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A CONJOINT ANALYSIS STUDY OF PREFERENCES AND PURCHASING BEHAVIOR OF POTENTIAL ADOPTERS OF THE BUREAU OF LAND MANAGEMENT WILD HORSES

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A CONJOINT ANALYSIS STUDY OF PREFERENCES AND PURCHASING BEHAVIOR OF POTENTIAL ADOPTERS OF THE BUREAU OF LAND MANAGEMENT WILD HORSES.

THESIS

A Thesis Submitted in partial fulfillment of the
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By

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ABSTRACT OF THESIS

A CONJOINT ANALYSIS STUDY OF PREFERENCES AND PURCHASING BEHAVIOR OF POTENTIAL ADOPTERS OF THE BUREAU OF LAND MANAGEMENT WILD HORSES.

This study uses conjoint analysis to examine the preferences of buyers for Bureau of Land Management (BLM) wild horses based on physical attributes of wild horses and individual characteristics of the buyers. Generalized ordered logit models and multinomial logit models are used to study the impact of the buyers' demographic characteristics such as age, gender, knowledge about wild horse care, and number of wild horses previously adopted on physical attributes of the horses such as color, age, height, training status, temperament, conformation, and unique markings. Using a choice experiment, taken together, these attributes determine buyer's preferences for a wild horse. This study reveals that characteristics of buyers have significant effects on their preferences for wild horses. Their gender, age, knowledge about wild horse care, and the number of horses previously adopted influence the importance that buyers place on physical attributes of a wild horse in their decision to purchase a wild horse.

Keywords: BLM wild horses, Generalized ordered logit model, Multinomial logit model, Conjoint analysis, Willingness to pay.

Omotoyosi Adekunle

April 22, 2015

A CONJOINT ANALYSIS STUDY OF PREFERENCES AND PURCHASING BEHAVIOR OF POTENTIAL ADOPTERS OF THE BUREAU OF LAND MANAGEMENT WILD HORSES.

By

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April 22, 2015
(Date)

This project is dedicated to all the people who have lost a loved one to the Ebola epidemic of West Africa. Someone right here is praying for you all.

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Chapter I: Introduction

Wild horses are referred to as the pioneer spirit of the west and also as a living symbol of the American freedom. According to the American Wild Horse Preservation association, wild horses are national icons that should be regarded as an integral part of the American history because the western United States was built on the backs of the ancestors of today's wild horses (Reis, 2014). Horses have been a part of America's history since the 16th century when Spanish explorers brought them to North America. In the 1920's, there became a huge demand for wild horses as they were slaughtered for meat, hooves and the production of glue. These wild horses, in addition to burros, started to be displaced by farmlands and communities, perhaps out of fear of competition with livestock for forage (National Systems of Public Lands, 2010). As a result of such displacement, the US government started to become aware and concerned about the decreasing numbers of wild horses on rangelands. A woman named Velma Johnston started a campaign against the inhumane treatment and the displacement of wild horses from their natural habitat. The campaign directed by Johnston led to the enforcement of the enactment law of 1959 that protected wild horses on rangelands from all sorts of harassment as well as death (Johnston, 2009).

In response to the wild horse preservation campaigns, in 1971, the US government set aside a public rule (92 P. L.195) which was signed by President Nixon and is widely known as the Wild Horses and Burro Act (WH&B Act). The enactment law of 1971 charged the Bureau of Land Management (BLM) of the US Department of Interior to be responsible for the protection and supervision of free roaming wild horses and burros on US public lands. This protection law of 1971 explicitly stated that wild free

roaming horses are protected in a way that promotes the natural ecological balance of rangelands, controls the total population of wild horses, protects wildlife habitat and prevents the deterioration of public lands.

The BLM preserves rangelands by keeping the herd sizes of wild horses at an appropriate management level (AML) set by the BLM. The appropriate management level of wild horses is defined by the BLM as the point at which the herd population of wild horses and burros are consistent with the land's capacity to support them. The current maximum appropriate management level (AML) is 26,684 (Gorey, 2014).

When the number of wild horses exceed the AML, round ups of wild horses are conducted. Horses that have been rounded up are placed in short or long term holding facilities. Those that are potentially adoptable (such as healthy horses and young horses) are placed in short term holding facilities where they are made available for public adoption. Wild horses that are above the age of 4 are put in the long term holding facilities, many of which are land owned by private people who contract with the US government, or may be adopted by someone who does not mind the age or health status of these horses. These wild horses are given the necessary vaccines needed to prevent disease outbreak upon round up and prior to adoption.

The short term holding facilities differ greatly. In some, the horses are not handled at all; they only see humans providing food. In others, such as the prison horse adoption program, the horses receive a lot of attention. The prison adoption program allows inmates that are experienced in horse training the benefit of training wild horses prior to public adoptions. The prison inmate wild horse training program began in 1986

in Canon City, Colorado, and is now one of five facilities in the US with the Wild Horse Inmate Program (WHIP). One of many benefits of WHIP is that it offers trained horses to adopters who do not have the experience, time or facilities to train wild horses. Otherwise, horses found in BLM holding facilities are possibly untouched.

In order to place these horses in private homes, the BLM administers an adoption program. It accomplishes this in two ways. First, it holds live public adoptions where potential adopters are presented with a number of wild horses and burros which they can adopt from. Second, it holds internet auctions where potential adopters are allowed to bid for horses, and the highest bidder purchases/adopts the horse.

In addition to the adoption program, BLM is a part of the Extreme Mustang Makeover which is a mission of the Mustang Heritage Foundation, targeted at increasing the adoption of BLM horses through awareness programs and competitions (Extreme Mustang Makeover, 2014). As a marketing tool and a strategy to increase public awareness, and demand BLM wild horses participate in Extreme Mustang Makeover events across the United States where the value and trainability of mustangs are showcased through competitions.

In this study, our research is aimed at improving the BLM's adoption program through the investigation of physical attributes of wild horses as well as the individual characteristics of potential horse adopters that may increase the demand for BLM's wild horses.

I.1. Problems and challenges faced by the BLM

A major challenge faced by the BLM is efficiently controlling the nation's free roaming wild horse populations given budget constraints, climate change, danger of overpopulation of wild horses on rangelands, declining public adoptions and negative public perceptions of the BLM program.

The BLM estimates that there are presently about 49,209 free roaming wild horses and burros on BLM-managed rangelands in 10 western States: Arizona, Nevada, Wyoming, Idaho, New Mexico, Utah, Oregon, California, Montana and Colorado (BLM, 2015). This number exceeds the AML by 22,525 horses. There are also an additional 48, 335 horses in short and long term holding facilities. According to the Mustang Heritage Foundation, the average lifetime cost of maintaining horse that are not adopted is $46,252 per horse which amounts to a total of $1,041,826,300 needed to maintain the present 22,525 excess wild horses. However, it costs the BLM $2100 per horse to maintain horses before adoption. This suggests that the BLM saves on maintenance cost when horses are adopted.

A great percentage of the BLM's budget for wild horses is spent on feeding and vaccination of wild horses in the holding facilities. The maintenance costs of holding wild horses singularly accounted for more than half of the amount spent on maintaining the entire wild horse and burro program in 2007. The BLM's records from 2007 show that $33.8 million was spent on the entire wild horse program of which $21.9 million was spent on holding facilities (Gorey, 2009).

In 2008, the cost of maintaining the entire program increased to $36.2 million, with $27 million designated for maintaining holding facilities. In 2011, the government budgeted $76, 919 million for the BLM program, and 11% of this amount was spent on the removal and gathering of wild horse, 61% accounted for holding costs, 10% on the adoption program, 2% on census and inspection of wild horse herd areas, 3% on planning and monitoring herd management areas, and 13% on general support and maintenance of wild horses (Hooks, 2015). In 2012, the government designated only $75 million to the entire program which was less than the funds designated in the previous year and also less than the funds anticipated for maintaining the entire program. In 2015, the BLM's budget request was $1.1 billion dollars which is $5.6 million dollars less than the budget request of 2014 (BLM, 2015).

From the financial records of the BLM, it is evident that the BLM spends millions of dollars maintaining the entire wild horse program. The high cost of maintaining the BLM program leaves the BLM with the major quandary of either reducing the number of round ups or finding alternative ways to get rid of unsold and unadoptable horses. Other possible alternatives for the BLM are euthanizing unsold wild horses, reducing or putting an end to round ups and selling unsold horses across US borders. However, these options may not be feasible because; 1) the BLM may be faced with the challenge of disposing euthanized horses, 2) reducing or eliminating round ups will leave rangelands threatened as the AML is exceeded, and 3) selling horses across U.S borders will prevent the BLM from supervising what becomes of these horses due to a change in ownership (slaughter is a likely outcome).

A second challenge that the BLM faces is with climate change. With the population of horses on rangelands left untouched, horses are prone to death from pronounced weather extremes such as heat and cold; these conditions increase the likelihood of starvation and dehydration. BLM rangelands may not provide adequate protection from these conditions, whereas horses in holding facilities are provided with man-made and natural wind breaks as well as food and shelter (Cella, 2014).

A third challenge that the BLM faces is with the danger of overpopulation of range lands with wild horses. Wild horses have no known natural predators, and their herd sizes can double every four years. Overpopulation of wild horses on rangelands can lead to the overgrazing of public lands which may affect plant life. When plant life becomes affected horses may die of starvation as a result of overgrazing (AAEP, 2011). In addition, the overpopulation of wild horses on rangelands can lead to disease outbreak among population herds of wild horses.

Apart from the environmental challenges, one further challenge that the BLM is facing is the declining rate of public adoptions. Fewer adoptions increase BLM's holding costs and create overcrowding of holding facilities. Although the BLM has successfully placed 225,000 horses in adoption since 1976, the present rates of public adoption are discouraging. About a decade ago, the adoption program was effective in finding private homes for horses held in the holding facilities. However, in the last five years there has been a significant drop in the number of public adoptions. According to the American Veterinary Medical Association, the number of adopted horses decreased by 55%, from 6,644 to 2,960, in 2006-2010 (Larkin, 2011). The reason for this decline is unknown; however, it is possible that adoption rate has declined due to the inability of horse owners

to afford the cost of owning a horse. The purchase price of a horse is small compared to the amount of money needed to keep the horse healthy. Adoption fees are a minimum fee of $125 per wild horse, whereas the cost for keeping a horse can exceed $1000 per year (BLM, 2015).

Finally, a fifth challenge that the BLM faces is with the negative perception of the public about the BLM's oversight of the wild horses and burros. There are widely divergent and conflicting perspectives about how the BLM manages and maintains the health of wild horses that have been captured from the wild (Phillips, 2012).

Because of their historical connection to the settlement of the west, Americans are passionate about wild horses. This makes it difficult for the BLM to assure the public that the institution follows standard measures in the process of capturing and handling wild horses and conducting adoptions. To make matters worse, there has been speculation about some adopters sending adopted horses to Mexico for slaughter (Philips, 2012). Moreover, the BLM has limited control over what buyers do with horses because buyers receive complete ownership of these animals directly from the Federal government (Gorey, 2009).

"Under the December 2004 Amendment to the Wild Horse and Burro Act of 1971, animals over 10 years of age that have been passed for adoption at least three times are eligible for sale or transaction in which title of ownership passes over immediately from the Federal government to the owner" (BLM, 2014). However, the practice of selling off wild horses that are unadoptable is being discouraged because the BLM losses total control and ownership of these horses. Still, there is a limit to what the BLM can do

to control what such buyers do with purchased horses; however, the BLM does not directly send unsold animals to slaughter houses or across US borders to be used as animals of burden.

I.2. Controversies about leaving excess wild horses to roam the wild

The Humane Society of the United States is of the opinion that wild horses should be left in the wild rather than captured and separated from their families. This society believes that "free roaming wild horse and burro deserves to first be given the chance to live out their lives wild and free and if and when it is required we owe them our best effort to ensure that any human actions that affect their lives such as gathers, fertility control, transportation, confinement and adoption are conducted in a way to assure their humane treatment" (HSUS, 2010). Petitions are presently being circulated for people to sign in support of eliminating wild horses round ups. HSUS supports the sterilization of wild horses which the BLM does to prevent the animals in the facility from reproducing.

I.3. Adopting a wild horse from the BLM

The BLM has a set of regulations governing wild horse adoption. The buyer must be 18 years or older and have no prior record of inhumane animal treatment. The buyer needs to have titles for all previously adopted horses. Finally, the buyer needs to be able to properly house (with BLM's requirement regarding fencing, height of fence and shelter), feed and provide veterinary care (which includes hoof care) for the horse. All wild horse facilities are inspected prior to and after adoption which adds cost to the program.

I.4. BLM wild horses and their possible future

A reasonable solution to the BLM wild horse challenges will require the use of numerous resources and a combination of methods through the application of science, strategies and economic analysis. In addition to the science of wild horse management, efforts should be targeted at increasing the confidence of the general public in the BLM's adoption program, optimizing the cost effectiveness of the holding facilities and increasing the demand in private homes for healthy wild horses and burros.

For example, the BLM recently created a trial incentive for the public adoption of older wild horses by giving $500 to any adopter of one these horses in the states of Kansas, Texas and Oklahoma (BLM, 2011). The goal of this program is to increase the number of mature horses (7-10 years) placed in private ownership which should in turn, decrease the number of older horses which the BLM needs to care for in the holding facilities. The only stipulation is that the adopter should have successfully cared for the horse for a year before they can receive the $500 reward. Otherwise, the standard adoption rules and fees apply. The buyer returns a title application in the mail along with the incentive voucher and then receives a check for $500 along with the title (BLM, 2011). Finally, with the exploration of science and effective marketing tools the BLM has a better chance of maintaining the wild horse adoption program.

I.5. Research questions and objectives of the study

Based on the economic challenges faced by the BLM's wild horse adoption program, it is essential to find strategies that can potentially increase the effectiveness of the BLM's adoption program. One way to do this is to understand which types of wild

horses potential adopters find attractive. Consequently, this research aims at analyzing the factors that may influence potential adopters' willingness to adopt a wild horse.

The first objective of this study is to understand the preferences of potential adopters of wild horses based on the physical characteristics of wild horses as well as the individual characteristics of these potential adopters. We use conjoint analysis, generalized ordered logit and multinomial logit models to determine the choice behavior of potential wild horse adopters. The second objective of this study is to use the results to provide sound information capable of informing policy decisions for the BLM adoption program.

I.6. Thesis structure

Chapter 1 presents an introduction to the issue and the objectives of the research project and current approaches to managing the issue. Chapter 2 presents the background information and the literature review. Chapter 3 talks about the theoretical model. Chapter 4 presents the empirical model. Chapter 5 outlines the survey design. Chapter 6 presents the descriptive statistics, correlation studies and results of the generalized ordered logit and multinomial logit models used in analyzing the preferences of potential horse adopters for BLM wild horses at an adoption event. Chapter 7 provides discussions, conclusions and recommendations useful for improving the BLM's adoption program.

Chapter II: Literature Review

II.1 Background information: willingness to pay

Different methods have been used to estimate buyer's willingness to pay for a product. Some of the methods commonly used to determine willingness to pay of consumers are hedonic pricing analysis, conjoint analysis and experimental auctions (Green and Srinivasan 1990). This study focuses on conjoint analysis as a technique to analyze consumer's choice behavior. Conjoint analysis, also known as discrete choice modeling, was first discussed by mathematical psychologist Luce and statistician Tukey in 1964 (Green &Srinivasan 1978). Although the first conjoint analysis studies were focused on mathematical applications rather than consumer choice behavior, the first consumer oriented conjoint analysis paper was in 1971 by Green and Rao. Since then, the model has been extended to the study of willingness to pay of consumers in business, marketing and economics.

"Conjoint" itself is a word derived from the word *conjoined*, and it refers to how products are viewed by buyers when the characteristics of the products are presented together to a consumer. The process of decision making that buyers go through before purchasing a product is intricate. It is also challenging for researchers to measure the value that buyers place on a product and to analyze the choice process that leads to a buyer's decision to purchase a product. Conjoint analysis is a model which uses a distinct method to evaluate the value that buyers place on products when all the attributes of the product have been bundled together into product choice sets. The value of a product is described by Zeithaml (1988) as the consumer's overall assessment of the utility of a product based on the attributes of the product that have been presented to the consumer.

The assumption underlying conjoint analysis is that utility can be derived from a product and the value that buyers place on product attributes informs the understanding of buyers' choice behavior and decision to purchase a product.

Conjoint analysis has been used in a number of fields. For example, in the food industry, researchers have studied willingness to pay for food products such as beef and local produce (Adalja et al 2013, Chung et al 2012, Chung et al 2008, Abidoye et al 2011, and Reynolds-Allie at al 2011). In the organic food industry, conjoint analysis has been used to study the willingness to pay of buyers for organic foods such as organic rice, organic blueberries, organic sport drinks, organic cheese in Spain, and organic chocolate in developing countries in Africa (Ara (2003), Ameseder et al, 2008, Hu et al, 2009, Bernabeu et al, 2008). Conjoint analysis has also been used to study the willingness to pay of buyers for genetically modified foods such as Chinese canola oil, Chinese soya bean oil and white maize (Hu et al, 2006, Hwang et al 2006, Baker et al 2005, Rodriguez et al 2008). It has been used in the tourism industry and environmental studies to study the willingness to pay of tourists for ecotourism (Marangon et al 2013, Joseph et al 2010, Yun (2010) and Massiani et al 2008).

Conjoint analysis is currently being extended into new fields in agriculture aside from its use in the study of organic foods, tourism and environment. For example, conjoint analysis was recently applied to the equine industry to study deworming choices by horse owners. Robert, (2013), studied the willingness to pay of Thoroughbred farm managers for alternative deworming regimes in horses using conjoint analysis.

II.2 Background information: wild horses

Very little research has focused on the management of wild horses. Economic approaches to this issue include hedonic pricing, opportunity cost measurement of forgoing wild horses from rangelands in Wyoming, and the measurement of the economic benefit of sterilization as a wild horse population control. In an opportunity cost study of the management of BLM wild horses Bastin, et al (1999), discovered that the marginal opportunity cost of holding wild horse numbers above the average management level is over $1900 per horse annually. With the current number of wild horses above AML, this is a total of 42,797,500 million dollars per year. This study suggests that the opportunity cost of leaving wild horses on rangelands to exceed the AML could be avoided when the government removes wild horses from rangelands in a timely fashion supporting the fact that excess wild horses need to be removed from rangelands.

A study by Bartholow (2007) looked into the economic benefits of sterilization as a population control method of wild horses that have been removed from rangelands and kept in the holding facilities. The study suggests that the BLM would experience significant savings when carefully designed methods are used to sterilize wild horses kept in the holding facilities.

Under the assumption that public adoption of wild horses plays a major role in the overall management of the BLM's wild horses on the adoption program, Alevey, et al (2010), conducted a study on the BLM wild horse auction in Nevada which studied the preferences of adopters for physical characteristics of wild horses and analyzed revenue equivalence between two types of auctions. In this study, two BLM wild horse auction

designs were investigated to identify the auction design that yields higher revenue. The first design focused on the distribution of wild horses through a right to choose auction (RTC) and the second focused on a baseline sequential auction (SEQ). RTC auctions are rounds of auctions where the highest bidder of each round is allowed to choose among the goods remaining in the sale (Burgette, 2007). On the other hand, baseline sequential auction (SEQ), are rounds of auctions where for each round bidders bid exactly once and sequentially and the highest bidder is allowed to make payments for a single object on sale (Krzysztof & Markakis , 2015). Alevey's study also investigated on the potential revenue of creating a wild horse and burro adoption center in Nevada. The results from the Alevey, et al, study showed 1) that adopters have color, training and gender preferences in wild horses, 2) that there are no differences between the revenue derived from the RTC and the SEQ wild horse auction, and 3) potential revenue can be recovered from constructing a wild horse and burro adoption center in Nevada .

Hedonic pricing approach was used by Elizondo (2011) to determine the marginal value of the physical characteristics of wild horses. The study used adoption fee data gathered from the BLM to conduct an empirical analysis of the demand for wild horses, analyzing both the probability of adoption and the price received for each horse. The results show that gender, age, color, and training status of a wild horse are statistically significant to explaining the variation in the willingness to pay of buyers. It was also found that a reduction in standard minimum adoption fees will increase the number of horses the BLM is able to place in private homes, thus saving the BLM cost of keeping wild horses in long term holding facilities.

Hedonic pricing method was also used by Adekunle, Markus, Stowe & Saghaian (2013) to study the willingness to pay for BLM's wild horses which were placed in internet auctions from November 2012 through February 2013. The qualities that determine the willingness to pay of wild horse buyers were proximity of the buyer to the sale location, location of birth of the wild horse (buyers preferred the ones captured from and born in the wild compared to ones born in captivity), a mare or stallion, color of the horse (roan, brown, pinto, palomino and dun horses were preferred to black and gray horses), and a horse that has stayed more than a few months in the BLM facility. The results from this paper also suggest that adopters/buyers are willing to pay more for some training for horses that have been in captivity longer.

Harris, et al, (2005) estimated the attractiveness of wild horses to virtual wild horse adopters and potential wild horse adopters. Virtual horse adopters do not physically adopt a horse, but pick a horse to support financially throughout a period of time. The results from the Harris, et al, study show that virtual adopters like to support larger sized, active and less expensive black horses. Web respondents (to an online survey) preferred to purchase a quiet, non-expressive, larger size, sorrel, palomino or black horse. The willingness to pay for wild horses shown in Harris's study showed that in general respondents are willing to pay more in dollar terms for younger horses than older ones, more for quiet horses, more for taller horses, and more for black horses. The study also included one quality of the buyer, which is knowledge of the buyer about wild horse care, in its analysis of willingness to pay.

Our study uses conjoint analysis to determine the willingness to pay of buyers for BLM's wild horses using physical attributes of wild horses identified in previous papers.

However, this study is different from previous papers because it includes individual characteristics of buyers (such as gender, age, knowledge about wild horse care, and the number of horses adopted in the past) and an ordinal ranking of buyers' preferences into the study of the willingness of buyers to purchase wild horses.

Chapter III: Theoretical Model

III.I. Conjoint analysis

Conjoint analysis is a discrete choice model that is used to analyze the choice of a decision maker for one alternative of a product from a set of mutually different alternatives that has been presented to potential buyers of the product (Robert 2013, Green and Srinivasan 1990, Koppelman and Bhat, 2006). A discrete choice model is one which allows a researcher to study the stated preferences of decision makers by asking them to choose among a set of alternatives. The set of alternatives must be mutually exclusive, exhaustive and the number of alternatives must be finite (New York University, 2012).

Many different factors influence a buyer's product choice, and much information about a buyer's purchasing pattern can be derived from a discrete choice study. Some of the factors potentially influencing a buyer's purchasing decision are the individual characteristics of the buyer (such as age and gender), the distance of the buyer from the market, the cost of the product, the knowledge of the buyer about a product, the color features of a product, or market information available about a product. Econometric analysis can be used for studying preferences among product attributes.

III.2 Stated and revealed preferences

As previously mentioned, consumers choose products based on the preferences they have for product alternatives that have been presented to them. The two approaches to measuring consumer preferences are revealed preferences and stated preferences. Revealed preferences are based on a researcher's observation of the past or present

actions and the actual choice behavior of a consumer (Ben-Akiva et al, 1994). It assumes that the observed actions of a consumer depend on the process of utility maximization. A researcher can study the outcome of a choice set experiment and discover the preferences of a buyer which have been revealed by the outcome of a choice study. On the other hand, stated preference measures preferences of individuals according to hypothetical choices presented to the individual. More precisely, it measures what individuals say they would do when presented with a given choice set. Stated preferences can be extracted through the use of survey based data collection from a choice experiment. In this study we use stated preferences to understand wild horse buyer's preferences for wild horses.

Some additional factors that could determine consumer preferences for a product besides the physical characteristics of a product are the consumer's personal life experiences, the consumer's physical characteristics or the consumer's biological taste pattern. For example, it is not expected that a tall person would prefer to use the lower of two water fountains when presented with a choice to choose between two water fountains placed side by side.

In this study, some of these additional factors are accounted for by including the knowledge of potential buyers about wild horse care and the number of wild horses that have been adopted in the past; they represent personal life experience preference determinants. The age range and gender of the buyers are also included and represent biological taste pattern determinants of buyer's preferences.

III.3 Fractional factorial designs of conjoint analysis

Conjoint analysis in consumer research is a stated preference analysis of consumer's preferences and tradeoffs among variety of alternatives of products or services which may differ according to various attributes (Green & Srinivasan, 1978). These alternatives are derived from fractional factorial experimental designs. A survey consisting of alternatives of the product provided are created through a statistically designed instrument (Harpman, 2008). Respondents are presented with different hypothetical alternatives of a product in a fractional factorial design, and these alternatives vary according to their characteristics or attributes. Individuals are then given the option to choose between one of two product alternatives with the additional option of choosing neither. In some cases, individuals may be asked to rank products according to their order of preference. These methods are used to measure the utility that a potential buyer receives from different attributes of a product.

The data derived from a conjoint study can provide information on the probability that the buyer will choose or not choose any of the hypothetical product alternatives that have been presented to them. Researchers can further use the data to study factors that contribute to the willingness to pay for a chosen product. Ordinal logit models, multinomial logit models and other models in the family of the multinomial logit model are useful to help analyze the data derived from a conjoint experiment.

III.4. Random utility model

The theoretical basis for conjoint analysis is the Random Utility Model (RUM), which proposes that consumers derive utility from the characteristics of a product rather than from the product itself (Lancaster, 1966). RUM explains the process of decision

making of potential buyers and the utility that buyers derive from attributes of product. Utility can be described as an indicator of the value that potential buyers place on the attributes of the alternatives of the product that have been presented to the buyer. Consumers then derive utility from the alternative that has been chosen from the choice set of mutually different alternatives. The RUM suggests that a potential buyer would choose product X over product Y if the perceived utility of product X is greater than that of product Y.

The RUM can be associated with consumer choice theory and the application of logit models. When RUM involves two alternatives of a product in a choice set, the logit model can be used as the empirical model of analysis for consumer preferences and willingness to pay for product alternatives. When the RUM is extended to more than two choices or product alternatives, multinomial logit models and mixed logit models can be used to study preference and willingness to pay for a product.

III.5. Random utility model (utility maximization)

An individual's utility for a choice can be disintegrated into two parts. The first part is deterministic, and it is assumed to be common to everyone given the same product characteristics and product attributes. The second part is randomly determined and cannot be predicted precisely without statistical analysis. It also reflects the distinctive tastes of individuals and unobserved attributes of a product. The RUM specifies that the utility of each alternative of a product is a linear function of the observed characteristics of the product plus the error term (Verbeek, 2012). For example, when there are 3 alternatives of a particular product; a buyer will have 3 different utilities for each alternative of the product. When these utilities are presented in a linear function, each equation should

include an error term. The equation below is an example of the utility of an individual (*i*) for an alternative (*j*) chosen out of the *t*-th choice set presented as a linear function.

$$Uijt = \beta\, \mathbf{X}ijt + \varepsilon ijt \qquad (3.1)$$

The first term $\beta\, \mathbf{X}ijt$ is the deterministic part of the equation which suggests that the preferences of a consumer can be observed from a choice experiment, and the error term is the stochastic part of the equation which suggests the randomness of the error term and the preferences for unobserved attributes. The coefficient β can be further described as the change in utility as a result of a unit change in attribute of a given product. Finally, U_{ijt} represents the utility that the individual ascribes to product *j*.

The probability that a buyer will choose one particular product alternative over another is given by the probability that the derived utility from the chosen alternative is greater than the utility derived from all other alternatives of that product. Buyers choose the alternative of a product when that alternative provides more utility. Assuming that there are two alternatives of a product (*j)* and (*k),* a buyer (*i*) will choose alternative product *(j)* if the utility of (*j)* is higher than (*k).* More formally:

Individual's *i'*s utility for alternative product (*j)* equals:

$$U_{ij} = V_{ij} + \varepsilon_{ij}, \qquad (3.2)$$

an individual's utility for alternative *(k)* equals*:*

$$U_{ik} = V_{ik} + \varepsilon_{ik} \qquad (3.3)$$

Then, utility for alternative (*j)* is greater than *(k)* when:

$$V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ij} \quad \text{for all } j \neq k \qquad (3.4)$$

The buyer chooses *j* if alternative *j* has the higher utility between alternatives *j* and *k*. The probability that a buyer chooses one alternative over another is described with respect to the alternative that is not chosen.

More Specifically,

$$Pr(y_i=j) = Pr(U_{ij} \geq U_{ik}) \text{ for all } j \qquad (3.5)$$

$$= Pr(U_{ik}-U_{ij} \leq 0) \text{ for all } j \qquad (3.6)$$

$$= Pr(\varepsilon_{ij-} \varepsilon_{ik} < U_{ij}-U_{ik}) \text{ for all } j \qquad (3.7)$$

Where "$Pr(y_i=j)$" is the probability that an individual (*i*) would choose alternative (*j*). The component of the equation (3.5) $Pr(U_{ij} \geq U_{ik})$ indicates the probability of the individual choosing *j* over *k* is the probability that *j* has a higher utility than *k*.

Chapter IV: Empirical Methodology

For the purpose of our study we designed an intercept survey which we presented to respondents at a BLM's adoption event which occurred at Lakeside Arena, Frankfort Kentucky from July 18-19, 2014.

The first section of the survey included all the demographic information about the respondents such as age range, zip code, knowledge about wild horse care and wild horse purchase history. The second section of the survey includes the importance ranking of attributes of wild horses based on survey respondent's perception of each attribute. The third section of the survey consists of multiple dichotomous choices between wild horses, with the option to choose neither.

To evaluate the data derived from the second section of the survey, we use the ordinal logit model as a model for ordered responses. In the ordinal logit model, the ordinal response of ranking on a scale of 1-5 of an attribute's importance to the purchase decision are used as the dependent variables while the categories/characteristics of wild horses (color, height, unique markings, conformation, training, age and temperament) are the independent variables.

To estimate data from the ordinal ranking response, the multinomial logit model or the basic OLS model could be utilized. However, there may be loss of efficiency and loss of information in the ordinal nature of responses when OLS or multinomial logit models are used, even though the parameter estimates from the multinomial logit approach or OLS model may still remain unbiased (Brown, 2014 and Borooah, 2002).

Hence, we use ordered logistic regression models to avoid the loss of important information that can be found in the ordinal nature of this data.

When estimating the ordinal logit models, we are testing the null hypothesis that the individual characteristics of a buyer (gender of buyers, age range of buyers, knowledge about wild horse care and the wild horse purchase history of buyers) do not determine the way that buyers rank the physical characteristics of a wild horse (color, height, age, unique markings, temperament, conformation and training) as relevant to their willingness to purchase a wild horse.

To evaluate data derived from the third section of the survey we use multinomial logit models to analyze dichotomous choices of wild horses made by respondents. Multinomial logit models allow us to study buyers' willingness to purchase a wild horse based on the individual characteristics of buyers and the physical characteristics of wild horses.

IV.1. Logit model

The logit model serves as the foundation for the ordinal logit, generalized ordered logit and the multinomial logits model and will be discussed first. The model is useful for binary dependent variables which are modelled as a function of one or more independent variables which may be categorical or continuous.

When the dependent variable is binary, a logit model is used instead of OLS because with OLS the predicted value is not restricted to be between 0 and 1. A logit model allows researchers to measure the effect of an explanatory variable on the odds ratio. The odds that an event occurs can be described as the ratio that an event occurs to

ratio that the event does not occur. This effect is determined by the parameter estimates of the predictor variables.

The logistic model is analyzed by using log of the odds ratio of being in a particular category for each combination of independent variables represented. For instance, in this study the log of the odds ratio of choosing color (color as the dependent variable) as an important determinant of the purchase decision of a wild horse is a function of the selected independent variables (gender, age, knowledge about wild horse care, the purchase history, and the number of horses adopted in the past). The log odds ratio ranges from negative infinity to infinity depending on whether there is a positive or negative effect of the independent variable on the categories of dependent variable that is being estimated.

The functional form for the logit model is given by the following equation:

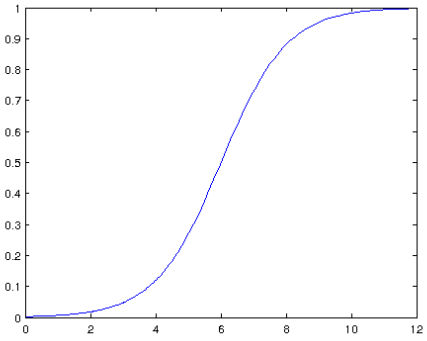
$$P\ (y_i = 1) = \frac{exp(x_i\beta)}{1+exp(x_i\beta)} \qquad (4.1)$$

The log odds that an event occurs can be represented as:

$$Ln\ (\frac{p(event)}{1-p(event)}) = \alpha + \beta x \qquad (4.2)$$

The figure 4.1 illustrates the graph of the logistic curve.

Figure 4. 1 The Logistic regression curve



In Figure 4.1, the x axis represents the log odds and the y axis represents the probability of an event occurring. We can deduce from the logistic curve that changes in the log odds of an event near the tails produces little changes in probability of an event occurring. On the other hand, near the middle of the S-shaped curve, changes in the log odds results in larger changes in probability of the occurrence of an event.

IV.2.The ordinal logit model

The ordinal logit model is a family member of the logit model and provides the framework for understanding generalized ordered logit models. In ordinal logit models responses are ordered. An ordinal dependent variable has more than two categories and the values of each category have a sequential order.

Ordinal logit models are based on the proportional odds assumption, or parallel lines and cumulative probabilities. The ordinal regression model assumes that there is proportionality in the odds ratio of the explanatory variables across the different thresholds of dependent variable. This can be further explained as the effect of an explanatory variable is assumed to be consistent or proportional across the categories of the ordinal outcome variable.

In an ordinal logistic model, the event of interest takes a score of either 1 or a number greater than 1. The cumulative probability for an event occurring can be represented as:

Θ_1= Probability (score 1)/ Probability (greater than 1)

Θ_2= Probability (score 1 or 2)/ probability (score greater than 2)

$\Theta_{3=}$ Probability (score 1 or 2 or 3)/ probability (score greater than 3)

The general form for the odds of an event is Θ_j= probability (score$\leq j$)/ probability (score $>j$). The equation can be further expressed as Θ_j= probability (score$\leq j$)/ (1- probability (score$\leq j$)). Then, the ordinal model for one dependent variable (Θ_j) can be represented as:

$$Ln\ \Theta_j = \alpha_j + \beta x \qquad (4.3)$$

In equation (*4.3)*, variable *j* can take up [-1, 1]. β indicates how a unit increase in the independent variables increases the log odds of being in a higher category of *j*. In other words, β is interpreted as the estimated increase in the log odds of an outcome per unit increase in the consumer's scale of preference for an outcome. The variable α_j acts like an intercept would in a linear regression. The intercept shows the log odds of being equal to or less than category *j* when all independent variables are set to zero. For instance, the log of odds of the importance ranking of attributes will be represented as:

$$Ln\ (attribute\ of\ wild\ horse) = \alpha_j + \beta x \qquad (4.4)$$

In equation (*4.4)*, the attributes will be color age, height, temperament, unique markings, conformation and training status, *x* is a matrix of independent variables. Variable α_j

denotes the categorical intercept of the logistic regression model and β is the parameter estimate that explains the order of ranking a buyer is likely to give to a particular attribute assuming other variables are held constant.

The proportionality odds assumptions of the ordinal logit model are frequently violated and researchers are left between using the ordered logit model method whose assumptions are known to be violated and switching to other methods (Williams, 2006). To fix this problem, a study by Williams (2006) suggests that the generalized ordered logit model be used. The generalized ordered logit model is less restrictive on the proportional odds assumption.

IV.3 Generalized ordered logit model

The generalized ordinal logit (gologit) model relaxes the proportional odds assumption of the ordered logit model. There are three categories of the gologit model. The first one is unconstrained, where the betas are free to differ across each individual *i*. The second one is constrained, which is a special case of proportional odds where the betas are the same across each individual *i* (William, 2000). The third one is the case of the partial odds, where some betas are allowed to differ across each *i* while others remain the same. In this study, we focus on the third category where betas are allowed to differ across some individuals. The partial odds/gologit model relaxes the partial odds assumption of the ordered logit model.

In the generalized ordered logit model, the probability that an individual *i* chooses a category of a dependent variable Y is represented as:

$$P\,(Y>J) = \frac{exp\,(\alpha_i + X_1\beta_i)}{1+[exp(\alpha_i + X_1\beta_i)]}, J=1, 2\ldots M\text{-}1 \qquad (4.5)$$

J represents the ordinal categories for dependent variable *Y*. *M* represents the highest ordinary category that can be given to a certain *Y*. In the unconstrained gologit model, βs are free to differ for each *i*. The partial odds/ gologit model is represented as:

$$P\ (Y>J) = \frac{exp\ (\alpha_i + X_1\beta_1 + X_2\beta_2 + X_3\beta_{3i})}{1+[exp(\alpha_i + X_1\beta_1 + X_2\beta_2 + X_3\beta_{3i})]},\ J=1,\ 2\ldots\ M\text{-}1 \qquad (4.6)$$

In equation (*4.6)*, β_1 and β_2 are the same across all *i*, but β_3 can vary across some *i*.

The gologit model is different from the ordered logit model because the ordered logit model estimates parameters as cumulative probabilities, while the gologit model estimates all parameters together, eliminating the idea of cumulative probabilities. In this study, we focus on the gologit model because the ordinal logit model estimated violated the proportionality odds assumption.

The independent variables in the gologit model are *GENDER, BUYERAGE, KNOWLEDGE, PURCHHIST, NUMPREVPURCH*. The dependent variables are the importance rankings of wild horse physical characteristics including *color, age, height, temperament, unique markings, conformation and training status*. We test the null hypothesis that all coefficient estimates are statistically equal to zero.

To estimate the gologit model, we grouped some of the categories of the explanatory variables together to create dummy variables. Table 4.1 shows independent variables and their corresponding dummy variables.

Table 4. 1: Independent variables and dummy variables (ordered logit model)

Name	Dummy Variable
GENDER	Gender of buyers *takes the value of 1 when gender is female and 0 otherwise
BUYERAGE	Age range of buyers * takes up a value of 1 when buyers are within age range 18-44years and a zero when buyers are above 44years
KNOWLEDGE	Self-Reported Knowledge of buyers *takes the value of 1 when people have Advanced and Intermediate knowledge and 0 otherwise
PURCHHIST	Purchase history of buyers * takes the value of 1 when buyers have a purchase history and 0 otherwise
NUMPREVPURCH	#adopted/ purchased *takes up a value of 1 when the buyer has adopted 1 or more horses and 0 when the buyer has not adopted a horse

IV.4. Goodness-of-fit for generalized ordered logit model

The goodness-of-fit of the gologit model is estimated using a maximum likelihood approach (SAS Support, 2014). Maximum likelihood provides coefficients and parameters of a statistical model that maximizes the likelihood function. The likelihood function describes how close the distribution is to the actual distribution of the observed dependent variable. When the likelihood function is maximized, the best coefficients are derived for each independent variable.

IV.5. Multinomial logit model and family

The Multinomial Logit (MNL) model can be described as a method that can predict the probability of the categorical membership of a dependent variable based on

multiple independent variables (Starkweather and Moske, 2010). In this study, we use one of the families of multinomial logit models as an extension of the random utility model and utility maximization theory to analyze discrete choice models.

The multinomial logit model (MNL) is used to measure the relationship between a dependent variable and a set of explanatory variables (So and Kuhfeld, 2012). In the multinomial logit model the data used are usually case-specific; that is, the explanatory variables are observed for the chosen product alternative and not for other alternatives; this is because the attributes of each of the alternatives of a product are independently distributed. The MNL is represented mathematically in the following equation;

$$P_{ij} = \frac{exp(x_i \beta_j)}{\Sigma_{l=1}^{m} exp(x_i \beta_l)} \quad j=1 \dots m \tag{4.7}$$

In the above equation, x_i are case specific explanatory variables, and the model ensures that $0 < P_{ij} < 1$ and $\Sigma_{j=1}^{m} P_{ij} = 1$. To make sure that the model is specified, $\beta_j = 0$ for one of the categories (which is the base category), and the coefficients are interpreted with respect to the chosen category.

In a MNL model, the following equations represent the probability that a buyer chooses alternative *j* and the probability that a buyer chooses other alternatives available;

$$P(y_i = j) = \frac{exp(x_{ij} \beta_j)}{1 + \Sigma_k exp(x_{ik} \beta_j)}, k = 1 \dots, J \tag{4.8}$$

$$P(y_i = 0) = \frac{1}{1 + \Sigma_k \exp(x_{ik} \beta_j)}, k = 1 \dots, J \tag{4.9}$$

The multinomial logit model has two basic assumptions. These assumptions are (1) the Independence of Irrelevant Alternatives (IIA) assumption and (2) the error terms

are independently and identically distributed over all alternatives (IID) assumption. The IIA assumption implies that the decision between two alternatives of a product is independent of the addition or the absence of other alternatives into a choice set of products available.

The IIA property is troublesome when two or more alternatives are very similar and their probabilities are highly correlated following a substitution pattern (Verbeek, 2012 and Spermann, 2008). This is the major weakness of the multinomial logit model; alternatives are independent from other alternatives and the addition of an irrelevant alternative can change the buyer's purchasing decision. Assuming that an individual *i* chooses from option *j* and option *k,* the following equation shows the ratio of choice probabilities:

$$\frac{P_{ij}}{P_{ik}} = exp[x_{ij}\ \frac{p_{ij}}{p_{ik}}] = \exp\left[x_{ij}^{'}(\beta_j - \beta_k)\right] \qquad (4.10)$$

In the above equation, *j* and *k* are independent from any other alternative bundles.

Jones and Hensher (2005) examined models that may relax the troublesome IIA property of the MNL model. Such models are the nested logit models, the bivariate logit models and the mixed logit models. The nested model is structured such that alternatives are grouped into categories called nests. In the nested model, the IIA only holds within each nest but does not hold across nests (Pecáková and Vojáček, 2010). Bivariate logit models use dependent binary variables usually coded as 1 or 0 in two different equations to analyze consumer choice decisions between alternatives of a product.

Finally, the mixed logit model relaxes IIA of the multinomial logit model by allowing substitution patterns to occur across alternatives. However, the multinomial logit model requires lower quality data, and it can be used when the willingness to pay estimates from mixed logit are exaggerated as a result of the skewedness of the data towards a dichotomous response and a small sample size (Greene and Heshner 2011, Bayaga, 2010). This study uses the multinomial logit models instead of the mixed logit models because of the skewedness in data and small sample size.

To estimate the multinomial logit models first we run a basic multinomial logit model without any interaction terms (MNL 0). Then we run four additional multinomial logit models, where each independent variable is interacted with knowledge about wild horse care (MNL 1), gender (MNL 2), age (MNL 3) and number of horses previously (MNL 4).

The dependent variable is the decision made by the respondents for wild horse A, B or option C, the status quo. We created dummy variables for the explanatory variables used to estimate the multinomial logit models. Table 4.2 below shows independent variables and their corresponding dummy variables.

Table 4. 2: Independent variables and dummy variables (multinomial logit model)

Independent Variable	**Dummy Variable**
Size	SIZE13 =1 when horses are 13 hands, else, 0 SIZE14=1 when horses are 14 hands, else, 0 SIZE15=1 when horses are 15 hands, else, 0
Color	BLACK=1 when color is black, else, 0 BAY=1 when color is bay, else, 0 PALOMINO=1 when color is palomino, else,0 BUCKSKIN=1 when color is buckskin, else,0 PINTO=1 when color is pinto, else, 0 CHESTNUT=1 when color is chestnut, else,0
Gender	MARE=1 when gender is mare else, 0 GELDING=1 when gender is gelding else, 0
Training	UNTOUCHED=1 when horse has not been trained else, 0 HALTERED=1 when horse has been haltered, else,0 SADDLED=1 when horse has been started under saddle, else 0
Temperament	CALM=1 when horse is calm else 0 NERVOUS=1 when horse is nervous else 0
Age	UNDER3YEARS =1 when horse is under 3yrs else 0 3-6years=1 when horse is 3-6yrs else 0 7-10years=1 when horse is 7-10yrs else 0
Price	N/A (Continuous Variable)
Neither	NEITHER =1 when the buyer does not make a wild horse choice, and 0 when buyer chooses a wild horse

Chapter V: Survey Design

This chapter describes the process of designing the survey that was used in investigating potential adopter's preferences for wild horses at an adoption event. First, we present the design of a conjoint analysis choice experiment used in creating the survey. Next, we outline the survey which consists of three sections: 1) demographic information, 2) simple ranking of importance of wild horse attributes, and 3) choice experiment over pairs of hypothetical wild horses. Last, we discuss the dates and venue of the adoption event where survey was given to respondents.

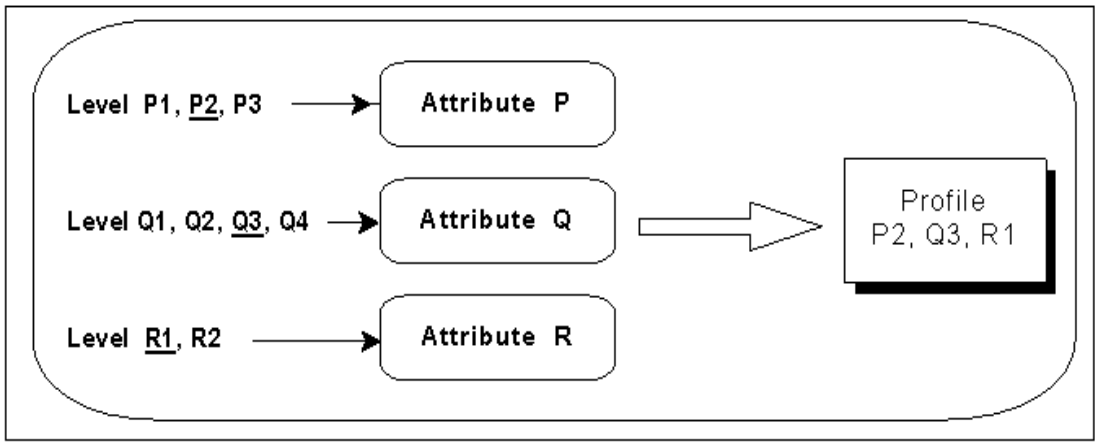
V.1. Design of a conjoint analysis choice experiment

The first step in designing a conjoint analysis is to determine the attributes of a product that a buyer may consider important when purchasing the product. The attribute of a product is the characteristic of the product. Each attribute may have a number of different levels. The levels of an attribute are the constituent parts or degree of an attribute (Orme, 2002). These levels could be numerical or non- numerical. In this study, the height of a horse is considered an important attribute and is measured in hands (where one hand equals 4 inches). Thus, relevant levels for the height attribute of a wild horse could be 13, 14 or 15 hands.

Next, the researcher creates a set of product profiles with the use of fractional factorial designs (Louviere, 1988). Fractional factorial designs are minimum efficient set of combinations of levels of product attributes to create hypothetical product profiles (Kuhfeld, 2010).

Hypothetical product profiles are random combinations of attributes and levels of a product; grouping different product profiles together results in a product choice set for survey respondents. Statistical software such as SAS, Saw tooth Software or JMP 10 can be used to create hypothetical product profiles. Respondents are generally asked to choose from a number of product choice sets. Figure 5.1 below, presents an example of a hypothetical profile.

Figure 5. 1: Hypothetical profiles (Dijkstra et al., 1996)



In Figure 5.1 above, we can observe that each profile is a combination of levels for each attribute. The hypothetical product above has attributes P, Q and R. Attribute P has 3 levels (P1 P2, P3), Q has 4 (Q1, Q2, Q3, Q4) and R has 2 (R1, R2). The particular product profile identifies a product with level P2 for P, level Q3 for Q and level R1 for R.

The choice set of alternatives for a product presented in a survey may include a decision not to choose any of the alternatives available to the survey respondent. Choosing neither alternative suggests the status quo is preferred to the alternatives available.

V.2. Survey outline

V.2.1.Demographic information

The first section of the survey requested demographic information from respondents. Information collected includes respondents' zip code, age range, and gender. In addition, we collected information to gain some understanding of the respondents' experience with wild horse. This information included the number of BLM adoption events that the respondents had previously attended, whether or not the respondents had recently purchased /adopted or owned a wild horse, the number of BLM horses that they had adopted, and the venue in which the wild horse was purchased. The respondents were also asked to assess their knowledge of caring for a wild horse.

V.2.2 The ranking of the importance of wild horse attributes

In the second section of the survey, respondents were asked to rank the importance of a number of attributes that may be relevant when evaluating the purchase of wild horses. These attributes included color, height, unique markings, conformation or build of the horse, training status of the horse and age of the horse. A Likert scale was used; respondents were asked to rank the importance of each attribute in a scale from 1-5, where 1 signifies very unimportant and 5 specifies very important.

V.2.3. Choice experiment over pairs of hypothetical wild horses

The third section of the survey contains experimental designs where respondents (potential horse buyers) were presented with dichotomous choices between two wild horses (wild horse A and wild horse B). Respondents were also provided the opportunity

to choose neither. In each choice set, hypothetical wild horses differed in the following characteristics: size/height, color, temperament, gender, training, age and price.

The selection of product attributes and levels in a conjoint experiment is critical to the success of the survey design. It is essential that a researcher selects the attributes and levels of a product represent those which respondents actually use when making decisions. The attributes and levels that were based on those selected by Alevey et al, (2010), study of willingness to pay for wild horses. The choice sets in the survey were then pilot tested by faculty and staff of the University of Kentucky's Ag Equine Programs. The attributes and levels used in the experimental design are: size/height (13, 14, or 15 hands); color (bay, black, buckskin, chestnut, palomino or pinto); temperament (calm or nervous); gender (mare or gelding); training (untouched, halter broke or started under saddle); age (under 3 years old, 3-6 years old, or 7-10 years old); and price ($125, $250, $500 or $1000). Table 5.1 shows a summary of attribute and levels of wild horse used in the choice experiment.

Table 5. 1: Attributes and levels of wild horses used in the choice experiment

Product attributes	Attribute level
Age	**Less than 3, 3-6, 7-10**
Color	**Bay, Black, Buckskin, Chestnut, Palomino, Pinto**
Gender	**Mare, Gelding**
Price	**$125, $150, $250, $500, $1000**
Size	**13 hands, 14 hands, 15 hands**
Temperament	**Calm, Nervous**
Training	**Untouched, Halter-broke, Started under saddle**

In designing choice cards, we used fractional factorial designs as suggested by Louviere (1988). Fractional factorial designs are sample treatments selected from a complete/full factorial design of combinations of attribute and attribute levels of a product. Full factorial designs are random combination of all the alternatives and attributes of a product into choice cards in order to estimate buyer's preferences. Fractional designs find the smallest number of choice cards that allows us to still estimate buyer's optimal preferences. The minimum number of choice cards is derived by adding 1 to the total number of attribute levels and subtracting the total number of attributes from the result. In designing the survey we had 7 attributes and 23 attribute levels. The minimum number of choice cards we needed was derived by adding 1 to 23 and subtracting 7; the outcome of this arithmetic is 17. However, in our survey we had 20 choice profiles which we designed with software JMP 10. The 20 choice profiles were

randomly distributed across five survey forms. Each survey form had four choice cards presenting wild horse attributes and levels.

The first attribute on the choice card was height of the horse. The size/ height levels 13, 14, and 15 hands were selected based on the typical sizes of horses that are available for adoption by the BLM. This information was gathered from horses available for adoptions through the BLM's online auctions.

The second attribute was color. Horses come in many colors and even when narrowing the set of possibilities we ultimately chose 6 levels for this attribute. The levels for color are bay, black, buckskin, chestnut, palomino, and pinto and were chosen based on the most common colors of wild horses put up for public adoption.

The third attribute was the horse's temperament; the levels assigned were calm and nervous. These levels are based on the description that the BLM gives to the personality of horses in the holding facilities. A calm horse is generally friendly with little fear of people. A nervous horse is more timid and may require more time to trust humans.

The fourth attribute was gender. The levels chosen are mare and gelding (a gelding is a castrated male horse). These levels were chosen because the BLM castrates all males prior to adoption for population control.

The fifth attribute was the amount of training the horse has been exposed to. The levels are untouched, halter broke and started under saddle. Most wild horses have never been touched by humans, and these are the untouched horses. However, at a few

facilities, some horses are haltered and introduced to very basic handling; on rare occasions, they are introduced to saddle and having a rider on them.

The sixth attribute was the age of the wild horse, with levels under 3 years old, 3-6 years and 7-10 years. A horse under age 3 is relatively young and might not yet be ridable but may be more willing to trust humans. Horses between ages 3-6 are more physically mature and should be ready for training sooner. Horses age 7-10 are quite mature and may not be as trainable as younger horses. The BLM does not offer horses that are older than 10 years of age; they are generally placed in long term facility (PBS, 2014).

The final attribute chosen was price. The adoption fee for a wild horse at a public adoption is $125. However, in online auctions, the adoption fee is sometime bid up to over $1000. Therefore, the price levels, $125, $250, $500 and $1000 were selected. Table 5.2 below shows a sample choice card.

Table 5. 2: A sample of choice card used in the survey

CARD 1	Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
	Size/Height(hands)	15	13	I would not purchase wild horse A or wild horse B
	Color	Chestnut	Pinto	
	Temperament	Calm	Nervous	
	Gender	Mare	Mare	
	Training	Started under saddle	Halter-broke	
	Age (years)	3-6	Under 3	
	Price($)	125	500	

Please check only **ONE** Box. ☐ ☐ ☐

V.3. Adoption event dates and venue

Data were collected at the BLM Wild Horse and Burro Adoption Event held at Lakeside Arena in Frankfort, Kentucky, on July 18 (Friday) and July 19 (Saturday), 2014, through the use of intercept surveys. Intercept surveys are surveys collected in-person in a public gathering Members of the survey team approached attendees, indicating that they were with the UK Agricultural Economics department, and requested they complete the survey. Survey team members wore blue polo shirts and name tags.

Chapter VI: Results

This section presents the results from the analytical models used in this study. First, we present the descriptive statistics of the data collected. Next, we present the results from the cross tabulations and Pearson's correlation studies of the data. Then, we present the results from the gologit models on prediction of importance of attributes. Last, we present results from the multinomial logit models

VI.1. Descriptive statistics

VI.1.1 Demographic information

There were 56 surveys completed at the event. Using information from the zip codes provided by respondents, we estimated that respondents came from eight states; Kentucky (80.2%), Virginia (5.4%), Tennessee (3.6%), Indiana (3.6%), California (1.8%), Montana (1.8%), New York (1.8%), and Minnesota (1.8%). Of the 56 respondents, 34 (60.7%) were female and 22 (39.3%) were male. Table 6.1 shows that about 80% of respondents are between 25-64 years of age, 14.3% are between ages 18-24 and 5.4% are over 65.

Next, we investigated the number of BLM adoption events that the respondents had previously attended. Table 6.2 shows that 1 respondent (1.8%) had never attended an adoption event, 33.9% (19) had attended 1 adoption event, 25% (14) of the respondents had attended 2 adoption events, 19.6% (11) of the respondents had attended 3 adoption events, 8.9% (5) of the respondents attended 4 adoption events, 5.4% (3) of the respondents had attended 6 adoption events, and another 5.4% (3) of the respondents had attended 7 adoption events.

Using the zip codes provided by the respondents we estimated the number of miles travelled to the event. To do this we used an online mapping tool to estimate the distance between respondents' zip codes and the zip code of the adoption event. Table 6.3 shows the descriptive statistic of the miles travelled to the event. The mode for miles travelled is 0, the mean is 134.26 miles and the range is 2137 miles. 87.5% of the respondents were within a 100 mile radius of the event and 71.4% of the respondents were within a 50 mile radius of the event.

Using the information respondents provided about whether or not they had previously purchased or owned a wild horse, we were able to estimate the respondent's wild horse purchase history. Table 6.4 shows that 37.5% of the respondents had never purchased a wild horse, while 62.5% of the respondents had purchased at least one wild horse. Out of those respondents who had purchased a wild horse, Table 6.5 shows that 57.1% of the respondents had purchased their wild horses from a BLM adoption event, 1.8% indicated that they purchased their wild horses from internet auctions and adoption events, another 1.8% stated that they purchased their wild horses from a BLM adoption event, internet auction and from a private party other than the BLM, and 3.6% had purchased from internet auctions only, 3.6% had purchased their wild horses through a private sale.

Additional questions were asked about the number of wild horses they had adopted in the past for those that had a wild horse purchase history. Table 6.6 shows that 17.9% (10) of the respondents had purchased 1 wild horse in the past, 23.2% (13) had purchased 2 in the past, 8.9% (5) had purchased 3 in the past, 5.4% (3) had purchased 4 in the past, 7.1% (4) had purchased 5 in the past, 1.8% (1) had purchased 6 in the past,

another 1.8% (1) had purchased 7 in the past, 3.6% (2) had purchased 10 in the past, and 1.8% (1) had purchased 20 in the past .

Lastly, we asked respondents to self-assess their knowledge about wild horse care. Table 6.7 shows that 33.9% (19) of the respondents reported they had an advanced knowledge about wild horse care, 44.6% (25) had intermediate knowledge about wild horse care, and 21.4% (12) had beginner knowledge about wild horse care.

Table 6. 1: Percentage distribution of age range of survey respondents

Age range	Frequency	Percent
18-24	8	14.3
25-44	22	39.3
45-64	23	41.1
65-100	3	5.4
Total	56	100.0

Table 6. 2: Frequency distribution of survey respondent's response for number of adoption event attended

Number of events attended	Frequency	Percent
0	1	1.8
1	19	33.9
2	14	25.0
3	11	19.6
4	5	8.9
6	3	5.4
7	3	5.4
Total	56	100.0

Table 6. 3: Descriptive statistics of miles travelled to the adoption event

Mean of miles travelled	Median	Mode	Standard Deviation	Min	Max
134.26	23.85	0	388.465	0	2137

Proximity to adoption event	Buyers within 100 mile radius	Percent 100 mile radius	Buyers within 50 mile radius	Percent 50 mile radius
Not within	7	12.5	16	28.6
Within	49	87.5	40	71.4
Total	56	100.0	56	100

Table 6. 4: Frequency distribution of survey respondent's wild horse purchase history

Purchase History	Frequency	Percent
No	21	37.5
Yes	35	62.5
Total	56	100.0

Table 6. 5: Frequency distribution of respondent's location of wild horse purchase

Location	Frequency	Percent
Adoption event	32	57.1
Adoption event and Internet Auction	1	1.8
Adoption event and Internet Auction and private sale	1	1.8
Internet Auction	2	3.6
N/A	18	32.1
Private sale	2	3.6

N/A refers to the percentage of those that had never purchased a wild horse

Table 6. 6: Frequency distribution of survey respondents' response for number of wild horses adopted/purchased

Adopted/purchased	Frequency	Percent
0	16	28.6
1	10	17.9
2	13	23.2
3	5	8.9
4	3	5.4
5	4	7.1
6	1	1.8
7	1	1.8
10	2	3.6
20	1	1.8
Total	56	100.0

Table 6. 7: Frequency distribution of survey respondent response to knowledge about wild horse care

Knowledge	**Frequency**	**Percent**
Advanced	19	33.9
Intermediate	25	44.6
Beginner	12	21.4
Total	56	100.0

VI.1.2 Data description of the importance ranking of wild horse characteristics

For a number of characteristics that would be considered when selecting a wild horse, color, height, unique markings, conformation, training, age and temperament, we asked the respondents to identify the importance of each when making a purchase decision. Respondents ranked each from very unimportant (1), unimportant (2), not so important (3), important (4) and very important (5). Table 6.8 shows the descriptive statistics of the importance ranking of all the attributes of wild horses used in this study. Conformation had the highest average ranking and unique markings had the lowest.

Table 6.9 shows a frequency distribution of the order of ranking for each characteristic. In general, the respondents believed superficial traits like color and unique markings were the least important determinants in purchasing a wild horse, while training and temperament were the most important determinants in their decision. However, on average each trait was identified as being of moderate importance (with average ranking of 3 or above).

Table 6. 8: Descriptive statistics of respondents' ranking of wild horse attributes

	Color	Height	Unique markings	Conformation	Training	Age	Temperament
N	56	56	56	56	56	56	56
Mean	3.14	3.75	3.07	4.00	3.38	3.52	3.96
Median	3.00	4.00	3.00	4.00	4.00	4.00	4.00
Mode	3	4	4	4	5	4	5
Std.Deviation	1.327	1.225	1.234	1.062	1.459	1.160	1.061
Minimum	1	1	1	1	1	1	1
Maximum	5	5	5	5	5	5	5

Table 6. 9: Frequency distribution of the importance ranking of each attribute

Attribute	1	2	3	4	5	Total
Color (Percent)	10 (17.9)	5 (8.9)	18 (32.1)	13 (23.2)	10 (17.9)	56 (100)
Height (Percent)	4 (7.1)	6 (10.7)	8 (14.3)	20 (35.7)	18 (32.1)	56 (100)
Unique Mark (Percent)	8 (14.3)	10 (17.9)	14 (25.0)	18 (32.1)	6 (10.7)	56 (100)
Conformation (Percent)	3 (5.4)	2 (3.6)	7 (12.5)	24 (42.9)	20 (35.7)	56 (100)
Training (Percent)	8 (14.3)	10 (17.9)	9 (16.1)	11 (19.6)	18 (32.1)	56 (100)
Age (Percent)	4 (7.1)	8 (14.3)	9 (16.1)	25 (44.6)	10 (17.9)	56 (100)
Temperament (Percent)	1 (1.8)	5 ((8.9)	4 (19.6)	17 (30.4)	22 (39.3)	56 (100)

VI.2. Cross tabulations and Pearson correlations study of data

From the data gathered from the survey, we analyze the data to find relationships or possible linkages between variables. Our results from this section are not exhaustive because linkages between variables in cross-tabulations tests and correlation studies do not imply causation.

VI.2.1 Cross tabulation studies

Cross tabulation studies showed that there are statistically significant relationships between the self-reported knowledge about wild horse care and 1) *purchase history of wild horses* 2) *the number of horses that they had previously adopted/purchased* 3) *the number of adoption events* that they had attended and 4) the *importance ranking of unique markings*. Table 6.10 shows the chi-square values and P-values for the significant relationships between these variables.

VI.2.2 Pearson's correlation studies between wild horse attributes

The Pearson's correlation coefficient measures the strength of linear relationships between variables. The correlation coefficient can take a value of 1 to -1, where 1 represents a perfect positive linear relationship and -1 represents a perfect negative linear relationship. From Table 6.11, we can deduce that the importance of training is most highly correlated with temperament. The importance of color is most highly correlated with unique marking and vice versa. The importance of height is most highly correlated with unique markings. The importance of conformation is most highly correlated with height and the importance of temperament is most highly correlated with age.

In summary, the importance ranking of unique markings and color has the highest correlation coefficient. The importance of temperament and training are highly correlated, and the importance of age and temperament of a wild horse are also highly correlated. These relationships help inform the discrete choice modelling developed in the next chapter.

Table 6. 10: Cross tabulation results

Knowledge	**Chi-square**	**P values**
Purchase history	19.159	0.000
#adopted/purchased	46.212	0.000
#adoption events attended	35.200	0.000
Importance ranking of unique markings	17.691	0.024

Table 6. 11: Pearson's correlation between wild horses attributes

Attribute	Training	Color	Height	Unique marking	Conform-ation	Age	Tempera-ment
Training	1	0.366***	0.287**	0.338**	0.129**	0.431***	**0.522*** **
Color	0.366***	1	0.615***	**0.860*** **	0.297**	0.294**	0.071
Height	0.287**	0.615***	1	**0.662*** **	0.629***	0.310**	0.291**
Unique markings	0.338**	**0.860*** **	0.662***	1	0.305**	0.279**	0.103
Conform-ation	0.129	0.297**	**0.629*** **	0.305**	1	0.399***	0.528***
Age	0.431***	0.294**	0.310***	0.279**	0.399***	1	**0.628*** **
Tempera-ment	0.522***	0.071	0.291**	0.103	0.528***	**0.628*** **	1

Number of observations=56, ***signifies correlation at the 0.01 level **signifies correlation at the 0.05 level. Correlation is a value of 1 when an attribute is correlated with itself

VI.3. Generalized ordered logit regression

VI.3.1. Color of a wild horse

The results from the gologit regression model of the importance ranking of color are presented in Table 6.12. The *BUYERAGE, KNOWLEDGE, NUMPREVPURCH* are all insignificant at the 5% level. None of the buyer characteristics predict the importance of color of a wild horse to buyers purchasing decision.

VI.3.2. Age of a wild horse

The results from the gologit regression model for HORSE AGE shows that only the variable *NUMPREVPURCH* is significant at a 5% level ($p<0.02$). Table 6.13 shows that the maximum likelihood parameter estimate for *age* has a coefficient of -0.238. This is interpreted as holding other variables constant, for a one unit increase in the number of horses previously adopted or purchased there is a 0.238 decrease in the log odds of being in a higher ranking category for the importance of age in the decision to purchase a wild horse.

VI.3.3. Height of a wild horse

We present the results from the gologit regression where importance of height is the dependent variable. Table 6.14 shows *BUYERAGE* and *GENDER* are both significant at 10% level ($p<0.07$ and $p<0.08$, respectively). The results from the maximum likelihood estimation show that the variable *BUYERAGE* has a coefficient of 1.018. This is interpreted as holding other variables constant, for buyers that are within the age range 18-44yrs compared to buyers above 44yrs old, there is a 1.018 increase in the log odds of

being in a higher ranking category for the importance of height in the decision to purchase a wild horse.

For the variable *GENDER*, the maximum likelihood estimation shows a coefficient of 0.970. This means that holding other variables constant, for females there is a 0.970 increase in the log odds of being in a higher ranking category for the importance of height in the decision to purchase a wild horse as compared to males. The remaining explanatory variables do not predict the importance ranking of height of a wild horse.

VI.3.4. Training status of a wild horse

The gologit regression where importance of training status is the dependent variable suggests that the variable *GENDER* is significant at 10% level ($p<0.09$). Table 6.15 shows that the coefficient of *GENDER* from the maximum likelihood estimation is -0.972. This suggests that holding other variables constant, for females there is a 0.972 decrease in the log odds of being in a higher ranking category for importance of a horse's training status in the decision to purchase a wild horse.

The variable *NUMPREVPURCH* is significant at the 5% level ($p<0.02$). The maximum likelihood estimation shows that this variable has a coefficient of -0.266. This suggest that holding other variables constant, for a one unit increase in the number of horses previously adopted or purchased there is a 0.266 decrease in the log odds of being in a higher ranking category for importance ranking of training status in the de purchase a wild horse. The variables *BUYERAGE, PURCHHIST* and *KNOWLEDGE* about wild horse care do not predict the importance ranking of training status of a wild horse.

VI.3.5. Unique markings of a wild horse

The results of the gologit regression model for unique markings are in Table 6.16. None of the variables are statistically significant in predicting the importance ranking of unique markings in the decision to purchase a wild horse.

VI.3.6. Conformation of a wild horse

The results from the gologit model results for conformation in Table 6.17 show that none of the variables are statistically significant in predicting the importance ranking of conformation in the decision to purchase a wild horse.

VI.3.7. Temperament of a wild horse

The results from the gologit regression model for unique markings in Table 6.18 show that only the variable *KNOWLEDGE* is significant at 10% level ($p<0.10$). The maximum likelihood estimation shows that the coefficient estimate is -1.408. This means that holding all other variables constant, for respondents with advanced or intermediate knowledge there is a 1.408 unit decrease in the log odds of being in a higher ranking category for importance of temperament in the decision to purchase a wild horse.

VI.4. Results from conjoint analysis of choice cards

This section presents the estimation results from the multinomial logit models used to analyze buyers' preferences for a wild horse.

VI.4.1. Multinomial logit model without interaction terms

The results from the basic multinomial logit model (MNL 0) are presented in Table 6.19. The log-likelihood for the basic multinomial logit model is -380.842 and has a pseudo R square value of 0.110.

The variables *SIZE15*, *PALOMINO*, *SADDLED*, *HALTERED*, and *CALM* are all significant at 1% significance level. The variable *SIZE14* is significant at 10% significance level.

We interpret the coefficient estimates of the significant variables this model as follows. First, for size/height of a horse, the estimate on *SIZE14* suggests that there is a 44.8% increase in the odds that a buyer will purchase horses 14 hands tall compared to horses that are 13 hands tall. The coefficient estimate for the variable *SIZE15* indicates that there is a 101.5% increase in the odds that a buyer will purchase horses that are 15 hands tall over horses 13 hands tall. Both of these results suggest that buyers prefer taller horses.

Next, we consider variables related to the color of the horse. The coefficient estimate for *PALOMINO* suggests that holding all variables constant, there is a 92.8% increase in the odds that a buyer will purchase horses that are *PALOMINO* over horses that are black. These results suggest that buyers do have a color preference.

We consider variables that are related to the training status of a wild horse. The coefficient estimate for *SADDLED* suggest that holding other variables constant, there is a 77.2% increase in the odds that a buyer will purchase horses that have been started under saddle compared to horses that have not been trained. The coefficient estimate for *HALTERED* suggest that there is a 80.0% increase in the odds that a buyer will purchase horses that have been halter trained over horses that have not be trained. Both of these results suggest that buyers prefer wild horses that have some amount of training.

Finally, we consider variables that relate to the temperament of a horse. The coefficient estimate of *CALM* indicates that holding other variables constant, there is a 63.0% increase in the odds that a buyer will purchase horses that are *CALM* over horses that are nervous.

In summary, buyers prefer the following characteristics: a horse that is 14 or 15 hands tall (compared to 13 hands tall), a horse that is calm (compared to one that is nervous), a horse that has been started under saddled or halter trained (compared to one that is untouched), and a horse that is palomino (compared to a horse that is black).

VI.4.2. Multinomial logit model with interaction terms

This section presents the results of the multinomial logit model when the independent variables are interacted with different demographic variables so that we can determine which buyer characteristics influence their willingness to purchase a wild horse.

VI.4.2.1 MNL 2 with interaction term knowledge of buyers

The results of the MNL 1 which includes the interaction term *knowledge of the buyers* about wild horse care are presented in Table 6.19. The log-likelihood of the model is -392.111 and the pseudo R square is 0.083. The variables *NEITHER, SIZE15,* and *PALOMINO,* are statistically significant at the 1% level. The variable *SIZE14* and *SADDLED* are significant at the 5% level.

The coefficient estimate for the variable *NEITHER* suggest that holding other variables constant, compared to those who picked a horse, the odds that a buyer who has knowledge about wild horse care will purchase a horse given the attributes that were

presented on the choice cards is expected to decrease by 55.3%. This suggests a preference for the status quo which indicates the decision of the buyers to not purchase a wild horse.

Next, we consider variables related to the size/ height of a wild horse. The coefficient estimate for *SIZE14* indicates that holding other variables constant, there is a 55.3% increase in the odds that a buyer with knowledge about wild horse care will purchase the taller horse. The coefficient estimate of *SIZE15* indicates that holding other variables constant, for a buyer with knowledge about wild horse care, there is an 86.6% increase in the odds that the buyer will purchase a horse that is 15 hands tall relative to a horse 13 hands tall.

We now consider variables related to the color of the horse. The coefficient estimate for *PALOMINO* suggests that holding other variables constant, there is an 89.9% increase in the odds that a buyer with knowledge will purchase a horse that is *PALOMINO* over a black horse.

Finally, we consider variable related to the training status of the horse. The coefficient estimate for *SADDLED* suggest that holding other variables constant, when a buyer has knowledge about wild horse care, there is a 64.5% increase in the odds of choosing a horse that has been started under saddle over a horse that is untouched.

In summary, people with intermediate or advanced knowledge about wild horse care, are willing to purchase horses that are 14 and 15 hands tall relative to horses 13 hands tall, horses that are palomino relative to black horses, and horses that have been started under saddle relative to untouched horses.

VI.4.2.2. MNL 2 with interaction term gender of the buyer

This section discusses the MNL 2 which includes with the interaction term *gender of the buyer*. Our results, which are in Table 6.19, show that the model has a log-likelihood of -396.765 and a pseudo R square of 0.072. The variables *NEITHER* and *PALOMINO* are significant at the 1% level. The variable *SADDLED* is significant at the 5% level.

The estimate for the coefficient for the variable *NEITHER* indicates that holding other variables constant, for female buyers, there is a 67.4% decrease in the log odds that female buyers would choose a horse given the horse attributes presented in the choice cards compared to male buyers. This indicates that females are less likely to choose a horse than males.

Now, we consider variable related to the color of a wild horse. The coefficient estimate for the coefficient of *PALOMINO* indicates that holding other variables constant, for a female buyer, there is a 128.8% increase in the odds of choosing a *PALOMINO* horse over a black horse.

Finally, we consider variable related to the training status of a wild horse. The estimate for the coefficient of *SADDLED* suggests that holding other variables constant, there is a 77.7% increase in the odds of purchasing a horse that has been started under saddle compared to an untouched horse.

In summary, female buyers had a stronger preference than males for palomino horse and horses started under saddle.

VI.4.2.3. MNL 3 with interaction term age range of the buyer

This section presents results from the MNL 3 which includes the interaction term *age range of the buyer.* The results are in Table 6.19. The model has a log likelihood of -401.202 and a pseudo R square of 0.062.

The variables *NEITHER, PALOMINO, BUCKSKIN, HALTERED* and *PRICE* are significant at the 5% level. The variables *Size15* and *Calm* are significant at the 10% level.

We interpret the estimate for the coefficient of *NEITHER* as holding other variables constant, compared to those who picked a horse, there is a 46.5% decrease in the odds that a buyer within the age range 18-44 would select any given the attributes presented in the choice cards. This indicates that younger buyers are less likely to purchase a horse.

The estimate for the coefficient of *SIZE15* suggests that holding other variables constant, there is a 69.3% increase in the odds that are buyer who is within the age range of 18-44 will purchase a horse 15 hands tall over a horse 13 hands tall.

Next, we consider the variables related to the color of the horse. The estimate for the coefficient of *PALOMINO* suggests that holding other variables constant, there is a 94.6% increase in the odds that a buyer in the age range 18-44 will purchase a horse that is of *PALOMINO* compared to a black horse. Moreover, the estimate for the coefficient of *BUCKSKIN* can be interpreted as holding other variables constant; there is a 92.0% decrease in the odds that a buyer in the age range of 18-44 will purchase a horse that is *BUCKSKIN* compared to a black horse.

Next, we consider the variable related to the training status of a horse. The estimate for the coefficient of *HALTERED* indicates that there is a 60.6% increase in the odds that a buyer who is within the age range 18-44 will purchase a horse that has been halter broken compared to an untouched horse.

We consider the variable related to the temperament of a horse. The estimate for the coefficient of *CALM* suggests that holding all variables constant, there is a 51.4% increase in the odds that a buyer who is within the age range 18-44 will purchase a horse that is calm compared to a nervous horse.

Finally, we consider the variable *PRICE*. The estimate for the coefficient of *PRICE* suggests that holding other variables constant, the odds of buyers within the age range of 18-44 purchasing a horse is 0.07% higher compared to buyers above 44yrs, for a one unit increase in price.

In summary, younger buyers (within the age range of 18-44), have stronger preferences for taller, palomino, training, temperament and are less price sensitive.

VI.4.2.4. MNL 4 with interaction term number of previous adoptions/purchase of the buyer

This section presents results from the MNL 4 which includes the interaction term *number of previous adoptions/purchases*. The results are in Table 6.19. The log-likelihood for the model is -391.081 and the pseudo R square for the model is 0.086. The variables *NEITHER* and *PALOMINO* are significant at the 1% level. The variables *SIZE15, SADDLED* and *HALTERED* are significant at the 5% level and *SIZE14* is significant at the 10%.

The estimate for the coefficient of *NEITHER* suggests that; holding other variables constant, there is a 76% decrease in the odds that a buyer who has adopted at least one horse before would choose any given the horse attributes presented in the choice cards.

Next we, consider the variable related to the size/height of a horse The estimates for the coefficients of *SIZE14* and *SIZE15* suggest that holding all variables constant, for those who have adopted/purchased at least one wild horse before, there is an increase of 53.0% and 69.7% respectively, in the odds that these buyers will purchase horses that are 14 hands tall or 15 hands tall over horses that are 13 hands tall.

We consider the variable related to the color of a horse. The estimate for the coefficient of *PALOMINO* suggests that holding all variables constant, there is a 119.8%, increase the odds that buyers that have adopted at least one horse before will purchase a *PALOMINO* horse compared to a black horse.

We consider the variable related to the training status of a wild horse. The estimates for the coefficients of *SADDLED* and *HALTERED* suggest that holding all variables constant, there are increases of 79.4% and 68.4% respectively, in the odds these buyers will purchase horses that are *SADDLED* or *HALTERED* over horses that are untouched.

In summary, buyers who have adopted/purchased at least one wild horse before have stronger preferences for taller, palomino and some amount of training.

V1.6. Lessons learned from multinomial logit model with interaction terms

From the basic MNL model we discovered that buyers have height, training temperament, and color preferences.

Models consisting of all interaction terms generally showed that buyers have stronger preferences for taller horses, palominos, calm temperament, and some amount of training compared to models without interaction with buyer's characteristics.

For model interacted with *knowledge of the buyers* about wild horse care we observed that buyers had stronger preferences for saddle training compared to halter trained or untouched horses. The model interacted with *gender of the buyer* suggests that female buyers have stronger color preferences compared to male buyers. In addition, we observed that females had stronger preferences for the saddle training compared to haltered or untouched horses. The model interacted with the *age range of buyers* suggests that younger buyers have less demand for a buckskin horse and are less sensitive to price. Finally, the model interacted with the *number of previous adoptions/purchases* suggests that buyers who have adopted at least one horse before are less likely to purchase an additional horse and have stronger preferences for saddle training compared to halter training or untouched horses.

Table 6. 12: Generalized ordered logit regression results for color

Criteria for estimation	Value
Log likelihood	-80.967
AIC	179.933
BIC	198.161

Maximum Likelihood Estimates

Variable	Coefficients	Standard Error	Wald test	P value
Intercept 1	-1.794**	0.803	5.000	0.025
Intercept 2	-0.505	0.782	0.420	0.519
Intercept 3	1.088	0.796	1.870	0.172
Intercept 4	1.672	0.815	4.20	0.040
BUYERAGE	0.802	0.528	2.310	0.129
PURCHHIST	1.465	0.711	4.240	0.400
GENDER	0.249	0.525	0.220	0.635
KNOWLEDGE	-1.324	0.826	2.570	0.109
NUMPREVPURCH	-0.163	0.100	2.680	0.102

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 13: Generalized ordered logit regression results for age

Criteria for estimation	Value
Log likelihood	-75.795
AIC	173.504
BIC	187.819

Maximum Likelihood Estimates

Variable	Coefficients	Standard Error	Wald test	P value
Intercept 1	-0.815	0.775	1.100	0.293
Intercept 2	1.368*	0.7793	2.980	0.084
Intercept 3	2.265***	0.844	7.190	0.007
Intercept 4	3.712***	0.980	14.340	0.0002
BUYERAGE	0.006	0.544	0.000	0.992
PURCHHIST	0.500	0.728	0.470	0.492
GENDER	-0.404	0.536	0.57	0.451
KNOWLEDGE	-0.502	0.776	0.42	0.518
NUMPREVPURCH	-0.238**	0.102	5.40	0.020

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 14: Generalized ordered logit regression results for height

Criteria for estimation	Value
Log likelihood	-76.076
AIC	170.153
BIC	188.381

Maximum Likelihood Estimates				
Variable	**Coefficients**	**Standard Error**	**Wald test**	**P value**
Intercept 1	-2.466****	0.799	9.540	0.0002
Intercept 2	-0.829	0.745	1.240	0.266
Intercept 3	0.020	0.757	0.000	0.980
Intercept 4	1.179	0.822	2.060	0.152
BUYERAGE	1.018*	0.554	3.380	0.066
PURCHHIST	1.107	0.709	2.440	0.118
GENDER	0.970*	0.540	3.230	0.072
KNOWLEDGE	-0.050	0.759	0.000	0.948
NUMPREVPURCH	-0.063	0.080	0.620	0.430

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 15: Generalized ordered logit regression results for training status

Criteria for estimation	Value
Log likelihood	-82.482
AIC	182.963
BIC	201.191

Maximum Likelihood Estimates				
Variable	**Coefficients**	**Standard Error**	**Wald test**	**P value**
Intercept 1	-0.018	0.737	0.000	0.981
Intercept 2	0.941	0.756	1.550	0.214
Intercept 3	1.719**	0.788	4.760	0.029
Intercept 4	2.864***	0.846	11.40	0.001
BUYERAGE	-0.302	0.513	0.350	0.556
PURCHHIST	1.180	0.748	2.490	0.114
GENDER	-0.972*	0..557	3.050	0.081
KNOWLEDGE	-0.3047	0.765	0.160	0.691
NUMPREVPURCH	-0.266**	0.111	5.770	0.016

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 16: Generalized ordered logit regression results for unique markings

Criteria for estimation	Value
Log likelihood	-83.363
AIC	184.725
BIC	202.953

Maximum Likelihood Estimates				
Variable	**Coefficients**	**Standard Error**	**Wald test**	**P value**
Intercept 1	-2.195****	0.830	7.00	0.008
Intercept 2	-0.236	0.788	0.09	0.764
Intercept 3	0.906	0.811	1.25	0.264
Intercept 4	1.997***	0.845	5.58	0.018
BUYERAGE	0.644	0.517	1.55	0.213
PURCHHIST	0.555	0.716	0.60	0.438
GENDER	0.169	0.516	0.11	0.743
KNOWLEDGE	-0.846	0.805	1.11	0.293
NUMPREVPURCH	-0.078	0.077	1.03	0.311

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 17: Generalized ordered logit regression results for conformation

Criteria for estimation	Value
Log likelihood	-70.046
AIC	158.092
BIC	162.006

Maximum Likelihood Estimates

Variable	Coefficients	Standard Error	Wald test	P value
Intercept 1	-1.083	0.772	1.970	0.161
Intercept 2	0.829	0.782	1.120	0.290
Intercept 3	1.867***	0.853	4.790	0.029
Intercept 4	2.435****	0.917	7.050	0.008
BUYERAGE	0.557	0.541	1.060	0.303
PURCHHIST	0.448	0.762	0.340	0.557
GENDER	0.398	0.542	0.540	0.463
KNOWLEDGE	-0.610	0.808	0.570	0.450
NUMPREVPURCH	0.053	0.096	0.300	0.581

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 18: Generalized ordered logit regression results for temperament

Criteria for estimation	Value
Log likelihood	-70.255
AIC	158.510
BIC	176.739

Maximum Likelihood Estimates

Variable	Coefficients	Standard Error	Wald test	P value
Intercept 1	0.576	0.856	0.450	0.501
Intercept 2	1.949**	0.909	4.600	0.032
Intercept 3	3.312***	0.975	11.540	0.001
Intercept 4	5.183***	1.324	15.330	<0.0001
BUYERAGE	0.721	0.557	1.680	0.195
PURCHHIST	0.588	0.720	0.670	0.415
GENDER	-0.608	0.561	1.170	0.279
KNOWLEDGE	-1.408*	0.848	2.750	0.097
NUMPREVPURCH	-0.091	0.008	1.350	0.246

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 19: Multinomial logit models

Variable	Basic model (MNL 0)	Interacted with Knowledge (MNL 1)	Interacted with gender of buyer (MNL 2)	Interacted with Age range of buyer (MNL 3)	Interacted with number of adoptions (MNL 4)
Neither	0.196 (0.269)	-0.553*** (0.202)	-0.674*** (0.201)	-0.465** (0.196)	-0.760*** (0.211)
Size14	0.448* (0.240)	0.533** (0.264)	0.268 (0.310)	0.126 (0.322)	0.530* (0.295)
Size15	1.015*** (0.295)	0.866*** (0.312)	0.592 (0.394)	0.693* (0.405)	0.697** (0.338)
Bay	0.050 (0.302)	0.058 (0.336)	0.113 ((0.391)	-0.040 (0.421)	0.090 (0.367)
Palomino	0.928*** (0.281)	0.893*** (0.301)	1.288*** (0.365)	0.946** (0.367)	1.198*** (0.343)
Buckskin	0.109 (0.338)	-0.316 (0.371)	-0.421 (0.417)	-0.920** (0.450)	-0.258 (0.403)
Pinto	-0.101 (0.286)	-0.445 (0.325)	-0.384 (0.389)	0.191 (0.404)	-0.472 (0.367)
Chestnut	-0.164 (0.300)	-0.121 (0.322)	-0.390 (0.384)	-0.365 (0.392)	-0.048 (0.344)
Mare	0.253 (0.235)	0.179 (0.254)	0.357 (0.293)	-0.129 (0.315)	0.304 (0.280)
Saddled	0.772*** (0.273)	0.645** (0.299)	0.777** (0.366)	0.606 (0.380)	0.794** (0.329)
Haltered	0.800*** (0.241)	0.672 (0.269)	0.705 (0.324)	0.721** (0.331)	0.684** (0.295)
Calm	0.630*** (0.213)	0.275 (0.232)	0.400 (0.272)	0.514* (0.280)	0.147 (0.256)
3-6yrs	0.364 (0.238)	0.300 (0.261)	0.276 (0.305)	0.009 (0.313)	0.451 (0.284)
7-10yrs	-0.815 (0.643)	-0.322 (0.695)	-0.270 (0.969)	-	-0.258 (0.718)
Price	-0.000662 (0.000371)	0.000072 (0.000328)	0.000297 (0.000309)	0.000691** (0.000298)	0.000209 (0.000308)
Constant	- 1.902**** (0.3351)	-0.937*** (0.194)	-0.872*** (0.154)	-0.970*** (0.148)	-0.865** (0.167)
Log likelihood **Pseudo R square** **Number of Obs.**	-380.842 0.110 672	-392.111 0.083 672	-396.765 0.072 672	-401.202 0.062 672	-391.081 0.086 672

***** Significance at 1% level** Significance at 5% level *Significance at 10%**

Table 6. 20: Descriptive statistics ordered logit regression

Variable	Label	Number of observations	Mean	Standard Deviation	Min	Max
Color	Color	56	3.143	1.327	1.000	5.000
Horse Age	Age	56	3.518	1.160	1.000	5.000
Height	Height	56	3.750	1.225	1.000	5.000
Training	Training	56	3.375	1.459	1.000	5.000
Unique markings	Unique markings	56	3.071	1.234	1.000	5.000
Conformation	Conformation	56	4.000	1.062	1.000	5.000
Temperament	Temperament	56	3.982	1.070	1.000	5.000
BUYERAGE	Buyers less than 44yrs	56	0.964	0.187	0.000	1.000
PURCHHIST	Buyers with a purchase history	56	0.489	0.489	0.000	1.000
GENDER	Buyers who are female	56	0.607	0.493	0.000	1.000
KNOWLEDGE	Buyers with advanced/intermediate knowledge	56	3.786	0.414	0.000	1.000
NUMPREVPUR-CH	Number of horses previously adopted or purchased	56	2.250	3.343	0.000	20.000

Table 6. 21: Summary statistics table for multinomial logit regression

Variable	Obs	Mean	Standard deviation	Min	Max
Id	672	112.500	64.711	1	224
D	672	0.333	0.472	0	1
Neither	672	1.125	0.331	0	1
Size14	672	0.268	0.443	0	1
Size15	672	0.180	0.385	0	1
Bay	672	0.106	0.308	0	1
Palomino	672	0.116	0.321	0	1
Buckskin	672	0.082	0.274	0	1
Pinto	672	0.118	0.322	0	1
Chestnut	672	0.135	0.342	0	1
Mare	672	0.234	0.423	0	1
Saddled	672	0.225	0.418	0	1
Haltered	672	0.193	0.395	0	1
Calm	672	0.389	0.488	0	1
3-6yrs	672	0.249	0.432	0	1
7-10yrs	672	0.022	0.148	0	1

Chapter VII: Discussions, Conclusions, Policy Implication and Weaknesses

VII.1: Discussions

The main objective of this study is to understand better the preferences and purchasing behavior of potential adopters of the BLM wild horses. To do this, conjoint analysis was utilized. Data were analyzing generalized ordered logit models and multinomial logit models. Attributes of the horse that were studied are age, color, conformation, height, training status, unique markings, conformation and temperament. Characteristics of potential adopters that were studied include the age, knowledge about wild horse care, gender and the number of horses adopted/purchased previously by the buyer.

Generalized ordered logit models were used to study the way that buyers rank the importance of different characteristics of wild horses in the decision to purchase a wild horse taking into consideration the demographics of potential adopters. Multinomial logit models (MNL) were used to analyze data from a conjoint analysis of choice cards targeted at studying the preferences of buyers in their decision to purchase a wild horse using the physical attributes of wild horses and the demographic characteristics of buyers.

The importance ranking of wild horse attributes suggest that training and temperament are the most important attributes in their decision to purchase a wild horse. Attributes including age, conformation, unique markings and height were ranked as important. Color was ranked as the least important attribute in their decision to purchase a wild horse. However, from the MNL models, we observed that buyers have color, height, training and temperament preferences.

When we compare the results from the importance ranking of attributes to the results from the choice cards, the observations that we see are as follows. Buyers showed strong training and temperament preferences from the choice cards and also ranked these attributes as most important in their decision to purchase a wild horse. Buyers ranked age of wild horse as important but showed no preferences for age on the choice cards. Buyers ranked height as important and also showed strong preferences for height on the choice cards. Color was ranked as the least important attribute; however, buyers showed preferences for color in the choice cards. Buyers ranked conformation and unique markings as important but these attribute were not included in the choice cards.

These results suggest that the importance ranking of attributes of wild horses could differ from the actual preferences of buyers when asked to choose between dichotomous choices of wild horses. However, a few similarities exist between the importance ranking of attributes and the preferences of buyers in a choice experiment given the same group of buyers. This may have happened because buyer's preferences in a stated preference study may not fully indicate their actual preferences (Abley, 1972, Ampt et al, 1995, List & Gallet, 2001, Yangui et al, 2014).

VII.2. Discussions of demographic characteristics of buyer

Demographic characteristics help predict the influence of physical characteristics of wild horses in the decision to purchase a wild horse. These results are summarized and discussed below.

Buyers with previous knowledge about wild horse care ranked temperament of a wild horse as important in their decision to purchase a wild horse. The results from the

choice cards suggested that the knowledge buyers have about wild horse care determine their color, height and training preferences. We conclude from the choice cards that the knowledge of the buyer about wild horse care influences buyers' preferences for certain physical characteristics of wild horses. This result is consistent with our intuition because a buyer with knowledge about wild horse care can determine attributes that are most or least important based on prior experience.

The importance ranking models suggests that female buyers had a greater importance ranking for height horses and lower importance ranking for training in their decision to purchase a wild horse. The result from the choice cards suggested that female buyers have different color and training preferences than males. We conclude that the gender of a buyer can influence preferences for certain physical attributes of wild horses.

The importance ranking models suggests that younger buyers have a lower importance ranking for height in their decision to purchase a wild horse. From the choice cards we observed that younger buyers have stronger color, height, training and temperament preferences than older buyers. Also, younger buyers are less sensitive to an increase in the price of a wild horse. We conclude that the age of a buyer can influence their preferences for certain physical attributed of wild horses. This result is consistent with the Stowe, et al, (2011) study of the adoptability of retired race thoroughbreds, where an increase in the adoption fee of retired thoroughbreds increases the adoptability of the horse.

The importance ranking models suggest that buyers that have adopted at least one wild horse before have a lower importance ranking for age and training in their decision

to purchase a wild horse. The results from the choice cards suggest that buyers have color, height and training preferences. We can conclude that the number of horses previously adopted/ purchased by a buyer can influence the preferences of a buyer for certain physical characteristics of wild horses. A buyer who has adopted at least one wild horse before is expected to have more experience which may determine their preference for certain physical attributes of wild horses.

VII.3 Conclusions

Alevey, et al, (2010) study suggests that for reviewed preference of wild horses placed in auctions, buyers have color, training and gender preferences.

In our study, we conclude that for the stated preferences of wild horses placed in an adoption event, buyers have color, height, training, and temperament preferences for the physical attributes of wild horses. Second, certain demographic characteristics of buyers (gender, age, knowledge about wild horse care, and the number of horses previously adopted/ purchased) influence the value buyers place on certain physical attributes of horses in their decision to purchase a wild horse.

Comparing the Alevey, et al, (2010) study to our study, we did not see any preferences in buyers for gender of wild horses. However, we were able to confirm that buyers have color and training preferences in their decision to purchase a wild horse.

Finally, in this study we were able to confirm that the importance ranking of attributes are based on the demographic characteristics of buyers. Second, we studied the preferences of buyers for attributes of wild horses in a choice experiment and discovered that the demographic characteristics of buyers are significant to observed preferences.

VII.4 Policy implications

In dealing with the overpopulation of wild horse, the main goal of the BLM is to place wild horses in private homes. The results from this study have some useful implications for the BLM adoption program. This study has shown that wild horse buyers have color, height, age, temperament and training preferences. We are also able to better understand the influence of demographics of buyers.

First, based on the understanding of the demographic of adopters, we propose a system where the BLM can select wild horses with more desirable attributes to make available for adoption.

Finally, the attendance rate of the BLM adoption event which occurred over two days was not as high as expected. The BLM should better promote the media to make more people aware of the dates and time of the BLM adoption program, as well as the purpose of the adoption program, which is to maintain public rangelands at AML and to place wild horses in good private homes.

VII.5. Limitations and future research

The first limitation of this study is that many of the respondents had bad perceptions of the BLM wild horse adoption program. Respondents who believed that researchers were affiliated with the BLM displayed negative reactions as questionnaires were handed out to them, and many of these individuals refused to fill out questionnaires.

Second, in the choice experiment, 71% of the responses on the choice cards presented to respondents were the choice “neither”. This may have been due to a number of factors; 1) the negative perception of the BLM’s adoption program, 2) choice cards are

not the best ways to present hypothetical choice for horses, and 3) the market for wild horses might be really small and not suitable for most people. In other words, respondents mostly selected the neither option presented to them in the survey. This limitation led to a major skewedness of data towards the "neither" option on the choice cards. As a result, we were unable to use models such as the mixed logit model to estimate the willingness to pay for specific attributes.

To address these limitations, future research includes collecting more data to increase sample sizes and thereby estimate willingness to pay. A survey tool that asks preference questions in an improved way indicating no affiliation to any specific organizations and that surveys a different site. For example, the Mustang Extreme Makeover horse events may have people who are more curious about mustangs. This may be helpful to effectively determine the willingness to pay of buyers for wild horses.

Third, the characteristics of wild horses and those of the buyers used in this study are not exhaustive. Other characteristics such as the distance of the buyers from the adoption event, conformation, movement, and the income of the buyers could be used to in future studies to determine buyer's willingness to purchase wild horses.

The fourth limitation of this study is that buyers are making hypothetical choices, not actual choices. Their actual preferences might be different from their stated preference which suggests that there may be some bias in our results (among others see Adland & Caplan, 2003, Jonathan, 2006 and Stevens et al, 2013). The direction of hypothetical bias depends on how pessimistic or optimistic buyers are about a product. The magnitude of hypothetical bias in stated preference studies varies from product to

product (Weisser, 2014 and Harrison et al, 1999). Previous literature suggests that the magnitude of hypothetical bias may depend on some of these factors; 1) the nature of the product (public vs private good), and 2) the design of the survey instrument used in estimating buyer's willingness to pay for the product (List & Gallet, 2001, Little & Berrens, 2004, Murphy et al, 2005,Weisser, 2014 and Loomis, 2014). Although the magnitude of hypothetical bias that may occur from product to product is inconclusive, there is always some degree of uncertainty in whether stated preferences represent actual choices of buyers.

APPENDIX

Wild Horse Survey

Section 1: Demographic information

1. What is your five digit zip code? ☐☐☐☐☐

2. What is your age range? ☐ 18-24 ☐ 25-44 ☐ 45-64 ☐ 65 or older

3. What is your gender? ☐ Male ☐ Female

4. How many BLM adoption events have you attended? ☐

5. Have you purchased/owned a wild horse? ☐ Yes ☐ No (**please skip to #8**)

6. If you answered yes to question 5, how many have you purchased/owned?

☐

7. Where did you purchase your horse? Please check one.
☐ Adoption event ☐ Internet Auction ☐ Other

8. How would you classify your familiarity with caring for a wild horse? Please check one.
☐ Beginner ☐ Intermediate ☐ Advanced

Section 2: Ordinal ranking of importance of wild horse attributes

Listed below are different factors you may be considering in your decision to purchase a wild horse. Please rate how important each of these factors are in your decision. Please circle **one** response for each factor.

Attributes	Very Unimportant	Not important	Not so important	Important	Very Important
1. Color	1	2	3	4	5
2. Height	1	2	3	4	5
3. Unique markings	1	2	3	4	5
4.Conformation or build of the horse	1	2	3	4	5
5. Training of the horse (halter-broke/started under saddle)	1	2	3	4	5
6. Age of the horse	1	2	3	4	5
7. Temperament	1	2	3	4	5

Section 3: Choice cards

Choice cards from survey form 1

CARD 1

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	15	15	I would not purchase wild horse A or wild horse B
Color	Chestnut	Black	
Temperament	Calm	Calm	
Gender	Mare	Gelding	
Training	Started under saddle	Started under saddle	
Age (years)	3-6	Under 3	
Price($)	125	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 2

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	15	13	I would not purchase wild horse A or wild horse B
Color	Chestnut	Pinto	
Temperament	Calm	Nervous	
Gender	Mare	Mare	
Training	Started under saddle	Halter-broke	
Age (years)	3-6	Under 3	
Price($)	125	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 3

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Palomino	Black	
Temperament	Calm	Calm	
Gender	Gelding	Gelding	
Training	Untouched	Untouched	
Age (years)	7-10	3-6	
Price($)	1000	250	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 4

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Palomino	Pinto	
Temperament	Calm	Calm	
Gender	Gelding	Mare	
Training	Halter-broke	Untouched	
Age (years)	7-10	7-10	
Price($)	125	500	

Please check only **ONE** Box. ☐ ☐ ☐

Choice cards from survey form 2

CARD 1

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	14	I would not purchase wild horse A or wild horse B
Color	Black	Pinto	
Temperament	Nervous	Nervous	
Gender	Gelding	Gelding	
Training	Halter-broke	Started under saddle	
Age (years)	7-10	Under 3	
Price($)	250	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 2

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Chestnut	Palomino	
Temperament	Calm	Calm	
Gender	Gelding	Gelding	
Training	Halter-broke	Started under saddle	
Age (years)	3-6	Under 3	
Price($)	500	250	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 3

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Palomino	Bay	
Temperament	Nervous	Nervous	
Gender	Gelding	Gelding	
Training	Untouched	Halter-broke	
Age (years)	3-6	Under 3	
Price($)	250	125	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 4

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Buckskin	Palomino	
Temperament	Calm	Calm	
Gender	Gelding	Mare	
Training	Untouched	Halter-broke	
Age (years)	3-6	3-6	
Price($)	1000	1000	

Please check only **ONE** Box. ☐ ☐ ☐

Choice cards from survey form 3

CARD 1

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	15	I would not purchase wild horse A or wild horse B
Color	Buckskin	Pinto	
Temperament	Nervous	Calm	
Gender	Mare	Gelding	
Training	Halter-broke	Started under saddle	
Age (years)	3-6	7-10	
Price($)	1000	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 2

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Bay	Black	
Temperament	Nervous	Nervous	
Gender	Mare	Mare	
Training	Untouched	Untouched	
Age (years)	Under 3	3-6	
Price($)	250	125	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 3

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	14	I would not purchase wild horse A or wild horse B
Color	Palomino	Black	
Temperament	Nervous	Calm	
Gender	Gelding	Gelding	
Training	Started under saddle	Started under saddle	
Age (years)	Under 3	Under 3	
Price($)	125	1000	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 4

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	14	I would not purchase wild horse A or wild horse B
Color	Black	Pinto	
Temperament	Nervous	Nervous	
Gender	Mare	Gelding	
Training	Untouched	Untouched	
Age (years)	Under 3	3-6	
Price($)	500	250	

Please check only **ONE** Box. ☐ ☐ ☐

Choice cards from survey form 4

CARD 1

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	15	13	I would not purchase wild horse A or wild horse B
Color	Buckskin	Chestnut	
Temperament	Nervous	Calm	
Gender	Gelding	Gelding	
Training	Started under saddle	Untouched	
Age (years)	7-10	7-10	
Price($)	500	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 2

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	15	I would not purchase wild horse A or wild horse B
Color	Chestnut	Bay	
Temperament	Calm	Calm	
Gender	Gelding	Mare	
Training	Started under saddle	Started under saddle	
Age (years)	7-10	Under 3	
Price($)	1000	1000	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 3

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	15	14	I would not purchase wild horse A or wild horse B
Color	Black	Buckskin	
Temperament	Nervous	Calm	
Gender	Mare	Gelding	
Training	Started under saddle	Started under saddle	
Age (years)	3-6	7-10	
Price($)	1000	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 4

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	13	I would not purchase wild horse A or wild horse B
Color	Chestnut	Palomino	
Temperament	Nervous	Calm	
Gender	Mare	Mare	
Training	Untouched	Halter-broke	
Age (years)	7-10	3-6	
Price($)	500	500	

Please check only **ONE** Box. ☐ ☐ ☐

Choice cards from survey form 5

CARD 1

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	13	I would not purchase wild horse A or wild horse B
Color	Bay	Pinto	
Temperament	Calm	Calm	
Gender	Gelding	Gelding	
Training	Untouched	Halter-broke	
Age (years)	3-6	Under 3	
Price($)	500	250	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 2

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	13	15	I would not purchase wild horse A or wild horse B
Color	Bay	Chestnut	
Temperament	Nervous	Nervous	
Gender	Gelding	Gelding	
Training	Started under saddle	Halter-broke	
Age (years)	Under 3	Under 3	
Price($)	125	500	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 3

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	12	I would not purchase wild horse A or wild horse B
Color	Chestnut	Pinto	
Temperament	Calm	Calm	
Gender	Mare	Mare	
Training	Started under saddle	Started under saddle	
Age (years)	3-6	3-6	
Price($)	250	125	

Please check only **ONE** Box. ☐ ☐ ☐

CARD 4

Characteristics of the Wild Horse	Wild Horse A	Wild Horse B	Neither
Size/Height(hands)	14	15	I would not purchase wild horse A or wild horse B
Color	Buckskin	Bay	
Temperament	Calm	Nervous	
Gender	Mare	Gelding	
Training	Started under saddle	Started under saddle	
Age (years)	7-10	3-6	
Price($)	500	500	

REFERENCES

Abidoye, B.O., Balut, H., Lawrence J.D., Mennecke, B., Townsend, A.M, 2011. "US Consumers' valuation of quality attribute in beef product" Journal Agriculture and Applied Economics (43)1:1-12

Abley. J., 1978. "Stated Preference Technique and Consumer Decision Making: New Challenges to Old Assumptions" Retrieved from https://dspace.lib.cranfield.ac.uk/bitstream/1826/664/2/SWP0200.pdf

Aadland, D., and A. J. Caplan. "Willingness to Pay for Curbside Recycling with Detection and Mitigation of Hypothetical Bias." American Journal of Agricultural Economics 85(2003):492– 502.

Adalja, A., Hanson, J., Charles, T., Tselepidakis, E., 2013. "An Examination of Consumer Willingness to Pay for Local Products" Agricultural and Applied Economics Association. 2013 Annual Meeting, August 4-6, 2013, Washington, D.C.

Adekunle Van Wie.O, Stowe, C., Saghaian S., and Markus, L., 2013. " A Hedonic Price Analysis of Internet Auctions for the BLM's Wild horses and Burros" Southern Agricultural Economics Association 2014 Annual meeting, February 1-4, 2014, Dallas Texas. Retrieved from http://purl.umn.edu/162469

Alevey, J.E., Englin, J., Hariss, T.R., Kim, M., Liheng, Y., Price, M., Schubert, J., 2010. "Project J: Wild horse and Burro Marketing study Pursuant: BLM Wild Horse and Burro Policy: Auction Design and Horse Park Feasibility Study" H.R. 2419, P.L. (28):103-109

Ameseder, C., Hass, R., and Meixner, O., 2008. "Viability of Values and Attitudes Concerning Purchase Intentions and Benefit Attribution for an Organic Sport Drink" Retrieved from http://purl.umn.edu/49766

Ampt, E., Swanson, J., Pearmain, D. (1995) Stated Preference Techniques: Too Much Deference? Presented to the 1995 PTRC Summer Conference.

Ara, S., 2003. "Consumer Willingness to pay for multiple attributes of organic rice: a case study in the Philippines" retrieved from http://purl.umn.edu/25911

Baker, G.A., and Mazzocco, M.A., 2005. "Who Should Certify the Safety of Genetically Modified Foods?" International Food and Agribusiness Management Review 82(8), 2005

Bastian C.T, Van Tassell L.W, Cotton A.C, and Smith M.A., "Opportunity costs related to feral horses: a Wyoming case study" Journal of range management.(52):104-112

Bayaga, A., 2010. "Multinomial Logistic Regression: Usage and Application in Risk Analysis" Journal of Applied Quantitative Methods. (5):2

Bernabeu, R, Olmeda, M., Diaz, M., and Olivasq, R., 2008. "Determination of the surcharge that consumers are willing to pay for an organic cheese in Spain" European Association of Agricultural Economists>2008 International Congress, August 26-29, 2008, Ghent, Belgium Retrieved from http://purl.umn.edu/44327

Bureau of Land Management (BLM), 2011. "$500 Wild horse adoption incentive program" retrieved from http://www.blm.gov/nm/st/en/prog/wild_horse_and_burro/_500_Wild_Horse_Adoption_Incentive.html

Bureau of Land Management (BLM), 2014. "BLM wild horse and burro sale information". Retrieved from http://www.blm.gov/wo/st/en/prog/whbprogram/adoption_program/sales.html

Bureau of Land Management (BLM), 2015. "Wild horse and burro quick facts" Retrieved from .http://www.blm.gov/wo/st/en/prog/whbprogram/history_and_facts/quick_facts.html

Bureau of Land Management (BLM), 2015. "Bureau Highlights; BLM funding" Retrieved from http://www.doi.gov/budget/appropriations/2015/highlights/upload/bh007.pdf

Bureau of Land Management (BLM), 2015. "Frequently asked questions about the wild horse BLM program" Retrieved from http://www.blm.gov/es/st/en/prog/wild_horse_and_burro/faq_s.html

Burgetto, R., 2007. "Right to choose in oral auctions". Journal of Economic Letters 95 (2):167-173

California State University. "Brief guide to Crosstabs (cross tabulations and Chi –square) in SPSS". Retrieved from http://www.csun.edu/~egodard/364/hdos/SPSS-Crosstabs.pdf

Cella, M., 2014. "Animal Stranded in Extreme Weather". Retrieved from http://www.hlntv.com/video/2014/01/07/animals-stranded-extreme-weather

Coull B.A and Agresti A.2004. "The use of mixed logit model to reflect Heterogeneity in Capture-Recapture studies". Biometrics 55(1)

Chung, C., Briggeman B.C., Han, S., 2012. "Willingness to pay for Beef Quality attributes: A latent segmentation analysis of beef Korean shoppers" Journal of Agricultural and Applied Economics 44(4):447-459

Chung, C., Briggeman B.C., Han, S., 2008. "Willingness to pay for Beef Quality attributes: combining mixed logit and latent segment approach" Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Orlando, Florida, July 27 - July 29, 2008.

Bastian C.T, Van Tassell L.W, Cotton A.C, and Smith M.A., "Opportunity costs related to feral horses: a Wyoming case study" Journal of range management. 52:104-112

Derr B., 2013. "Ordinal Response Modelling with Logistic Procedure" SAS Institute Inc. paper 446

Dijkstra, J., Roelen W.A.H and Timmermans H.J.P. (1996). "Conjoint Measurement in Virtual Environments: A Framework". Proceedings 3rd Design and Decision Support

Systems in Architecture and Urban Planning Conference, Vol. 1: Architecture Proceedings, Eindhoven University of Technology, Eindhoven, pp. 132-142.

Elizondo, V.V, 2011. “An Economic Analysis of Wild Horse and Burro Program” Retrieved from http://scholarworks.montana.edu/xmlui/bitstream/handle/1/1224/ElizondoV0511.pdf?sequence=1&isAllowed=y

Extreme Mustang Makeover, 2014 “Mission” Retrieved from http://extrememustangmakeover.com/more-info/

Graham, A. (2008). “Wild Horses and Federal Tax Dollars.” Retrieved from http://www.amillionhorses.com/images/Ashton%20Graham%20%20Wild%20Mustang%20Paper.pdf.

Gorey T., 2014. “Myths and Facts”. US Department of Interior: Bureau of Land Management. Retrieved from http://www.blm.gov/wo/st/en/prog/whbprogram/history_and_facts/myths_and_facts.html

Gorey, T., 2009. “Factsheet on Challenges Facing the BLM in its Management of Wild Horses and Burros” Online. Available at http://www.blm.gov/wo/st/en/prog/wild_horse_and_burro/wh_b_information_center/blm_statements/new_factsheet.html. Retrieved May 31, 2013

Green, P.E., and Srinivasan V. 1990. “Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice.” Journal of Marketing 54(4):3–19.

Green P.E and Srinivasan, V., 1978. “Conjoint Analysis in consumer Research Issues and Outlook” Journal of Consumer Research 5(2):103-123

Greene, 2010. “Discrete Choice” Retrieved from http://pages.stern.nyu.edu/~wgreene/DiscreteChoice/Readings/Greene-Chapter-23.pdf

Green and Rao, Vithala R. 1971, "Conjoint Measurement for Quantifying Judgmental Data," Journal of Marketing Research, 8, 355-63.

Harris T.R, Englin, J.E., Nelson, J.R., Widner L., Lutz J., 2005. “Feasibility Analysis of the Construction and Operation of the Proposed National Wild Horse and Burro Interpretative” Technical Report Uced2005/06-06 Aees 05-02

Harpman, D.A., 2008. “Reclamation Managing Water in the West: Introduction to Conjoint Analysis for Valuing Ecosystem Amenities” Technical Memorandum Number EC 2008-03.

Heshner, D.A. and Greene W. H. 2003 “The Mixed Logit Model: The State of Practice”. Kluwer Academic publishers. Transportation 30:133-176

Hensher. D.A., and Greene, W.H, 2011. "The Mixed Logit model: The state of practice and warning for the unwary**"** Retrieved from http://people.stern.nyu.edu/wgreene/MixedLogitSOP.pdf

Hooks, H. (2015) "Wild horse Burro Program Budget Overview" Retrieved from http://www.blm.gov/live/pdf/budget_overview.pdf

Hu., W., Woods T.A., and Bastin, S., 2009. "Consumer Acceptance and Willingness to Pay for Blueberry Products with Nonconventional Attributes" Retrieved from http://purl.umn.edu/48753

Hu, W., Chen K.Z., and Yoshida, K., 2006. "Japanese Consumers' Perceptions on and Willingness to Pay for Credence Attributes Associated with Canola Oil" Journal of Agricultural and Applied Economics, 38(1), April 2006

Humane Society of the United States (HSUS), 2010. "The HSUS and our vision for wild horse management in the U.S: safely and humanely managing wild horse populations". Retrieved from http://www.humanesociety.org/issues/wild_horses/facts/hsus_wild_horse_management.html

Hwang, Y.J., Roe B.E., Teisl, M.F., 2006. "Does Price Signal Quality? Strategic Implications of Price as a Signal of Quality for the Case of Genetically Modified Food" International Food and Agribusiness Management Review 9(01), 2006

Institute for Digital Research and Education (IDRE), 2014. "SAS Annotated Output Ordered Logistics Regression" Retrieved from http://www.ats.ucla.edu/stat/sas/output/sas_ologit_output.htm

Institute for Digital Research and Education (IDRE), 2014. "SAS Annotated Output Multinomial Logistics Regression" Retrieved from http://www.ats.ucla.edu/stat/stata/output/stata_mlogit_output.htm

Johnston, C.2009. "Wild Horses" The Nevada Magazine. Retrieved from http://wildhorseadventure.net/nevmag.pdf

Joseph, J., Singh-knights, D., and Dennis, D., 2010. " Sustainability in the tourism sector assessing ecotourist's willingness to pay for ecotourism offerings in Trinidad and Tobago" Retrieved from http://purl.umn.edu/18793

Johnston, R. "Is Hypothetical Bias Universal? Validating Contingent Valuation Responses Using a Binding Public Referendum." Journal of Environmental Economics and Management 52(2006):469–481.

Koppelman F.S, and Bhat C., 2006. "A self-instructing course in mode choice modelling: multinomial and nested logit model" US Department of transportation and federal transit Administration. Retrieved from http://www.ce.utexas.edu/prof/bhat/courses/lm_draft_060131final-060630.pdf

Krzysztof R.A, and Markakis E., 2015. “Sequential Bidding in the Bailey-Cavallo Mechanism” Institute of Logic, Language and Computation, University of Amsterdam Athens University of Economics and Business, Department of Informatics, Athens, Greece, CWI, Science Park 123, 1098 XG Amsterdam, The Netherlands

Larkin, M. 2011. “AEEP releases report on BLM’s Wild horses: Adoption program has evolved into a welfare program”. American veterinary medical association. Retrieved from https://www.avma.org/News/JAVMANews/Pages/111101j.aspx

Lancaster, K.J., 1966. “A New Approach to Consumer Theory”. Journal of Political Economy 74(2):132-157

Lommis B.J, 2014. “2013 WAEA Keynote Address: Strategies for Overcoming Hypothetical Bias in Stated Preference Surveys”. Journal of Agricultural and Resource Economics 39(1):34–46 ISSN 1068-5502 Copyright 2014 Western Agricultural Economics Association

Louivere J.J., 1988. “Conjoint Analysis Modelling of Stated Preferences: A Review of Methods Recent Developments and External Validity” The London School of Economics and Political Science. Journal of transport Economics 22(1):93-119.

List, A.J and Gallet, A.C., 2001. “What Experimental Protocol Influence Disparities Between Actual and Hypothetical Stated Values?” Environmental and Resource Economics 20: 241–254, 2001. © 2001 Kluwer Academic Publishers. Printed in the Netherlands.

Little, J., Berrens, R., 2004. “Explaining disparities between actual and hypothetical stated values: further investigation using meta-analysis”. Economics Bulletin 3, 1-13.

Marangon, F., Troiano, S., Tempesta, T., and Vechiato, D., 2013. “Consumer Behavior in Rural Tourism. Conjoint analysis of Choice Attributes in the Italian-Slovenian cross-boundary area” SAEA selected paper. Retrieved from http://ageconsearch.umn.edu/bitstream/169838/2/Marangon.pdf

Massiani, J., and Paolo R., 2008. “The Preferences of Trieste Inhabitants for the Re-use of the Old Port: A Conjoint Choice Experiment” Retrieved from http://purl.umn.edu/44224

Murphy, J.J., Allen, P.G., Stevens, T.H., Weatherhead, D., 2005. A meta-analysis of hypothetical bias in stated preference valuation. Environmental and Resource Economics 30, 313-325

National Academic sciences, 2013. “Using science to improve the BLM wild horse and burro program: a way forward. Retrieved from http://wildhorseeducation.files.wordpress.com/2013/06/13511.pdf

National Systems of public land, 2010. Working towards a sustainable management of America’s Wild horses and Burros”. Retrieved from http://www.azgfd.gov/inside_azgfd/documents/Strategy_06_01_2010.pdf

Orme, B. 2002. “Formulating attributes and levels in Conjoint Analysis” Retrieved from http://www.sawtoothsoftware.com/download/techpap/formatt.pdf

Peterson, B. L. and Harrell, F. E. 1990, “Partial Proportional Odds Models for Ordinal Response Variables,”
Journal of the Royal Statistical Society, Series B, 39, 205–217.

Philips D. 2012. “Buyer of Wild Horses under Investigation by State, Feds”. Retrieved from http://www.propublica.org/article/buyer-of-wild-horses-under-investigation-by-state-feds

Philips D. 2012. “All the missing horses: What happened to the wild horses Tom Davis bought from the government”. Retrieved from http://www.propublica.org/article/missing-what-happened-to-wild-horses-tom-davis-bought-from-the-govt

Reis A., 2014. “The plight of the American Wild Horse”. American Wild Horse Preservation. Retrieved from http://wildhorsepreservation.org/media/plight-american-wild-horse

Reynolds-Allie, K., and Fields, D., 2011. Alabama Restaurant Preferences and Willingness to Pay for Local Food: A choice based Approach”. Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting, Corpus Christi, Texas; February 5-8, 2011

Robert, M. A., "Thoroughbred Farm managers' Willingness-to-pay for Alternative Deworming Regimens in Horses" 2013. Theses and Dissertations--Agricultural Economics. Paper 18.

Rodriguez-Entrena, M., and Sayadi, S., 2008. “Who Should Certify the Safety of Genetically Modified Foods?” European Association of Agricultural Economists 2008 International Congress, August 26-29, 2008, Ghent, Belgium

SAS Institute Inc. 2013. “Ordinal Model for Multinomial Data” SAS/STAT® 13.1 User’s Guide. Cary, NC: SAS Institute Inc.:3026-30

So Y., and Kuhfeld, W., 2012. “Multinomial Logit models” Retrieved from http://support.sas.com/techsup/technote/mr2010g.pdf

Spermann, A. (2008). Logit Models. Germany: University of Freiburg. SS 2008. Retrieved from https://www.google.com/search?q=spermann+A (2008) +logit+models&oq=spermann+A (2008) +logit+models&aqs=chrome.0.69i57.11507j0&sourceid=chrome&ie=UTF-8

Starkweather, J., and Moske A.K, 2010. “Multinomial Logistic regression” Retrieved from http://www.unt.edu/rss/class/Jon/Benchmarks/MLR_JDS_Aug2011.pdf

Stevens, T. H., M. Tabatabaei, and D. Lass. “Oaths and Hypothetical Bias.” Journal of Environmental Management 127(2013):135–141.

Stowe, C.J., and Kibler, M.L., 2011. “Characteristics of adopted race horses in second careers”. Department of Agricultural Economics, University of Kentucky, 40506 Department of Agricultural and Resource Economics, Colorado State University, 80523. Under revision for Journal of Applied Animal Welfare Science.

Train, K. E. 1997. “Recreation Demand models with taste differences over people” Department of Economics University of California, Berkeley, July 1997 Forthcoming, Land economics, 74(2).

-2009. Discrete Choice Methods with Simulation (2nd Ed.). Cambridge, UK: Cambridge

US Global Change Research Program (UGCRP), 2014. “Impacts on Society” Retrieved from http://www.globalchange.gov/climate-change/impacts-society

US Department of interior Bureau of Reclamation, 2008. “Reclamation managing Water in the west: Introduction to conjoint analysis for valuing ecosystems amenities” Retrieved from http://www.usbr.gov/pmts/economics/reports/conjoint/TMEC200803.pdf

Vojacek, O., and Pecakova I, 2010. “Comparison of Discrete choice models for economic environmental research” Parague Economic Paper 1

Verbeek, M. 2012. “A guide to Econometrics” 4th edition. Chichester: John Wiley and Sons

Weisser, R.A., 2014. “How real is hypothetical bias in the context of risk and time preference elicitation?” Journal of Economic Literature C18 D80:1-35

Wild horse foundation, 2010. “Costs of managing a wild horse” Retrieved from http://www.wildhorsefoundation.org/horsecosts.htm

Williams, R. 2006. "Generalized Ordered Logit/ Partial Proportional Odds Models for Ordinal Dependent Variables." The Stata Journal 6(1):58-82

Yangui, A., Akaichi, F., Costa-Font, M., Gil, J.M., 2014. “Are ranking preferences information methods comparable with the choice experiment information in predicting actual behavior?” Paper prepared for presentation at the EAAE 2014 Congress ‘Agri-Food and Rural Innovations for Healthier Societies’ August 26 to 29, 2014 Ljubljana, Slovenia

Yun. H., 2009. “Conjoint Analysis of Choice Attributes and Market Segmentation of Rural Tourists In Korea” Retrieved from http://purl.umn.edu/90685

Zeithaml, V.A., 1988. “Consumer perception of price quality and value: A means-end model and synthesis of Evidence” Journal of Marketing 52:2-22

VITA

OMOTOYOSI ADEKUNLE -VAN WIE

Educational Background

Master of Science, Agricultural Economics, University of Kentucky, April 2015

Bachelor of Science, Agricultural Economics, University of Idaho, May 2012.

Work Experience and Training

Collaborative Institutional Training Initiative (CITI), University of Miami 2014-2017

Graduate Research Assistant, Jan 2013-to present

University of Kentucky, Agricultural Economics Department

Public Relations Officer Graduate Students organization (GSO), Jan 2013 to present

University of Kentucky, Agricultural Economics, Graduate students organization

Medical Outreach and Cultural Exchange program Coordinator, Accra Ghana 2012-2014

University of Ghana, Legon, Accra, Ghana

Peer Educator and Sexual Health Counselor, December 2003- December 2010

Total Development International Foundation (TODEV), Accra Ghana and Ibadan Nigeria

Other Work Experience

Survey Data Analyst with Dr. Stowe 2014

The Department of Agricultural Economics, University of Kentucky.

Environmental Economists Volunteer 2013

Confederated Tribes of the Umatilla Indian Reservation, Idaho, USA

The Palouse Clearwater Environmental Institute (PCEI): Moscow, Idaho.

Sales/business Associate, 2013-2014

Integritea, tea company Lexington, Kentucky.

Agricultural business Consultant, 2012

Reggear Tree Farms, Idaho, USA

Volunteer Agronomist, August 2010 to August 2012

Sales calls, March 2011

Re/MAX connections, Moscow Idaho

Skills

Computer Experience:

Microsoft: Word, PowerPoint, Excel, Access. Others: SAS, STATA, JMP 10, SPSS, Photoshop, MyMathLab.

Communication Skills*:*

Research presentation, Public speaking, Seminars, Training Workshops, International Students Orientation

Leadership skills:

Choir Leader: St. Luke's Methodist Church "Multicultural Service" Lexington, KY. 2015.

Public Relations Officer; Graduate student organization, Agricultural Economics department, University of Kentucky 2013-2015

Student Welfare Officer, African Students Association, University of Idaho 2009 – 2012

Other: Team management, Motivational leader, goal driven writer and speaker on health and fitness, sensual relationships and lover/supporter of community development

Awards and Membership

Awarded "Outstanding Masters Student" Gamma Sigma Delta Honors International Honors society of Agricultural Economics, University of Kentucky, 2014

Award of Outstanding Academic Excellence and Distinguished Community Service by Golden key Honors Society, University of Idaho, 2013

Agricultural Economics and Rural Sociology Departmental Alumni Scholarship Award, University of Idaho, 2011-2012

Idaho and Oregon Seed Association Scholarship Award, 2011

Agricultural Economics and Rural Sociology Departmental Alumni Scholarship Award, University of Idaho, 2011-2012

Awarded Sheik Memorial Book scholarship for outstanding excellence, 2010

Recognized and Awarded for academic excellence and distinguished community service by Phi Eta Sigma Honors Society, University of Idaho, 2009

Awarded “Outstanding Freshman” by University of Idaho, 2008

Dean’s List, University of Idaho, 2008-2012

Awarded “International Student Merit Scholarship” by University of Idaho, 2008

Awarded “Best Graduating Economics Student” byMaster’sok High School, Ibadan Nigeria, 2006

Member of Gamma Sigma Delta International Honors Society of Agriculture, University of Kentucky, 2014

Member of Southern Agricultural Economics Association (SAEA) since 2013

Member of Economics Club, University of Idaho, 2011-2012

Member of Golden Key Honors Society, University of Idaho, 2010

Member of Phi, Eta Sigma Honors Society, University of Idaho, 2009

Academic Papers Written

Master Thesis- A Conjoint Analysis Study Of Preferences and Purchasing Behavior Of Potential Adopters Of The Bureau Of Land Management Wild Horses.

Southern Agricultural Economics Association (SAEA) selected paper “A hedonic price Analysis of internet auctions for the BLM’s wild horses and Burros and an overview of sales strategies***:*** selected to be presented at SAEA academic conference 2014.

References

Available upon request.