simply allow their equid to find its own water throughout the day.

Feed and Water Schedules

With the majority of Honduras being lush forested areas, equids had ample opportunity to graze on forage. When asked what the owners equids eat, 96.6% (n=63) identified grass/pasture as the animals' main food source. Of the 63 owners who identified grass/pasture as their equids source of nutrition, 40.0% (n=26) also provided corn grain as an additional nutrition source.

Knowledge and Learning

The research team sought to identify sources of education and willingness to learn as part of the scope of the study. Of the village residents visited during the data collection period, 44.6% (n=29) reported that the knowledge they had of working an equid came from a parent or other family member; another 41.5% (n=27) identified as self-taught individuals. From the population, only 24.6% (n=16) said they were willing to travel for additional information; most owners stated they were only willing to travel 5 kilometers or less (56.9%, n=37), while 21.5% (n=14) would travel 15 kilometers or less, and 21.5% (n=14) would travel more than 16 kilometers. When surveyed, 92.3% (n=60) of owners openly share the latest information with their peers and community. Should questions arise, regarding their equids, 33.8% (n=22) of owners seek help from local NGO involvement or a local veterinarian (30.8%, n=20).

Locus of Control

Rotter's Locus of Control is a numerical continuum in which the lowest possible score tabulated can be a 1, representing a true internal locus of control, while the highest possible score would result in a 23, representing a true external locus of control. Individuals may score any value, within the continuum, from 1 up to 23; the center of this range is 11.5 which represents a neutral score. It is impossible to score a half point on this scale; the mode of the continuum represents individuals who fall close to possessing quality traits of both loci. Note, individuals who possessed a score of 11 were identified as having an internal locus of control while those who possessed a score of 12 were identified as externals. Figure 4.7, below, displays the distribution of locus of control scores among the participants in the study (n=65).

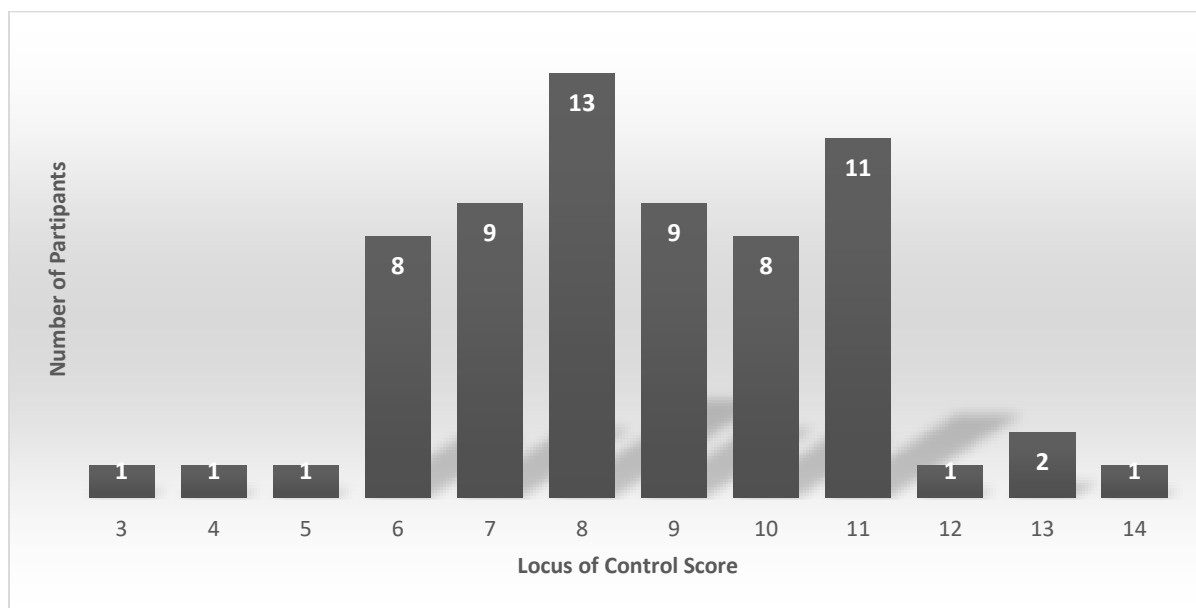
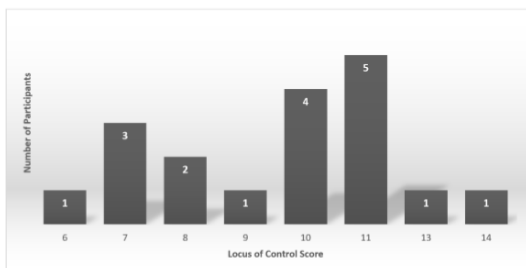


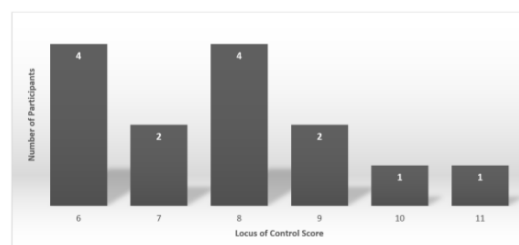
Figure 4.7 Range of Locus of Control Scores from all Participants in the Study (n=65)⁵

⁵ The number in each bar represents the number of participants who attained that locus of control score

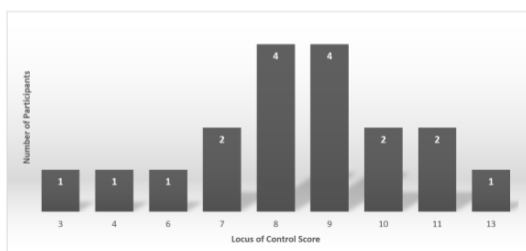
Figure 4.8 a-d below, display the range of locus of control scores received by the participants of this study.



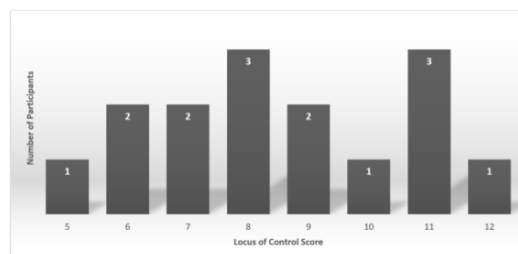
(a) Range of LOC Scores in Villecito (n=18)



(b) Range of LOC Scores in Aguaquire (n=14)



(c) Range of LOC Scores in Telmo Ruiz (n=18)



(d) Range of LOC Scores in Altos De La Cruz (n=15)

Figure 4.8 Distribution of Locus of Control (LOC) Scores among each Village in the Study⁶

⁶ The number in each bar represents the number of participants who attained that locus of control score.

Means and standard deviations were calculated for the sample as well as individual villages. The comprehensive table of values can be seen in table 4.5 below. The data showed that Aguaquire, a rural village in northern Olancho Honduras, displayed the lowest mean locus of control score (7.79) in relation to the other villages in this study. Whereas Villecito, an urban village in northern Olancho Honduras, presented the highest mean locus of control score (9.67) from the villages involved in this study.

Table 4.6
Summary of Means and Standard Deviations

<i>Village</i>	<i>N</i>	<i>Mean</i>	<i>Standard Deviation</i>
<i>Villecito</i>	18	9.67	2.169
<i>Aguaquire</i>	14	7.79	1.578
<i>Telmo Ruiz</i>	18	8.33	2.425
<i>Altos De La Cruz</i>	15	8.53	2.134
<i>Total</i>	65	8.63	2.191

Data Analysis: Working Equid Welfare Assessment

The following section reports the finding of the working equid welfare checklist employed in this study in addition to the demographic analysis of the equid sample. Data was collected from the following four villages during a nine-day collection period: Villecito, Aguaquire, Telmo Ruiz, and Altos De La Cruz.

Working Equid Demographics

There was a total of 65 working equids (n=65) assessed in this study. Of the total sample of equids, 93.8% (n=61) were horses, 4.6% (n=3) were mules, and 1.5% (n=1) were donkeys. A graphical representation of the data can be seen in figure 4.9 below.

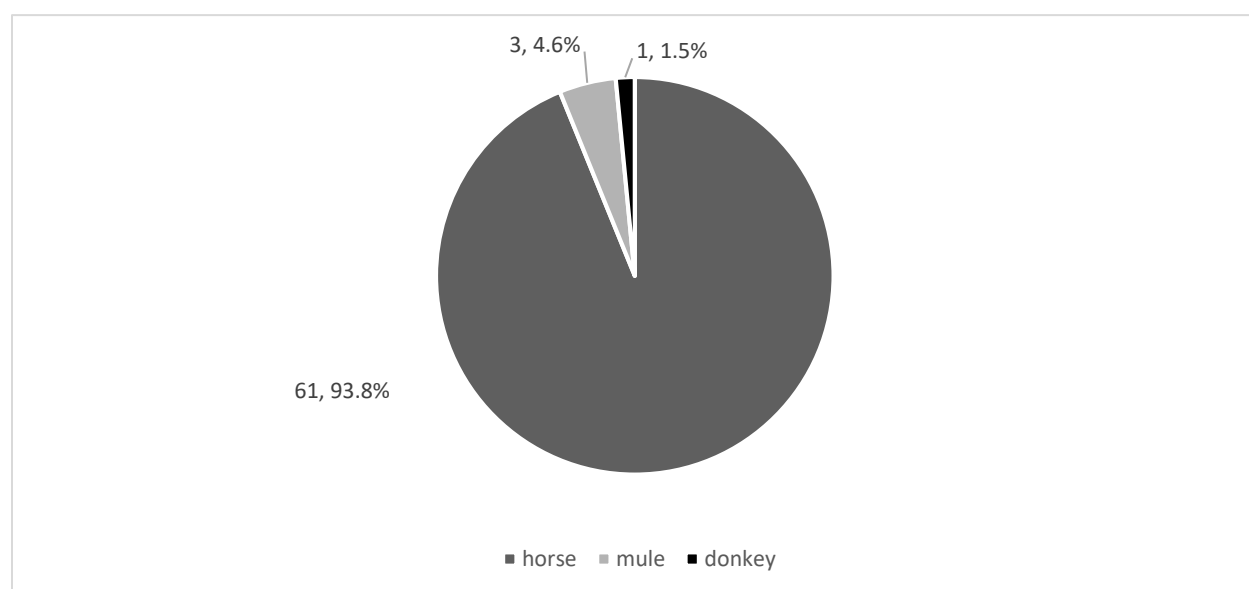


Figure 4.9 Distribution of Species of Working Equids in the Study

Most of the sample comprised of intact males (50.8%, n=33), also referred to as stallions or studs, while the remainder of the sample encompassed mares (35.4%, n=23) and geldings (13.8%, n=9). The graphical distribution of sex in working equids can be seen in figure 4.10 below.

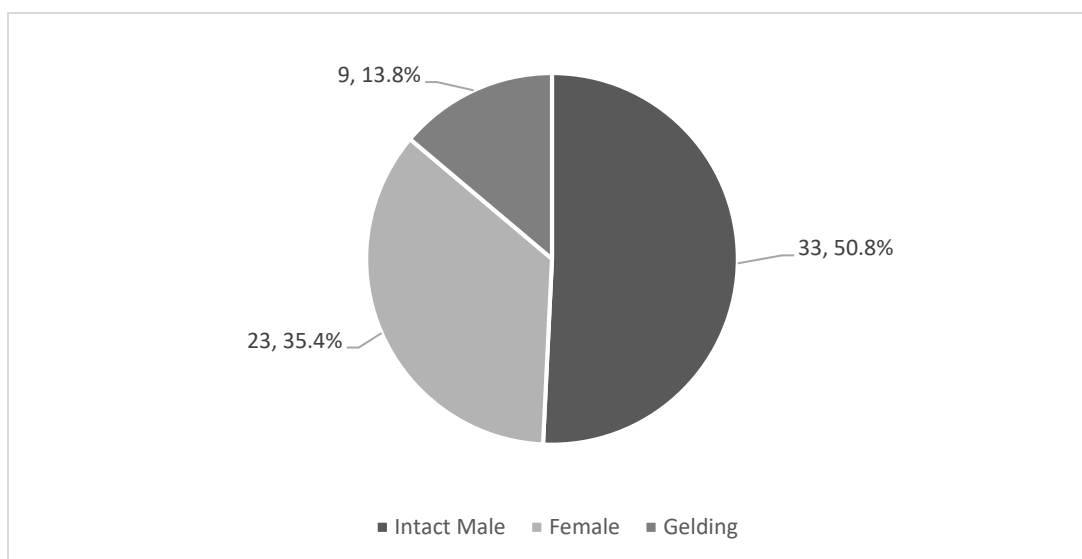


Figure 4.10 Distribution of Sex in working Equids of the Study

Equid owners were surveyed regarding the age of their working equid. Below, in figure 4.11, is a graphical representation of the age distribution seen in the sample. Note that 61.5% (n=40) of the sample was between the ages of 5 and 15 with the remaining 38.5% (n=25) of working equids were younger than 5 years of age. From the 65 equids assessed in this study, no working equids were over 15 years of age.

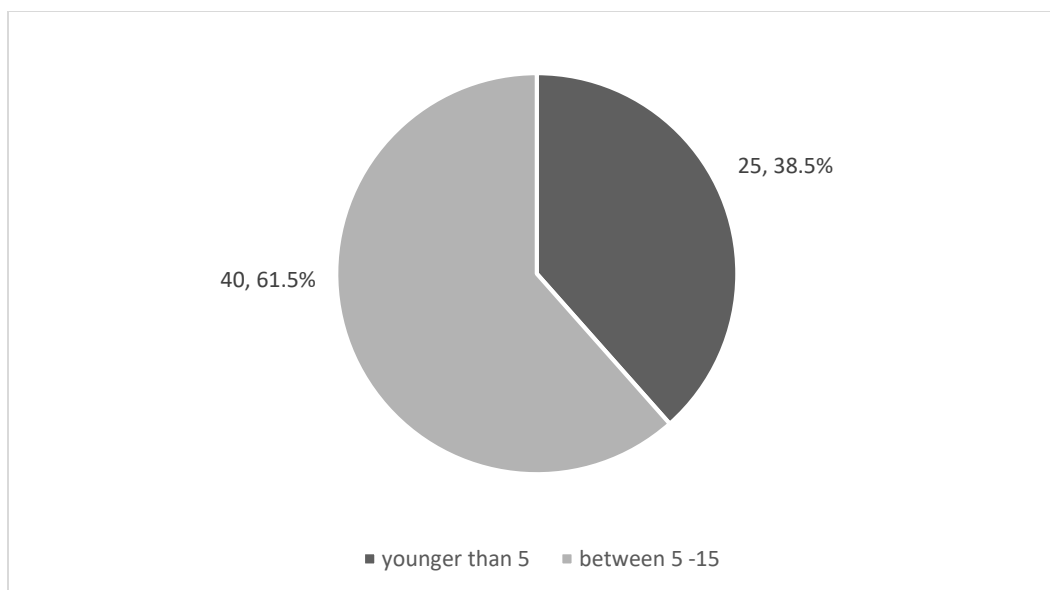


Figure 4.11 Distribution of Age in Working Equids in the Study

The following section reports the finding of the working equid assessment checklist employed in this study. Data was collected from the following four villages during a nine-day collection period: Villecito, Aguaquire, Telmo Ruiz, and Altos De La Cruz where behavior, body condition, coat condition, body lesion, hoof, and total welfare scores were measured.

Total Welfare Scores Exhibited in Sample

The working equid welfare checklist employed in this study analyzed the prevalence and severity of specific welfare indicators on the entire equid body. Each parameter consisted of a range of values from 0 to 1 increasing in value by 0.25; where a score of 0 denoted unacceptable welfare and a score of 1 denoted exceptional welfare conditions. The minimum score attainable was a 0 which represented an equid with critically poor welfare, while the maximum score attainable was a 19 which indicated an equid in top condition with exemplary welfare conditions. The full working equid welfare checklist, with scoring values for each parameter, can be viewed in Appendix E.

Figures 4.12-4.17 below, display the distribution of the total sample's welfare scores (n=65). The working equid welfare assessment analysis showed 10.8% (n=7) of the total sample scoring a 12 on the assessment. Only 4.6% (n=3) of the total sample exhibited a welfare score of 15.5, representing good welfare conditions (Ali et al., 2016).

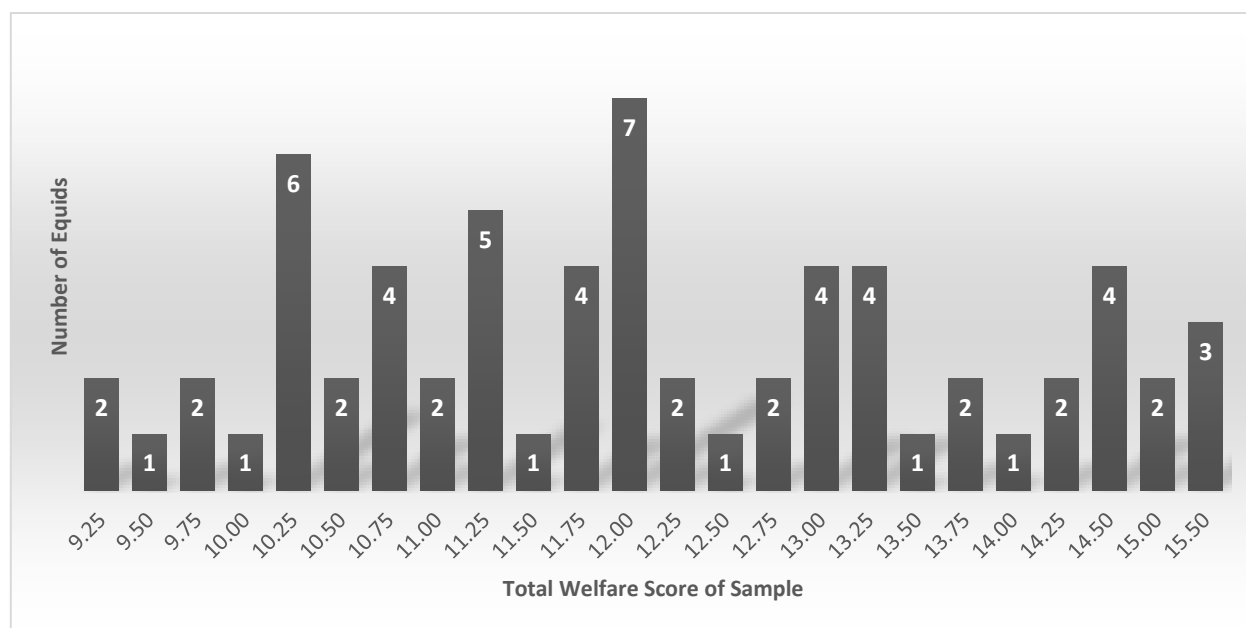


Figure 4.12 Total Welfare Scores (TWS) of the Sample in the Study (n=65)^{7,8}

⁷The number in each bar represents the number of equid who attained that welfare score

⁸The total welfare score is determined through the addition of the total scores from BS, BCS, BCoS, BLS, and HS

The parameters measured in this study included a behavior score tabulated by adding the values of the equid's alertness, response to observer approach, and the acceptance or rejection of chin contact from the observer. Equids could have scored a minimum of 0, indicating a depressed aggressive and unresponsive state. The maximum score and equid could receive was a 3 indicating alert calm and social behavior. Figure 4.13 below displays the distribution of behavior scores recorded in the total sample (n=65).

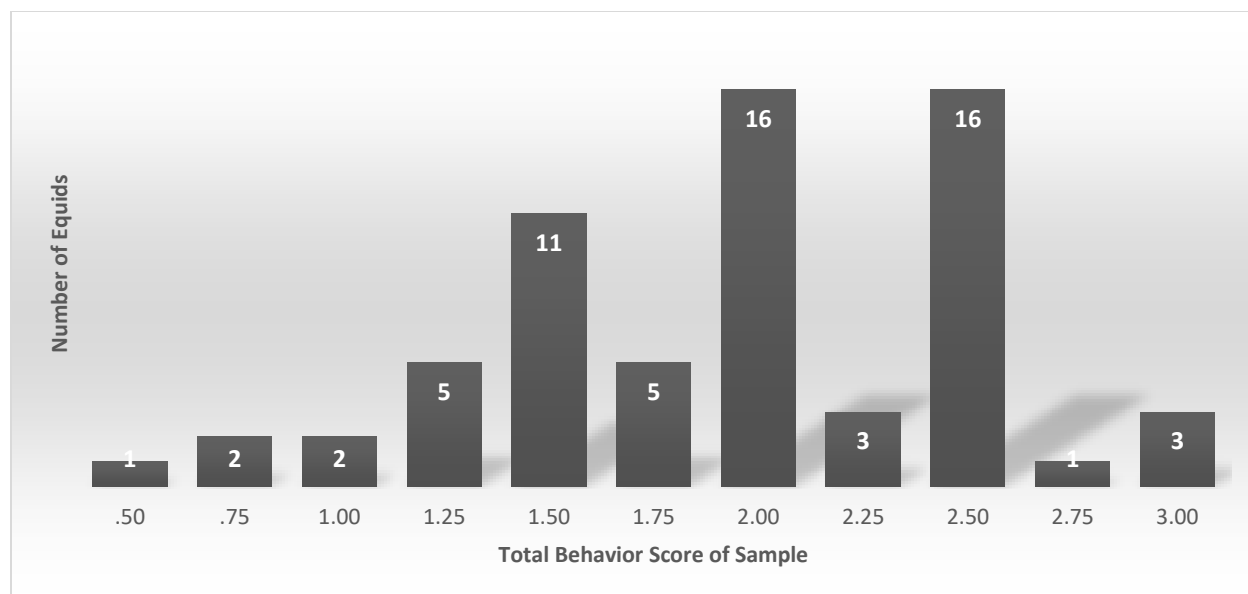


Figure 4.13 Total Behavior Scores (BS) of the Sample in the Study (n=65)⁹

⁹ The number in each bar represents the number of equid who attained that welfare score

The body condition score was based on the Henneke Body Condition Scoring System which was modified from the 1-9 scale to a 1-5 scale. This adaptation was based on general body condition scores for working equids in developing regions of the world, describing the equid as “thin”, “moderate BCS”, or “obese” (Ali et al., 2016). Of the total sample of working equids, 47.7% (n=31) of equids displayed a body condition score range of 1-2. A body condition score of 1-2 indicated that there was emaciation seen throughout the equids body with visible ribs, withers, shoulders, hips, and tail head. Some of the sample displayed stronger welfare scores with 20% (n=13) falling within the range of 2.5-3.5 which indicated that ribs were visible, points of the shoulder bones were visible, and points of the hips were palpable; equids that fell in this range had moderate fat covering across their bodies. The remaining 32.3% (n=21) of the total sample received a body condition score of 4-5. This indicated fat covering was seen throughout the body; ribs and hip bones were not visible but could be felt when palpated.

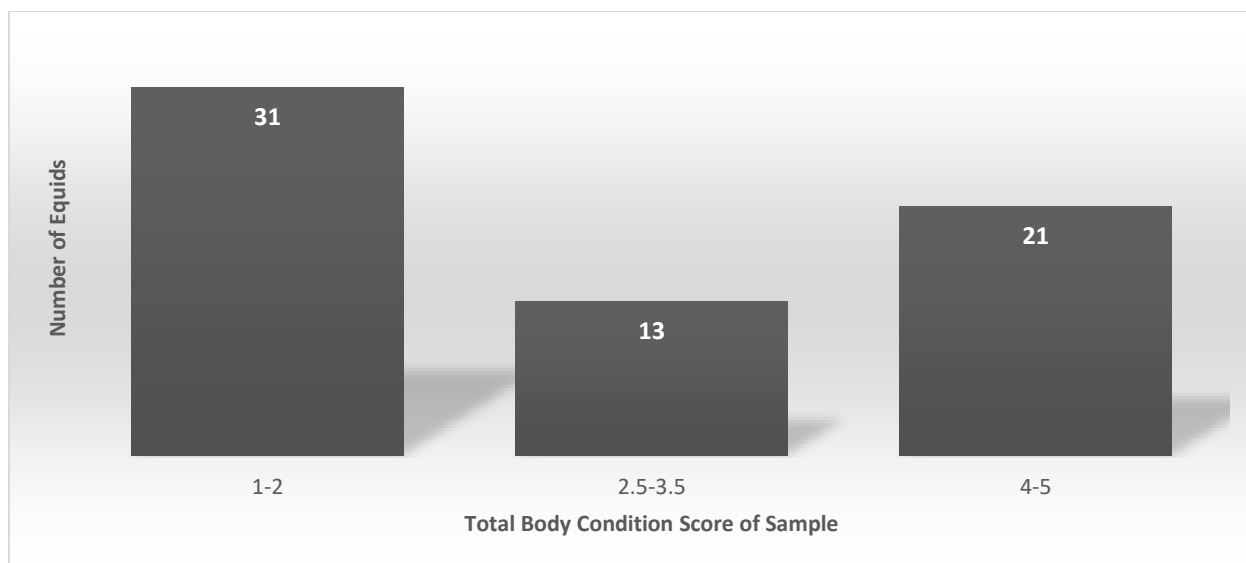


Figure 4.14 Total Body Condition Scores (BCS) of the Sample in the Study (n=65)

A working equid coat score was tabulated via the addition of three subcategories which included overall coat health, presence of ectoparasites, and if the equid was recently groomed. The minimum score attainable was a 0 which indicated an unhealthy parasite infested coat. Whereas a maximum score of 3 indicated a parasite free healthy coat. Figure 4.15 below represents the total samples (n=65) distribution of the total coat score.

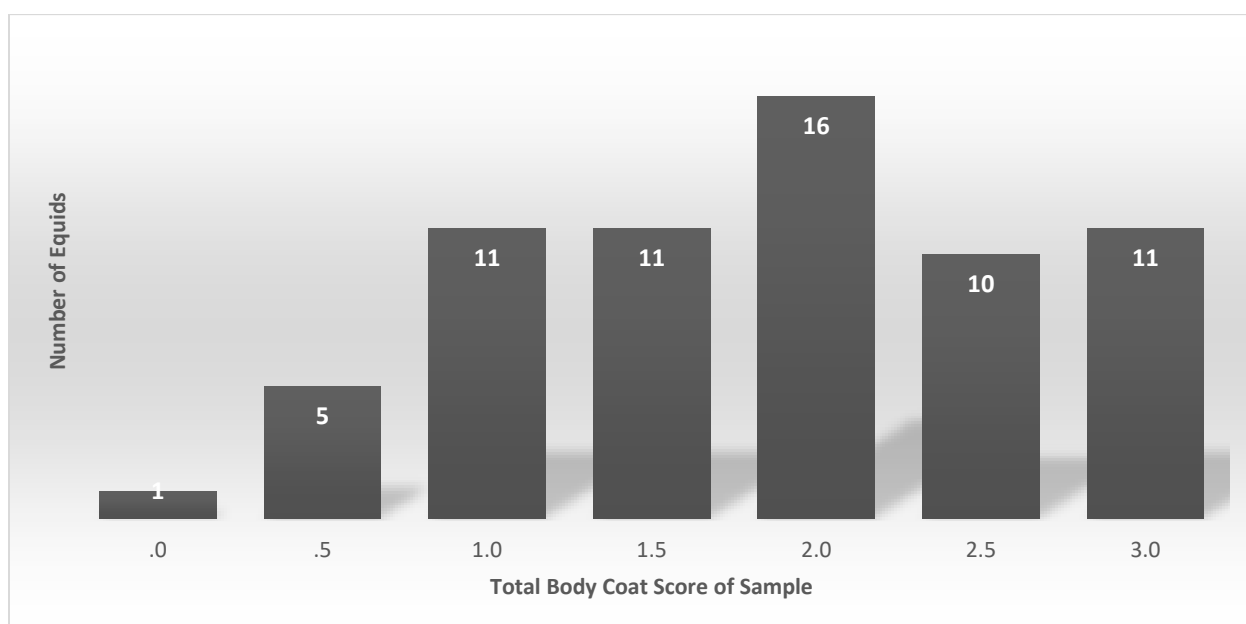


Figure 4.15 Total Body Coat Scores (BCoS) of the Sample in the Study (n=65)

To calculate the total body lesion score, numerous categories were included which comprised of the harness induced body lesion (HIL) score (broken down into subsections of the equid body including neck, shoulders, sides of chest, withers, and spine), mistreatment induced body lesion (MIL) score (broken down into subsections of the equid body including points of hocks, nasal bridge and lips, and hind quarters), overworked induced body lesions (OIL) (broken down into subsections of the equid body including pain or swelling of forelimbs, hindlimbs, tendons, fetlock, and anterior aspect of knee) other body lesions (OBL) seen on the body aside from those previously accounted, firing (FL) and tethering lesions (TL). A minimum score of 0 represented a body with significant, potentially debilitating lesions across its body whereas a maximum score of 11 indicated an equid free of lesions or swelling. Figure 4.16 below, displays the total body lesion scores for the entire sample (n=65).

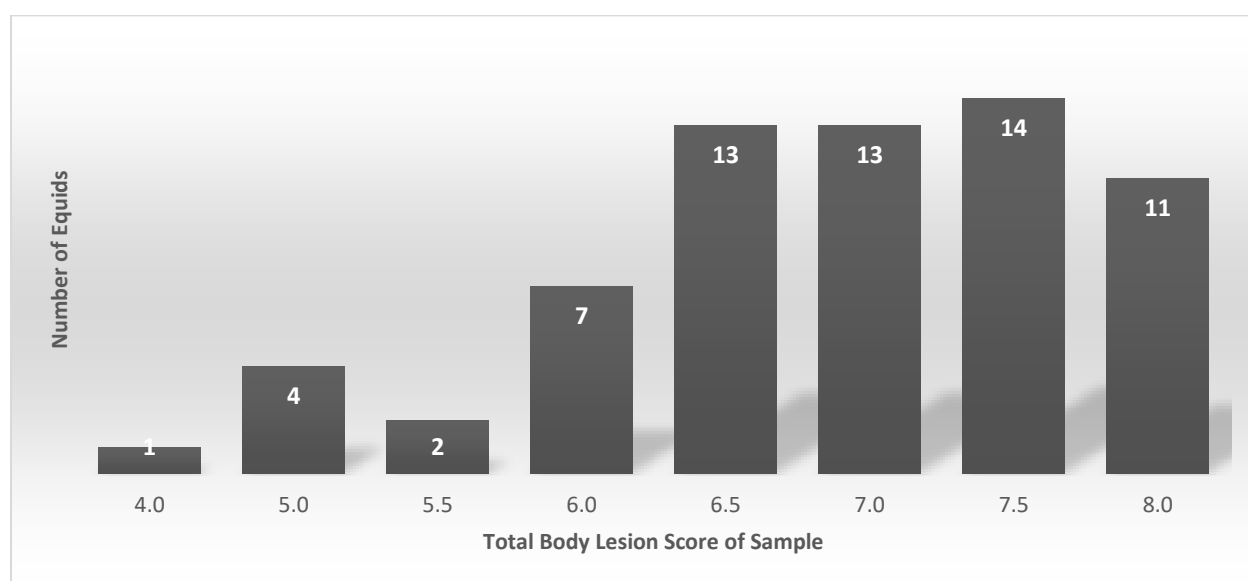


Figure 4.16 Total Body Lesion Scores (BLS) of the Sample in the Study (n=65)¹⁰

¹⁰ The total BLS score is derived from subcategories HIL, MIL, OIL, OBL, FL, and TL

The total hoof score was also calculated as part of the total welfare score of the working equid. A score of 0 indicated the equid had severe cracks, chips, or displays of lameness when moving. A maximum score of 1 indicated the equid had acceptable hooves to conduct its daily routine, free of any visual signs of lameness such as shortened stride length, head bobbing when walking, or an obvious limp. The score of 1 also indicated that the overall hoof structure was intact, with no debilitating cracks or chips. Only 7.7% (n=5) of the total sample scored a 0.5

which indicated minor cracks or chips in the hooves; these cracks may or may not have caused lameness in the equid depending on the location and severity of the crack.

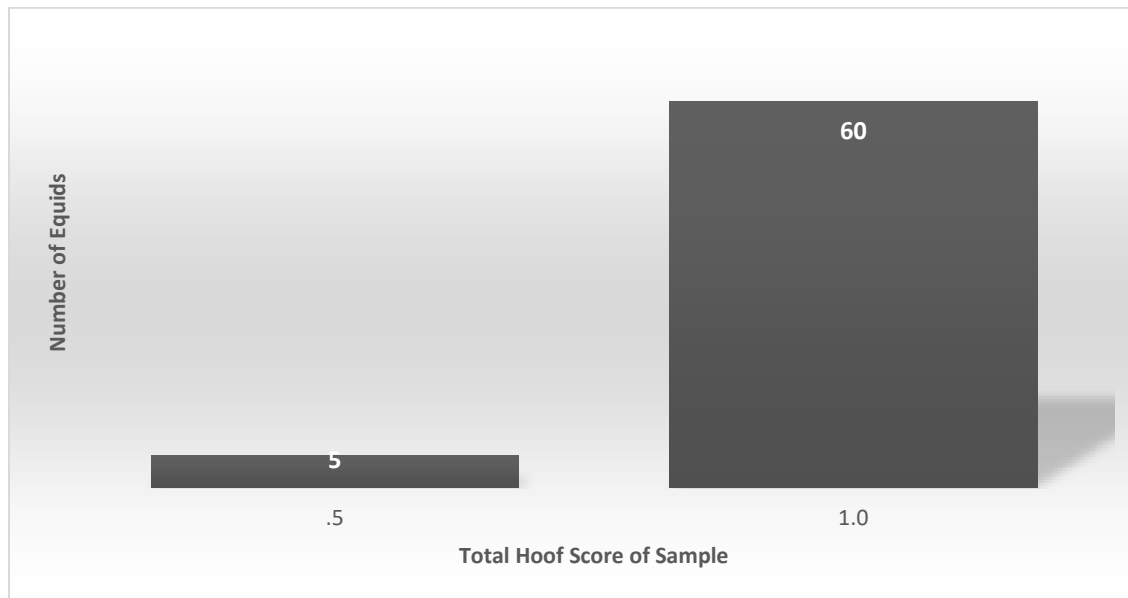


Figure 4.17 Total Hoof Scores (HS) of the Sample in the Study (n=65)

Table 4.7 below displays the total unweighted scores from the total working equid sample (n=65). The total welfare score for the sample had a minimum score of 9.25 and a maximum score of 15.5, out of 19 total possible points, regarding overall welfare of the working equids. Additional ranges in the total behavior, body condition, coat, body lesions, and hoof scores can be observed below. The total behavior score (BS) had the potential to score a minimum of 0 and a maximum of 3; the average BS of the sample (n=65) was 1.9385 with 0.57 standard deviation. This value indicated that the overall BS of the sample exhibited any combination of alertness, non-aggressive behavior, and acceptance of observer approach. The total body condition score of the sample of working equids received 0.5423 with 0.33 standard deviation out of a total possible score of 1. The mean of the sample indicated that the working equids displayed an average body condition score (BCS) of 2.5-3.5 on the adapted BCS scale. With an average BCS of 2.5-3.5 the overall condition of the working equid indicated that ribs were visible, points of the shoulder bones were visible, and points of the hips were palpable; equids that fell in this range had moderate fat covering across their bodies. The sample had an average body coat score (BCoS) of 1.846 and 0.80 standard deviation. The minimum body coat score was 0 with a

maximum of 3; indicating the sample had a moderate coat score with moderate attention and care given to the coat by the owner. The total body lesion score (BLS) had the potential to score a minimum of 0 and a maximum of 11; the average BLS of the sample (n=65) was 6.854 with 0.91 standard deviation. This value indicated that the overall BLS of the sample exhibited numerous areas in which lesions were present; severity and size of lesion were included when tabulating the overall BLS but was not explicitly documented on the assessment. The total sample average for hoof score was 0.962 with 0.13 standard deviation. With a minimum score of 0 and a maximum possible score of 1, the overall hoof score of the sample was commendable. An average score of 0.962 indicated most of the sample had exemplary hooves with little to no cracks or chips.

Table 4.7

Frequencies, Means, Standard Errors, and Ranges of the Working Equid Welfare Assessment from the Total Sample (n=65)¹¹

	N Statistic	Minimum Statistic	Maximum Statistic	Mean		Std. Deviation Statistic
				Statistic	Std. Error	
Behavior Score Unweighted (BS)	65	.50	3.00	1.9385	.07063	.56945
Body Condition Score Unweighted (BCS)	65	.25	1.00	.5423	.04123	.33240
Body Coat Score Unweighted (BCoS)	65	.0	3.0	1.846	.0992	.8000
Body Lesions Score Unweighted (BLS)	65	4.0	8.0	6.854	.1127	.9088
Hoof Score Unweighted (HS)	65	.5	1.0	.962	.0167	.1343
Total Welfare Score Unweighted (TWS)	65	9.25	15.50	12.1423	.20952	1.68922
Valid N (listwise)	65					

¹¹ *Statistical Analysis of the Study's Working Equids*

A detailed summary of the descriptive scoring characteristics can be seen in table 4.8 below. How to calculate the total welfare scoring and associated categories can be found in Appendix G.

Table 4.8

Summary of the Descriptive Scoring Characteristics and Ranges for each Welfare Category

Total Welfare Scoring Category	Description of Category
Behavior Score (BS)	<p>The parameters measured in this study included a behavior score tabulated by adding the values of the equid's alertness, response to observer approach, and the acceptance or rejection of chin contact from the observer. Equids could have scored a minimum of 0, indicating a depressed aggressive and unresponsive state. The maximum score and equid could receive was a 3 indicating alert calm and social behavior.</p>
Body Condition Score (BCS)	<p>The body condition score was based on the adapted version of the Henneke Body Condition Scoring System. A body condition score of 1-2 ("thin") indicated that there was emaciation seen throughout the equid's body with visible ribs, withers, shoulders, hips, and tail head. A range of 2.5-3.5 ("moderate BCS") indicated that ribs were visible, points of the shoulder bones were visible, and points of the hips were palpable; equids that fell in this range had moderate fat covering across their bodies. A condition score of 4-5 ("obese") indicated fat covering was seen throughout the body; ribs and hip bones were not visible but could be felt when palpated.</p>

Total Welfare Scoring Category	Description of Category
Body Coat Score (BCoS)	A working equid coat score was tabulated via the addition of three subcategories which included overall coat health, presence of ectoparasites, and if the equid was recently groomed. The minimum score attainable was a 0 which indicated an unhealthy parasite infested coat. Whereas a maximum score of 3 indicated a parasite free healthy coat.
Body Lesion Score (BLS)	The total body lesion score, numerous categories were included which comprised of the harness induced body lesion (HIL) score (broken down into subsections of the equid body including neck, shoulders, sides of chest, withers, and spine), mistreatment induced body lesion (MIL) score (broken down into subsections of the equid body including points of hocks, nasal bridge and lips, and hind quarters), overworked induced body lesions (OIL) (broken down into subsections of the equid body including pain or swelling of forelimbs, hindlimbs, tendons, fetlock, and anterior aspect of knee) other body lesions (OBL) seen on the body aside from those previously accounted, firing (FL) and tethering lesions (TL). A minimum score of 0 represented a body with significant, potentially debilitating lesions across its body whereas a maximum score of 11 indicated an equid free of lesions or swelling.
Hoof Score (HS)	The total hoof score was also calculated as part of the total welfare score of the working equid. A score of 0 indicated the equid had severe cracks, chips, or displays of lameness when moving. A maximum score of 1 indicated the equid had acceptable hooves to conduct its

Total Welfare Scoring Category	Description of Category
	daily routine, free of any visual signs of lameness such as shortened stride length, head bobbing when walking, or an obvious limp. The score of 1 also indicated that the overall hoof structure was intact, with no debilitating cracks or chips.
Total Welfare Score (TWS)	The minimum score attainable was a 0 which represented an equid with critically poor welfare, while the maximum score attainable was a 19 which indicated an equid in top condition with exemplary welfare conditions. The TWS was calculated through the addition of the total BS, BCS, BCoS, BLS, and HS scores for each working equid.

Working Equid Welfare Scores in Villecito

Refer to table 4.8 to review the descriptive qualifications and possible score ranges for the total welfare score. Figure 4.20 exhibits the total welfare scores (TWS) achieved by the working equids in Villecito (n=18). Villecito had a TWS ranging from 10-15.5 among the 18 equids assessed.



Figure 4.18 Total Welfare Scores (TWS) of the Working Equids in Vilecito (n=18)^{12,13}

¹²The number in each bar represents the number of equid who attained that welfare score

¹³The total welfare score is determined through the addition of the total scores from BS, BCS, BCoS, BLS, and HS

Table 4.9 below displays the total unweighted scores of working equids from the village of Vilecito (n=18). The total welfare score for Vilecito had a minimum score of 10.0 and a maximum score of 15.5, out of 19 total possible points, regarding overall welfare of the working equids. The average total welfare score for Vilecito was 12.29 indicating moderately strong overall welfare. The elements that lowered the overall score were in the body lesion and body coat score categories; these categories had lower total averages causing the total welfare score to decrease. Additional ranges in the total behavior, body condition, coat, body lesions, and hoof scores can be observed below. The total behavior score (BS) had the potential to score a minimum of 0 and a maximum of 3; the average BS of Vilecito (n=18) was 1.8750 with 0.69 standard deviation. This value indicated that the overall BS from most of the sample exhibited any combination of alertness, non-aggressive behavior, and acceptance of observer approach. The total body condition score of the sample of working equids received 0.5000 with 0.30 standard deviation out of a total possible score of 1. The mean of the sample indicated that the working equids displayed an average body condition score (BCS) of 2.0-2.5 on the adapted BCS scale. With an average BCS of 2.0-2.5 the overall condition of the working equid indicated that ribs were prominent, points of the shoulder bones were visible, and presented a sunken

appearance at the hips; equids that fell in this range had minor fat covering across their bodies and were considered thin. The sample had an average body coat score (BCoS) of 1.778 and 0.73 standard deviation. The minimum body coat score was 0 with a maximum of 3; indicating the sample had a moderately high coat score where attention and care given to the coat by the owner was visible by the lack of ectoparasites and sheen to the coat hairs. The total body lesion score (BLS) had the potential to score a minimum of 0 and a maximum of 11; the average BLS of Villecito (n=18) was 7.250 with 0.79 standard deviation. This value indicated that the overall BLS of the sample exhibited areas in which minor lesions were present; severity and size of lesion were included when tabulating the overall BLS but was not explicitly documented on the assessment. The total sample average for hoof score was 0.889 with 0.21 standard deviation. With a minimum score of 0 and a maximum possible score of 1, the overall hoof score of the sample was commendable. An average score of 0.889 indicated most of the sample had exemplary hooves with little to no cracks or chips. Villecito was an urban based village in Catacamas in which resources and trade skills were readily accessible to equid owners. The equid owners of Villecito had access to a farrier who would regularly trim and file hooves, thus increasing the average total hoof score of the working equids in Villecito.

Table 4.9

Frequencies, Means, Standard Errors, and Ranges of the Working Equid Welfare Assessment from Villecito (n=18)¹⁴

		Statistics					
		Behavior Score	Body Condition Score	Body Coat Score	Body Lesions Score	Hoof Score	Total Welfare Score
		Unweighted (BS)	Unweighted (BCS)	Unweighted (BCoS)	Unweighted (BLS)	Unweighted (HS)	Unweighted (TWS)
N	Valid	18	18	18	18	18	18
	Missing	0	0	0	0	0	0
Mean		1.8750	.5000	1.778	7.250	.889	12.2917
Std. Error of Mean		.16326	.07001	.1726	.1863	.0504	.34670
Std. Deviation		.69266	.29704	.7321	.7906	.2139	1.47092
Minimum		.75	.25	.0	5.0	.5	10.00
Maximum		3.00	1.00	3.0	8.0	1.0	15.50

¹⁴ *Statistical Analysis of Villecito's Working Equids*

Figures 4.19-4.23 represent the distributions of individual categories that comprise the total welfare score for the working equids in Villecito (n=18). Equids could have scored a minimum of 0, indicating a depressed, aggressive and/or unresponsive state. The maximum score and equid could receive was a 3 indicating alert calm and social behavior. Figure 4.19 below displays the distribution of behavior scores recorded in Villecito (n=18). Refer to table 4.8 to review the descriptive qualifications and possible score ranges for each welfare category.

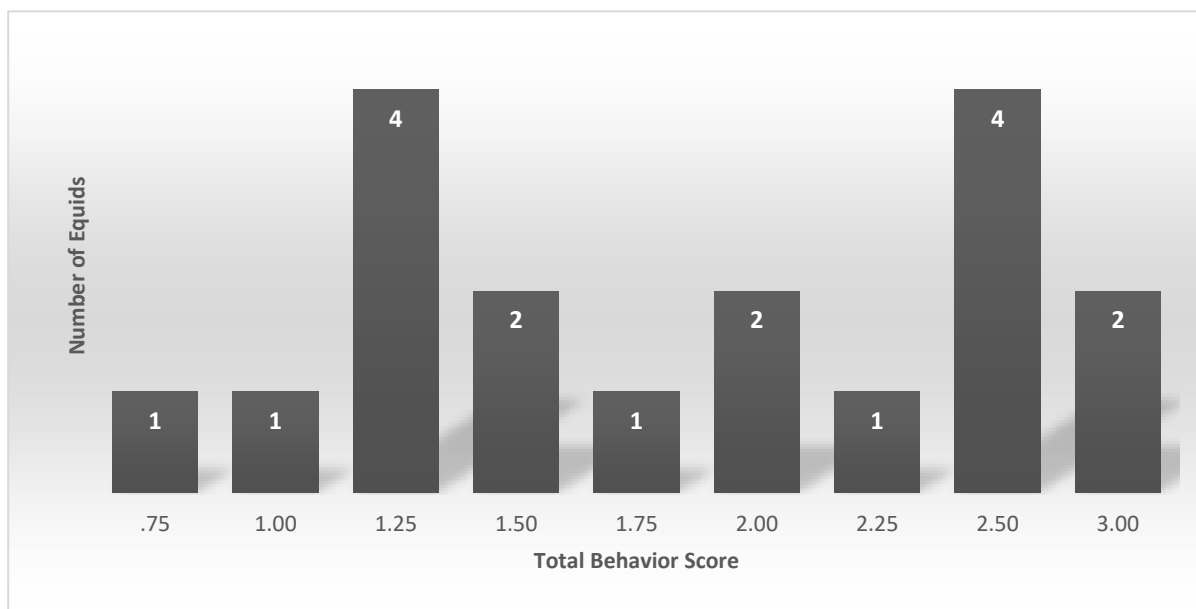


Figure 4.19 Total Welfare Scores (TWS) of the Working Equids in Villecito (n=18)¹⁵

¹⁵ The number in each bar represents the number of equid who attained that welfare score

Of the working equids in Villecito, 44.4% (n=8) scored a BCS of 1-2 as seen in figure 4.20 below. Some of the sample displayed stronger welfare scores with 33.3% (n=6) falling within the range of 2.5-3.5 while the remaining 22.2% (n=4) of Villecito received a 4-5 body condition score.

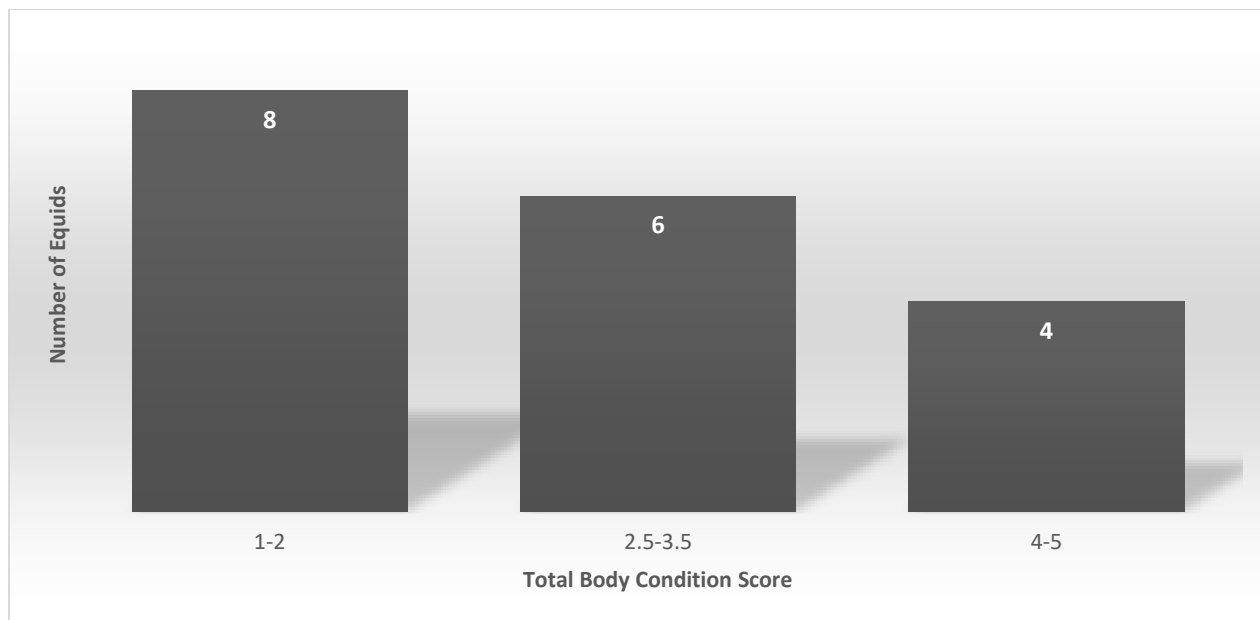


Figure 4.20 Total Body Condition Scores (BCS) of the Working Equids in Vilecito (n=18)

Figure 4.21, below, displays the distribution of behavior scores recorded in the sample of working equids from Vilecito (n=18). From the sample, 22.2% (n=4) scored a total behavior score of 2.5 and 11.1% (n=2) scored a 3 which indicated that the animal was displaying calm behavior.

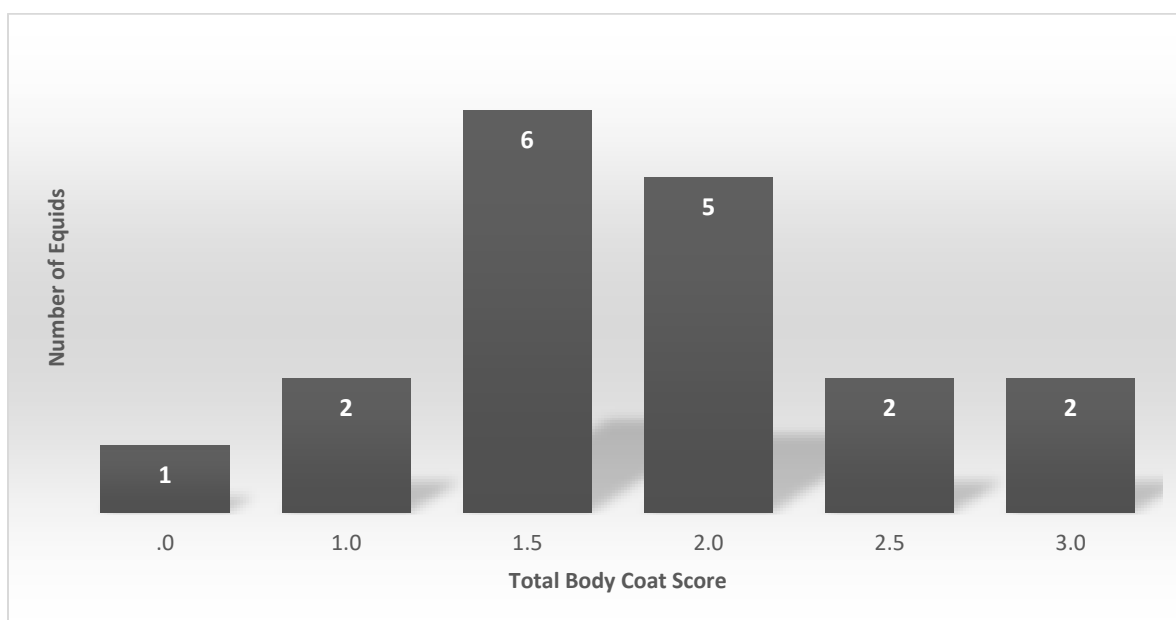


Figure 4.21 Total Body Coat Scores (BCoS) of the Working Equids in Vilecito (n=18)

Figure 4.22 below, displays the total body lesion scores for Vilecito (n=18). Refer to table 4.8 for a complete description of the body lesion scoring parameters. Of the working equids, 33.3% (n=6) scored a BLS of 8 out of a total of 11 possible points, indicating that the overall presence of body lesions was minimal and non-severe.

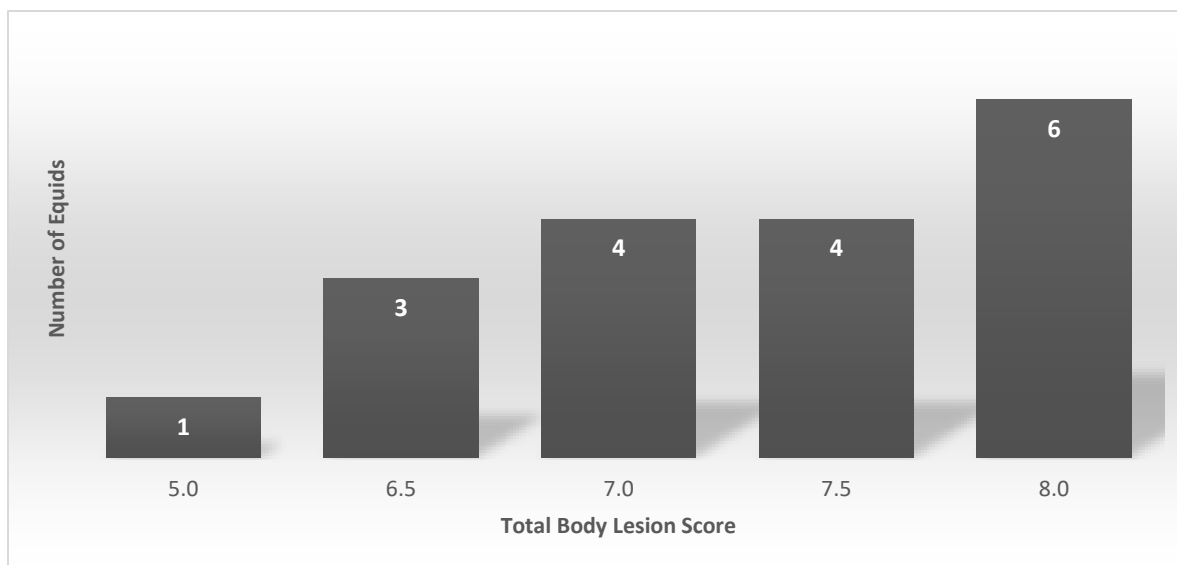


Figure 4.22 Total Body Lesion Scores (BLS) of the Working Equids in Vilecito (n=18)¹⁶

¹⁶ The total BLS score is derived from subcategories HIL, MIL, OIL, OBL, FL, and TL

Figure 4.23, below, specifies 22.2% (n=4) of the total sample scored a 0.5 which indicated minor cracks or chips in the hooves; these cracks may or may not have caused lameness in the equid depending on the location and severity of the crack. The remaining 77.8% (n=14) of the working equids in Vilecito scored a 1, indicating the equids hooves were in acceptable condition.

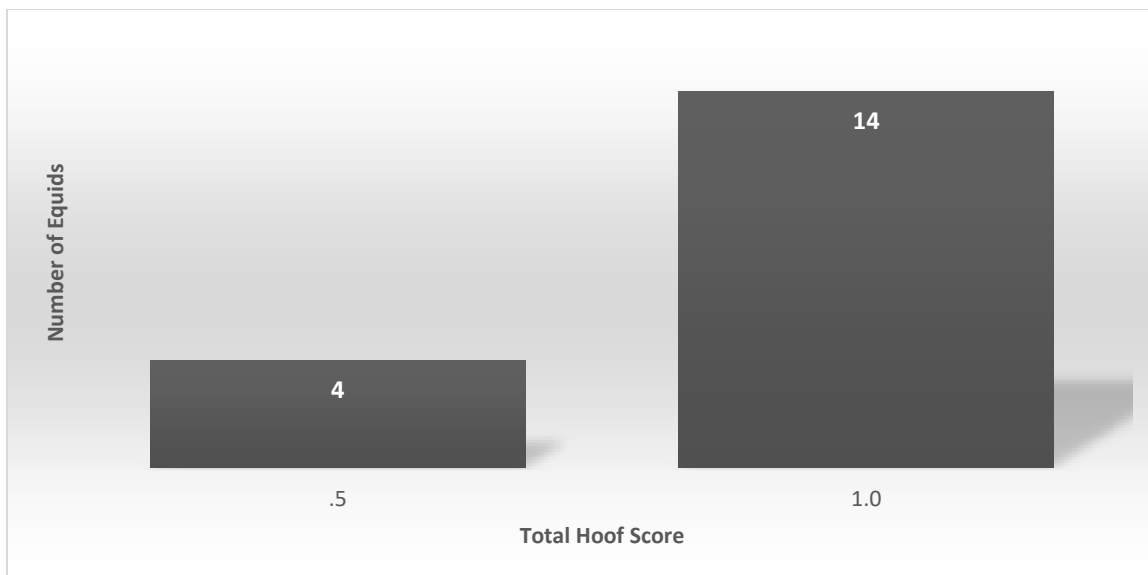


Figure 4.23 Total Hoof Scores (HS) of the Working Equids in Vilecito (n=18)

Working Equid Welfare Scores in Aguaquire

A total welfare score, in addition to a behavior, body condition, coat, body lesion, and hoof scores were calculated for each village. Figure 4.24 exhibits the total welfare scores (TWS) achieved by the working equids in Aguaquire (n=14). Aguaquire had a TWS ranging from 10.25-15.5 among the 14 equids assessed.

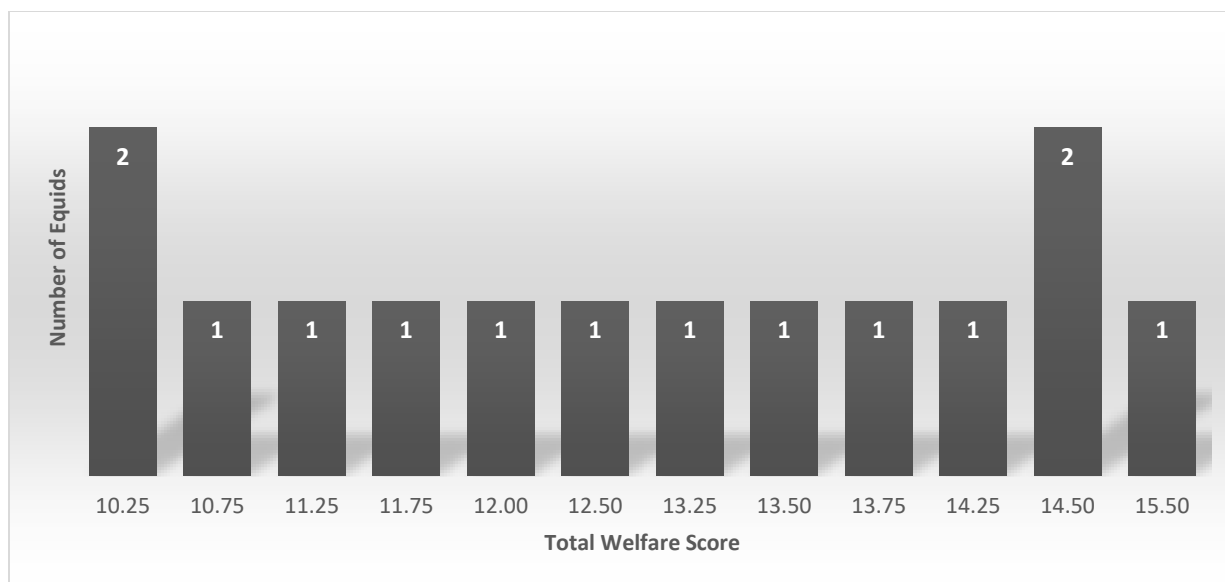


Figure 4.24 Total Welfare Scores (TWS) of the Working Equids in Aguaquire (n=14)^{17,18}

¹⁷The number in each bar represents the number of equid who attained that welfare score.

¹⁸The total welfare score is determined through the addition of the total scores from BS, BCS, BCoS, BLS, and HS.

Table 4.10 below displays the total unweighted scores of working equids from the village of Aguaquire (n=14). The total welfare score for Aguaquire had a minimum score of 10.25 and a maximum score of 15.5, out of 19 total possible points, regarding overall welfare of the working equids. The average total welfare score for Aguaquire was 12.71 indicating moderately strong overall welfare. The elements that lowered the overall score were in the body lesion and body coat score categories; these categories had lower total averages causing the total welfare score to decrease. Additional ranges in the total behavior, body condition, coat, body lesions, and hoof scores can be observed below. The total behavior score (BS) had the potential to score a minimum of 0 and a maximum of 3; the average BS of Aguaquire (n=14) was 2.1429 with 0.35 standard deviation. This value indicated that the overall BS from most of the sample exhibited any combination of alertness, non-aggressive behavior, and acceptance of observer approach. The total body condition score of the sample of working equids received 0.5357 with 0.32 standard deviation out of 1 total possible points. The mean of the sample indicated that the working equids displayed an average body condition score (BCS) of 2.0-2.5 on the adapted BCS scale. With an average BCS of 2.0-2.5 the overall condition of the working equid indicated that ribs were prominent, points of the shoulder bones were visible, and presented a sunken appearance at the hips; equids that fell in this range had minor fat covering across their bodies

and were considered thin. The sample had an average body coat score (BCoS) of 1.786 and 0.91 standard deviation. The minimum body coat score was 0 with a maximum of 3; indicating the sample had a moderate coat score where attention and care was given to the coat. The total body lesion score (BLS) had the potential to score a minimum of 0 and a maximum of 11; the average BLS of Aguaquire (n=14) was 7.286 with 0.47 standard deviation. This value indicated that the overall BLS of the sample exhibited areas in which lesions were present; severity and size of lesion were included when tabulating the overall BLS but was not explicitly documented on the assessment. The total sample average for hoof score was 0.964 with 0.13 standard deviation. With a minimum score of 0 and a maximum possible score of 1, the overall hoof score of the sample was commendable. An average score of 0.964 indicated the sample had exemplary hooves with little to no cracks or chips. Aguaquire was a rural based village in Catacamas with a town farrier available to equid owners.

Table 4.10

Frequencies, Means, Standard Errors, and Ranges of the Working Equid Welfare Assessment from Aguaquire (n=14)¹⁹

		Statistics					
		Behavior Score Unweighted (BS)	Body Condition Score <u>Unweighted</u> (BCS)	Body Coat Score Unweighted (BCoS)	Body Lesions Score <u>Unweighted</u> (BLS)	Hoof Score <u>Unweighted</u> (HS)	Total Welfare Score Unweighted (TWS)
N	Valid	14	14	14	14	14	14
	Missing	0	0	0	0	0	0
Mean		2.1429	.5357	1.786	7.286	.964	12.7143
Std. Error of Mean		.09345	.08635	.2442	.1253	.0357	.45758
Std. Deviation		.34965	.32310	.9139	.4688	.1336	1.71211
Minimum		1.50	.25	.5	6.5	.5	10.25
Maximum		2.50	1.00	3.0	8.0	1.0	15.50

¹⁹ *Statistical Analysis of Aguaquire's Working Equids*

Figures 4.25-4.29 represent the distributions of individual categories that comprise the total welfare score for the working equids in Aguaquire (n=14). For a complete list of descriptive characteristics and ranges for each welfare category, refer to table 4.8 above.

Figure 4.25, below, displays the distribution of behavior scores recorded in the sample of working equids from Aguaquire (n=14). 35.7% (n=5) of the sample either scored a total

behavior score of 2.5 or 2.0 respectively which indicated that the animal was displaying calm behavior.

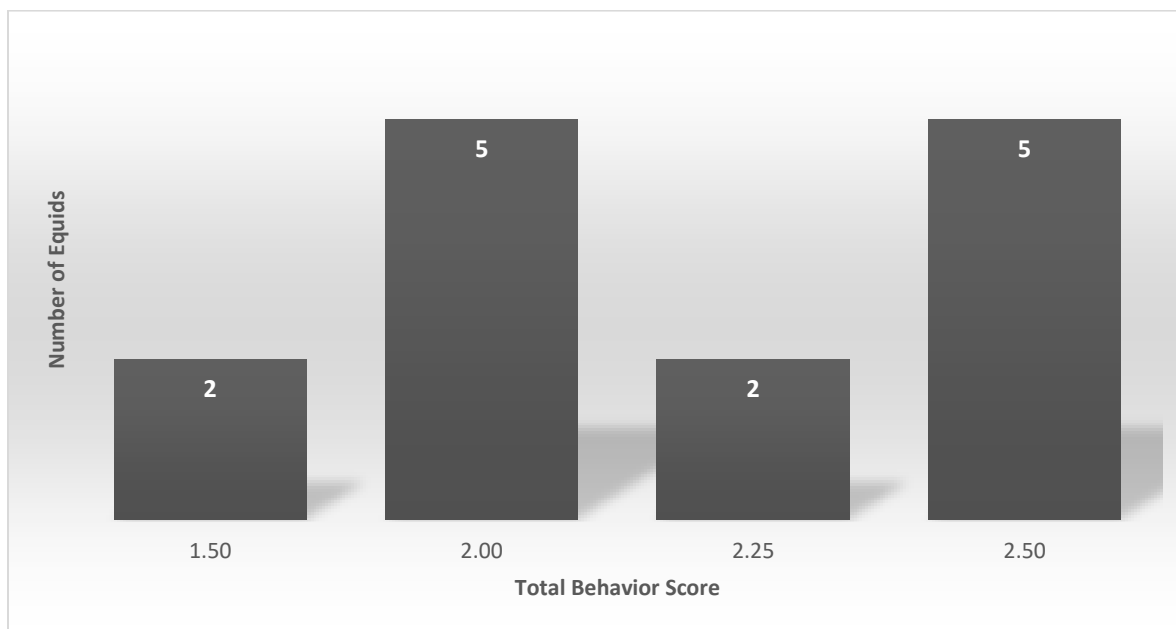


Figure 4.25 Total Behavior Scores (BS) of the Working Equids in Aguaquire (n=14)

From the 14 sampled working equids in Aguaquire, 42.9% (n=6) scored a BCS of 1-2 as seen in figure 4.26 below. Few of the sample displayed strong welfare scores with 38.63% (n=4) falling within the range of 2.5-3.5 or 4-5 respectively.

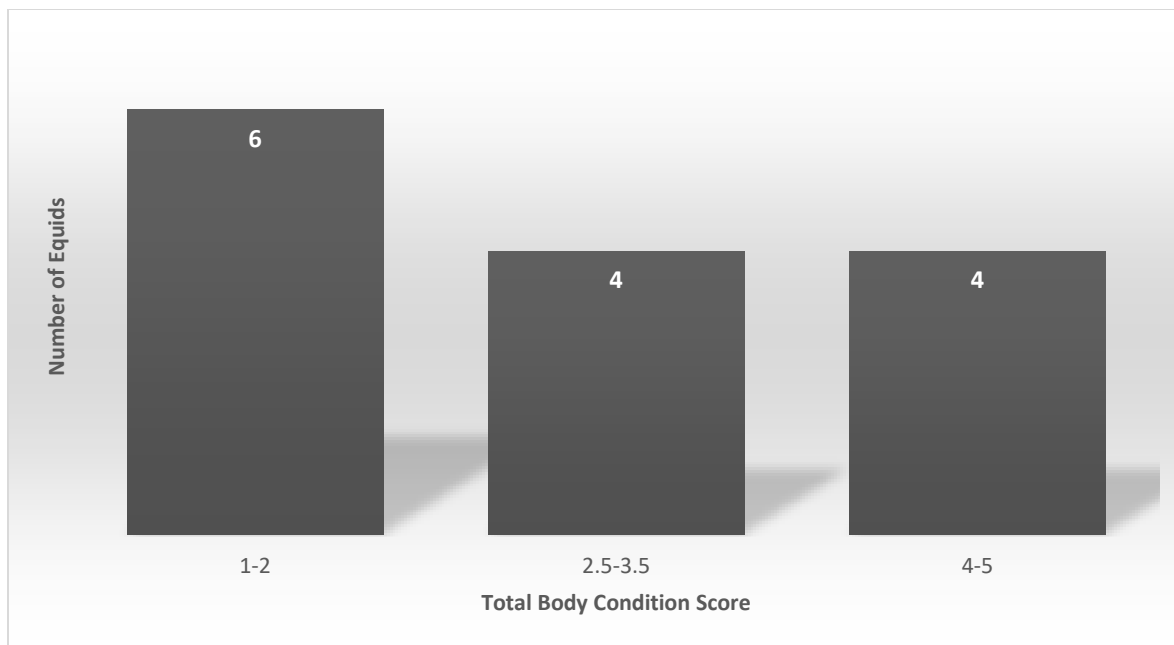


Figure 4.26 Total Body Condition Scores (BCS) of the Working Equids in Aguaquire (n=14)

Figure 4.27 below represents Aguaquire's (n=14) distribution of the total coat score. Refer to table 4.8 for a complete description of the coat scoring parameters. Of the working equids from Aguaquire, 42.9% (n=6) scored a 2.5 BCoS out of 3 total possible points indicating predominately healthy coats; where 7.1% (n=1) had a recently groomed coat that displayed a lustrous appearance and had no ectoparasites present. A total of 21.4% (n=3) of the working equids in Aguaquire scored a total BCoS of 0.5 indicating the equid the overall coat health was poor.

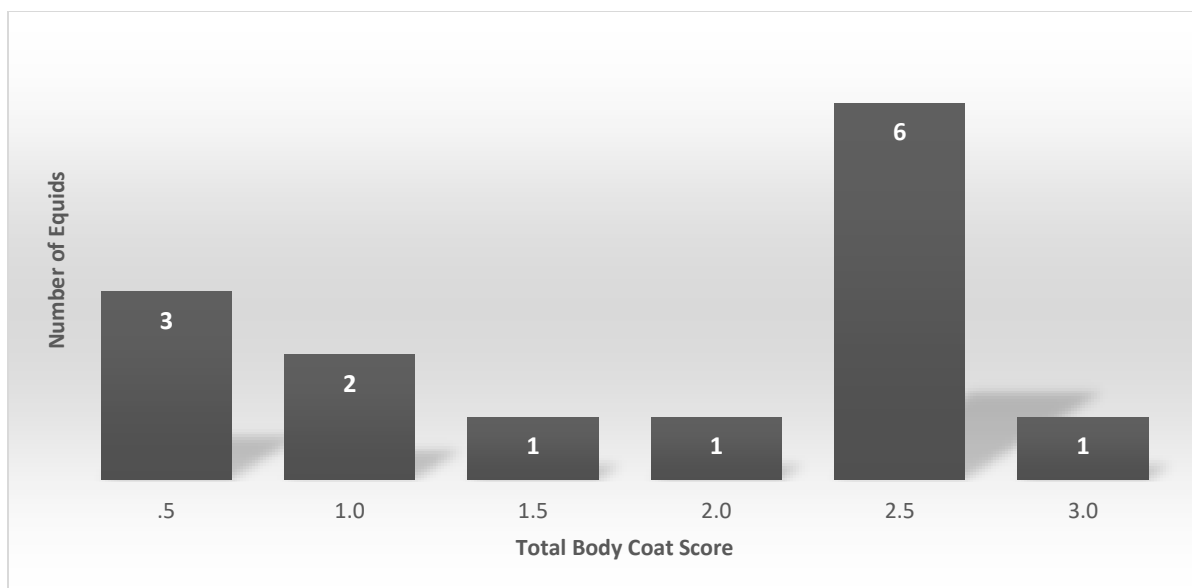


Figure 4.27 Total Body Coat Scores (BCoS) of the Working Equids in Aguaquire (n=14)

Figure 4.28 below, displays the total body lesion scores for Aguaquire (n=14). Refer to table 4.8 for a complete description of the body lesion scoring parameters. Of the working equids in Aguaquire, 42.9% (n=6) scored a BLS of 7.5 out of a total of 11 possible points, indicating that the overall presence of body lesions was minimal and non-severe.

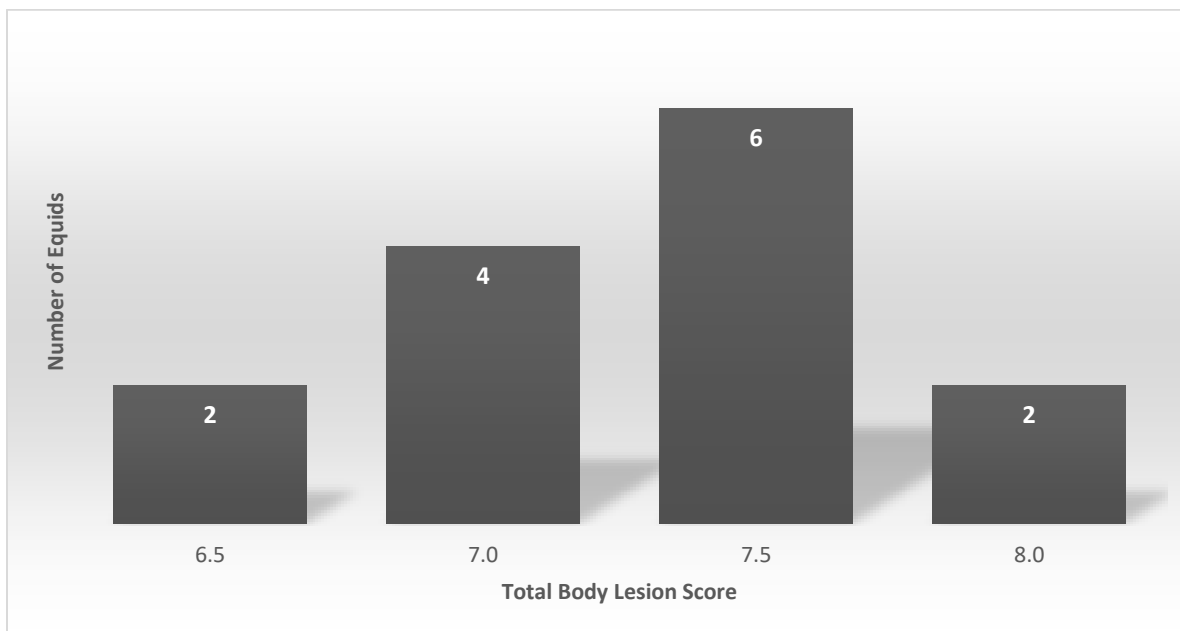


Figure 4.28 Total Body Lesion Scores (BLS) of the Working Equids in Aguaquire (n=14)²⁰

²⁰ The total BLS score is derived from subcategories HIL, MIL, OIL, OBL, FL, and TL

Figure 4.29, below, specifies 7.1% (n=1) of the total sample scored a 0.5 which indicated minor cracks or chips in the hooves; these cracks may or may not have caused lameness in the equid depending on the location and severity of the crack. The remaining 92.9% (n=13) of the working equids in Aguaquire scored a 1, indicating the equids hooves were in acceptable condition.

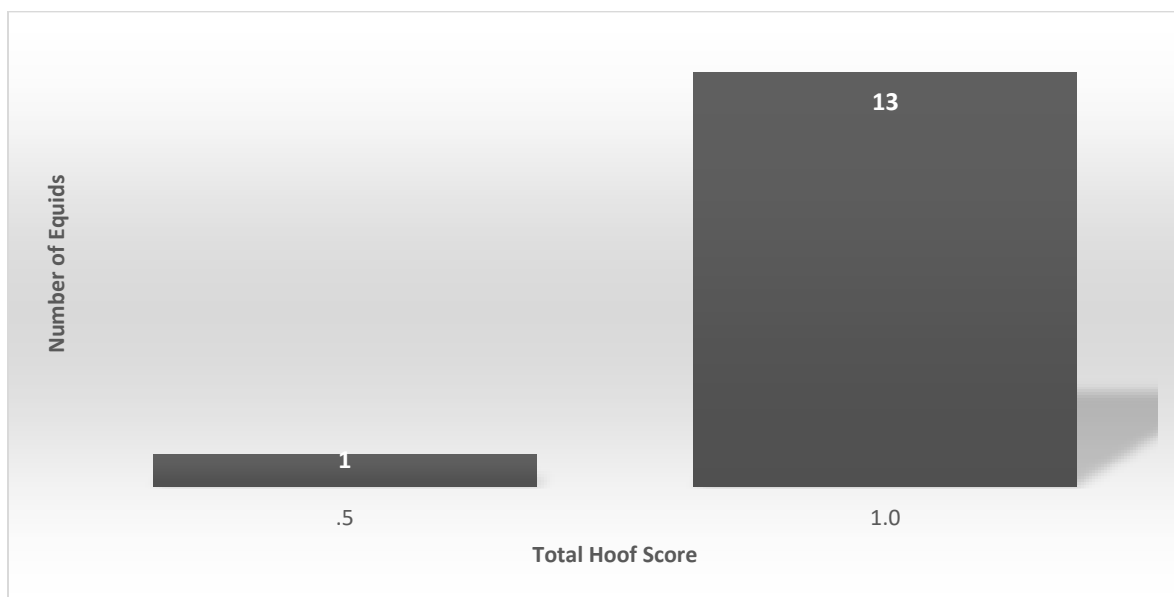


Figure 4.29 Total Hoof Scores (HS) of the Working Equids in Aguaquire (n=14)

Working Equid Welfare Scores in Telmo Ruiz

Refer to table 4.8 to review the descriptive qualifications and possible score ranges for the total welfare score. Figure 4.32 exhibits the total welfare scores (TWS) achieved by the working equids in Telmo Ruiz (n=18). Telmo Ruiz had a TWS ranging from 9.25-15.5 among the 18 equids assessed.

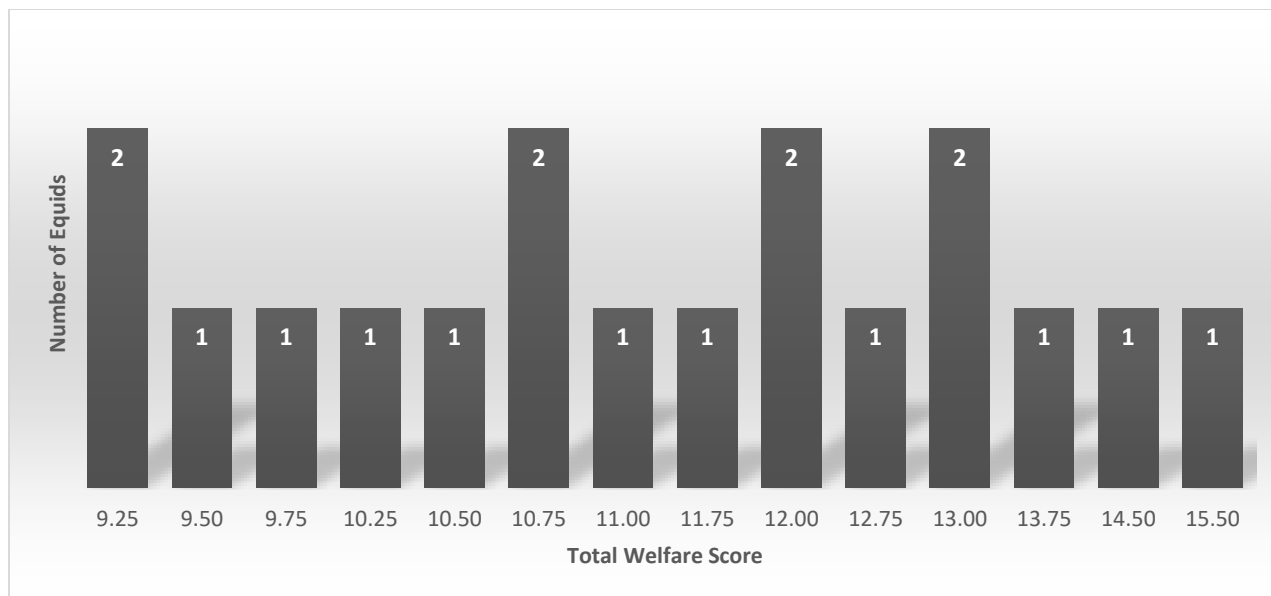


Figure 4.30 Total Welfare Scores (TWS) of the Working Equids in Telmo Ruiz (n=18)^{21,22}

²¹The number in each bar represents the number of equid who attained that welfare score

²²The total welfare score is determined through the addition of the total scores from BS, BCS, BCoS, BLS, and HS

Table 4.11 below displays the total unweighted scores of working equids from the village of Telmo Ruiz (n=18). The total welfare score for Telmo Ruiz had a minimum score of 9.25 and a maximum score of 15.5, out of 19 total possible points, regarding overall welfare of the working equids. The average total welfare score for Telmo Ruiz was 11.63 indicating moderate overall welfare. The elements that lowered the overall score were in the body lesion and body condition score categories; these categories had lower total averages causing the total welfare score to decrease. Additional ranges in the total behavior, body condition, coat, body lesions, and hoof scores can be observed below. The total behavior score (BS) had the potential to score a minimum of 0 and a maximum of 3; the average BS of Telmo Ruiz (n=18) was 1.8889 with 0.61 standard deviation. This value indicated that the overall BS from most of the sample exhibited any combination of alertness, non-aggressive behavior, and acceptance of observer approach. The total body condition score of the sample of working equids received 0.4861 with 0.34 standard deviation out of 1 total possible points. The mean of the sample indicated that the working equids displayed an average body condition score (BCS) of 1.0-2.0 on the adapted BCS scale. With an average BCS of 1.0-2.0 the overall condition of the working equid indicated that all or most ribs were prominent, points of the shoulder bones were protruding, and had a sunken

appearance at the hips with hip points visible; equids that fell in this range had little to no fat covering across their bodies and were considered emaciated. The sample had an average body coat score (BCoS) of 1.694 and 0.89 standard deviation. The minimum body coat score was 0 with a maximum of 3; indicating the sample had a median coat score displaying any combination of a dull coat, brittle hair, or the presence of ectoparasites. The total body lesion score (BLS) had the potential to score a minimum of 0 and a maximum of 11; the average BLS of Telmo Ruiz (n=18) was 6.556 with 0.92 standard deviation. This value indicated that the overall BLS of the sample exhibited significant areas in which numerous lesions were present; severity and size of lesion were included when tabulating the overall BLS but was not explicitly documented on the assessment. The total sample average for hoof score was 1.000 with 0.00 standard deviation. With a minimum score of 0 and a maximum possible score of 1, the overall hoof score of the sample was commendable. An average score of 1.000 indicated the sample had exemplary hooves with no cracks or chips. Telmo Ruiz was a rural based village in Choluteca with a town farrier available to equid owners.

Table 4.11

Frequencies, Means, Standard Errors, and Ranges of the Working Equid Welfare Assessment from Telmo Ruiz (n=18)²³

		Statistics					
		Behavior Score	Body Condition Score	Body Coat Score	Body Lesions Score	Hoof Score	Total Welfare Score
		Unweighted (BS)	Unweighted (BCS)	Unweighted (BcoS)	Unweighted (BLS)	Unweighted (HS)	Unweighted (TWS)
N	Valid	18	18	18	18	18	18
	Missing	0	0	0	0	0	0
Mean		1.8889	.4861	1.694	6.556	1.000	11.6250
Std. Error of Mean		.14323	.07950	.2106	.2173	.0000	.43360
Std. Deviation		.60768	.33729	.8934	.9218	.0000	1.83962
Minimum		.75	.25	.5	5.0	1.0	9.25
Maximum		3.00	1.00	3.0	8.0	1.0	15.50

²³ *Statistical Analysis of Telmo Ruiz's Working Equids*

Figures 4.31-4.34 represent the distributions of individual categories that comprise the total welfare score for the working equids in Telmo Ruiz (n=18). For a complete list of descriptive characteristics and ranges for each welfare category, refer to table 4.8 above.

Figure 4.31, below, displays the distribution of behavior scores recorded in the sample of working equids from Telmo Ruiz (n=18). Of the sample of working equids in Telmo Ruiz, 27.8% (n=5) scored a total behavior score of 2.0 which indicated that the animal was displaying calm behavior. While 27.9% (n=5) of the equid sample scored a behavior score of 2.50 or higher, indicating alert, calm, and approachable behavior.

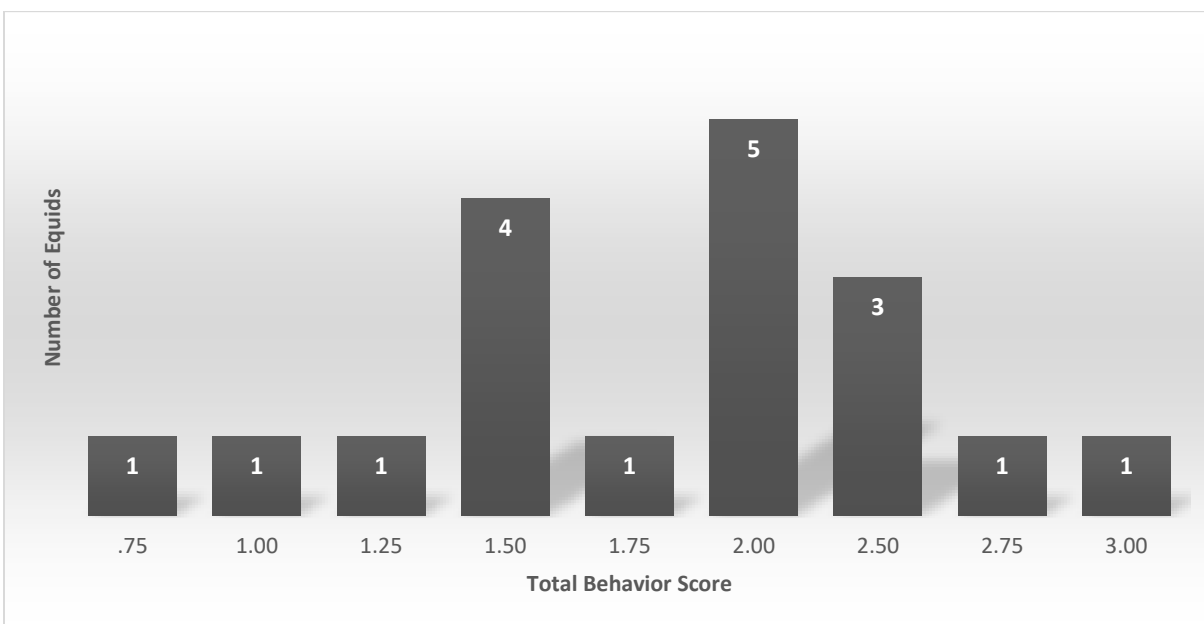


Figure 4.31 Behavior Scores (BS) of the Working Equids in Telmo Ruiz (n=18)

From the sample of working equids in Telmo Ruiz, 61.1% (n=11) scored a BCS of 1-2 as seen in figure 4.32 below. Few of the sample displayed strong welfare scores with 11.1% (n=2) falling within the range of 2.5-3.5 and 27.8% (n=5) 4-5 respectively.

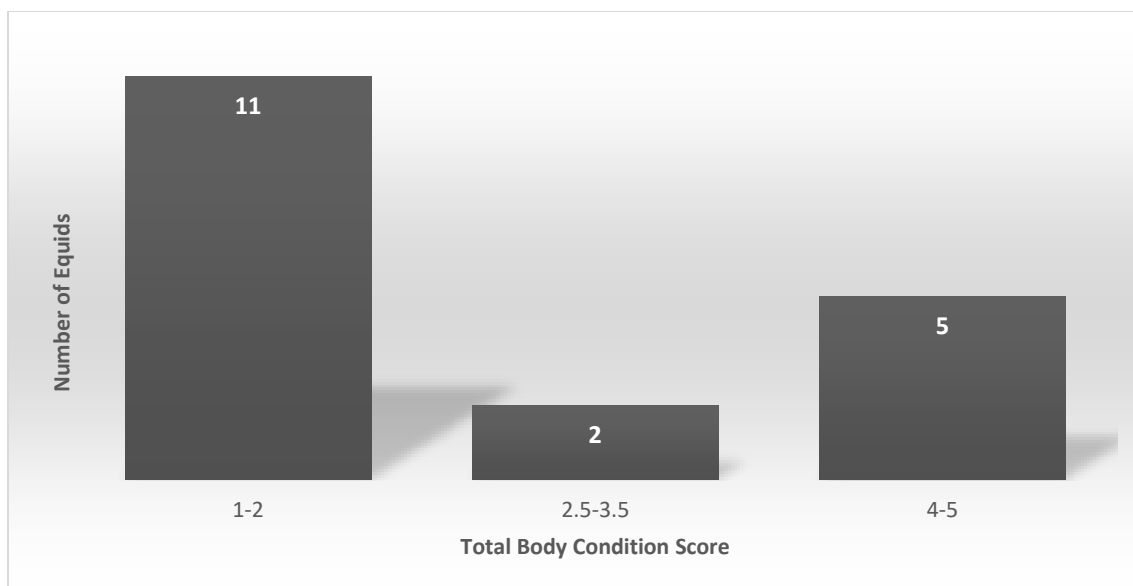


Figure 4.32 Total Body Condition Scores (BCS) of the Working Equids in Telmo Ruiz (n=18)

Figure 4.33 below represents Telmo Ruiz's (n=18) distribution of the total coat score. Refer to table 4.8 for a complete description of the coat scoring parameters. From the 18 working equids, 33.3% (n=6) scored a 1.0 BCoS out of 3 total possible points indicating predominately unhealthy coats; while 22.2% (n=4) scored the maximum 3 points possible indicating the equids had a recently groomed coat that displayed a lustrous appearance and had no ectoparasites present. Of the equids, 11.1% (n=2) scored a total BCoS of 0.5 indicating the equid the overall coat health was poor with characteristics of a dull dry and potentially parasite invested coat appearance.

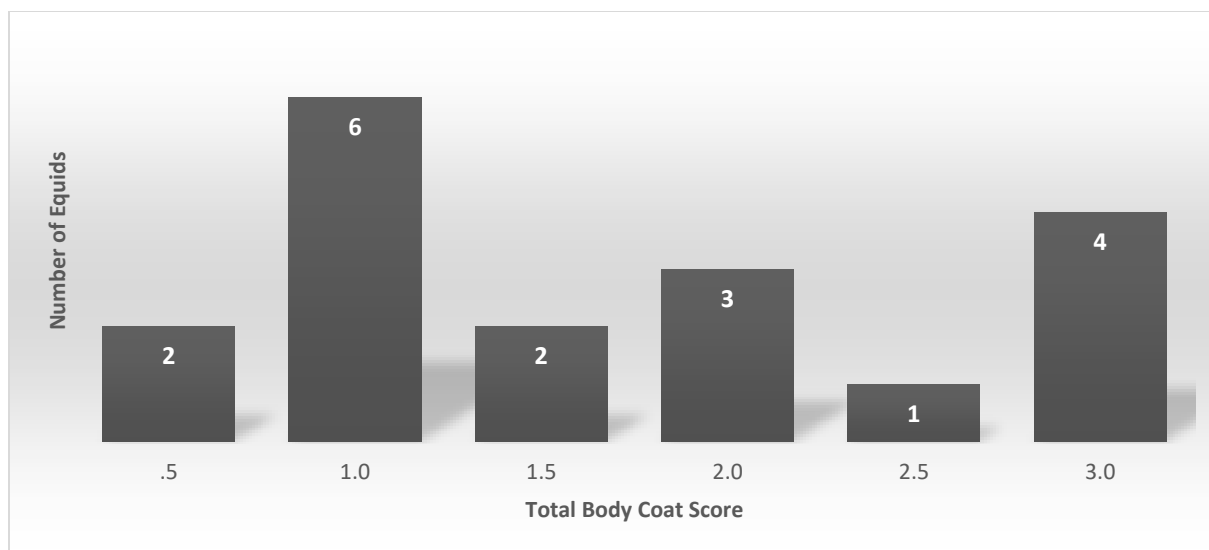


Figure 4.33 Total Body Coat Scores (BCoS) of the Working Equids in Telmo Ruiz (n=18)

Figure 4.34 below, displays the total body lesion scores for Telmo Ruiz (n=18). Refer to table 4.8 for a complete description of the body lesion scoring parameters. Regarding total BLS, 27.8% (n=5) of the working equids scored a BLS of 6.0 out of a total of 11 possible points, indicating the overall presence of body lesions were frequent and in numerous locations on the body.

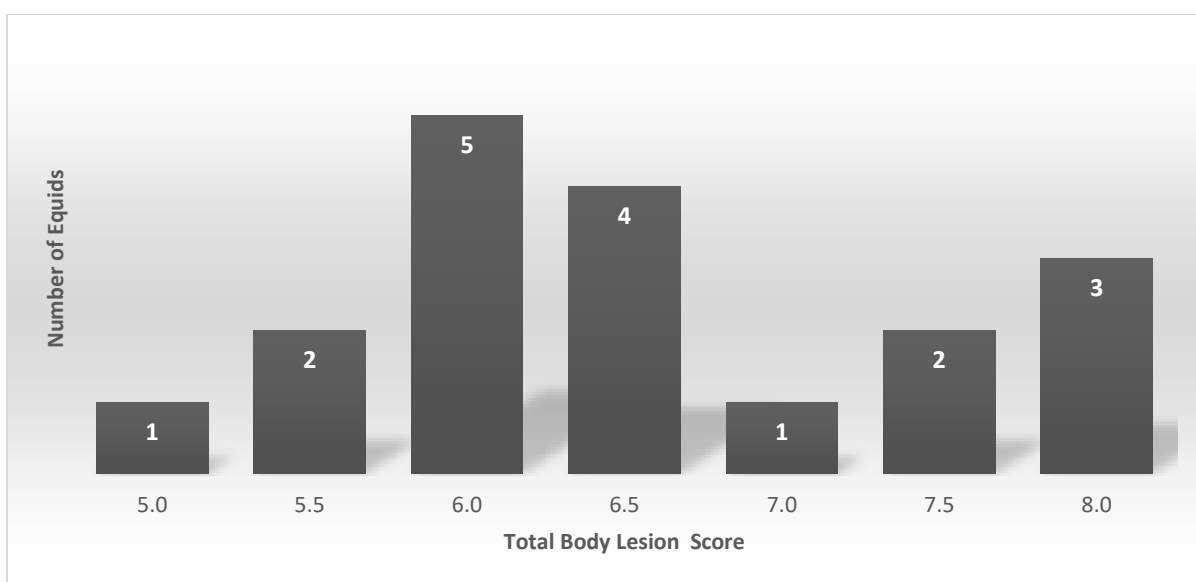


Figure 4.34 Total Body Lesion Scores (BLS) of the Working Equids in Telmo Ruiz (n=18)²⁴

²⁴ The total BLS score is derived from subcategories HIL, MIL, OIL, OBL, FL, and TL

The sample of Telmo Ruiz's working equids scored a 1.0 (100%, n=18) regarding total hoof score indicating the working equids hooves in Telmo Ruiz were healthy and displayed minor to no cracks or other blemishes.

Working Equid Welfare Scores in Altos De La Cruz

Refer to table 4.8 to review the descriptive qualifications and possible score ranges for the total welfare score. Figure 4.35 exhibits the total welfare scores (TWS) achieved by the working equids in Altos De La Cruz (n=15). Altos De La Cruz had a TWS ranging from 9.75-15.0 among the 15 equids assessed. The total welfare score was calculated via the addition of the supplementary five welfare related categories.



Figure 4.35 Total Welfare Scores (TWS) of the Working Equids in Altos De La Cruz (n=15)^{25,26}

²⁵ The number in each bar represents the number of equid who attained that welfare score

²⁶ The total welfare score is determined through the addition of the total scores from BS, BCS, BCoS, BLS, and HS

Table 4.12 below displays the total unweighted scores of working equids from the village of Altos De La Cruz (n=15). The total welfare score for Altos De La Cruz had a minimum score of 9.75 and a maximum score of 15.0, out of 19 total possible points, regarding overall welfare of the working equids. The average total welfare score for Altos De La Cruz was 12.05 indicating reasonable overall welfare. The elements that lowered the overall score were in the

body lesion score category; this category had a lower total average causing the total welfare score to decrease. Additional ranges in the total behavior, body condition, coat, body lesions, and hoof scores can be observed below. The total behavior score (BS) had the potential to score a minimum of 0 and a maximum of 3; the average BS of Altos De La Cruz (n=15) was 1.8833 with 0.53 standard deviation. This value indicated that the overall BS from most of the sample exhibited any combination of alertness, non-aggressive behavior, and acceptance of observer approach. The total body condition score of the sample of working equids received 0.6667 with 0.37 standard deviation out of a total of 1 possible points. The mean of the sample indicated that the working equids displayed a modest body condition score (BCS) of 2.5-3.5 on the adapted BCS scale. With an average BCS of 2.5-3.5, the overall condition of the working equid indicated that ribs were visible, points of the shoulder bones were visible, and points of the hips were palpable; equids that fell in this range had moderate fat covering across their bodies. The sample had an average body coat score (BCoS) of 2.167 and 0.62 standard deviation. The minimum body coat score was 0 with a maximum of 3; indicating the sample had indicating the sample had an exemplary coat score where attention and care was given to the coat indicated by the lustrous coat appearance and lack of ectoparasites. The total body lesion score (BLS) had the potential to score a minimum of 0 and a maximum of 11; the average BLS of Altos De La Cruz (n=15) was 6.333 with 0.99 standard deviation. This value indicated that the overall BLS of the sample exhibited significant areas in which numerous lesions were present; severity and size of lesion were included when tabulating the overall BLS but was not explicitly documented on the assessment. The total sample average for hoof score was 1.000 with 0.00 standard deviation. With a minimum score of 0 and a maximum possible score of 1, the overall hoof score of the sample was commendable. An average score of 1.000 indicated the sample had exemplary hooves with no cracks or chips. Altos De La Cruz was an urban based village in Choluteca with a town farrier available to equid owners.

Table 4.12

Frequencies, Means, Standard Errors, and Ranges of the Working Equid Welfare Assessment from Altos De La Cruz (n=15)²⁷

		Statistics					
		Behavior Score	Body Condition Score	Body Coat Score	Body Lesions Score	Hoof Score	Total Welfare Score
		Unweighted (BS)	Unweighted (BCS)	Unweighted (BCoS)	Unweighted (BLS)	Unweighted (HS)	Unweighted (TWS)
N	Valid	15	15	15	15	15	15
	Missing	0	0	0	0	0	0
Mean		1.8833	.6667	2.167	6.333	1.000	12.0500
Std. Error of Mean		.13773	.09657	.1594	.2567	.0000	.43793
Std. Deviation		.53341	.37401	.6172	.9940	.0000	1.69611
Minimum		.50	.25	1.0	4.0	1.0	9.75
Maximum		2.50	1.00	3.0	7.5	1.0	15.00

²⁷ *Statistical Analysis of Altos De La Cruz's Working Equids*

Figures 4.36-4.39 represent the distributions of individual categories that comprise the total welfare score for the working equids in Altos De La Cruz (n=15). For a complete list of descriptive characteristics and ranges for each welfare category, refer to table 4.8 above.

Figure 4.36, below, displays the distribution of behavior scores recorded in the sample of working equids from Altos De La Cruz (n=15). Of the sample of working equids in Altos De La Cruz, 26.7% (n=4) scored a total behavior score of 2.0 with an additional 26.7% (n=4) scoring a 2.5 which indicated that the animal was displaying on or more behavioral observations such as alert, calm, and approachable behavior.

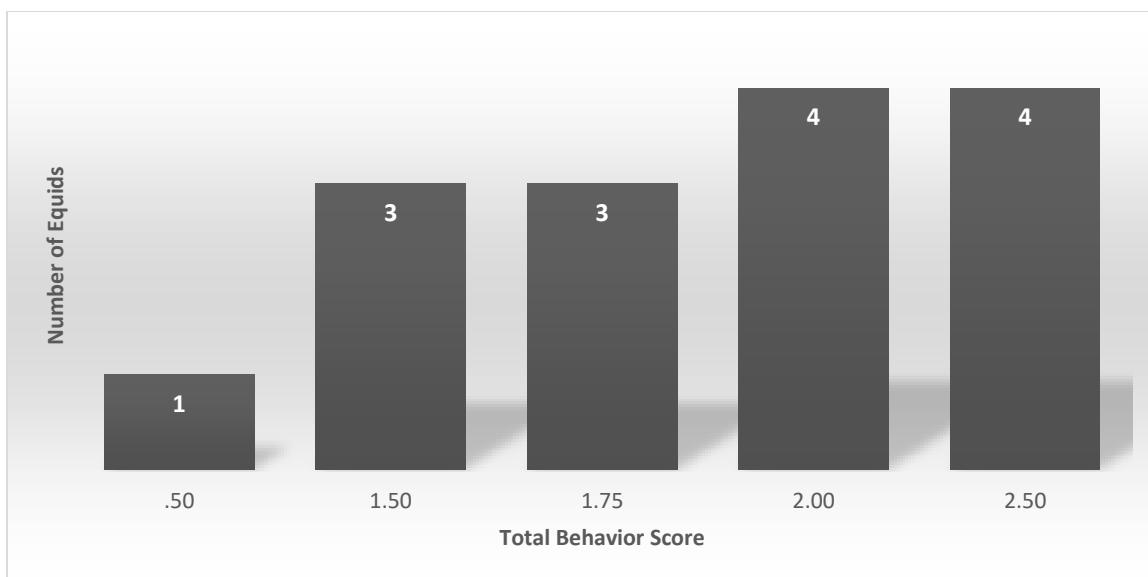


Figure 4.36 Total Behavior Scores (BS) of the Working Equids in Altos De La Cruz (n=15)

Of the working equids, 40% (n=6) scored a BCS of 1-2 as seen in figure 4.37 below, indicating the presence of ribs, points of the shoulder and hip bones, and a prominent tail head. Most of the sample displayed strong welfare scores of 4-5 with 53.3% (n=8) of the sample displaying healthy weight and even fat covering.

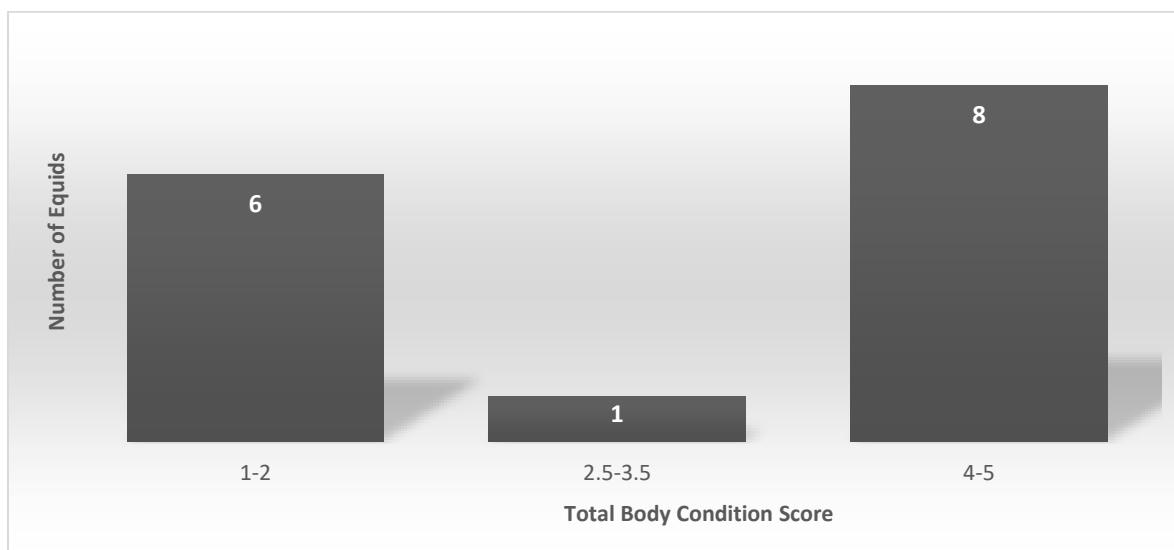


Figure 4.37 Total Behavior Condition Scores (BCS) of the Working Equids in Altos De La Cruz (n=15)

Figure 4.38 below represents Altos De La Cruz's (n=15) distribution of the total coat score. Refer to table 4.8 for a complete description of the coat scoring parameters. Approximately 46.7% (n=7) scored a 2.0 BCoS out of 3 total possible points indicating moderately healthy coats; where 26.7% (n=4) scored the maximum 3 points possible indicating the equids had a recently groomed coat that displayed a lustrous appearance and had no ectoparasites present. From the equids sampled in Altos De La Cruz, 20% (n=3) scored a total BCoS of 1.5 or lower, indicating the equid the overall coat health was poor with characteristics of a dull dry and potentially parasite invested coat appearance.

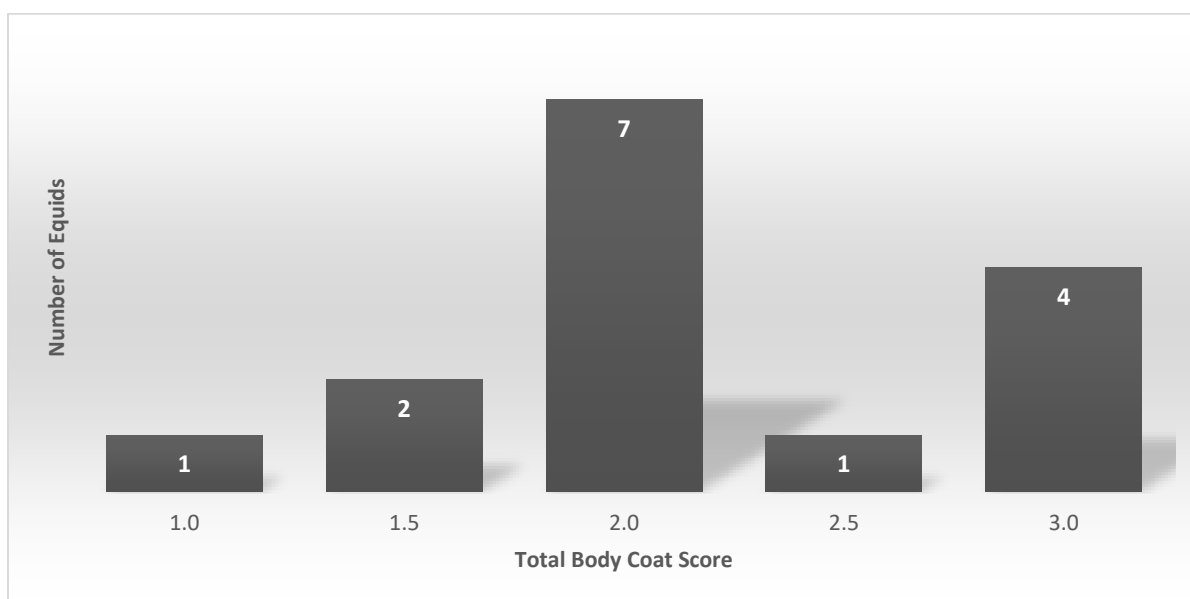


Figure 4.38 Total Body Coat Scores (BCoS) of the Working Equids in Altos De La Cruz (n=15)

Figure 4.39 below, displays the total body lesion scores for Altos De La Cruz (n=15). Refer to table 4.8 for a complete description of the body lesion scoring parameters. From the working equids, 26.7% (n=4) scored a BLS of 6.5 or 7.0 (26.7%, n=4) out of a total of 11 possible points, indicating the overall presence of body lesions were frequent and in numerous locations on the body. Approximately 20% (n=3) of the working equids in Altos De La Cruz scored a 5.0 or lower, indicating the presence of severe lesions, potentially requiring medical attention, in numerous locations on the body.

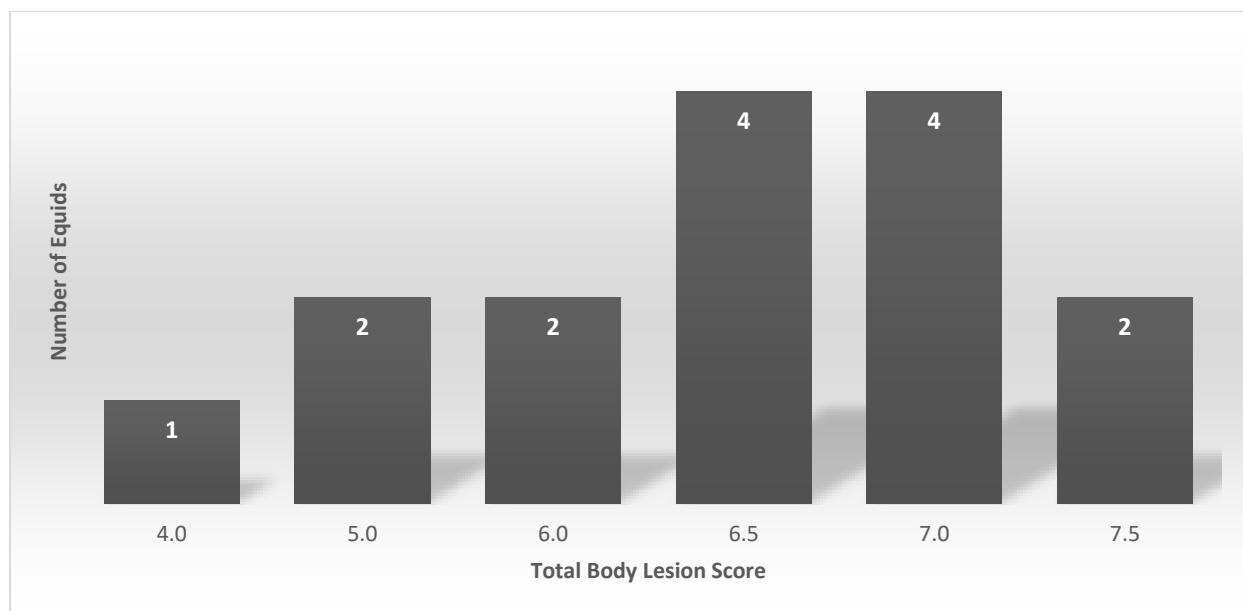


Figure 4.39 Total Body Lesion Scores (BLS) of the Working Equids in Altos De La Cruz
(n=15)²⁸

²⁸ The total BLS score is derived from subcategories HIL, MIL, OIL, OBL, FL, and TL

Of the total sample, 100% (n=15) scored a 1.0 regarding total hoof score indicating the working equids hooves in Altos De La Cruz were healthy and displayed minor to no cracks or other blemishes.

Correlations and Comparisons

Prior to data analysis, data from the four villages was compiled into one data file and sorted into groups based on equid species. The species included in this study comprised of working horses (n=62), mules (n=2), and donkeys (n=1). A Pearson Correlation test was conducted to measure the strength and relationship between owner locus of control and working equid welfare. In addition to a Pearson Correlation test, a one-way analysis of variance (ANOVA) was conducted to identify if any relationships were present between the physiological or psychological welfare of the working equid and the locus of control of the working equid's owner. An in-depth analysis of the study's research questions is outlined in the subsections below.

Locus of Control as an Oral Interview Survey

In response to research question 1 (to what extent can working equid owner locus of control be determined through oral interview methods?) Pilot testing and implementation of the adapted oral survey format to two independent samples in Haiti (n=10) and Honduras (n=65) indicated this format was feasible to conduct a full locus of control survey to participants in their native tongue. Final tabulation of the Honduran sample's locus of control scores (refer to figure 4.7) displayed scores ranging from 3 to 14 indicating the successful calculation of individual locus of control based on an oral delivery method. The lowest locus of control score received in the sample was a 3; a score of 3 indicated that respondent had an enormously internal locus of control. The nature of an individual possessing an internal locus of control possessed traits including the ability to be more readily willing to accept responsibility for their outcomes and exhibit individualism towards their actions and are less likely to show obeisance to others. Those who can find satisfaction and value from their actions also exhibit the ability to resist influence. Characteristics associated with internal individuals focus on the value of self and exhibit a tendency to exude confidence in decision-making.

Individuals scoring higher than 11 were identified as having an external locus of control. The highest locus of control score seen in the sample (n=65) was a 14; on a scale of 23, 14 is slightly above the median indicating the respondent had an external locus of control. The nature of an individual possessing an external locus of control commonly believe that fate, chance, or other outside forces dictate the outcomes of their lives; that their efforts do not affect the outcomes of the future.

Relevance of Locus of Control on Working Equid Welfare

In reply to research question 2 (how does an owner's locus of control impact the welfare status of the working equid?) and 2b (are physiological or psychological indicators, of the working equid, associated with owner locus of control?) A Pearson Correlation test was conducted to determine if there were any significant correlations between working equid welfare and owner locus of control. A significant negative correlation was identified between the equid behavior score (BS) and overall locus of control (LOC) with a correlation of 0.047 at 95% confidence, as seen in table 4.13 below. This relationship suggests that the equid behavior and

locus of control beliefs of the equid owner, whether presenting internal or external characteristics, are weakly correlated, and account for approximately 6% of the variance (using the coefficient of determinations, -0.247 squared) in this study. The behavior of the equid seen in the equid's approachability, alertness, and receptiveness to non-owner approach. The significance between owner locus of control and equid behavior score suggests there this a weak negative relationship between the behavioral status of working equids and the locus of control of owners. In terms of an equids total working welfare score (TWS) in relation to an owner's locus of control score (LOC), no significant correlation was found between the two groups.

Further responding to research question 2b, a Pearson Correlation determined that results between owner locus of control and equid anterior knee lesions were correlated when comparing each locus of control score as individual groups. Analysis determined owner locus of control and lesions at the anterior aspect of the knee was correlated ($p=0.008$, $F(11,53)= 2.684$ at 95% confidence) when comparing locus of control scores as individual groups. Due to the small sample size of locus of control scores where scores 3, 4, 5, 12 and 14 had one participant, no post-hoc analysis could be conducted and no locus of control score groups could be recognized as correlated to anterior knee lesions on the working equid. Figure 4.40 below, displays the distribution of locus of control scores and the associated averages for anterior knee lesions scores seen on the working equids.

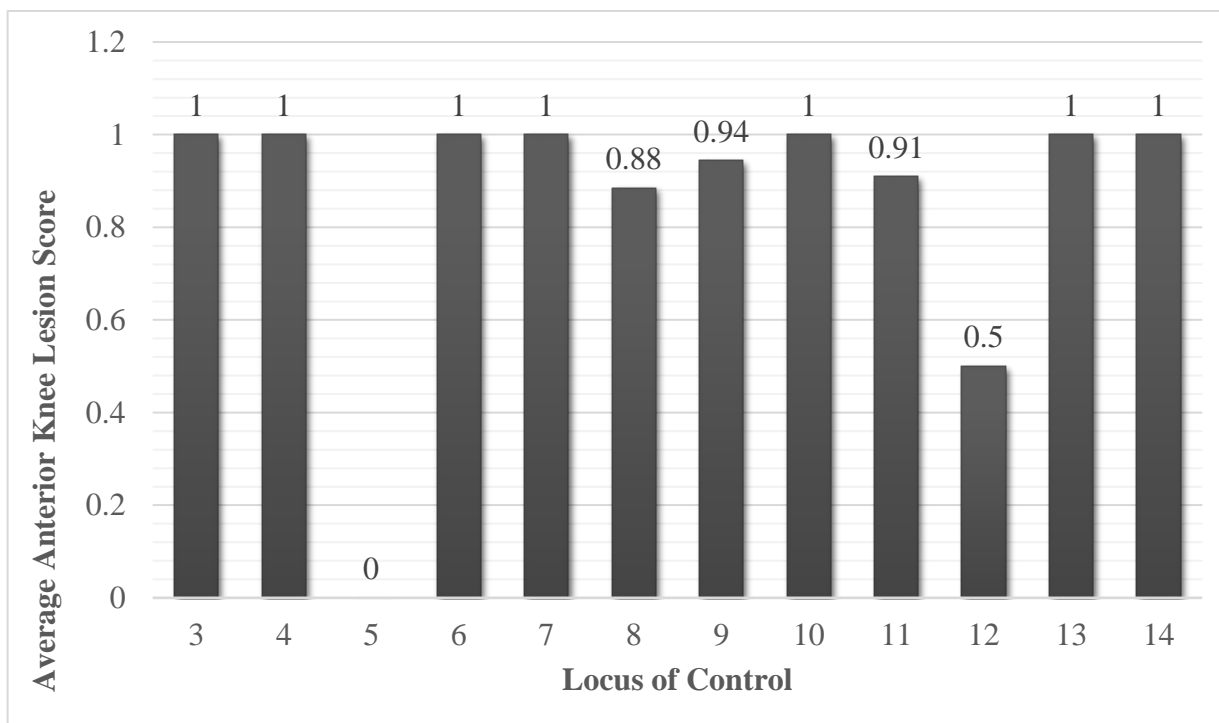


Figure 4.40: One-way Analysis of Variance Displaying the Difference in Means Between Anterior Knee Lesions and Locus of Control

A significant positive correlation was also identified between equid body condition score (BCS) and equid body coat score (BCoS) with a significance of 0.000 at 95% confidence. A significant positive correlation between equid body condition score and coat score confirms the relationship the two categories have with each other. Proper nutrition is vital for a healthy coat; if the equid exhibits emaciation or malnutrition, based on the Henneke body condition scale, it can be assumed the equid is not receiving adequate vitamins, minerals, and proteins necessary to maintain a healthy coat. The following equid welfare categories were identified as significant at 95% confidence in relation to total welfare of a working equid: behavior, body condition, body coat, and body lesion scores. The significance between these categories was anticipated since the BS, BCS, BCoS, and BLS scores were all key components used to calculate the total welfare score (TWS) for working equids. The complete correlation analysis of the categories discussed above can be viewed in table 4.13 below.

Table 4.13

Pearson's Correlation between Owner Locus of Control and Categories of Working Equid Welfare

		Correlations							
	LOC.Overall	Hoof Score (HS)	Behavior Score Unweighted (BS)	Body Condition Score Unweighted (BCS)	Body Coat Score Unweighted (BcoS)	Body Lesions Score Unweighted (BLS)	Hoof Score Unweighted (HS)	Total Welfare Score Unweighted (TWS)	
LOC.Overall	Pearson Correlation	1	.031	-.247*	.006	-.060	.188	.031	-.007
	Sig. (2-tailed)		.809	.047	.964	.637	.133	.809	.958
	N	65	65	65	65	65	65	65	65
Hoof Score (HS)	Pearson Correlation	.031	1	-.031	.037	-.020	-.079	1.000**	.025
	Sig. (2-tailed)	.809		.804	.770	.877	.533	.000	.846
	N	65	65	65	65	65	65	65	65
Behavior Score Unweighted (BS)	Pearson Correlation	-.247*	-.031	1	.076	.279*	.016	-.031	.490**
	Sig. (2-tailed)	.047	.804		.548	.024	.897	.804	.000
	N	65	65	65	65	65	65	65	65
Body Condition Score Unweighted (BCS)	Pearson Correlation	.006	.037	.076	1	.561**	.234	.037	.617**
	Sig. (2-tailed)	.964	.770	.548		.000	.060	.770	.000
	N	65	65	65	65	65	65	65	65
Body Coat Score Unweighted (BcoS)	Pearson Correlation	-.060	-.020	.279*	.561**	1	.151	-.020	.758**
	Sig. (2-tailed)	.637	.877	.024	.000		.229	.877	.000
	N	65	65	65	65	65	65	65	65
Body Lesions Score Unweighted (BLS)	Pearson Correlation	.188	-.079	.016	.234	.151	1	-.079	.655**
	Sig. (2-tailed)	.133	.533	.897	.060	.229		.533	.000
	N	65	65	65	65	65	65	65	65
Hoof Score Unweighted (HS)	Pearson Correlation	.031	1.000**	-.031	.037	-.020	-.079	1	.025
	Sig. (2-tailed)	.809	.000	.804	.770	.877	.533		.846
	N	65	65	65	65	65	65	65	65
Total Welfare Score Unweighted (TWS)	Pearson Correlation	-.007	.025	.490**	.617**	.758**	.655**	.025	1
	Sig. (2-tailed)	.958	.846	.000	.000	.000	.000	.846	
	N	65	65	65	65	65	65	65	65

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

In response to research question 2a (are there similar trends in owner's locus of control and the welfare of their working equids amongst members of the same community?) a comparison of mean frequencies was conducted. The mean frequencies comparing owner locus of control against the categories that comprise working equid welfare is displayed in figure 4.40 below. The first group of bars represent the mean locus of control scores for each village. The first village, Villecito, had the highest overall locus of control score on the continuum nearing the external range, with an average of 9.67; among all the villages, this was the closest score to the beginning of the external continuum. All villages had a mean internal locus of control score. Comparing Villecito's mean locus of control scores with the categories associated with working equid welfare, figure 4.42 shows the average scores for behavior (BS), body condition (BCS), and hoof (HS) were lower than the average scores for the other villages.

Comparatively, the village of Aguaquire had the lowest average locus of control scores compared to the other villages in the sample with a 7.79 average. Comparing the average score for Aguaquire with the welfare categories associated with total working equid welfare, average scores for behavior (BS), lesions (BLS), and total welfare (TWS) were higher than the other village averages. Higher averages in the welfare categories indicate healthier overall welfare. Figure 4.41 below indicates that individuals from Aguaquire, on average, had a lower (internal) locus of control score than other villages, while also, on average having equids demonstrating higher welfare scores.

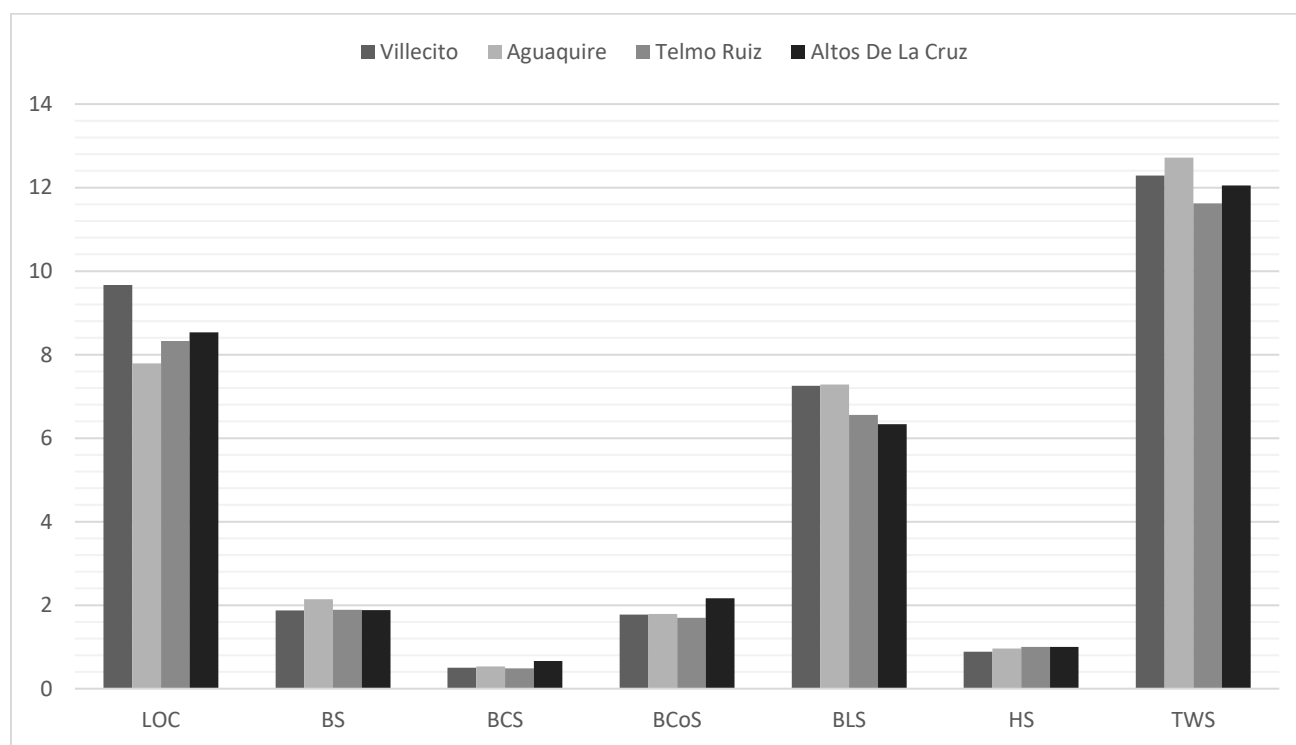


Figure 4.41 Mean Frequencies Comparing Owner Locus of Control Against the Categories that Comprise Working Equid Welfare

Locus of Control's Effect on Working Equid Health Concerns

Responding to research question 3 (does the equid owner's locus of control effect the prevalence of health concerns seen in the working equid?) the research team conducted a one-way analysis of variance (ANOVA, $F(11,53)=2.684$) to determine significance between owner

locus of control and working equid welfare. Due to the sample size ($n=65$), the research team could not initially determine which groups were identified as statistically significant.

Anterior lesions on the knees of equids represent previous injury to the cutaneous layer of skin. Typically, these lesions become present when an equid falls and catches itself with its knees to avoid ground to muzzle impact. Open sores, scrapes, or reddened raw skin signify the equid has recently fallen, while white smoothed skin indicating permanent hair loss or raised scar tissue indicate the equid had fallen numerous times that the hair would not grow back or that the fall was severe enough to cause permanent damage to the cutaneous layer. It is not common for equids to fall to their knees; this action is due to extreme fatigue, an excess weight, tripping, or a combination of those factors. Identifying significance between these knee lesions and owners' locus of control indicates owners may push their animals to the point of exhausting and falling. There was a lower prevalence of knee lesions on equids whose owner had an internal locus of control score. Speculation indicates that internal owners are more conscientious of the duration of work an equid can withstand before succumbing to fatigue and provide physical breaks to allow the equid to rest.

In reply to the final research question 3a (are there specific regions of the working equid's body more prevalent to lower welfare scores whose owners exhibit a tendency towards a more external locus of control?) locus of control scores were divided into three equal groups. Group 1 consisted of individuals who exhibited a locus of control score of 3 to 7 (primarily internal), group 2 consisted of individuals who exhibited a locus of control score of 8 to 9 (moderately internal), and group 3 consisted of individuals who exhibited a locus of control of 10 to 14 (moderately external). A one-way analysis of variance determined a significant statistical difference between groups 2 and 3 in the categories of harness induced lesions (HIL) ($p=0.005$, $F(2,62)=5.743$) and lesions at the withers and spine (WL) ($p=0.031$, $F(2,62)=3.683$) at a 95% confidence interval. When broken into three equal groups, no correlation could be determined between owner locus of control and lesions at the anterior aspect of the knee. Figure 4.42 below, displays the distribution of mean differences between the groups. Note, the mean difference between group 2 and 3 was -0.4723 in which the mean for group 2 was lower than group 3.

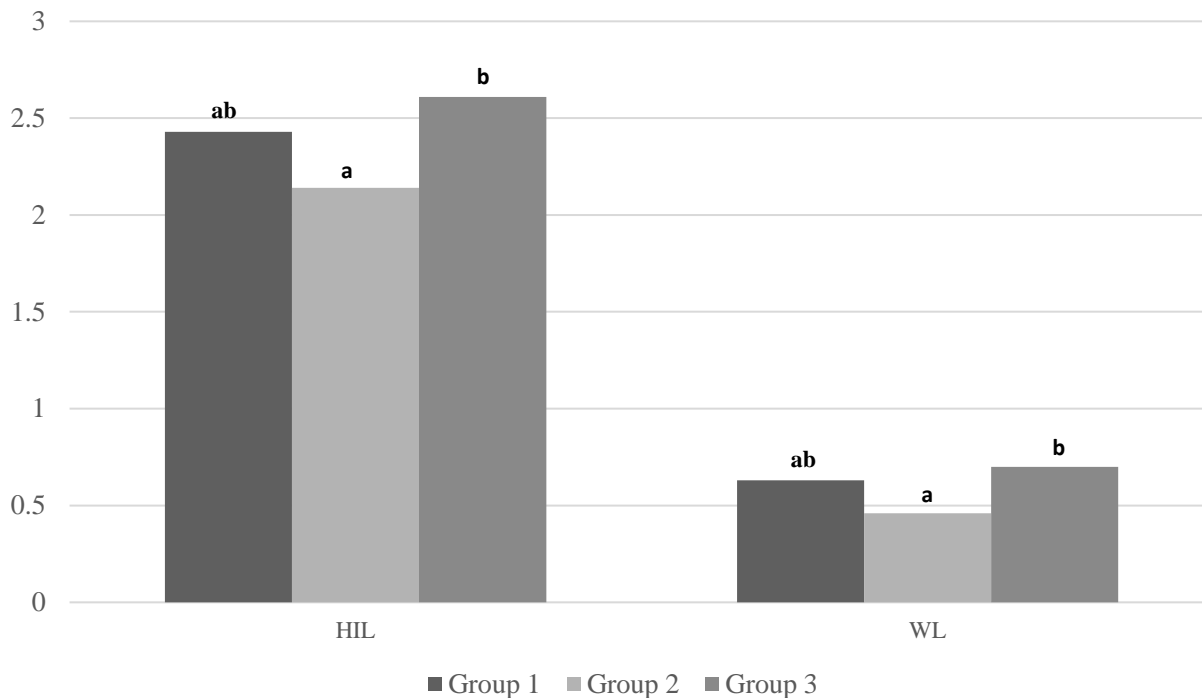


Figure 4.42: Distribution of One-way Analysis of Variance Mean Difference Among Locus of Control Groups

Interpretation of the results allowed the research team to draw preliminary conclusions from the data. It was recognized that the participants sampled had willingly attended the veterinary clinic hosted by Equitarian Initiative, indicating the owner of the working equid potentially sacrificed a day of income or production to treat and or resolve an issue with their equid. The action, previously described, is an indicative definition of those who are characterized as having internal locus of controls. This indication, of more internally driven individuals, could account for most participants scoring as internals in the context of this study.

The data collected from the working equid welfare assessment presented a trend in a scantiness of superficial care given to working equids coat condition. Participants who were categorized as externals by scoring a 12 or higher on the locus of control survey had equids averaging lower scores in the coat health and recently groomed categories. Lower scores indicated the equid owner did not brush their equid frequently or place emphasis on maintaining a healthy coat. Owners with an external locus of control also had equids that scored lower in terms of body condition score, in comparison to those who scored as internal individuals, which is associated to the poor coat health.

Limitations

There were limitations identified within this study. The primary limitation of this study was the accessibility to working equid owners in Honduras. The research team had the opportunity to survey a limited number of owners during each day of data collection. The intervention strategies of Equitarian Initiative provided the research team with the means to access a clear majority of a village's working equid population due to the need for veterinary care and medication. While the study was designed to have a short interview process, some owners chose to decline the survey due to time constraints in their day. Another limitation of the study was the setting in which the interviews were conducted. It was assumed that all responses were independent of previous responses to questions and locus of control statements, the research team cannot identify that there was no response bias to the survey. Participants who were accompanied by their children may have had a stronger response bias to questions to set an example to their children or deviate from an unbiased response for some un-identifiable motive. The final limitation in this study was related to a participant's overall attention to the survey questions. When conducting field work on a working population with livestock, unpredictable events or distractions occur. These distractions include, but are not limited to, shouting from owner to owner, stallions screaming towards mares, fights between unfamiliar equids that are too close together, parents watching over children playing in the distance, loud or sudden noises from veterinary equipment (dental tools), or the arrival of friends who call attention to the participant. At any given time, numerous distractions were occurring that could draw the attention of the participant away from the survey. This distraction may have caused inaccurate answers due to participant assumption of the question or a desire to rush the survey to return to the situation drawing the participant's attention.

CHAPTER 5: COMPREHENSIVE CONCLUSIONS AND IMPLICATIONS

Purpose of the Study

The purpose of this study is to ascertain relationships between working equid owner's locus of control and equid welfare, to have the ability to identify an additional variable associated with the overall condition of working equids.

Objectives of the Study

The overall objective of this research is to explore potential relationships in individuals' locus of control as a potential variable contributing to the status of their working equid's welfare. The objective is to expand the base of knowledge concerning the psycho-social factors impacting the welfare of working equids.

The specific objectives were to:

1. Administer Julian Rotter's locus of control assessment to identify perceptions of owner locus of control as it pertains to working equid welfare
2. Identify whether there is a relationship between owners' perceived locus of control and equid welfare
3. Disseminate data and results for future studies focusing on equid welfare and owner interactions to NGO's, research teams, and medically trained personnel interested in the improvement of working equid welfare

Hypothesis

It is hypothesized that working equid owners who exhibit more external loci of control traits (which consist of beliefs, opinions and overall actions being dictated by outside forces such as luck, chance or fate (Rotter, 1966)) will have working equids that display a lower overall welfare score.

Research Questions

The subsequent research questions guided this study:

RQ1. To what extent can working equid owner locus of control be determined through oral interview methods?

RQ2. How does an owner's locus of control impact the welfare status of the working equid?

- a. Are there similar trends in owner's locus of control and the welfare of their working equids amongst members of the same community?
- b. Are physiological or psychological indicators, of the working equid, associated with owner locus of control?

RQ3. Does the equid owner's locus of control effect the prevalence of health concerns seen in the working equid?

- a. Are there specific regions of the working equid's body more prevalent to lower welfare scores whose owners exhibit a tendency towards a more external locus of control?

Conclusions and Implementations for Future Research

The following implications of the findings are based on the data analysis and discussion that was previous presented. Based on testing for the feasibility of conducting the locus of control survey in an oral format, the research team concluded the locus of control survey can be replicated as an oral survey and administered to other related populations. The overall reliability of the survey offers evidence that the calculated locus of control score is consistent among each participant surveyed. While direct correlations between owner locus of control and total working equid welfare could not be drawn, notable trends in the data were identified.

It was determined that and owner's overall locus of control, in relation to total working equid welfare, was not significant. Breaking down the total welfare of the working equid into its respective welfare areas of body condition, body coat, behavior, body lesions, and hoof condition determined significance between owner's overall locus of control and the equids overall behavior score indicating that there are measurable traits exhibited in working equid behavior based on the locus of control of the owner. The significance seen between an equid owner's locus of control

and the behavior of their working equid merits further research. Behavior, and the ability to express natural behavior, is an integral component of overall health and welfare of an equid; this ability for the equid to express natural behavior, and the owner or handler having the ability to recognize and assess what the behavior means can greatly improve human-horse relations (Hausberger et al., 2008).

Working equids are deeply ingrained in the fabric of society for many developing regions of the world. The brute strength and transportation abilities alone provide those who rely on the equids natural power a means of income and sustainability. While equids play a leading role in society, owners struggle to maintain their equids predominantly due to financial costs (The Brooke, 2018). Equid welfare is comprised of numerous subsections focusing on the overall health, maintenance, nutrition, and longevity of the animal; while each factor is important to the functionality of the animal, it is important to remember an equid's behavior also plays a key role in the overall mental and physical health of the animal and its overall ability to perform at its maximum capacity.

It is advantageous for those who implement intervention strategies, in communities who rely on equid power, to incorporate education into current intervention strategies. Behavioral education and behavioral training for owners is affordable; resources needed for behavioral training between owner and equid can be salvaged from local inputs. To complement in-field behavioral training, education and developing awareness of equid behavior, as a component of welfare, can be woven into current educational workshops provided to working equid owners in developing regions.

Implementation of Education to Equid Owners

Education to owners will always be a critical component contributing to the functionality of working equids. While current intervention strategies and NGO organizations work to promote healthy equids by providing free veterinary care nutrition strategies and equipment fitting, behavioral education must be considered. The identification of owner locus of control can serve as an educational platform for those designing educational tools and having a better understanding for local populations of equid owners. Information provided through the identification of owner locus of control can provide educators with a foundational understanding of the audiences receiving information. Identifying the distribution of internal individuals versus

external individuals in a community can assist in the tailoring of educational tools and the method of presentation of said tools. This study identifies that those with an external locus of control perceive their situations differently than those who have an internal locus of control. If external individuals perceive life as being out of their control or having limited choices, belief that they can improve their equid's welfare may be skewed by those perceptions. Educators aware of those perceptions, prior to providing educational tools to owners, would have the ability to tailor learning material to those who feel that choices are limited. Structuring and designing educational tools to better accommodate the audience would provide a more substantial quality of learning to the audience, relevance to topic material, stronger invested interest in the material being presented, and a higher possibility of owners (especially external individuals) practicing newly learned welfare techniques.

Implementation of Locus of Control with NGO's

There are benefits to implementing Rotter's Locus of Control survey into current assessments administered by NGO's when surveying populations in need of assistance. By implementing this short oral survey to a population of equid owners, NGO educators can add an additional level of knowledge about their potential population to their curriculum. Knowing that an owner's locus of control is significant to an equid's behavioral status can inform future researchers to assist in the development of appropriate approach methods, identify what specific behavioral tendencies need attention, how to communicate the information to the owner, and implement behavioral training for owners focusing on owner-equid interactions.

Long term bonds, created between horse and owner through mutual partnership, are diverse in nature and require observation from intervening parties to understand the nature and degree of the bond. Currently, information regarding the complexity and intricacy of the human-equid behavioral bond has been collected from broad based informational surveys that are limited to human-equid accidents or observational reports of human-equid interactions (Hausberger et al., 2008). Rotter's locus of control survey provides the foundation for these complex bonds to be better understood.

Future research and intervention strategies need to recognize human behavioral traits, including but not limited to locus of control, are significant in the behavioral status and in turn the overall welfare status of working equids. Equid owners and NGO's who work alongside

equid owners can benefit greatly from administering an oral locus of control survey to assess the perceptions and behaviors of equid owners in developing regions of the world. With a stronger understanding of one of the many underlying causes of abnormal equid behavior, future intervention strategies can be tailored to uniquely accommodate each audience. The oral locus of control survey can provide future research teams with additional information regarding equid owners, creating an opportunity to advance equid welfare and increase the quality of life for the working equids in developing regions of the world.

Applicability of Locus of Control in Varying Social Structures of Society

This study has sought to identify an additional human factor that could contribute to the overall condition of working equid welfare in developing regions of the world through the administration and analysis of locus of control to working equid owners in Haiti and Honduras. Future applications of locus of control must consider the variability of society as an influential factor of human perception and their associated level of autonomy. This study focused solely on the perceptions of current working equid owners in four villages of Honduras. These owners were self-selected since they sought care and resolution to problems in their working equids by attending a clinic hosted by Equitarian Initiative and volunteering their time to this study. A thorough examination of every current and past working equid owner may provide insight on the overall autonomy of the working equid cohort.

Future applications of this study would benefit from applying the tools, within this study, to varying social structures in different regions of the world to compare and develop a more robust understanding of variable populations. Examples of further cohorts could include but are not limited to the urban versus rural poor, comparing working class women to men, or alternative livestock owners (bovine, porcine, avian, etc.). Gathering information on the autonomy of a group sharing similar experiences or knowledge, can provide valuable insight to outside sources that seek to work alongside these populations. Understanding and having the ability to target individuals who may need more attention, based on their locus of control, will greatly improve the process of information transfer and potentially increase the interest of, relevance towards, and implementation of subject matter in the targeted populations around the world.

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APPENDIX A. LOCUS OF CONTROL SURVEY

1. *a. Children get into trouble because their parents punish them too much.	*b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.	b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.	b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.	b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.	b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks one cannot be an effective leader.	b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try some people just don't like you.	b. People who can't get others to like them don't understand how to get along with others.
8. *a. Heredity plays the major role in determining one's personality.	*b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.	b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.	b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11. a. Becoming a success is a matter of hard work; luck has little or nothing to do with it.	b. Getting a good job depends mainly on being in the right place at the right time.

Appendix A continued

12. a. The average citizen can have an influence in government decisions.	b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.	b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. *a. There are certain people who are just no good.	*b. There is some good in everybody.
15. a. In my case getting what I want has little or nothing to do with luck.	b. Many times we might just as well decide what to do by — flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.	b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.	b. By taking an active part in political and social affairs the people can control world events.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.	b. There really is no such thing as "luck."
19. *a. One should always be willing to admit mistakes.	*b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes "you".	b. How many friends you have depends upon how nice a person you are.
21. a. In the long run the bad things that happen to us are balanced by the good ones.	b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22. a. With enough effort we can wipe out political corruption.	b. It is difficult for people to have much control over the things politicians do in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.	b. There is a direct connection between how hard I study and the grades I get.
24. *a. A good leader expects people to decide for themselves what they should do.	*b. A good leader makes it clear to everybody what their jobs are.

Appendix A continued

25. a. Many times I feel that I have little influence over the things that happen to me.	b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.	b. There's not much use in trying too hard to please people, if they like you, they like you.
27. *a. There is too much emphasis on athletics in high school	*b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.	b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.	b. In the long run the people are responsible for bad government on a national as well as on a local level.

*filler item

APPENDIX B. HAITI IRB APPROVAL



HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To: COLLEEN BRADY
AGAD 219

From: JEANNIE DICLEMENTI, Chair
Social Science IRB

Date: 12/12/2016

Committee Action: **Determined Exempt, Category (2)**

IRB Action Date: 12/09/2016
1611018470

IRB Protocol #: Investigating the Relationships between Mindset and Locus of Control and
Study Title: Welfare of Working Equids in Haiti

The Institutional Review Board (IRB) has reviewed the above-referenced study application and has determined that it meets the criteria for exemption under 45 CFR 46.101(b).

Before making changes to the study procedures, please submit an Amendment to ensure that the regulatory status of the study has not changed. Changes in key research personnel should also be submitted to the IRB.

Please retain a copy of this letter for your regulatory records. We appreciate your commitment towards ensuring the ethical conduct of human subject research and wish you well with this study.

APPENDIX C. ANIMAL WELFARE INDICATOR WORKSHEET (AWIN)

Date: _____ Assessor: _____ Farm: _____ Horse ID: _____

Single horse recording sheet

Sex Male
 Female
 Gelding
 Pregnant female

Age _____

Management-based indicators

Exercise

Frequency of exercise (walking in hand, riding, lunging and hand grazing, not under controlled exercise in a dry lot, arena, pen or pasture) Daily
 Weekly (1-4 times/wk)
 Sometimes (less than 1/wk)

Exercise per day in h _____

Body Condition Score Score 1
 Score 2
 Score 3
 Score 4
 Score 5
 NA

Hair coat condition Healthy
 Unhealthy
 NA

Abnormal breathing Present
 Absent
 NA

Swollen joints Present
 Absent
 NA

Integument alterations: if you see any alteration tick the correspondent cell

	Muzzle	Head	Neck	Shoulder	Midsection	Hindquarters	Legs	Hooves
Alopecia								
Skin lesion								
Deep wound								
Swelling								

Nasal discharge Present
 Absent
 NA

Signs of hoof neglect Present
 Present
 Absent
 NA

Consistency of manure Normal
 Abnormal
 NA

Resource-based indicators

Social interaction Possibility to nibble and partly groom
 Possibility to sniff other horses)
 Possibility to have visual contact
 No possibilities for visual or physical contact

APPENDIX D. HONDURAS IRB APPROVAL



HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To: BRADY, COLLEEN MBRIZGYS, LAUREN A
From: DICLEMENTI, JEANNIE D, Chair
 Social Science IRB
Date: 09/07/2017
Committee Action:(2) Determined Exempt, Category (2)
IRB Action Date: 09 / 07 / 2017
IRB Protocol #: 1708019493
Study Title: The Role of Locus of Control on Working Equid Welfare in Latin and Central American Communities

The Institutional Review Board (IRB) has reviewed the above-referenced study application and has determined that it meets the criteria for exemption under 45 CFR 46.101(b).

Before making changes to the study procedures, please submit an Amendment to ensure that the regulatory status of the study has not changed. Changes in key research personnel should also be submitted to the IRB through an amendment.

Refer to our guidance "**Changes Not Requiring Review**" located on our website at <http://www.irb/purdue.edu/policies.php>. For changes requiring IRB review, please **Create a New Amendment** through the CoeusLite Online Submission System. Please contact our office if you have any questions.

Below is a list of best practices that we request you use when conducting your research. The list contains both general items as well as those specific to the different exemption categories.

General

Appendix D continued

- To recruit from Purdue University classrooms, the instructor and all others associated with conduct of the course (e.g., teaching assistants) must not be present during announcement of the research opportunity or any recruitment activity. This may be accomplished by announcing, in advance, that class will either start later than usual or end earlier than usual so this activity may occur. It should be emphasized that attendance at the announcement and recruitment are voluntary and the student's attendance and enrollment decision will not be shared with those administering the course.
- If students earn extra credit towards their course grade through participation in a research project conducted by someone other than the course instructor(s), such as in the example above, the students participation should only be shared with the course instructor(s) at the end of the semester. Additionally, instructors who allow extra credit to be earned through participation in research must also provide an opportunity for students to earn comparable extra credit through a non-research activity requiring an amount of time and effort comparable to the research option.
- When conducting human subjects research at a non-Purdue college/university, investigators are urged to contact that institution's IRB to determine requirements for conducting research at that institution.
- When human subjects research will be conducted in schools or places of business, investigators must obtain written permission from an appropriate authority within the organization. If the written permission was not submitted with the study application at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval, etc.), the investigator must submit the written permission to the IRB prior to engaging in the research activities (e.g., recruitment, study procedures, etc.). Submit this documentation as an FYI through Coeus. This is an institutional requirement.

Categories 2 and 3

- Surveys and questionnaires should indicate
 - only participants 18 years of age and over are eligible to participate in the research; and
 - that participation is voluntary; and
 - that any questions may be skipped; and
 - include the investigator's name and contact information.
- Investigators should explain to participants the amount of time required to participate. Additionally, they should explain to participants how confidentiality will be maintained or if it will not be maintained.

Appendix D continued

- When conducting focus group research, investigators cannot guarantee that all participants in the focus group will maintain the confidentiality of other group participants. The investigator should make participants aware of this potential for breach of confidentiality.

Category 6

- Surveys and data collection instruments should note that participation is voluntary.
- Surveys and data collection instruments should note that participants may skip any questions.
- When taste testing foods which are highly allergenic (e.g., peanuts, milk, etc.) investigators should disclose the possibility of a reaction to potential subjects.

You are required to retain a copy of this letter for your records. We appreciate your commitment towards ensuring the ethical conduct of human subjects research and wish you luck with your study.

APPENDIX E. WORKING EQUID WELFARE CHECKLIST

Equid number			
species			
age	<5	5-15	>15
gender	M	F	G
Behavior observation (BO)			
1-alertness			
Sc 0 - Depressed			
Sc 1 - Alert			
2-response to observer ap			
sc 0 - aggressive			
sc 0.25- Avoid observer			
sc 0.5 - ignore observer			
sc 1 -friendly			
3- Chin contact			
sc0 reject			
sc1 accept			
Body cond. score (BCS)			
sc 0.25 (1-2)			
sc 1 (≥ 2.5 - ≤ 3.5)			
sc 0.75 (4-5)			
Coat observation (CO)			
1-coat health			
sc 1 healthy			
sc 0 unhealthy			
2-ectoparasites			
sc 1 free			
sc 0 infested			
3-recently groomed			
sc 1 yes			
sc 0 no			
Harness induced body lesions (HIL)			
Lesions at Neck and point of Shoulders (LNS)			
sc 1 no lesion			
sc 0.5 superficial or healed			
sc0 broken S/C or deep lesion			
Lesions at sides of Chest (LC)			
sc 1 no lesion			
sc 0.5 superficial or healed			

Appendix E Continued

sc0 broken S/C or deep lesion	
Lesions at Withers and spine (LW)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc 0 broken S/C or deep lesion	
Mistreatment induced body lesions (MIL)	
Lesions at points of hocks	
sc 1 absent	
sc 0 present	
Lesions at nasal bridge and/or commissures of the lips	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Lesions at hind quarters	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Overwork induced body lesions (OIL)	
Pain and/or Swelling of the forelimbs and/or hind limbs Tendons and/or Fetlock joint	
Sc 1 absent	
Sc 0 present	
Lesions at anterior aspect of the knee	
Sc 1 absent	
Sc 0 present	
Other body lesions (OBL)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Firing lesions (FL)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc 0 broken S/C or deep lesion	
Tethering lesions (TL)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc 0 broken S/C or deep lesion	

Appendix E Continued

Hoof score (HS)	
sc 1- normal	
sc 0 abnormal	

APPENDIX F. ORAL LOCUS OF CONTROL SURVEY

Thank you for taking the time to complete and submit this questionnaire. The purpose of this questionnaire is to help us have a better understanding of your involvement with working horses and what resources are available to assist you in caring for and learning about your horse.

Your honest answers are valuable and greatly appreciated. The responses you provide will provide us with helpful information that will be later used to help develop new means of communication and education on horse related topics identified from your questionnaire responses.

This questionnaire will take you **approximately 15-20 minutes** to complete. Your responses are **100% confidential and no identifiable comments will link you to your responses.**

If you have any questions, or would like a member of the research team to assist you, please raise your hand! We are happy to help!

Upon completion of your questionnaire please **raise your hand** and a member of the research team will collect your questionnaire.

Thank you!

1. What is your gender? *Circle one:*

- a. Male
- b. Female

2. What is your age? *Circle one:*

- a. 18-25
- b. 26-35
- c. 36-45
- d. 46-55
- e. Over 55

3. Where do you currently live?

Write your town(s) below:

4. Have you attended school?

Circle one:

- a. Yes
- b. No →(Skip to Question 6)

Appendix F continued

5. What is your highest level of education? *Circle one:*
- a. Primary School
 - b. Middle School
 - c. High School or Equivalent
 - d. Vocational/ Technical Training School (2 years)
 - e. Some College
 - f. Bachelor's Degree
 - g. Master's Degree
 - h. Doctoral Degree
 - i. Professional Degree (i.e MD. DVM. JD. DDS)
 - j. Other →(please specify) _____
6. What is your average income? *Circle one:*
- a. 0-5,000 L
 - b. 5,001-10,000 L
 - c. 10,001-20,000 L
 - d. 20,001-30,000 L
 - e. 30,001-40,000 L
 - f. Greater than 40,001 L
7. Is your horse your primary source of income?
Circle one:
- a. Yes
 - b. No →(Please specify primary source of income) _____
8. How many years have you worked with a horse?
Circle One:
- a. Less than 1
 - b. 1-5
 - c. 6-10
 - d. 11-15
 - e. 16-20
 - f. More than 20
9. How do you use your horse? *Circle all that apply:*
- a. Ride
 - b. Drive
 - c. Lead

Appendix F continued

10. What is the main role of your horse? *Circle all that apply:*

- a. Agriculture:
 - Plowing
 - Tilling
 - Weeding
 - Transporting inputs (water, fertilizer)
 - harvesting
- b. Human transportation:
 - Ridden
 - Driven
- c. Goods transportation
- d. Industrial work:
 - Moving building materials
 - Moving machinery
 - Collecting and removing trash
- e. Tourism

11. How many days during the week does your horse work?

Circle one:

- a. 1-2 days a week
- b. 3-4 days a week
- c. 5-6 days a week
- d. Everyday

12. Does anyone else use your horse? *Circle one:*

a. Yes → (*Who? Select all that apply:*)

- Brother/sister
- Children
- Spouse
- Parent
- Other relative

b. No

Appendix F continued

13. Do others in your community use your horse?

Circle one:

- a. Yes
- b. No

The following questions are focused on the management of your horse:

14. Do you vaccinate your horse?

Circle one:

- a. Yes
- b. No, I do not vaccinate

15. Do you deworm your horse? *Circle one:*

a. Yes → (*How often? Circle one:*)

- 1 time a year
- 2 times a year
- 3 times a year
- 4 times a year
- More than 4 times a year

b. No, I do not deworm

16. Does your horse get its feet trimmed? *Circle one:*

a. Yes → (*By whom? Circle all that apply:*)

- Farrier
- Myself
- Other (*please specify*): _____

b. No

Appendix F continued

17. Has your horse been lame in the last six months? *Circle one:*

a. Yes →(Which leg? *Circle all that apply:*)

Front right

Front left

Back right

Back left

b. No

18. Have you had your horse's teeth checked/examined by a Veterinarian?

Circle one:

a. Yes →(When? *Circle one:*)

In the last 6 months

In the last year

b. No, I have not had my horse's teeth checked

19. What does your horse eat?

Circle all that apply:

a. Hay

b. Grass/pasture

c. Grain

d. I don't know

e. Other (*Please specify*): _____

20. How often should you feed your horse?

Circle one:

a. Once a day

b. Twice a day

c. My horse finds its own feed

21. What do you think is acceptable weight for your horse to be good enough to work?

Circle one:

a. Spine can be seen

b. Ribs and hip bones can be seen

c. Spine cannot be seen

d. Ribs and hip bones cannot be seen

Appendix F continued

22. How often do you give your horse water?

Circle one:

- a. 1 time a day
- b. 2 times a day
- c. 3 times a day
- d. I leave water out all day
- e. My horse find's its own water

23. Where does your horse get water from?

Circle one:

- a. Bucket
- b. Stream/river
- c. I don't know

24. How do you tell if your horse needs water?

Circle all that apply:

- a. Shallow quick breathing
- b. red gums
- c. dry eyes
- d. no saliva production
- e. extremely hot body temperature
- f. other (*Please specify*): _____

25. How do you tell if your horse is heat exhausted?

Circle all that apply:

- a. Tired/lethargic
- b. Heavy breathing/panting
- c. Excessive saliva
- d. Red tongue and gums
- e. Extremely hot body temperature
- f. other (*Please specify*): _____

26. How do you house your horse?

Circle one:

- a. Stall
- b. Fenced in area
- c. Tied up
- d. I let my horse roam until I need it

Appendix F continued

The following questions are focused on where you receive information regarding horse care and management:

27. From whom did you learn how to take care of your horse?

Circle all that apply:

- a. Self-taught
- b. Parent
- c. Friend
- d. Veterinarian
- e. NGO (non-governmental organization/charity)
- f. Other (*Please specify*): _____

28. Do you seek out new information to learn how to care for your horse? *Circle one:*

- a. Yes → (*where? Please specify*): _____
 - b. No → (*Why not? Please specify*): _____
-

29. How far are you willing to travel for new information?

Circle one:

- a. 0-5 km
- b. 6-10 km
- c. 11-15 km
- d. 16-20 km
- e. More than 21 km

30. Do you share knowledge and information with your peers and community? *Circle one:*

- a. Yes
- b. No

31. Do community members come to you asking for help caring for their horses? *Circle one:*

- a. Yes
- b. No

32. Who do you contact for if you need help with your horse?

Circle one:

- a. Family Member
- b. Friend
- c. Veterinarian
- d. Other (*Please specify*): _____

Appendix F continued

Below you will find the remainder of the questionnaire number 1-29. Each number below consists of a pair of statements lettered “a” or “b”. Please circle the ONE statement from each pair that you most strongly agree with.

Please circle the statements based on personal belief, DO NOT spend too much time on any item. Be sure complete the entire chart, do not leave any numbers blank or circle both statements given for that number. Try to select your response to each statement independently; do not be influenced by your previous selections.

1. a. Children get into trouble because their parents punish them too much.	b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.	b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.	b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.	b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.	b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks one cannot be an effective leader.	b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try some people just don't like you.	b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.	b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.	b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

Appendix F continued

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.	b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11. a. Becoming a success is a matter of hard work; luck has little or nothing to do with it.	b. Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.	b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.	b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. a. There are certain people who are just no good.	b. There is some good in everybody.
15. a. In my case getting what I want has little or nothing to do with luck.	b. Many times we might just as well decide what to do by — flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.	b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.	b. By taking an active part in political and social affairs the people can control world events.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.	b. There really is no such thing as "luck."
19. a. One should always be willing to admit mistakes.	b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes "you".	b. How many friends you have depends upon how nice a person you are.
21. a. In the long run the bad things that happen to us are balanced by the good ones.	b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

Appendix F continued

22. a. With enough effort we can wipe out political corruption.	b. It is difficult for people to have much control over the things politicians do in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.	b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.	b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times I feel that I have little influence over the things that happen to me.	b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.	b. There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school	b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.	b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.	b. In the long run the people are responsible for bad government on a national as well as on a local level.

Thank you for taking the time to complete this survey!
At this time, please double check that you have answered all the questions. If you are satisfied with your responses, please raise your hand and member of the research team will be over to collect your packet momentarily.

APPENDIX G. WORKING EQUID WELFARE SCORING SYSTEM

Equid number	
species	
age	<5 5-15 >15
gender	M F G
behavior observation (BO)	= alertness + response to behavior approach + chin contact
1-alertness	
Sc 0 - Depressed	
Sc 1 - Alert	
2-response to observer approach	
sc 0 - aggressive	
sc 0.25- Avoid observer	
sc 0.5 - ignore observer	
sc 1 -friendly	
3- Chin contact	
sc0 reject	
sc1 accept	
Body cond. score (BCS)	= Body Condition Score
sc 0.25 (1-2)	
sc 1 (≥2.5-≤3.5)	
sc 0.75 (4-5)	
Coat observation (CO)	= coat health + ectoparasites + recently groomed
1-coat health	
sc 1 healthy	
sc 0 unhealthy	
2-ectoparasites	
sc 1 free	
sc 0 infested	
3-recently groomed	
sc 1 yes	
sc 0 no	
Harness induced body Lesions (HIL)	= LNS + LC + LW
Lesions at Neck and point of Shoulders (LNS)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Lesions at sides of Chest (LC)	
sc 1 no lesion	

Appendix G continued

sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Lesions at Withers and spine (LW)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc 0 broken S/C or deep lesion	
Mistreatment induced body Lesions (MIL)	= LPH + LNBC + LHG
Lesions at points of hocks (LPH)	
sc 1 absent	
sc 0 present	
Lesions at nasal bridge and/or commissures of the lips (LNBC)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Lesions at hind quarters (LHQ)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Overwork induced body	= PSFT + LAK + OBL + FL + TL
Pain and/or Swelling of the forelimbs and/or hind limbs Tendons and/or Fetlock joint (PSFT)	
Sc 1 absent	
Sc 0 present	
Lesions at anterior aspect of the knee (LAK)	
Sc 1 absent	
Sc 0 present	
Other body lesions (OBL)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc0 broken S/C or deep lesion	
Firing lesions (FL)	
sc 1 no lesion	
sc 0.5 superficial or healed	
sc 0 broken S/C or deep lesion	
Tethering lesions (TL)	
sc 1 no lesion	
sc 0.5 superficial or healed	

Appendix G continued

sc 0 broken S/C or deep lesion	
Hoof Score (HS)	= HS
sc 1- normal	
sc 0 abnormal	
Behavior Score (BS)	= alertness + response to behavior approach + chin contact
Body Condition Score (BCS)	= Body Condition Score
Body Coat Score (BcoS)	= coat health + ectoparasites + recently groomed
Body Lesions Score (BLS)	= LNS + LC + LW + LPH + LNBC + LHG + PSFT + LAK + OBL + FL + TL
Hoof Score (HS)	= HS
Total Welfare Score (TWS)	= BS + BCS + BCoS + BLS + HS