Promoters and Detractors

Exploring what horse owners appreciate in equine veterinary practice

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MASTER THESIS

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Abstract

In the field of veterinary medicine, it remains unclear what clients find essential in order to remain satisfied with their veterinarian's services. Moreover, it is argued that clients' expectations may differ depending on the kind of animal they own, and that aspects like communication are vital for the client-veterinarian relationship. However, there is a lack of knowledge on what clients expect from their veterinarian, which can result in dissatisfaction with the provided service. In other words, there is no theoretical framework that describes what skills or knowledge a veterinarian should rely on in particular scenarios with a client. To fill this research gap, I performed several data analyses through natural language processing on the data from a survey taken by horse owners from the Netherlands and the United States. In this study, I conduct topic detection analysis on several open ended questions from a survey with the goal to identify what clients appreciate in their veterinarian, including the potential reasons why a client may leave a veterinarian's service. First, the data is pre-processed to eliminate dispensable words to optimise the analysis. Second, an exploratory data analysis is conducted in order to get an overview of the participants that were recruited for the study, such as their demographics, the purposes for which they have horses in their care, and the number of times they require a veterinarian's services. Next, I use term frequency-inverse document frequency (TF-IDF) to create word clouds in order to get a general overview of trends in the data. Furthermore, k-means clustering and the topic modeling method named Latent Dirichlet Allocation (LDA) are used to identify the most essential topics and themes from the data. Lastly, these clusters were manually evaluated in order to detect the themes present in the data. Through affinity diagramming and colour coding all the words in the clusters, I constructed frameworks according to Elte et al.'s [31] categories, which describe the varying kinds of client requirements and to what extent they overlap. I highlight several limitations of my chosen analysis methods. Additionally, I pose several future research directions based on the study's findings.

Keywords
Equine veterinary medicine, client satisfaction, term frequency-inverse document frequency, k-means clustering, latent dirichlet allocation, topic detection, frameworks for equine veterinary client satisfaction.

Team Members
This project was completed in partnership with two other master students: Reinout W. Hofman and Giorgio Lucangeli. I conducted the exploratory data analysis, i.e. histograms, cross-tabulations and correlation matrices, with Reinout, whereas all the other analyses mentioned in the thesis were performed by myself.

Contents

1 Introduction

In 2021, Elte et al. [31] conducted a structured literature review in order to get a concrete overview of what is currently known in the field of veterinary medicine concerning client satisfaction. In this paper, the authors opted for a structured review in order to decrease reviewer bias [76]. Unfortunately, the field of veterinary medicine does not provide a large enough body of literature on this topic in order to conduct a systematic literature review [73]. As such, the field requires more peer-reviewed research on this topic. In the field of veterinary medicine, it remains unclear what clients view as important in their equine veterinary care, hence the field lacks a framework or theoretical basis for practitioners to use to evaluate their clients' satisfaction [24].

1.1 Problem

Despite the research available on horses and client satisfaction in a greater sense, there is a lack of peer-reviewed research on clients' requirements, as well as what factors determine their satisfaction, in the field of veterinary medicine. All in all, it remains unclear what factors veterinarians should take into consideration in order to improve a client's satisfaction, especially depending on the type of client.

However, one of the main problems is that veterinarians tend to experience more stress than the average worker, which has consequences, including the possibility that veterinarians experience more underperformance than what is to be normally expected in a (stressful) job. For example, Pohl et al.'s [99] study suggested that there are indications for increased levels of psychological stress in the veterinary profession, which suggests higher risk for mental health issues like burnout. They also found that female veterinarians tend to have worse health outcomes than their male counterparts [99]. Veterinarians' jobs tend to be very physically demanding, especially of those who work with large (farm) animals [129, 94]. Besides physical stress, veterinarians tend to experience psychological stressors as well. Causes of psychological stressors may include tough work schedules, tight finances, client demands [97], as well as ethical dilemmas [9]. According to a meta-analysis that analysed the relationship between workplace stressors and mortality in the US, totaling 228 studies, found that mortality was increased by almost 20% when an employee had long working hours [42]. Stressors could include low social support, loss of control, performance pressure, and feelings of inequity [42]. These stressors have been connected with psychological problems like depression and anxiety, and even with dementia [124, 105].

Rhodes et al. [107] conducted a study where they recruited 222 female veterinarians, and asked them about symptoms like burnout, depression, anxiety, stress and their experiences with clients. They found that positive experiences with clients were directly associated with lower levels of depression and "client-related burnout", whereas negative client experiences were directly associated with both work-related burnout and client-related burnout [107]. Additionally, they found that these negative experiences were indirectly related to depression [107]. Similar results were presented in a paper by Perret et al. [96] wherein they found evidence to support the idea that veterinarians experience higher levels of burnout symptoms related to their job and client interactions. In specific, the Canadian veterinarians in their study scored low on their so-called "Personal Accomplishment" (PA) scale, which was correlated to higher burnout rates [96]. The PA scale measures how competent and successful a person feels in their job [74]. These findings of veterinarian's burnout, stress and other related issues present a clear problem in the field. One such possible cause is the field's lack of knowledge on how to best deal with the clients, which may typically the main source of stress in veterinarians.

Although the underlying problems to these stressors in the profession may be hard to solve, being able to concretely identify what clients tend to find most important, may be able to reduce veterinarians' mental load by focusing on what is essential to the client. Furthermore, the identification of these needs may help shape more effective education in veterinary school, which could help future veterinarians in their ability to better adapt to clients' needs, hence potentially increasing a vet's ability to deal with the occupation's challenges. Therefore, the research field also needs a basis for concepts that may play an essential role in client satisfaction, such as interpersonal skills and quality of care.

1.2 Goal

This thesis builds upon a structured literature review conducted by Elte et al. in 2021 [31], in which the authors aimed to figure out what is currently known and unknown on client's expectations and requirements to be satisfied with veterinary services. In this literature review, they identified seven categories that describe what client satisfaction may consist of: (1) quality of care, (2) quality of service, (3) horsemanship of the veterinarian, (4) costs of service, (5) interpersonal skills, (6) professional attitude and (7) transfer of knowledge [31]. However, the authors emphasise that more research is needed so that the framework can be expanded, as well as outlined in more detail through evidence-based findings [31]. Therefore, this thesis aims to evaluate what subcategories or elements are relevant to these seven main categories. Identifying subcategories may help in the identification of more concrete concepts that determine a client's requirements with regards to the received services at a veterinarian. The end goal of the thesis is to create an abstract framework of clients' requirements for veterinarians. Hopefully, this framework can help veterinarians to evaluate how they can improve their interactions with their clients in their daily practice. These frameworks could provide a more solid basis for the definition of these categories.

There is a research opportunity in creating a framework to provide an overview as to what exact aspects and subcategories are relevant for client satisfaction, potentially even depending on the type of situation. Moreover, it is somewhat unclear if the type of visit is relevant for a client's requirements. For example, is it relevant for a client to be aware of every single detail during routine checkups at the clinic? And, does a client require updates on changes in the costs of services every time before they visit the clinic? These are potentially relevant questions in the setup of such a framework. Although I may not be able to provide a detailed answer to each question of relevance, my aim is to also provide directions for future research that can study the different types of horse owners in more detail, what types of characteristics these horse owners have, hence their needs. Studying these different types of horse owners could complement my frameworks, thus making them more effective and generalisable in the field.

All in all, I aim to answer the following research question in this thesis: "What do horse owners appreciate most in their veterinarian, and why do they leave?"

1.3 Outline

This thesis is structured into several chapters. Chapter 2 provides some background information on the field of veterinary medicine, including what is currently known and unknown about client satisfaction and other related aspects. Consequently, I identify the research gaps and introduce the research question I aim to answer in this thesis. In chapter 3, I discuss what research methods and data analysis techniques were used in order to extract relevant information in order to answer the research question. Chapter 4 discusses the results of these data analysis techniques. Next, chapter 5 provides an overview of the thesis' findings, the limitations of the chosen data analysis techniques and what this study contributes to the field of veterinary medicine and client satisfaction. Additionally, this chapter introduces directions and opportunities for future research. Lastly, chapter 6 summarises the most important findings of this thesis, concluding with the main takeaways.

2 Related Work

This chapter provides an overview of related work on client satisfaction and other related concepts, including stress, burnout, psychological distress and empathy fatigue in the field of veterinary medicine. Furthermore, I propose where current research gaps lie in the literature of the veterinary medicine domain. In order to identify the research gaps in the literature, I explore several facets of the profession, including practitioner-client communication, client satisfaction, veterinarians' mental well-being and empathy fatigue. I explore these topics as they may reveal potential causes or factors that play a role in veterinarians' performance, hence client satisfaction.

2.1 Motivation

According to Conners and Feldman [28], the equine industry is a multi-billion-dollar industry wherein both leisure horse owners' and Olympic competitors' needs are met. The services of veterinary doctors and professionals are sought out by horse caretakers whenever they require to [31].

As is the case in all veterinary practices, a horse professional has both a duty towards the horse and its health and towards the horse's caretaker [45].

A client's satisfaction is based on cognitive, emotional and behavioural aspects, which influence their perception of their experience with a professional [92]. Similarly in the field of Human-Computer Interaction (HCI), cognition and emotion is used to substantiate design choices in technological applications, i.e. interfaces, as well as to evaluate their effectiveness to meet a particular goal. However, capturing a person's opinion based on their emotional and cognitive processes is difficult and requires complex analyses. For this thesis, my aim is to capture the core of the opinions of different kinds of horse owners, including their differences in needs by evaluating their textual answers from a survey on a variety of questions. In order to understand what was asked in this questionnaire and how to interpret the participants' answers, I aim to get a deeper understanding of the (equine) veterinary field by exploring the literature.

Furthermore, my aim is to identify concrete research gaps in the field of equine veterinary practice, including in the realm of client satisfaction, in order to determine the concrete research directions for my thesis. The research gaps can aid in the process of determining what to look for in the data, as well as what research methodologies to use in turn.

2.2 Veterinarian-Client Communication

In a focus-group study conducted by Brown and Silverman [17], also referred to as the "KPMG study", it was identified that one of the six main issues in veterinary medicine is the lack of management and communication skills between veterinarian and client in order to conduct successful business transactions. Although this finding is not representative of all veterinarians, obviously, participants in the study reported that there was a lack of training in communication skills during their education in veterinary school [17]. Additionally, clients of veterinarians rated (1) the way that a veterinarian handles their pet (e.g. in a gentle and kind manner) and (2) how respectful and informative the veterinarian is as the two most important factors in choosing a particular veterinarian [17]. This suggests that a veterinarian's interpersonal skills are a vital requirement for clients' satisfaction (e.g. [112]). In fact, regulatory bodies in the field of veterinary medicine report that most complaints are in relation to the communication and interpersonal skills of veterinarians or a veterinary practice [110].

Furthermore, veterinarians have to deal with clients' changes in expectations with regards to the well-being of their pets, i.e. due to culture and societal changes. For example, it has been reported that veterinarians have to deal with clients that are highly educated more frequently than before, and as a result may be faced with more questions and higher expectations [13]. Consequently, this puts more pressure on veterinarians to provide high quality service to all clients at all times, as the clients may be more unforgiving of unprofessional services [13].

Unfortunately, there is limited knowledge on veterinarian-client communication [112]. The knowledge that is available are typically no peer-reviewed studies, but rather based on opinions of experts or anecdotal [112]. It is arguable that a veterinarian's skills are vital to the well-being of their clients as well. Research suggests that veterinarians can alleviate a client's grief and guilt for a pet's death by providing

adequate support [2]. However, veterinarians' end-of-life communication training varies greatly across curricula between different veterinary schools [113]. In fact, a lot of veterinarians feel unprepared to have these conversations with their clients as they report not having had this type of training at all [120]. A gap between veterinary school curricula and the skills needed to become a successful veterinarian has also been identified by educators [23, 33, 67]. Even for veterinarians who receive this kind of training, many report that these discussions present challenges due to feelings of responsibility for the animal's condition, feelings of failure, uneasiness with death in general, feelings of uncertainty as to how this may affect their relationship with the client, feelings of worry concerning the animal's quality of life, and concerns with regards to the client's emotional response [19, 44, 108].

2.3 Client Satisfaction

Despite the lack of a theoretical framework concerning client satisfaction in the field of veterinary medicine, it is considered essential to provide high service quality in order to maintain successful relations in the animal healthcare sector [103]. Thus, it is argued that client satisfaction is heavily influenced by a client's expectation of the service, and their eventual perception of this service [102]. It is also expected that horse owners' expectations of a veterinarian's service is high, potentially higher than those of other animal owners, due to the fact that horses have high monetary and emotional value to the owner [93]. As a result, equine veterinarians are under more pressure to meet client's demands [72]. Consequently, client satisfaction in equine veterinary practice is of great importance to successful business interactions, which has also been emphasised by numerous authors in the field [72, 71, 12, 80, 56].

In small animal practice, like dogs, cats, rabbits, guinea pigs and other companion animals, it has also been shown that client satisfaction is of importance [88, 91, 4, 21]. However, it is worth noting that clients' requirements and demands of equine veterinary practice are substantially different compared to clients' expectations of small animal practice due to their differing reasons for keeping the animals (e.g. [31]). For example, small animals like dogs and cats are typical 'companion animals', meaning that owners tend to consider those animals as part of the family, whereas horses are typically considered animals to pursue goals with, such as win competitions and recreation [28, 40, 126]. Therefore, Elte et al. [31] argue for a need to conduct research on small animals and equines separately.

2.3.1 Quality of Care

Elte et al. [31] found in their review that "quality of care" was one of the decisive factors for clients to rate a veterinarian visit on an equal level of their expectations, or even above their expectations [1]. In line with this, other work reports that the more knowledgeable, competent and skillful a veterinarian appears, the more a client is to perceive their consultation as positive [56, 80, 12, 102]. Although veterinarians may be skeptical of clients' understanding in order to be able to provide a fair judgement of a professional's competencies [12], we cannot deny reality: how well a veterinarian's abilities is perceived in relation to the given quality of care is what will determine a client's satisfaction, not the actual skills of the professional.

However, it remains unclear to what extent we can influence clients' perceptions and how. My study aims to tackle the how part of the question by examining what characteristics they appreciate the most in their veterinarian.

2.3.2 Quality of Service

Elte et al. [31] describe quality of service as a category that "includes all aspects related to a professional service provided between individuals, such as availability, duration of consultation, ease of making an appointment, etcetera" (p. 5). In other words, this category describes that typically the way in which a service is provided, rather than the service or quality itself, is of greater importance to a client [46]. The way in which a service is provided entails many facets. For example, this could include aspects like how a client is welcomed into the practice, how long it takes to schedule an appointment, the availability of a particular veterinarian, the practice's hygienic standards, and how accessible a practice is [12]. Interestingly, multiple studies report that clients find the cleanliness of equipment and facilities more important than how advanced

they are [102, 12, 10]. This again supports the idea that the what (e.g. the types of equipment) is less important to the client than the how (e.g. how the equipment is maintained).

Although it is roughly known what the quality of service may entail, it is relatively unclear to what extent this category overlaps with the 'Quality of care' category. According to what is currently known about these categories, they both seem to be related to the way in which a veterinarian deals with their clients. In other words, both categories refer to the perception of a veterinarian's skills, not so much their qualifications. As such, one of the goals of the thesis is to figure out to what extent these categories overlap and in what ways they differ.

2.3.3 Horsemanship of the Veterinarian

A veterinarian's horsemanship refers to all aspects of a veterinarian's knowledge and skills that are specifically related to horses [31]. As such, horsemanship may refer to how a veterinarian 'communicates', handles and cares for a horse [31].

In the literature, horsemanship is often referred to as "the art of riding, driving, handling and managing horses" [43, p. 5]. Hence, horsemanship can be described as a specific skill that can only be acquired through experience with horses (e.g. [43]). However, some argue that horsemanship can be a skill that is more innate and natural to some people, whereas others may not have this natural ability to handle horses well [32]. Hence, the ability to work well with horses is most likely partially innate and learned (e.g. [43]). People who typically have more feel for horses–maybe even animals in general–tend to use smoother body movements, stay calm and patient, and make more use of visual and tactile cues rather than auditory, in order to communicate with a horse (e.g. [43]). In fact, animals learn their behaviours through their environment [115, 90], as well as by rewarding good behaviours and unlearning bad behaviours [78]. This type of behavioural training is especially important for horse riding, as a horse will need to 'listen' to stimuli from its rider over stimuli from the environment (e.g. [43]).

The principle of teaching an animal good behaviour is nowadays often done through positive reinforcement, which corresponds to granting an animal a reward once they display a desired behaviour. Another well-known concept is negative punishment, which is part of B.F. Skinner's operant conditioning theory, which refers to the idea of removing something desirable (e.g. a toy or food) if an animal displays unwanted behaviour. Operant conditioning is the theory of creating associations between specific types of behaviours and a corresponding consequence, e.g. a reward or punishment [115].

As argued in Elte et al.'s [31] literature review, a veterinarian's horsemanship can be especially helpful for a client if knowledge of the equine industry is of significance [1, 72, 102] (Black, 2009). Understandably, Elte et al. [31] that more research is needed in order to determine the different 'horsemanship' needs depending on the type of horse owner, including how to integrate these types of differences in handling communication with a client accordingly. Other studies have indicated this need for differentiating between the kinds of horse owners as well (e.g. [1, 122]).

2.3.4 Costs of Service

The 'costs of service' category refer to all the financial aspects with regards to veterinary care [31]. This category includes all concerns and issues that clients may have with regards to veterinary costs, such as to what extent a client feels like the costs are accurate and justified, the value for their money and the clarity of the bills [31]. Research argues that the amount of money that a visit to a veterinarian takes is typically an undeciding factor for a client's satisfaction [1, 12, 102]. Instead, it is found that clients want value for money, meaning that the actual cost of a service is less important [1, 102, 10]. This observation is in line with findings from other types of industries as well: clients are willing to pay a higher price as long as the quality of the service aligns with what is expected [93, 88, 127].

2.3.5 Interpersonal Skills

A veterinarian's personal skills involve the way they communicate, show compassion and empathy, work together with their colleagues and clients, and how they form (intercollegiate) relationships [31]. Moreover, interpersonal skills were listed as the number one criterion for client satisfaction [12]. Interestingly, a large

part of clients (43%) report that they see their primary veterinarian as a good friend [1]. This may be a reason as to why clients find good communication with their veterinarian essential: they simply do not view their relation with their vet merely as a business transaction. Typically, we would rather have good communication with a dear friend than with a person we do business with.

Furthermore, it has been reported that clients tend to remain with the same veterinarian for 9 years, on average [1]. This may show that people prefer to remain loyal to a particular practitioner, but this may also be an indication that we indeed tend to form more familial connections with our veterinarians (and other types of practitioners) than with other types of people we do 'business transactions' with [1]. Additionally, clients want to be listened to, respected, being communicated with clearly and being told what to expect from their veterinarian [72, 12, 10, 112]. In other words, clients want to be taken 'seriously' by their veterinarians. These findings call for more evidence-based communication strategies and communication training in the curriculum of veterinary schools so that prospective veterinarians can become effective communicators with their future clients [112, 5, 77, 24].

2.3.6 Professional Attitude

Another category from Elte et al.'s [31] structured review is "professional attitude". Professional attitude refers to the way in which veterinarians present themselves to a client [31]. The way one presents themselves has to do with, i.e., their attire, cleanliness, and characteristics like respect, trust and honesty [31]. According to Mossop and Cobb [85], veterinarian professionalism is a complex term with multiple facets. Some of those facets include animal welfare, client satisfaction, societal pressure, and their own norms and values [85]. In their everyday job, veterinarians have to balance all these facets against one another [85].

Noticeably, the categories 'interpersonal skills' and 'professional attitude' seem to somewhat overlap in their definitions. For example, one can argue that in order to maintain a professional attitude, one has to communicate efficiently and effectively. Similarly, someone who may possess proper interpersonal skills, may be more likely to be perceived as professional. Therefore, it may be somewhat unclear if clients genuinely prefer one category over the other, or if they may prefer a combination of the two. Moreover, it may be of interest to know if this preference for professionalism and/or interpersonal skills is (partially) dependent on the type of client, so that veterinarians can adapt their conduct depending on the client's requirements. For example, some kinds of clients may have no interest in knowing all details of a particular treatment or reasoning for a particular diagnosis, hence presenting all the particulars to such a client may be overwhelming.

2.3.7 Transfer of Knowledge

The last category mentioned in Elte et al.'s [31] paper is 'transfer of knowledge'. At first glance, one may expect that the transfer of knowledge and interpersonal skills categories are closely related. For example, one may expect that once a person possesses adequate interpersonal skills, one may be more successful in transferring their knowledge of the current situation to the other person. Vice versa could potentially apply as well: the better someone is in transferring knowledge to another person, the more likely the other person has sufficient interpersonal skills as well. In summary, it remains a question what the exact relation between these two categories is.

Elte et al. [31] defined this category as "the acquisition and dissemination of relevant knowledge and skills within the context of continued professional development, between veterinarians and from veterinarian to client" (p. 5). It has been reported in former work that a horse's owner typically wishes to be educated on their animal's condition [56]. Elte et al. [31] state that providing the necessary information depending on the client's needs and knowledge could improve their satisfaction, but more research is needed in order to determine what kinds of information are especially of concern for the different kinds of clients.

In order to be able to effectively transfer knowledge to clients, consideration for what is known in the literature with regards to knowledge transfer may be of interest. According to Ward et al. [125], the knowledge transfer process involves 5 steps: (1) problem identification and communication, (2) knowledge/research development and selection, (3) analysis of context, (4) knowledge transfer activities or interventions, and (5) knowledge/research utilization. Moreover, different kinds of knowledge transfer processes have been identified as well, namely (1) a linear process, (2) a cyclical process; and (3) a dynamic

multi-directional process.

2.4 Empathy Fatigue

In order to figure out potential factors that may affect veterinarians' skills, I explore the topic of empathy fatigue to get more insight into how well this has been studied, as well as to examine whether or not this concept would be relevant for continuations on my work. Although veterinarians may be at high risk for burnout and other psychological issues, another explanation for veterinarians' distress could be compassion fatigue. In fact, Mitchener and Ogilvie [83] argue that burnout may be frequently mistaken for burnout, considering that they may "feel" similar. Compassion fatigue is "the result of a depletion of our internal emotional resources" [83, p. 308]. Compassion fatigue may occur when a professional caregiver, like a veterinarian, feels empathy for a patient through listening to the patient and placing themselves in the shoes of the patient [83]. So while compassion fatigue is driven by how a caregiver processes their emotions, burnout is caused by organisational structures, procedures and policies [83]. As such, researchers like Foote [36] call for more awareness of burnout and more research on the topic that are caused by, i.e., ethical dilemmas that other kinds of stressful situations that veterinarians experience on a daily basis.

In 2021, Harrison wrote an essay on the importance of empathy in medical practice, as well as in what ways compassion fatigue is intertwined with negative mental health outcomes for veterinarians. In the veterinary profession, feelings of empathy are applicable to both the animals' caregivers and the animals themselves [49]. Empathy is a vital part of caregiver-client interactions, as it has been reported that clients tend to be satisfied with their received care if the caregiver was empathetic, regardless of the outcome of the treatment [118]. As such, Harrison [49] argues that this highlights why communication is such an important aspect to the profession, since communication may be the most effective and efficient way to express our feelings of empathy. Some degree of social skills may be essential to express empathy [49]. In fact, perceiving another person's feelings of empathy is affected by, inter alia, non-verbal communications like gaze direction and body orientation [18].

3 Method

In this chapter, I describe the kinds of tools and data analysis techniques I use in order to get an overview of client's requirements and needs with regards to their veterinarian, as well the reasons as to why they may leave a veterinarian. Furthermore, I describe why particular data analysis methods were chosen. Figure 1 provides more insight into the structure of the study, as well as what particular tools and data analysis methods were used.

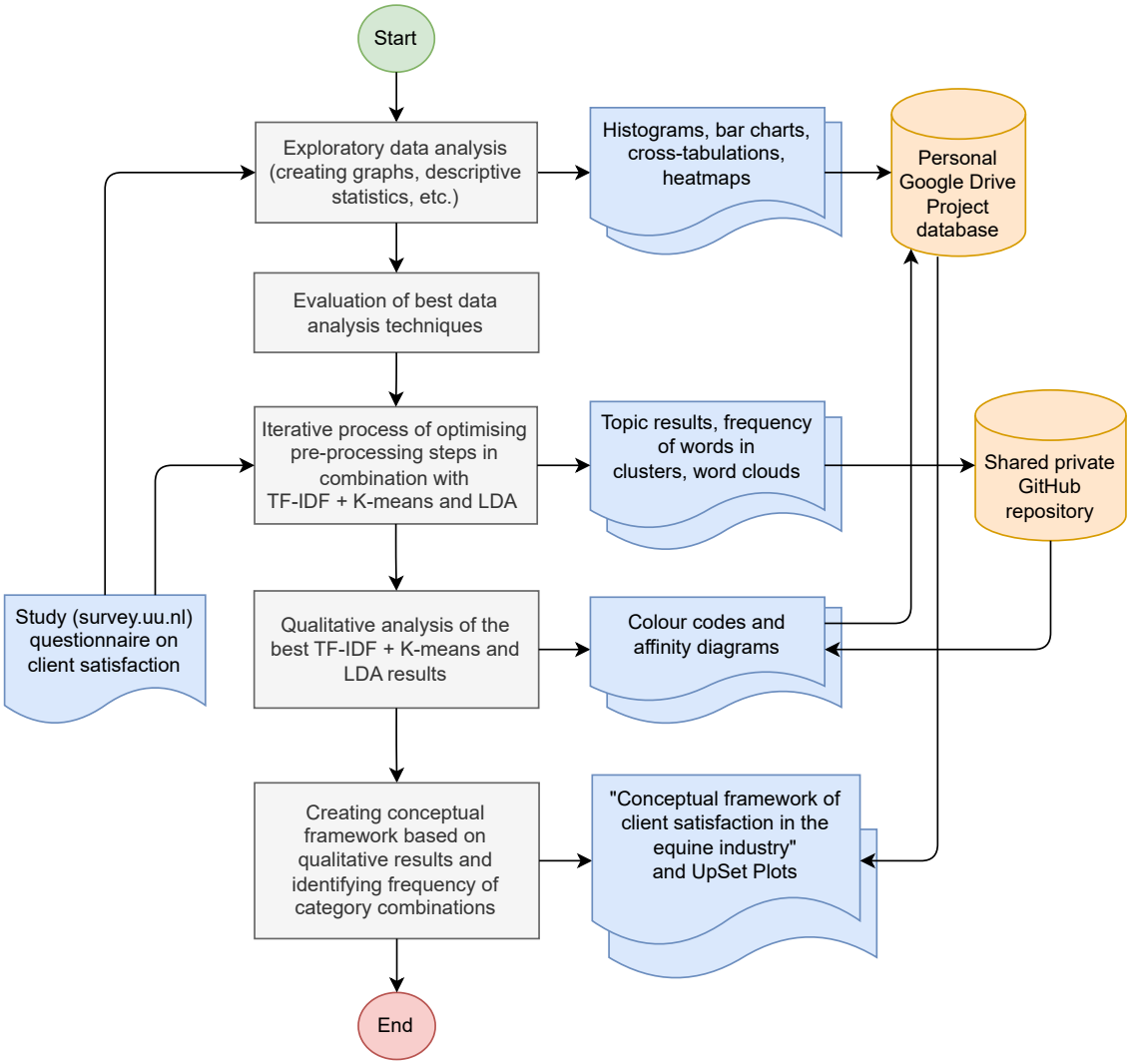

Figure 1: Flow chart providing an overview of the taken steps taken in the research, including the different types of data analysis techniques and materials produced.

First, I conduct an Exploratory Data Analysis (EDA) in order to figure out what the data looks like and to decide what data analyses to evaluate the data in more detail. Then, I conduct a relatively simple persona identification analysis by determining how many participants are a combination of particular characteristics based on looking at the intersection of their answers on several questions from the questionnaire. Next, I conduct topic detection analysis with the chosen methods based on the results of the EDA. This topic detection analysis is conducted in several iterations wherein I experiment with different pre-processing steps to clean the data. I analyse the clusters that provided the best results in more detail by examining the words that were included in the clusters, as well as through examination of their frequently. Lastly, I use the results from the topic detection analysis for qualitative analysis, with the hope to identify concrete

lessons learned, trends, and research gaps for future research.

3.1 Dataset

Drs. Yteke Elte conducted a survey in order to figure out what kinds of aspects clients find important in their veterinarian, as well as questions regarding how many veterinarians the clients have, their reasons for keeping horses, their reasoning for leaving a veterinarian and what aspects (e.g. horsemanship, cost of service) they find most important in different kinds of scenarios. An overview of the questionnaire is given in Appendix 6.

In the questionnaire, the participant is first presented with general questions such as their demographics, the reasons as to why they keep horses, how much money they spend on veterinary care, how many horses they have and how many veterinarians they tend to visit. These general questions are particularly used in the exploration phase.

Next, the participant is given the option to elaborate on their answers, such as why they have multiple veterinarians, what types of horse competitions they may participate in, **why they have at some point stopped using a veterinarian's services**, and **what they appreciate in their veterinarian**. Note that the questions in bold are of particular importance to my research question. The open ended regarding the usage of multiple veterinarians is also analysed for persona identification purposes.

Lastly, the participant is presented with several scenarios that may occur with their horse and in a veterinary practice, and they are asked to rate the importance of the categories defined by Elte et al.'s [31] according to the given scenario. I use these scenarios to explore the data.

3.2 Exploratory Data Analysis

John W. Tukey [121] is best known for popularising *Exploratory Data Analysis* (EDA) in the field of data science and statistics. He emphasises the importance of exploring the data before conducting more thorough (statistical) analyses, as one should have a grasp on what the data looks like in order to decide what analysis methods will provide suitable and interpretable results [121]. Choosing an appropriate data analysis technique is vital to obtain proper results. So in order to get a grasp at the type of participants that were recruited for the study, we performed an EDA by creating graphs, heatmaps, word clouds, correlation matrices and cross-tabulation matrices. Additionally, we use descriptive statistics to get a better overview of the participants that were recruited for the study. I use the results of the descriptive statistics analysis for my persona identification analysis.

3.2.1 Descriptive Statistics

As part of the descriptive statistics, I consider measures like the means, maxima, minima, standard deviations, and the 25th, 50th and 75th percentiles of participants answers for which they had to provide numerical answers. Examples of questions that require numerical answers are "How many horses are in your care?" and "How many veterinarians/practices do you use?"

3.2.2 Graphs & Tables

Naturally, raw numbers do not always provide a full picture of the types of participants, their needs and opinions. Therefore, I explore the data together with my two other teammates by creating graphs and tables of the data. In specific, we create histograms, cross-tabulation, heatmaps, and word clouds.

3.3 Persona Identification

Additionally, I aim to identify the different kinds of users that have taken the questionnaire according to their combinations of answers. I do this by going over numerous multiple choice questions and counting how many participants selected a particular combination of choices.

Besides that, I aim to conduct my analysis in several ways in which the data can be separated, namely by language. By conducting topic detection analysis on the full dataset, wherein Dutch and English answers

are combined together (which I call 'bilingual' in the thesis), and on two datasets where Dutch and English answers are separated ('monolingual'). Depending on the quality of my results for the monolingual and bilingual datasets, I might focus my study somewhat more on either of the two dataset types. However, my aim is to at least identify whether or not there are some similarities and differences between what Dutch and English-speaking horse owners, i.e. Americans, tend to answer. If I were to analyse the bilingual data in more detail, it would be relevant to know any differences in the Dutch and English answers for my final results, as the dataset consists of more Dutch than American clients. Hence, creating frameworks that could be slightly biased towards the Dutch answers.

3.4 Topic Detection & Modeling

Here, I discuss the different kinds of topic modeling techniques I use in this thesis. Furthermore, I provide reasoning as to why the discussed methods were chosen.

3.4.1 Pre-Processing the Data

The text of several open-ended questions from Drs. Yteke Elte's survey were pre-processed before performing topic modeling on it, as I want to exclude as many meaningless words from the clusters that will be created with these modeling approaches. To be specific, I pre-processed the text of the following questionnaire questions:

1. Q12: How many veterinarians/ practices do you use? (Optional)
    - Q12_2: I use 2 veterinarians/practices.
    - Q12_3: I use 3 or more veterinarians/ practices.
2. Q15_2: Have you ever stopped using a particular vet(practice)? (Optional)
3. Q45: Would you like to explain any of your answers? (Optional)
4. Q46: What do you appreciate most in your veterinarian? (Mandatory)

The pre-processing of the text was performed in an iterative process, wherein I evaluated in each cycle what pre-processing steps seemed to provide the most insightful results by examining the clusters created by the topic modeling techniques. For example, I evaluated what extra stopwords should be deleted and the kinds of words that should be included (e.g. nouns, verbs).

As the survey contained both Dutch and English answers, I experimented with several types of pre-processing steps. Here, in this section, I describe the different types of pre-processing steps I experimented with in order to get to the final selection of pre-processing steps. First, I considered two different methods to pre-process the data and to experiment with it. The first method involved pre-processing all the answers in one batch without separation of the Dutch and English answers. The second method was the contrary: pre-processing the Dutch and English answers separately.

For the first method, I used the *PorterStemmer* from Python's *NLTK* library. The Porter Stemmer was used for this combined pre-processing method, as this stemmer is typically described as one of the more 'aggressive' ones due to its rule-based approach, meaning that the stemmer is applied wherever a pattern matches (e.g. [62, 27], irrespective of context. As a result, a downside of the Porter Stemmer is that the word after stemming can be non-existing and ambiguous [100]. Also, the Porter Stemmer neither works for irregular words (e.g. arise, arose, arisen) nor can it remove prefixes [100]. However, the Porter Stemmer is considered as one of the best stemmer algorithms for extremely large datasets [100]. As the used survey for this study was relatively large due to the number of recruited participants, I noticed a relatively large amount of spelling errors in the data, in my opinion. Thus, I wanted to experiment with the Porter Stemmer in order to figure out whether or not I could work around these spelling errors, as I found in the literature that stemming algorithms–rather than purely lemmatisation algorithms–are either based on spelling correction algorithms (e.g. [61]) or designed specifically to correct these spelling errors (e.g. [58]). Although there are considered to be better stemmers out there, I experimented with the Porter Stemmer as it has been found to be especially effective on words that are more frequently present in a dataset [61], and from manually observing the data, I estimate that participants tend to frequently use the same words to describe their

opinions. Next, both Dutch and English stopwords from Python's spaCy library were eliminated from the data, named *nl_core_news_sm* and *en_core_web_sm*, respectively.

For the second method, I first only considered the relevant 'features'. These potentially useful text features are nouns, verbs, proper nouns, adverbs and adjectives. These options of text features are experimented with as I presume that these are content words that carry the most semantic weight in a sentence. For example, Kraaij and Pohlmann [69] found that the successful terms to deduct a Dutch sentence's main message were nouns, verbs and adjectives. I cleaned the remaining text through lowercasing, removing punctuation and diacritics (e.g. umlauts, acute accents, grave accents), and tokenising and lemmatising the text. Diacritics were removed with the help of the *unicode* library. The text was tokenised with the *word_tokenize* function and lemmatised with *WordNetLemmatizer* from Python's *NLTK* library. I specifically use the WordNet Lemmatizer as it has been described as being more 'precise' than stemming like the Porter Stemmer due to transforming the words into a dictionary root [104]. In specific, WordNet establishes semantic relationships between the words, i.e. in the English language, which potentially explains its effectiveness and preciseness [81]. Moreover, it has been reported that Porter's stemmer [101] and the WordNet lemmatizer [34] can be quite effective when used together with particular machine learning models (e.g. Support Vector Machines [29]) or regression models [55]. Therefore, I want to experiment with both Porter's stemmer and the WordNet lemmatizer to evaluate how they perform individually, especially considering that I could not find studies that have evaluated these methods' performances on a questionnaire dataset detailing a specific type of subject, like equine veterinary care. Afterwards, removing stopwords was done individually for the Dutch and English answers with the same libraries from the previously discussed pre-processing method.

3.4.2 Keywords Extraction & Term Frequency-Inverse Document Frequency (TF-IDF)

One of the main reasons for using TF-IDF to provide better insights into the data, is that TF-IDF is frequently used in the literature in combination with other data analysis techniques. For example, there are numerous studies that combine TF-IDF with the k-means clustering technique (e.g. [20, 117, 89]).

Furthermore, I aim to identify themes in participants' answers, as well as subcategories to Elte et al.'s [31] main categories concerning client satisfaction with the help of topic analysis, which is typically done by clustering the data. Besides pre-processing the data, it is essential to have structured data to effectively cluster the data (e.g. [3]). TF-IDF is an effective method to convert unstructured data into structured data by extracting words from all the documents.[1] as it ignores the most common words (e.g. 'the', 'and') but considers important ones by determining how frequently they are used across documents [84].

All in all, after pre-processing the data, I use TF-IDF to identify the most and least important words in the participants' answers. For the dataset used in the study, the term frequency (TF) represents the number of times a word appears in participants' answers. In other words, the TF is calculated by dividing the number of times a word appears in a particular participant's answer by the number of total words in the participant's answer [109].[2] The second element to TF-IDF is the IDF: Inverse Document Frequency. This element calculates how rare a word is in the entire selection of answers that participants have given. In specific, the IDF is calculated with the formula: log(N/DF), wherein N represents the total number of unique answers that we have from participants, and DF represents the total number of participants' answers that include that particular word [109].[3] The final TF-IDF value for a word can then by calculated by multiplying the TF and IDF, which represents a weight of importance for each word [109]. The higher the final TF-IDF weight of word, the more important it is for the clusters I create.[4] With this technique, somewhat uncommon words are given a higher weight than extremely common ones. The TF-IDF results

[1] Here, 'documents' refer to each participant's individual answer to a particular question in the survey. You can see each row in the dataset, representing an answer, as a separate 'document'.

[2] TF = (Number of times the word appears in participant's answer) / (Total number of words the participant's answer consists of) If a participant has mentioned 'knowledge' one time in their answer, and their answer is ten words long, then our TF will be: 1/10 = 0.1.

[3] So for example, if we have 50 participants that all provided an answer, we have N = 50. If we are interested in how popular the word 'knowledge' is, we count how many participants mention the word knowledge in their answer. If 20 participants mention this word, then DF = 20. Next, we can calculate the IDF by filling in the formula: log(50/20) = log(2.5) = 0.3979400

[4] Let's assume that for our word of interest, the TF value is 0.1 and the IDF value is 0.3979 (same values calculated in the previous footnotes). If we were to calculate the full TF-IDF, we use the formula: TF * IDF = 0.1 * 0.3979 = 0.03979.

will be used to determine the optimal number of clusters in the k-means clustering and LDA methods.

3.4.3 K-Means Clustering

From the literature, I found that there are two main approaches to identify topics in text data, namely LDA and k-means clustering. I used both LDA and k-means with the different kinds of pre-processing steps and compared the results. The k-means clustering was described in 1975 in detail by Hartigan [50]. A few years later, Hartigan and Wong [51] introduced a more efficient version of the k-means clustering algorithm. The goal of the k-means algorithm is to divide the number of available points, in this case the words, into a particular number of clusters such that the within-cluster sum of squares is minimal [51]. In other words, the k-means algorithm aims to identify groups of points wherein their similarity between one another are as high as possible. Therefore, the traditional k-means is a type of algorithm that produces locally optimal clusters [51], but not necessarily globally optimal ones. A frequently discussed drawback to k-means is that the programmer needs to input how many clusters the algorithm needs to make (e.g. [48]). Although other types of k-means algorithms have been proposed as well, such as the *global k-means clustering algorithm* for global optimization of the clusters [70], the traditional k-means clustering algorithm for local optimisation is more widely accepted for practical applications [57].

The results from the k-means clustering and LDA were evaluated according to the cohesiveness of the clusters. I evaluated the cohesiveness of the clusters through examination of whether or not the given words provided similar meanings, and considering how many words with low frequencies were included in the cluster. After the last iteration of experimentation with the pre-processing steps, I consider either the results of the k-means clustering method, or the LDA, or both, depending on the quality of clusters of the methods.

To determine the optimal number of clusters, I use Python's KneeLocator function from the *kneed*, as this is considered the standard in the research field, wherein all kinds of applications of k-means clustering is implemented with this elbow method due to its effectiveness (e.g. [86, 22, 66]). The elbow method is an efficient technique to determine the ideal number of clusters by drawing a line along the Sum of Squared Errors (SSE) for a range of values of K (K = number of clusters). Where the line starts to represent the angle of an elbow, meaning that the SSE starts decreasing linearly, which is where all the data points–in this case, the words from the participants' answers–start having an as equal a distance to their assigned cluster as possible [119]. In other words, the elbow method helps in designating words together in clusters, which depends on the positioning of other words. With this library, I test a range of 1 to 20 clusters to evaluate which number of clusters provides the most benefit. Additionally, I also superficially experiment with manually tweaking the number of clusters to evaluate if this slightly improves the clusters.

Next, k-means clustering is used to form the clusters with the optimal number of clusters. For the clusters, I print all the words contained in the clusters, rather than, e.g., the top 10 or top 20 words. I manually labelled the topic I identified per cluster through a small description or several words. In section 3.5, I describe how I analyse the clusters in more detail.

3.4.4 Latent Dirichlet Allocation (LDA)

An example of such a topic modeling approach is Latent Dirichlet Allocation (LDA), which provides a solution to one of k-means clustering's drawbacks, namely the question of how many clusters the algorithm should opt for (e.g. [123]), as LDA relies on assigning probabilities to a document to indicate what topic it belongs to [26]. LDA was first introduced by Blei et al. [16], proposed as a method capable of modelling topics from previously unseen documents. Xu et al. [128] confirmed this finding as well, as they found that LDA provided more reliable topics in their study compared to k-means clustering. Since LDA shows promising results over other types of topic models such as pLSI [54], and is a possible solution to the drawbacks of k-means, I aim to use both methods in order to evaluate whether or not one or the other provides higher quality topics over the other. If one method provides clearly better results over the other, I may continue my analysis with that method.

A literature review on topic modeling techniques concluded that LDA is a popular approach in both the machine learning and natural language processing field in order to label the data according to themes and topics [64]. LDA is also an appropriate technique to deal with large quantities of unstructured data [64].

Due to LDA's popularity, as well as its solution to one of k-means's drawbacks, I experiment with both LDA and k-means in order to evaluate the differences and similarities in their results.

Despite the increasing amount of studies and research conducted on topic modeling, there are some challenges still, including the visualisation of topics, and the (subjective) human interpretation of topics [64]. In this thesis, I discuss several ways in which the trends in the topics could potentially be visualised in a more effective manner, such as with UpSet plots. Additionally, I discuss a method that could help with regards to more effective human interpretation of topics: through traditional systematic qualitative research methods, which I discuss in the upcoming section (section 3.5).

Note that 'topics' may refer to, e.g., the top 10 words that were selected by the topic modeling approach as the most descriptive words for the corresponding cluster, whereas 'cluster' typically refers to the entire selection of words that is part of the cluster. However, I may use the terms somewhat interchangeably throughout the thesis.

3.5 Interpreting the Results

As mentioned previously, the research field of veterinary medicine lacks information on client satisfaction. As such, this study is of an exploratory nature, as this thesis aims to identify current research gaps and identify an initial framework of possible subcategories to Elte et al.'s [31] identified main categories. Hence, this research aims to define hypotheses that need to be further researched in the future.

Therefore, the interpretation of the EDA and topic modeling methods need qualitative analyses. To identify the subcategories, I open code all the clusters identified from both the k-means clustering and LDA results. During this open coding process, I colour code all the unique types of opinions and themes in the clusters. From this initial open coding process, I create a coding tree per answer from the survey. Where necessary, I revise these initial open codings based on this coding tree. This coding tree provides an overview of all the unique 'labels' or 'themes' that I . Therefore, this coding tree provides more insight into what codings I may have to combine together or separate in order to gain a more concrete interpretations of the clusters. For a deeper understanding of the codes, affinity diagramming [15] will be used as a means to conclude the final categories, wherein the categories in the diagrams provide a summary of what subcategories exist, as well as potential subsubcategories.

4 Results

In this chapter, I discuss the results from the exploratory data analysis, keyword extraction analysis, sentiment analysis and topic detection.

4.1 Exploratory Data Analysis

Before conducting the specific analyses relevant to the research question of this thesis, we conducted an exploratory data analysis in order to get an overview of the data, as well as the distributions of answers that participants have given.

4.1.1 Descriptive Statistics

In total, 1436 participants (n = 1436) were recruited, with 1319 females (91.85%), 47 males (3.27%), 1 non-binary (0.07%), 2 other (0.14%) and 67 did not say (4.67%). The participants were aged from under 18 to 84 years old (M = 47, SD = 14.46)[5] The majority of participants (50.7%) use veterinary services 3 to 6 times a year, and 35.8% of participants said that they visit the vet 1 to 2 times a year. The rest of the participants either use a veterinary service once a month (8.3%), multiple times a month (3.9%), weekly (1%) or never (0.3%). Furthermore, 86.5% of participants do not keep horses for professional reasons, whereas 13.5% do.

Age range	**Rounded age**	**Percentage**	**Count**
Under 18	17	0.36%	5
18 - 24	21	6.18%	86
25 - 34	29.5	15.59%	217
35 - 44	39.5	22.05%	307
45 - 54	49.5	23.35%	325
55 - 64	59.5	19.69%	274
65 - 74	69.5	11.49%	160
75 - 84	79.5	1.29%	18
85 or older	86	0%	0
Total	**NA**	**100%**	**1392**

Table 1: Overview of distribution among participants who filled in their age in the questionnaire.

4.1.2 Histograms & Cross-Tabulations

As shown in Figure 2, the majority of participants, regardless of the number of veterinarians whose services they use, keep 1 to 3 horses (greenish bars in the histogram). A smaller number of participants keep more than three horses. However, it is noticeable that among participants who have 3 or more veterinarians, there is a higher ratio of owners who keep more than 3 horses compared to those who visit less than 3 vets. In other words, horse owners with 3 or more vets are relatively more likely to own more horses.

4.1.3 Correlation Matrices & Cross-Tabulation Analysis

Figure 3 is an image of a cross-tabulation which displays the relationship between the participants that keep horses for a professional reason or not, and their reasoning for keeping horses. This cross-tabulation shows that people who keep horses for non-professional reasons tend to either have them for breeding, as a companion or hobby or for sports. Those who keep horses for professional reasons participate in horse breeding, hobby, but mainly sports. Interestingly, sports is a common purpose for keeping horses for both professional and non-professional horse owners.

[5]The exact calculated mean was 46.95438. The exact calculated standard deviation is 14.46395. See Appendix G (Section 6) for the R code that was used to calculate the mean and standard deviation of the participants' age.

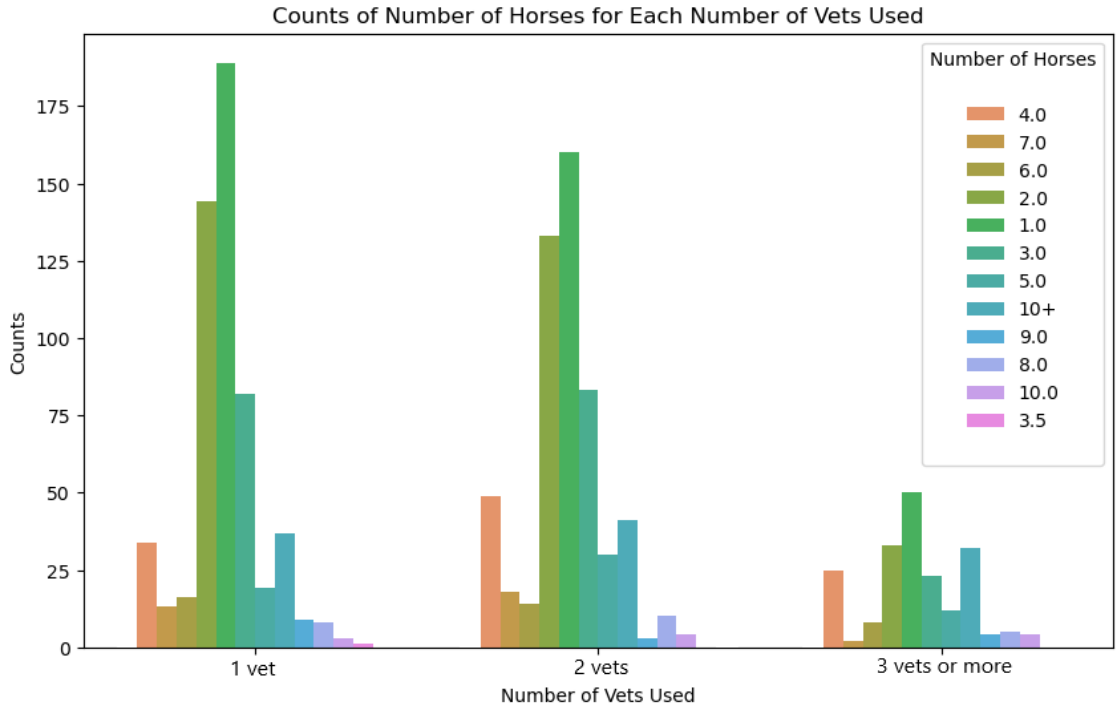

Figure 2: Image of three histograms displaying how many participants keep a particular number of horses depending on how many veterinarians' services they make use of. How many horses a participant keeps is displayed with the differently coloured bars in each of the 3 separate histograms.

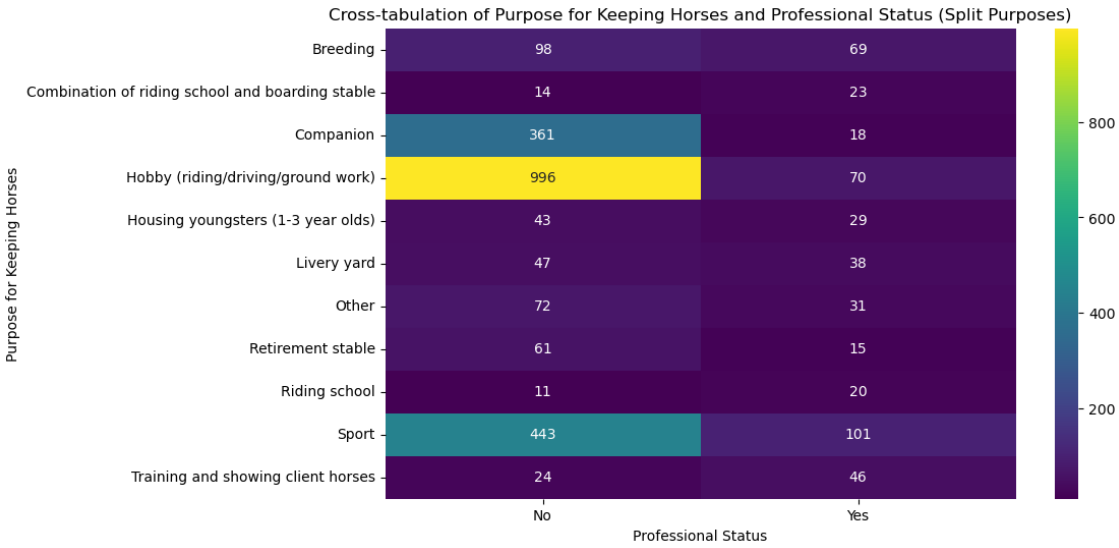

Figure 3: Cross-tabulation displaying the relationship between the types of purposes for which horse owners keep horses and their given professional status. The yellow and greenish colours show that there are a substantial number of participants who chose the corresponding categories, whereas the purple and dark blue colours indicates that few participants chose that combination of aspects.

Figure 4 is an image of a cross-tabulation which displays the relationship between the frequency at which participants use a veterinarian's service, and the duration of using their primary vet's services.

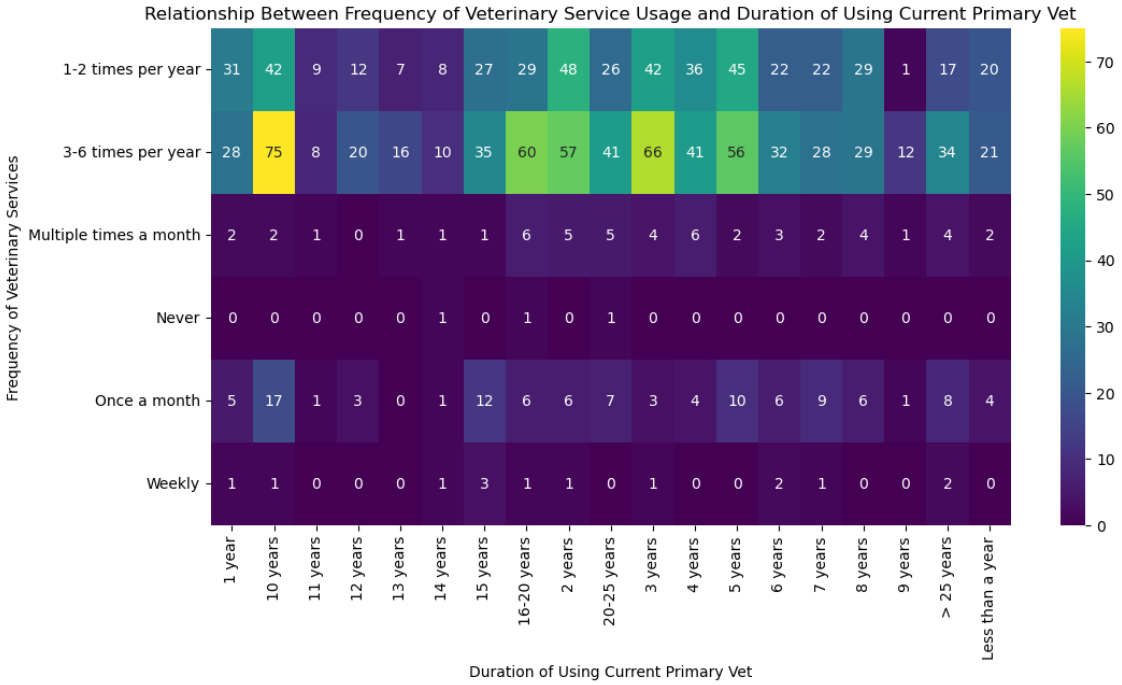

Figure 4: Cross-tabulation of the relationship between the amount of participants that keep horses for a particular purpose and whether or not these participants participate in competitions. The yellow and greenish colours show that there are a substantial number of participants who chose the corresponding categories, whereas the purple and dark blue colours indicates that few participants chose that combination of aspects.

Scenario 1 was phrased as the following: "It is time for the yearly influenza vaccination. What aspect do you find most important with regards to your visit to your veterinarian?" Figure 5 displays what categories were given particular rankings most frequently. It illustrates that 'Professionalism' and 'Cost of service' in particular, were frequently positioned on lower rankings (e.g. positions 4 to 7), meaning that these categories were considered less important in this vaccination scenario. On the other hand, it shows that the categories 'Quality of care', 'Quality of service' and 'Horsemanship' were frequently positioned in higher rankings (e.g. 1 to 3), possibly pinpointing to their perceived importance for clients in this scenario. Note that Table 2 provides a summary of Figure 5 by outlining the categories that were most frequently chosen or least frequently chosen per ranking.

Rankings for Scenario 1	**Most frequently chosen category**	**Least frequently chosen category**
Ranking 1	Quality of care	Professionalism
Ranking 2	Horsemanship	Professionalism
Ranking 3	Quality of care	Cost of service
Ranking 4	Cost of service	Quality of care
Ranking 5	Cost of service	Quality of care
Ranking 6	Professionalism	Quality of service
Ranking 7	Interpersonal skills	Professionalism

Table 2: Overview on how frequently a particular aspect was positioned on a particular ranking. Scenario 1_1 refers to ranking 1 for scenario 1, meaning the most frequently chosen for this position is 'Quality of care', whereas 'Professionalism' was chosen least frequently.

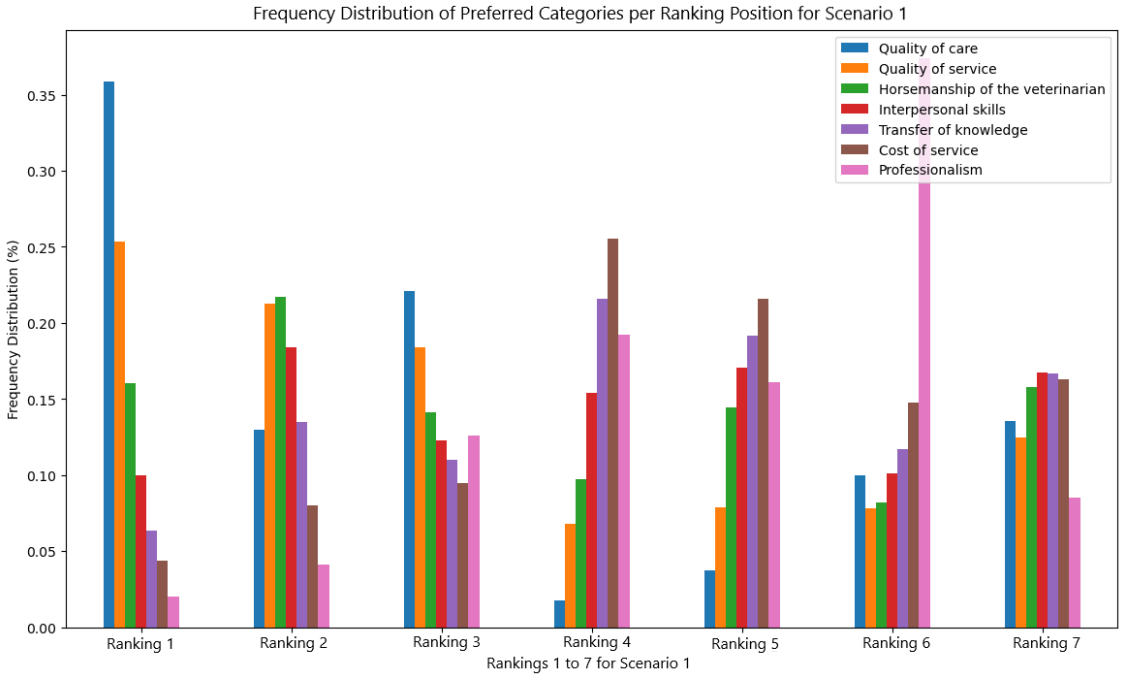

Figure 5: Histograms of the frequency distributions for the different kinds of possible ranking positions for scenario 1. This figure shows that 'Quality of care' was most frequently positioned on ranking 1, meaning that this category was selected as one of the most important categories for this scenario.

4.1.4 Heatmaps

The heatmap displayed in Figure 6 shows the relation between the main purposes for keeping horses and the frequency at which a participant makes use of a veterinarian's services. From this heatmap, it becomes apparent that a substantial number of those who go to the vet 3-6 times per year, keep youngsters (1-3 year olds). Besides that, common purposes among this group of participants include sports, training clients' horses and hobby. The participants who fairly infrequently used a veterinarian's service, namely 1-2 times per year, tended to either have horses for companions, as a hobby or for other purposes not named in the survey. This shows that those who may keep horses for fun, rather than for 'serious' or professional reasons, may also not have to visit the veterinarian as frequently as others. Furthermore, this figure shows that those who go the veterinarian once a month, tend to have horses for the livery yard, breeding, riding school, retirement stable and a combination of riding school and boarding school. Those who go to the veterinarian a large amount of times ('multiple times a month') tended to keep horses for training clients' horses, riding school and breeding. As such, this may suggest that these types of clients, whom have to go to the veterinarian frequently, tend to keep them for more 'serious' purposes.

4.2 Persona Identification

In this section, I provide the results of my persona identification analysis. I aimed to identify the personas according to the following questionnaire questions:

- Q2 Are you? [Fill in gender] - Selected Choice
- Q4 How much, on average, do you spend on veterinary costs per horse per year?
- Q8 Do you and/or your horse(s) participate in competitions? - Selected Choice (Yes/No)
- Q12 How many veterinarians/ practices do you use? - Selected Choice
- Q14_NPS_GROUP How likely is it that you would recommend your (primary) veterinarian to friends or colleagues? - Group

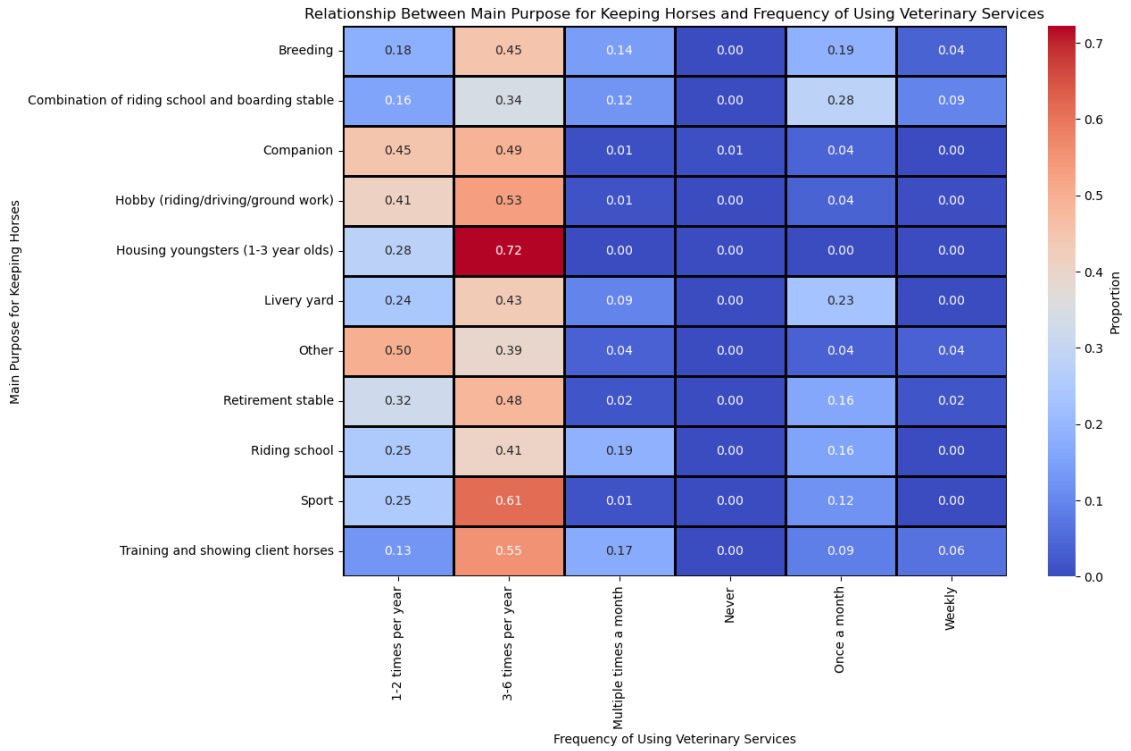

Figure 6: Heatmap showing the relationship between the number of participants that keep horses for a particular purpose and the frequency with which they use a veterinarian's service. The red and orange colours displays that there are a substantial number of participants who chose the corresponding categories. The blue colours that there are few participants who chose that combination of aspects.

- Q15 Have you ever stopped using a particular vet (practice)? - Selected Choice
- Q40 What is your age (in years)?

4.2.1 Combinations for Veterinary Costs

In this section, I refer to the results from Tables 13, 15, 16, 18 and 23 in Appendix D (Section 6).

Looking at the question combination Q2-Q4, the majority of participants spend somewhere between 200 to 1500 euros on veterinary costs per year. Interestingly, a good portion (189 participants) do not know what they spend yearly on veterinary services participants. The rest of participants either spend below 200 euros a year, or above 1500 euros a year.

Here, I refer to the question combination Q4-Q12. Noticeably, a good portion of participants who use 3 veterinarians or more, do not know how much money they spend on veterinary services. This is noticeably different compared to participants who use 1 or 2 veterinarians. Also, of all the participants who use 1 veterinarian, a good portion of them spends quite a lot of money on veterinary services. For example, 6 participants spend over 10,000 euros/dollars (whereas the participants who used 2 or 3(+) veterinarians had 4 participants spending over 10,000 each). This is a noticeable difference, because there are much fewer participants who solely use 1 veterinarian compared to those who use more. Also, we see that there are relatively more participants who spend 1501-5000 euros/dollars when they have 1 veterinarian (46 participants) compared to when participants have 2 veterinarians (95 participants) or when they have 3(+) veterinarians (95 participants). This is noticeable because in the group of participants that use 1 veterinarian, the number of participants who spend 1501-5000 dollars/euros is comparable to the number of participants who spend 201-500 euros/dollars (43 participants) and 501-1500 euros/dollars (54 participants). Whereas for the participants who use 2 veterinarians, the number of participants who spend 201-500 euros/dollars is 176, and the number of participants who spend 501-1500 euros/dollars is 167. And for the participants

who use 3(+) veterinarians, the number of participants who spend 201-500 euros/dollars is 182, and the number of participants who spend 501-1500 euros/dollars is 155.

For the combination Q4-Q40, it is noticeable that the majority of participants fall in the 35 to 64 age bracket. For this category, there seem to be no trends that stand out. What is somewhat noticeable, is that those who are in the younger age brackets, namely '18 - 24' and 'Under 18', have a higher rate of 'Don't know' answers. Especially the '18 - 24' age bracket stands out. This could be due to the fact that those who are younger may be given less responsibility over the care of their horse(s). This lack of responsibility could potentially be due to the fact that their parents own the horse(s).

When analysing the combination of Q4-Q8, I notice a change in the participants' behavioural patterns in terms of how they spend their money. In the lower price ranges ('$<$ 200 euro/dollar' and '201-500 euro/dollar'), the majority do not participate in competitions with their horses. This may suggest that those who do not participate in competitions may be more aware of how much they want to spend on veterinary care, e.g. due to reasons such as lower budgets. It may also suggest that horses that do not partake in competitions require less care, hence the lower costs. For higher price ranges ('501-1500 euro/dollar', '1501-5000 euro/dollar', '5001-10.000 euro/dollar' and 'over 10,000 euro/dollar'), the majority of participants do participate in horse competitions. This may suggest that those who partake in competitions are more likely to spend money somewhere in the medium to high price ranges. However, it is worth noting that the difference becomes especially large for the '5001-10,000 euro/dollar' range, because in that range 20 participants are competitors and 8 are not, which means that competitors outnumber non-competitors nearly 3 times, whereas for the other (more medium price ranges) competitors outnumber non-competitors barely 2 times.

This paragraph, I refer to question combination Q4-Q15. Interestingly, when examining the participants who do not know how much money they spend on veterinary services, a relatively large number of people also have stopped using a veterinarian's service at some point. This may indicate that those who are more critical or have higher demands, are also willing to spend an indefinite amount of money on good service. For example, if someone does not know how much money they spend on veterinarians, they probably have enough money to spend. Besides this, it is somewhat difficult to draw clear conclusions from this data, because overall the majority of people have at some time stopped using a particular veterinarian's service, which is why the numbers in the rows with 'Yes' for Q15 are also consistently higher than 'No'.

4.2.2 Combinations for Competition Participation

In this section, I refer to the results from Tables 14, 19 and 22 in Appendix D (Section 6).

As shown in the combination Q2-Q8, the majority of participants identifies as female. Female participants are approximately evenly divided between those who participate in competitions (653 participants) and those who do not (682 participants). There are substantially fewer male and 'other' participants. But of the male participants, those who participate in competitions (34 participants) noticeably outnumber those who do not (14 participants). This could potentially suggest that males who own horses are more likely to do so for competitive reasons. Of the 'other' participants, the majority do not participate in competitions.

As shown in question combination Q8-Q12, participants who do not participate in competitions, do tend to opt for solely 1 veterinarian (328 participants), whereas participants who do participate in competitions, tend to opt for 2 veterinarians (298 participants). Participants who do not participate in competitions, are less likely to use 3 or more vets (127 participants) compared to those who do participate in competitions (203 participants). The same applies for those who use 2 vets (competition: 298 participants; non-competition: 248 participants).

From the results of question combination Q8-Q15, there is no clear relationship between taking part in competitions and, for example, how critical someone is of veterinarians/practices as there is no clear difference in the trends. The ratio of those who have stopped using a veterinarian's service versus those who have not is consistent across participants who do or do not participate in competitions.

4.2.3 Combinations for Number of Veterinarians

Question combination Q12-Q14 shows that the majority of participants either promote their primary veterinarian or they remain passive about it. The majority of participants who use 1 veterinarian are promoters

(302 participants). The majority of participants who use 2 veterinarians are passive about their veterinarians (251 participants). This may suggest that if someone is happy about their primary veterinarian (promoters), they may be less likely to want to have more veterinarians (they remain 'I use one vet(practice)').

At one point or another, most people have stopped using a particular veterinarian/practice, which is displayed in question combination Q12-Q15. From this information, it is somewhat hard to draw conclusions, because the numbers are fairly evenly distributed. Interestingly though, a good number of people who have at some time stopped using the services of a particular veterinarian/practice, might still opt for using merely 1 veterinarian/practice currently (321 participants). A substantial number of participants who have at some time stopped a veterinarian, are currently using 2 veterinarians (375 participants).

4.2.4 Combinations for Quitting Vet's Service

I aimed to evaluate whether or not particular clients may be somewhat critical and have more needs or requirements with the intersection of categories Q14 and Q15. Interestingly though, 423 participants who said they had stopped using a particular veterinarian, would currently also promote their primary veterinarian. Also, 184 participants who indicated never having stopped using the services of a particular veterinarian and/or practice, were also passive about recommending their primary veterinarian now. This may suggest that these participants are not too critical, as otherwise they might stop using the veterinarian's services, even if they are not over the moon with their veterinarian's services. Another potential reason is a limited selection of vets in their area, so they may have no choice but to keep on using this veterinarian.

4.2.5 Summary of Persona Identification Analysis

From the persona analysis, I identified several potentially distinct types of horse owners:

- Those who use 3 or more veterinarians are more likely to not know how much money they spend on veterinary services.
- The very few who use 1 veterinarian tend to spend quite a lot of money on veterinary services.
- Younger horse owners are more likely to know less, or not even know at all, about the veterinary costs spent on their horse(s).
- Those who do not participate in competitions probably do not have as much veterinary costs compared to those that do and/or they are more aware of the veterinary costs they have, and those who spend a lot of money on the care of their horse(s) may be more likely to participate in competitions.
- Those who are somewhat more critical of their veterinarian may also be more likely to be willing to spend an indefinite amount of money on (good) veterinary services, and they may also be more likely to seek out the service's of solely 1 (very good) veterinarian.
- A male horse owner is more likely to participate in some kind of competition involving horses.
- Those who (regularly) use the services of more than 2 veterinarians are more likely to participate in horse competitions, and those who solely use the services of 1 veterinarian are more likely to not be a competitor.
- Those who opt for 1 veterinarian are also more likely to promote that veterinarian to others, potentially suggesting that a participant is less likely to utilise another veterinarian's services if they are happy with their current/primary veterinarian.
- Those who may not be as critical of a veterinarian, may opt for 'good enough' more quickly than others (and therefore not recommend their veterinarian to others).

Note that it is possible that for all possible horse owners listed above, that it is unclear what the exact relation between the variables of considerations could be. It is unclear both in what direction the relation flows (what the cause and effect is) and what other variables might play a role in this potentially existing relation.

4.3 Keyword Extraction: TF-IDF & Word Clouds

Before conducting topic detection analysis, I aimed to get some general insights into the trends in the data with word clouds created with TF-IDF. In this section, I briefly describe the general trends I am identifying in the word clouds.

4.3.1 Word Clouds for the Bilingual Data

Figures 7, 8, 9 and 10 display the word clouds for the bilingual data (Dutch and English combined) for questions 12.2, 12.3, 15.2 and 46, respectively.

As shown in Figures 7 and 8, the main reasons for having several veterinarians is for specialty care such as dentistry (Dutch: “tandarts”), as well as lameness, emergencies (Dutch: “spoed”), and more regular stuff such as vaccinations (Dutch: “inenting” or “enten”). Participants also clarify that using a particular veterinarian’s services is dependent (Dutch: “afhankelijk”) on the situation and the issue with the horse.

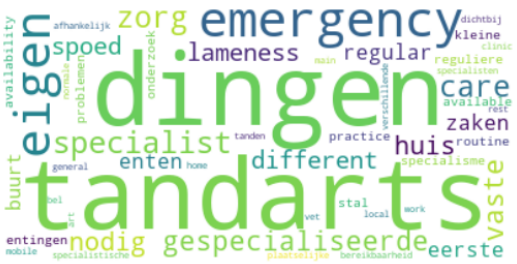

Figure 7: Word cloud of question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected ”I use 2 veterinarians / practices” for the bilingual data (Dutch and English).

Figure 8: Word cloud of question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” for the bilingual data (Dutch and English).

Figure 9 clarifies that one of the main reasons for quitting a veterinarian’s services is due to moving house (Dutch: “verhuizing”), incorrect diagnoses, poor communication, and costs.

On the other hand, Figure 10 signifies that clients tend to appreciate a veterinarian’s knowledge (Dutch: “kennis”), honesty (Dutch: “eerlijk” and “eerlijkheid”) and communication skills most.

Figure 9: Word cloud of question 15.2 ”Have you ever stopped using a particular vet (practice)?” where the participant previously selected ”Yes” for the bilingual data (Dutch and English).

Figure 10: Word cloud of question 46 ”What do you appreciate most in your veterinarian?” for the bilingual data (Dutch and English).

4.3.2 Word Clouds for the Monolingual Dutch Data

For the monolingual Dutch data, it becomes apparent that the results are somewhat similar to the results on the bilingual data. Figures 11 and 12 show that clients have several veterinarians for specialties like dentistry, emergencies and vaccinations. Additionally, I notice the word 'buurt', which translates to a practice being 'in the area'. Another word, 'vaste', translates to 'fixed' or 'stable' which may refer to the aspect that clients tend to have a regular veterinarian for the simpler checkups and types of care. Also, 'holistisch' refers to holistic care, which may refer to more natural solutions, e.g. changes in diet, rather than more drastic measures such as surgery.

Figure 11: Word cloud of question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" for the monolingual Dutch data.

Figure 12: Word cloud of question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" for the monolingual Dutch data.

Figures 13 and 14 also display similar results to the bilingual word clouds for questions 15.2 and 46. Likewise, clients emphasise moving house, incorrect diagnoses and costs as reasons to stop using a particular veterinarian's services. However, other words are more noticeable as well, such as trust (Dutch: "vertrouwen") and being taken seriously as a client (Dutch: "serieus"). For question 46, honesty and knowledge are the main elements in the word cloud, similarly to the bilingual data. Moreover, words 'meedenken' (English: "accessibility"), 'bereikbaarheid' (English: "accessibility"), and 'kundig' (English: "skilled") are mentioned regularly as to why a client appreciates their veterinarian(s).

Figure 13: Word cloud of question 15.2 "Have you ever stopped using a particular vet (practice)?" where the participant previously selected "Yes" for the monolingual Dutch data.

Figure 14: Word cloud of question 46 "What do you appreciate most in your veterinarian?" for the monolingual Dutch data.

4.3.3 Word Clouds for the Monolingual English Data

Figures 15 and 16 highlight somewhat different words compared to the bilingual data and the monolingual Dutch data. For example, it is noticeable that clients tend to have more than one veterinarian for aspects like emergencies, lameness and locality, as well as having a regular (versus specialist) veterinarians seem to be a common phenomenon.

Figure 15: Word cloud of question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" for the monolingual English data.

Figure 16: Word cloud of question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" for the monolingual English data.

Interestingly, the word cloud for question 15.2, given in Figure 17, seems to highlight the moving house aspect substantially more compared to the monolingual Dutch data (see words "moved" in combination with "practice", and "area"). The word 'retired' is also noticeable in the word cloud. For question 46, there is also a slight change in word emphasis, see Figure 18. For example, this word cloud does not emphasise 'honesty', whereas the monolingual Dutch data does. Additionally, the English data accentuates knowledge, availability and communication.

Figure 17: Word cloud of question 15.2 "Have you ever stopped using a particular vet (practice)?" where the participant previously selected "Yes" for the monolingual English data.

Figure 18: Word cloud of question 46 "What do you appreciate most in your veterinarian?" for the monolingual English data.

4.3.4 Summary of Word Cloud Results

All in all, it seems like Dutch- and English-speaking clients tend to have similar reasons for having multiple veterinarians, as well as similar reasons for quitting a veterinarian's services and the aspects they appreciate in a veterinarian. However, there does seem to be a slight difference in the extent to which Dutch- and English-speaking clients emphasise particular aspects.

For example, I noticed that Dutch clients tend to appreciate honesty in a veterinarian, whereas English-speaking do not mention honesty as a characteristic they appreciate. Instead they tend to emphasise a veterinarian's knowledge and availability more. Moreover, English-speaking clients seem to argue that either a veterinarian moving house or changing practices, or the client themselves moving house is the most common reason for stopping using a veterinarian's service. It is worth noting that most of these English-speaking clients originate from the United States of America. Therefore, geographic or even cultural differences between US citizens and Dutch citizens may be a possible explanation for these slight differences.

4.4 Topic Detection

For the topic detection analysis, I evaluated the results from the TF-IDF paired with k-means, and the two versions of LDA. Moreover, I performed k-means and LDA in a monolingual and bilingual manner, meaning that I performed k-means clustering and LDA both on Dutch and English text separately, and where Dutch and English were combined in the data. First, I discuss what pre-processing steps provided the best results for the topic analysis. Then, I discuss what results I got with k-means and LDA with the chosen pre-processing steps.

4.4.1 Pre-Processing Results

As discussed in the *Method* section, Section 3, I experimented with mainly two different types of pre-processing methods.

From evaluating these two main methods, I found that the second method, wherein I pre-process the Dutch and English text separately (based on features like nouns and verbs and remove punctuation, amongst other things), provided the best results. The selection of specific types of words, like verbs and nouns, proved to be an effective method for eliminating non-useful words, as I found that solely verbs, nouns and adjectives contained the core of a participant's message.

In Appendix E (Section 6), I provide an extensive overview of the iterative steps to get to the best selection of pre-processing steps. As shown in the appendix, it took me around five rounds to get to final selection of pre-processing steps. Do note that these rounds describe how I experimented with both of the two main pre-processing methods mentioned in the previous paragraph. For example, rounds 1, 2 and 4 correspond to the first pre-processing method, whereas rounds 3 and 5 describe the second method.

The final selection of pre-processing steps (round 5) includes the following:

- Remove punctuation
- Lowercasing
- Removing diacritics
- Tokenization with NLTK
- Lemmatization with WordNetLemmatizer from NLTK
- Only nouns, verbs, and adjectives
- Elimination of Dutch stopwords from spaCy's nl_core_news_sm library
- Elimination of English stopwords from spaCy's en_core_news_sm library
- Elimination of extra stopwords (full list of those stopwords given in Appendix E)

For the final selection of pre-processing steps, I provide some reasoning as to why I removed particular words:

- **(Paarden)dierenarts, paardenarts, veterinarian(s), vet**: At first I included these words in the topic detection analysis, but I noticed that these words would then be integrated in a good number of topics, which in turn reduces the purpose for including such a word in the analysis.
- **Horse, horses, paard, paarden**: Since the questionnaire's focus is on equines and equine medicine, it is logical that these words would come up a lot in participant's answers, hence redundant to include.
- **Goed, good, goede, better, important, belangrijk, belangrijker, slechte, slechter, slecht**: It is not essential to have these words in the topics, because the phrasing of the corresponding questionnaire question indicates whether or not the participant is mentioning the aspects in a positive or negative light. Moreover, a good amount of words are naturally positive or negative, hence making it redundant to include words like 'good' and 'bad'.
- **Kliniek, praktijk**: Similar reasoning for 'dierenarts' and veterinarian. The questionnaire is inherently focused on veterinary clinics, so these words are not inherently meaningful to what I aim to analyse.

Therefore, the following sections describe the results of the topic modeling approaches and the qualitative analyses based on the pre-processed data according to the (round 5) steps described in this section.

4.4.2 Latent Dirichlet Allocation (LDA)

In this section, I shortly describe the results for both LDA versions. Note that in Appendix E (Section 6), I provide a more extensive overview as to what (pre-processing) steps I took for the LDA and k-means clustering data analyses to get the final results.

As discussed previously, I used two different versions for the LDA topic modeling. Version 1 uses a Document-Term Matrix (DTM) to fit the LDA model, whereas Version 2 uses a bag-of-words (BoW) representation of the data to fit the LDA model. I evaluate the two versions' performance based on their coherence scores. All the coherence scores can be found in Appendix L, Section 6.

For Version 1, I found that the monolingual Dutch data and combining Dutch and English text together (bilingual data) provided similar coherence scores for questionnaire questions 12.2, 12.3 and 15.2. For those same questions, the monolingual English had slightly lower coherence scores than the bilingual data. Though, for questions 45 and 46, I found that the topics based on the bilingual data had the highest coherence scores compared to both the monolingual English and monolingual Dutch results.

Furthermore, I found that for Version 2, the bilingual data provided more coherent topics than creating topics from both the Dutch and English data separately, as the bilingual topics had higher coherence scores for questions with one exception. The only exception to this was for question 15.2, wherein the monolingual Dutch data provided similar scores to the bilingual data.

Overall, these results suggest that the bilingual data provides somewhat more coherent topics than the monolingual data. Therefore, I focus more on the results from the bilingual data for my qualitative analysis to create the frameworks on client satisfaction than the results from the monolingual data.

Additionally, I analysed the topics from the LDA and k-means clustering manually to evaluate their cohesiveness. From this manual observation, I have decided to analyse the topics created with the k-means clustering, rather than those created with LDA, in more detail in the next section, as I notice that the quality of some topics created by LDA are somewhat lower. For example, Tables 47 (Q12.2 and Q12.3), 34 (Q12.2 and Q12.3) and 40 (Q12.2, Q12.3 and Q15.2) in Appendix I (Section 6) denote the possibility that LDA presents more redundancy in the topics. However, this redundancy was mostly observed in LDA Version 1, whereby the LDA model was fitted according on the data presented in DTM format. This may suggest that presenting the data in a BoW format is more effective for (LDA) topic modeling approaches than DTM.

4.4.3 TF-IDF & K-Means Clustering

In this section, I describe what meaningful words were mentioned in the topics. Note that the words mentioned in this section are not all the unique words mentioned in the topics. For questions 12.2 and 12.3 (Table 38 from Appendix I, Section 6), corresponding to the questionnaire question "How many veterinarians / practices do you use?", the results for the bilingual data mention the following top 10 words, wherein the numbers indicate in what topic (as provided in the appendix) the words were mentioned:

- Q12.2
  - Specialties (Dutch: "specialisme"): 1, 2, 3, 5, 6, 8, 9, 11, 12, 14
  - Dentistry (Dutch: "tandarts"): 2, 3, 4, 6, 12, 13, 15
  - Availability (Dutch: "beschikbaarheid"): 1, 4, 5, 9
  - Emergency (Dutch: "spoed"): 1, 3, 4, 5, 11, 12, 13
  - Orthopedics (Dutch: "orthopedisch"): 2, 6, 7, 8
  - Lameness (Dutch: "kreupelheid"): 3, 7, 11
  - Location, locality (Dutch: "locatie", "woonplaats", "dichtsbijzijnd"): 1, 3, 7, 8, 12
  - Regular, general: 2, 3, 5, 14
  - Primary (Dutch: "eerste", "vaste"): 5, 10, 13, 15
- Q12.3
  - Specialties (Dutch: "specialisme"): 3, 4, 7
  - Dentistry (Dutch: "tandarts"): 5, 7, 8
  - Availability (Dutch: "beschikbaarheid"): 2
  - Emergency (Dutch: "spoed"): 1, 5, 6

  - Lameness (Dutch: “kreupelheid”): 1, 6, 8
  - Distance (Dutch: “afstand”): 4
  - Locality: 1, 6
  - Regular, general: 1, 5
  - Primary (Dutch: “eerste”, “vaste”): 2, 4

In total, there are 23 topics for these 12.2 and 12.3 questions. Noticeably, ‘specialty’ type of care, lameness, emergency and dentistry are commonly mentioned as reasons for having multiple veterinarians.

Tables 44 and 45 in Appendix I, Section 6 provides an extensive overview of the top 10 words of the topics for questions 12.2 and 12.3 for the monolingual Dutch data. The following words were mentioned in their corresponding topics:

- Q12.2
  - specialties (Dutch: “specialisme”): 1, 2, 3, 4, 6, 9, 10, 11
  - Dentistry (Dutch: “tandarts”): 7, 9, 10, 11, 12
  - Vaccinations (Dutch: “vaccinatie”, “enting”): 4, 7, 8, 9
  - Availability (Dutch: “beschikbaarheid”): 12
  - Emergency (Dutch: “spoed”): 2, 11
  - Orthopedics (Dutch: “orthopedisch”): 9
  - Lameness (Dutch: “kreupelheid”, “beenproblemen”): 4
  - Location, locality (Dutch: “locatie”, “woonplaats”, “dichtsbijzijnd”, “omgeving”, “buurt”, “plaatselijk”, “huis”, “regio”, “regionaal”): 2, 3, 7, 11
  - Regular, general, normal, simple, basic: 2, 3, 4, 7, 8, 10, 11, 12
  - Primary (Dutch: “eerste”, “vaste”): 5, 6, 9, 12
- Q12.3
  - specialties (Dutch: “specialisme”): 1, 2, 3, 5, 6, 7, 10, 14, 15, 16
  - Dentistry (Dutch: “tandarts”): 1, 4, 8, 9, 11, 13, 14, 16
  - Vaccinations (Dutch: “vaccinatie”, “enting”): 2, 3, 6, 9, 14, 16
  - Availability (Dutch: “beschikbaarheid”): 3
  - Emergency (Dutch: “spoed”): 11
  - Orthopedics (Dutch: “orthopedisch”): 5, 7, 8, 11, 15
  - Lameness (Dutch: “kreupelheid”, “beenproblemen”): 5, 13
  - Distance (Dutch: “afstand”): 6
  - Location, locality (Dutch: “locatie”, “woonplaats”, “dichtsbijzijnd”, “omgeving”, “buurt”, “plaatselijk”, “huis”, “regio”, “regionaal”): 1, 2, 4, 7, 9, 10, 14, 15, 16
  - Regular, general, normal, simple, basic: 2, 7, 9, 10, 11, 12
  - Primary (Dutch: “eerste”, “vaste”): 8, 14, 15

In total, the monolingual Dutch data has 28 topics for questions 12.2 and 12.3. Similarly to the bilingual results, specialisation and dentistry. However, interestingly, ‘emergency’ is not as prominent in the Dutch results compared to the bilingual results. Also, the locality of a veterinarian and the simplicity of the care that some veterinarians have to provide seems to be highlighted a bit more in the Dutch results than the bilingual ones.

In Table 47 (Appendix I, Section 6) are provided the results for questions 12.2 and 12.3 of the monolingual English data. Again, I list the the frequency with which particular words are mentioned in the topics:

- Q12.2
  - Specialties, expertise, experience: 3, 4, 5, 6, 9, 12
  - Travel: 1
  - Dentistry: 2, 5, 8, 10
  - Vaccinations, shots: 8, 9, 10, 11
  - availability, mobile, call(ing): 6, 7, 10

  - Emergency: 2, 3, 7, 8, 10
  - Lameness: 3, 12
  - Location, locality: 3, 4, 7, 10, 11, 12
  - Regular, general, normal, simple, basic: 2
  - Primary, main: 2, 6

- Q12.3

  - Specialties, expertise, experience: 2, 4
  - Travel: 4
  - Dentistry: 5
  - Vaccinations, shots: 3
  - Availability, mobile, call(ing): 1, 3
  - Emergency: 3
  - Lameness: 2, 3, 5
  - Location, locality: 1, 2, 4, 5
  - Regular, general, normal, simple, basic: 5

In total, there are 17 topics, which is fewer than for the monolingual Dutch data and the bilingual data. This is probably due to the fewer number of English answers compared to Dutch ones. For the English answers, a new word 'travel' was mentioned two times in the topics.

According to the bilingual results for question 15.2, moving house, a lack of skills or quality of service and costs are a common reason for clients to quit a veterinarian's services, as shown with the frequency of the following popular words from the top 10's:

- Trust (Dutch: "vertrouwen"): 1
- Moving house, retired vet (Dutch: "verhuizing"): 2, 3, 5, 8
- Communication: 4, 10
- Service, skills (Dutch: "(on)kunde"): 1, 3, 6, 9, 10
- Diagnosis: 4, 7, 8
- Availability (Dutch: "bereikbaarheid", "regio", "afstand", "locatie"): 2, 4, 6, 8
- Emergency (Dutch: "spoed"): 1, 10
- Costs, prices, finances (Dutch: "duur", "kosten"): 1, 6, 7, 9
- Horsemanship: 10

The topics with all the top 10 words are given in Table 39 from the appendix.

Again, I am taking a look at Table 45 (given in Appendix I, Section 6), but for question 15.2's monolingual Dutch data. I found the following word distributions across the topics by evaluating the the topics' top 10 words:

- Trust (Dutch: "vertrouwen"): 5
- Moving house, retired vet (Dutch: "verhuizing"): 1, 4
- Communication (Dutch: "luisteren"): 1, 3, 5
- Service, skills (Dutch: "(on)kunde", "ervaring"): 2, 4, 5
- Diagnosis: 3, 6
- Willingness (Dutch: "(on)kunde"): 2
- Availability (Dutch: "bereikbaarheid", "regio", "afstand", "locatie"): 1, 3, 4
- Emergency (Dutch: "spoed"):
- Costs, prices, finances (Dutch: "duur", "kosten"): 2, 4

Compared to the bilingual results, the Dutch results focus somewhat less on moving house and costs. The moving house aspect, wherein fewer veterinarians may be available in more rural areas, could be a particular problem that American clients face, whereas Dutch clients do not.

I evaluated the question 15.2 topics made from the monolingual English data as well. The complete topics are provided in Table 51 (Appendix I, Section 6). Again, I solely evaluated how frequently the most popular words or types of words were mentioned in the clusters:

- Moving house, retired vet, vet stopped: 1, 4, 6, 7
- Communication, interpersonal skills, rudeness, manners: 2, 5, 6
- Service, competence: 3, 4, 5
- Availability, attention, area, calls: 1, 3, 4, 5
- Emergency: 1, 3
- Costs, prices, finances: 5, 6
- Horsemanship: 2

From the monolingual English results, it becomes more apparent that either a veterinarian moving house or the horse owner moving house is one of the main reasons for quitting a veterinarian practice's services, which I noticed in previous results as well. Furthermore, the availability of a veterinarian is a common reason for English-speaking, i.e. American, clients.

The topics for the bilingual data of question 46 are provided in Table 39 (Appendix I, Section 6). From evaluating the top 10 words of the topics, I found several popular words. I list them with their corresponding theme:

- Knowledge (transfer) and skills (Dutch: "kennis", "kunde", "deskundigheidheid"): 2, 3, 5, 7, 8, 10, 11
- Honesty (Dutch: "eerlijkheid", "openheid"): 1, 2, 3, 4, 9, 11, 12
- Costs: 9
- Trust (Dutch: "betrouwbaarheid"): 3, 12
- Clarity (Dutch: "duidelijkheid"): 2, 7, 8, 12
- Willingness, thinking along (Dutch: "betrokkenheid", "behulpzaamheid", "meedenken): 1, 2, 3, 5, 7, 12
- Availability (Dutch: "bereikbaarheid", "snelheid", "tijd"): 1, 3, 4, 5, 6, 7, 9, 11, 12
- Communication, compassion, listening, explaining (Dutch: "vragen", "vriendelijkheid", "persoonlijk", "uitleg): 1, 3, 6, 7, 8, 9, 10, 11
- Practicality (Dutch: "nuchterheid", "directheid"): 1, 2, 11, 12

From these word distributions across the topics, aspects such as knowledge, willingness, availability and communication seem to be regularly appreciated in a veterinarian.

Moreover, I analysed the monolingual Dutch data for question 46. The complete topics are provided in Appendix I (Section 6), Table 46. I determined the distribution of the word theme frequencies:

- Knowledge (transfer) and skills (Dutch: "kennis", kunde", "deskundigheidheid", "vakmanschap"): 1, 2, 3, 4, 5, 6, 10, 11
- Honesty and openness (Dutch: "eerlijkheid", "openheid): 3, 4, 5, 7, 8, 9, 10, 11
- Trust (Dutch: "betrouwbaarheid"): 4, 5, 8, 10
- Emergency (Dutch: "spoed"): 9
- Clarity (Dutch: "duidelijkheid", "helderheid"): 2, 3, 6, 7, 12, 13
- Willingness, thinking along (Dutch: "betrokkenheid", "behulpzaamheid", "meedenken"): 1, 3, 4, 5, 8, 12
- Availability (Dutch: "bereikbaarheid", "snelheid", "tijd", "geduld", "rustig): 1, 2, 5, 7, 8, 9, 11, 12, 13
- Communication, empathy, compassion, listening, explaining (Dutch: "vriendelijkheid", "persoonlijk", "uitleg", "klantgericht"): 1, 2, 3, 4, 5, 6, 10, 11, 13
- Practicality and professionalism (Dutch: "nuchterheid", "directheid", "samenwerking", "overleg"): 1, 3, 4, 6, 7, 8, 10

From the bullet list provided above, it becomes apparent that Dutch clients may find aspects like trust, practicality and clarity somewhat more important when comparing it to the bilingual results. Interestingly, costs were not mentioned in any of the Dutch topics whereas the bilingual topics did mention it, which may suggest that Dutch people are not particularly focused on the costs of veterinarian services when distinguishing average from excellent veterinary care. Besides that, the Dutch results are quite similar to the bilingual results explained previously.

Lastly, I analysed the monolingual English data for question 46. Table 52 displays the top 10 words of the topics created through k-means clustering. Below I provide a quick overview as to the clusters tend to mention:

- Knowledge (transfer), expertise, diagnosis, competence, experience and skills: 1, 2, 3, 4, 5, 6, 7, 10
- Honesty and directness: 3, 4, 7, 10, 11
- Costs: 2, 4, 11
- Service quality: 9
- Trust and reliability: 5
- Emergency: 9
- Availability, mobile (calling), approachability, time, area, date: 1, 2, 4, 5, 6, 8, 9, 12
- Communication (explain, listen, answer), personal, compassion, respect, kind, friendliness, empathy: 1, 2, 3, 4, 5, 7, 8, 11, 12
- Practicality and professionalism: 1, 2, 5, 6, 7, 10

From these results, I notice that aspects like trust, honesty and clarity are mentioned substantially fewer times compared to the Dutch results. This potentially suggest that Dutch clients may be somewhat more interested in being provided with detailed and clearer explanations as to why the veterinarian has decided upon a particular diagnosis or treatment plan. Also, the trust aspect may suggest that Dutch clients are more likely to be interested in the personal relationship with a veterinarian, whereas Americans are less likely to. Furthermore, the English results mention costs in the topics numerous times, whereas the Dutch results do not mention this aspect at all.

4.5 Frameworks for Equine Veterinary Client Satisfaction

In this section, I provide a description of each framework I created according to the results of the qualitative. The frameworks consist of the following elements: (1) subcategories, (2) individual elements are aspects as part of these subcategories, (3) dotted lines that form connections across subcategories, and (4) colours that indicate a subcategory's or element's connection to another framework or other subcategories as well. For example, during the colour coding process I gave each category a colour:

- Quality of care: blue
- Quality of service: purple
- Horsemanship: yellow
- Costs of service: green
- Interpersonal skills: red
- Professional attitude: orange
- Transfer of knowledge: purple

Below, I describe the frameworks in the same order as the bullet points. The same colours are also used in the frameworks to indicate a connection to another main category. A connection may be formed due to the fact that similar terms were mentioned in another category. The dotted lines are formed by interpreting the meaning of the words in the clusters. For example, if the words 'discussion' and 'advice' are mentioned together in a cluster, it could indicate that participants were declaring that they want clear advice from a veterinarian through a proper discussion. If I categorise these words as part of separate subcategories, I draw a dotted line between them in order to indicate that I see them as related. Note that the subcategories are also defined according to my own interpretation of the qualitative results.

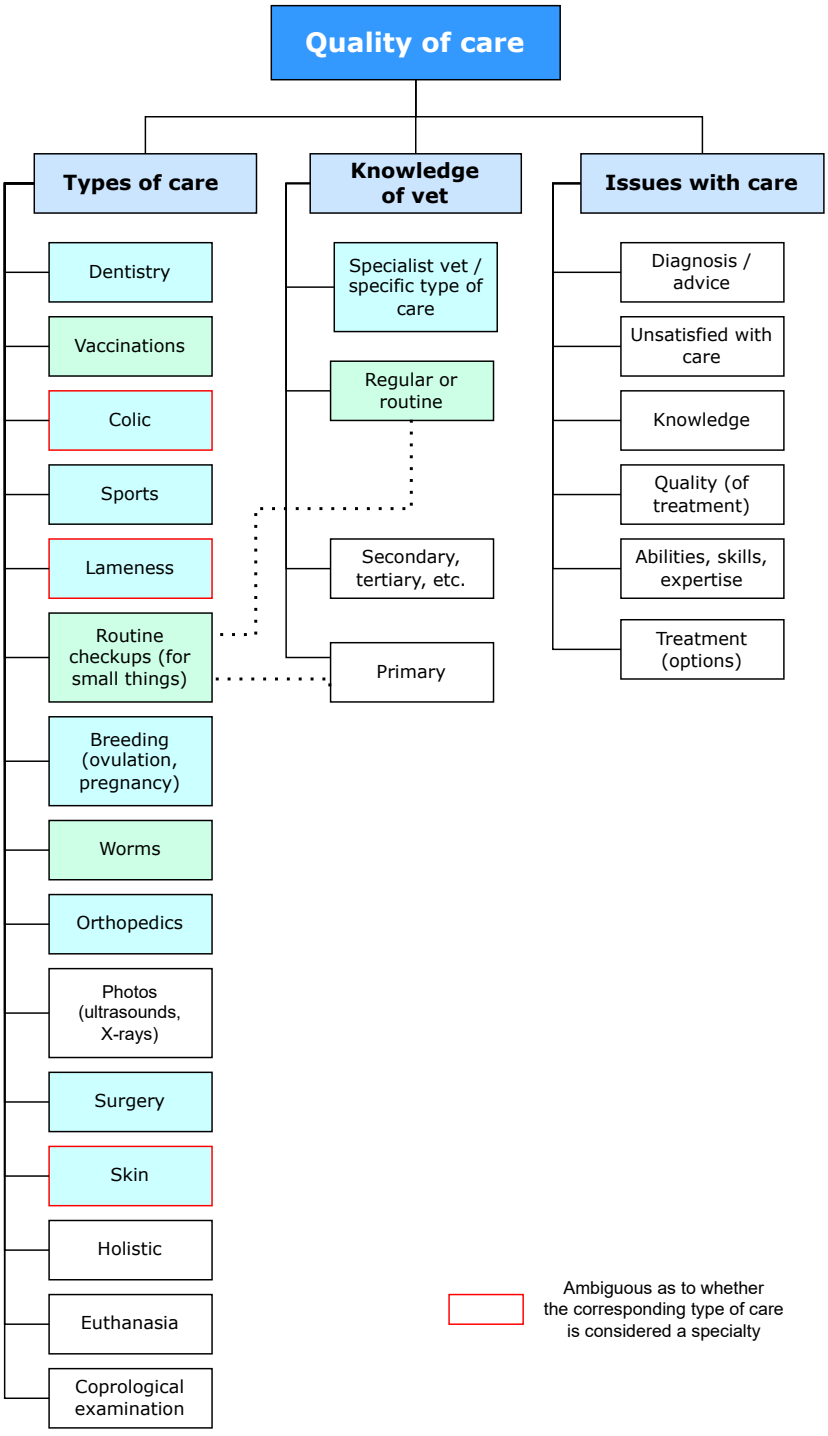

Figure 19: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Quality of care'. The aspects that are coloured in light blue are all considered 'specialty' treatments, as these may not be offered by regular veterinary practices that focus on routine checkups.

4.5.1 Quality of Care

The largest framework is the one made for the 'Quality of care' category, given in Figure 19. For this category, I identified three subcategories: (1) *types of care*, (2) *knowledge of vet*, and (3) *issues with care*,

as the topics included mainly words related to specific types of care that veterinarians can perform (e.g. dentistry), words related to the degree of knowledge a veterinarian has (e.g. specialist, regular), and the types of issues that may occur in the process of taking care of an animal (e.g. incorrect diagnoses, lack of treatment options), respectively.

This framework is especially large in size due to the *types of care* subcategory, wherein a lot of different kinds of regular and specialist care is given. For question 12 in the questionnaire, participants provided a substantial number of examples of (specialist) care for which they have different veterinarians. Notably, the types of care 'dentistry', 'colic' and 'lameness' were the most frequently mentioned types of care. Furthermore, some types of care can be considered a special type of care, which a veterinarian for regular checkups may not have the knowledge or skills for. I highlighted these specialties in light blue in the framework. I identified these specialist types of care by identifying how frequently they were mentioned in the clusters paired with words like 'specialised'. However, for the types of care named 'colic', 'lameness' and 'skin' it was somewhat ambiguous as to whether or not they can be fully considered special, considering that some participants implied that these are conditions which every equine veterinarian should have knowledge of.

Additionally, several types of care are coloured with a green/bluish mix, namely 'vaccinations', 'routine checkups' and 'worms'. These types of care are grouped together due their connection to the 'regular or routine' element in the *knowledge & type of vet* subcategory. I found that these three elements were frequently mentioned as more regular types of care that any type of equine veterinarian should be able to do.

In the last subcategory for the 'Quality of care' framework is *issues*. In this subcategory, I mention all the different kinds of issues that participants have had with the quality of care from their veterinarian. A substantial number of participants having had to deal with wrong diagnoses or advice from their vet. Others mentioned being unsatisfied with the care, which is somewhat ambiguous as to where this dissatisfaction comes from. Others mentioned being disappointed with the lack of knowledge their veterinarian had. The lack of the overall quality of the treatment, the lack of skills and the lack of treatment options were commonly mentioned issues as well.

4.5.2 Quality of Service

Figure 20 displays the framework for the 'Quality of service' category. For this category, I identified two subcategories of which it consists of, namely *appointments* and *availability & accessibility*. The *appointments* subcategory refers to the more functional aspects of making an appointment with a veterinarian, such as how long a client has to wait to be able to make an appointment, and the duration of the appointment itself. The *availability & accessibility* subcategory refers to the reasons that could influence a veterinarian's or practice's availability or a client's accessibility to that veterinarian or practice. For example, not all practices offer (emergency) care at a client's home, veterinary practices may be limited in the type of care they can offer, some practices are more closely located to the client's horse stable, and veterinarians may prioritise horses that require special care over regular checkups.

Noticeably, two elements are connected to both subcategories: (1) "Availability for calls and reachability over phone" and (2) "Availability of specific vet or primary care contact person". The first element is related to making appointments, as well as how available or reachable the practice is in order to make such an appointment. The second element relates to the desire to make an appointment with a specific veterinarian who may be part of a larger clinic. A client may prefer to talk to their regular veterinarian, but this may get in the way of being able to make a quick appointment due to that veterinarian's unavailability. In turn, this could limit the client's accessibility to (quick) care.

Furthermore, four elements are purple-coloured due to their connection to one another. I found that in case a client has to deal with an emergency, they tend to opt for veterinarians or practices that are more locally located, since it may be of importance to get to a veterinarian as quickly as possible. Moreover, clients mention not wanting to wait long before they can get admitted for an appointment, since an emergency's outcome can be time-dependent. In line with this, clients want the veterinary practice to be easily reachable over phone, preferably any time of the day, so that the emergency can be dealt with.

Lastly, the element "Diligence during the appointment" is orange-coloured due to its association with the main category 'Professional attitude'. In a subsequent paragraph I explain the 'Professional attitude' framework in more detail. Though, in essence, I found that clients find it professional if a veterinarian

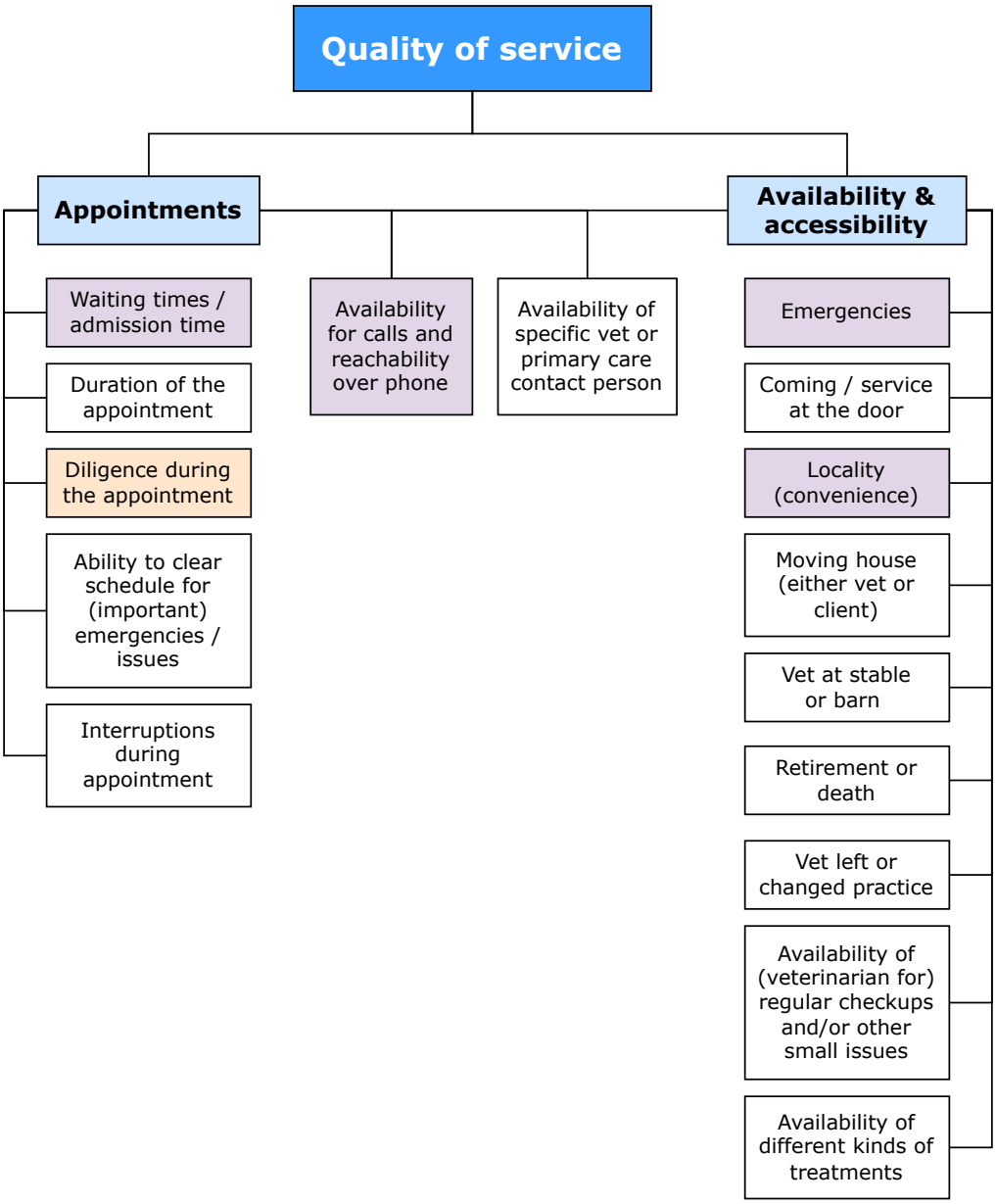

Figure 20: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Quality of service'. The aspects that are coloured in purple are related to one another. The aspect in orange has a relatedness with the 'Professional attitude' category.

seems committed with their horse's care and willingness to help the horse. I argue that this sense of commitment could partially be a result of a veterinarian's diligence during an appointment, hence the orange colour.

4.5.3 Horsemanship

Dating back to the ancient Greek history, horsemanship has been acknowledged throughout time as a skill wherein humans relate to horses, meaning that besides horse riding, the human is able to interpret what the horse feels, what they are thinking, and how to act accordingly (e.g. [11]). In other words, horsemanship

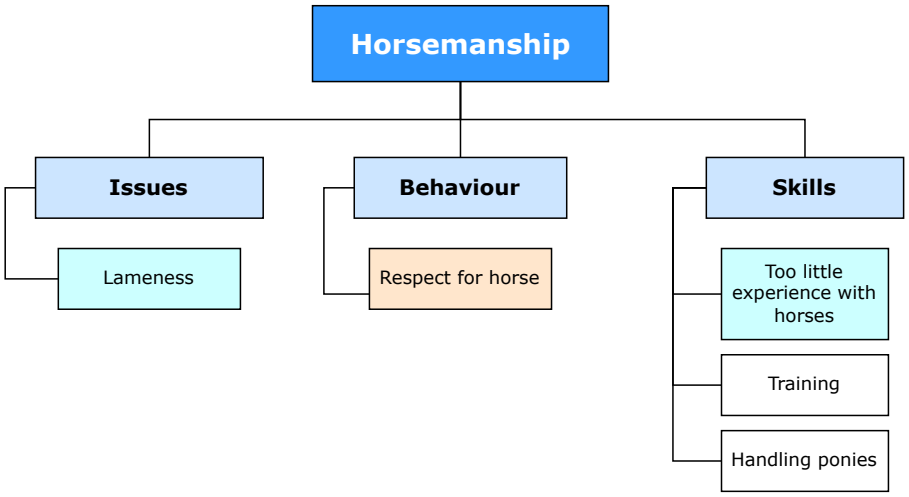

Figure 21: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Horsemanship'. The light blue colour indicates that the corresponding aspect is also mentioned in the framework for 'Quality of care'. Similarly, the orange colour indicates that the aspect is mentioned in the 'Professional attitude' category.

can be roughly defined as 'knowing how to handle a horse', i.e. how to touch the horse and keep them calm.

Similarly to the former framework, the 'Horsemanship' framework, given in Figure 21, is one of the smaller frameworks. Despite its size, I divided it into three main subcategories: *issues*, *behaviour* and *skills*. The *issues* refer to particular issues a horse may have–in this case lameness–which a client considers basic knowledge for someone who treats horses. Since lameness was frequently mentioned in the clusters overall and in combination with words like 'horsemanship', I reckon that clients may expect a person with adequate horsemanship to have basic knowledge on the types of issues that horses can have throughout their lives.

I found that variations of the word 'respect' were commonly mentioned in clusters related to horsemanship. This is somewhat unsurprising, considering it is naturally to be expected that a pet owner—probably someone who likely made the active decision to take care of their animal–would want others to be kind to their animals and treat them with respect. Moreover, I found that clusters in relation to horsemanship displayed themes such as having (previous) experiences with horses, knowledge of how to train horses and the ability to handle ponies.

4.5.4 Costs of Service

The first framework (Figure 22) is based on the 'Costs of service' category. For this framework, I identified two main subcategories, namely *types of costs* and *subjective judgement*. From the clusters, I identified that participants discussed three types of 'costs': (1) unwanted costs, (2) only the essential costs, and (3) high prices for particular types of services. From the analysis, I found that clients tend to consider costs for ineffective treatments, i.e. due to wrong diagnoses, unwanted. As a result, they consider the unwanted costs expensive. Note that the 'wrong diagnosis / wrongly selected treatments' element is coloured blue due to its connection to the 'Quality of care' category, which I explain in more detail later on. The reverse pattern also holds: treatments that are considered essential for the recovery of the horse, i.e. due to a correct diagnosis, were not considered expensive. However, some expenses outside of the horses' treatments were considered expensive as well, such as call fees (Dutch: "voorrijkosten").

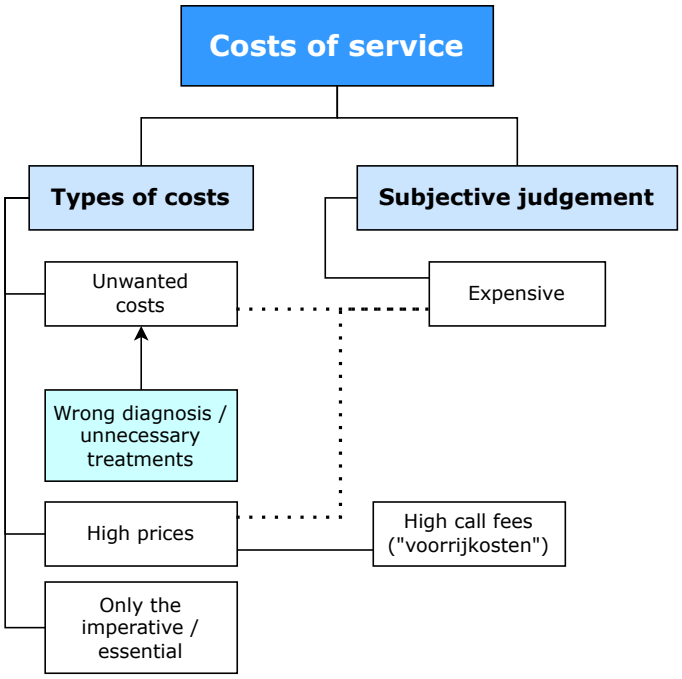

Figure 22: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Costs of service'. The light blue colour indicates that the corresponding aspect is also mentioned in the framework for 'Quality of care'.

4.5.5 Interpersonal Skills

Figure 23 shows the framework for the 'Interpersonal skills' category. This framework includes three subcategories: *personality*, *communication*, and *professional*, which correspond to the veterinarian's personality traits, communication skills, and professional attitudes, respectively. The *professional* subcategory is coloured in orange, as it describes similar elements to the 'Professional attitude' framework in Figure 24. Besides the orange coloured subcategory, there is a single element under the *communication* which is considered strongly related to the *professional* subcategory as well, named '(two-way) discussion'. This element refers to the ability with which a veterinarian is willing to have a discussion with the client, wherein the conversation consists of listening and explaining on both party's end, rather than having a one-directional conversation wherein, e.g., merely the veterinarian wants to discuss their own thoughts without considering the client's knowledge or opinions.

The pink-coloured elements have an association with the 'Transfer of knowledge' category, as *understandability* is actually a main subcategory for the transfer of knowledge. For communication to be effective between veterinarian and client, the veterinarian should clearly explain what they have observed in the client's horse, hence why they are making a particular diagnosis. At the same time, the veterinarian's explanation has to be complete, because I found from the results that clients appreciate getting the full picture, including all the possible treatment options. Besides that, participants emphasised wanting the contact with their (primary) veterinarian to be personal, rather than formal. Also, participants highlighted preferring calm and engaging communication with their veterinarian, which could potentially be explained by the principle that client-veterinarian relationships may become personal over time due to clients' loyalty to and consistent visits with a particular veterinarian.

Last, *personality* refers to aspects like the veterinarian's traits. My analysis suggested that clients appreciate a veterinarian's compassion, empathy, warmness, friendliness and sociability. Compassion and empathy was typically mentioned with respect to the client's horse, whereas warmness, friendliness and sociability were more commonly mentioned with respect to the client. Notably, that someone has a 'warm personality' is somewhat subjective, and may have to be clarified more in future research.

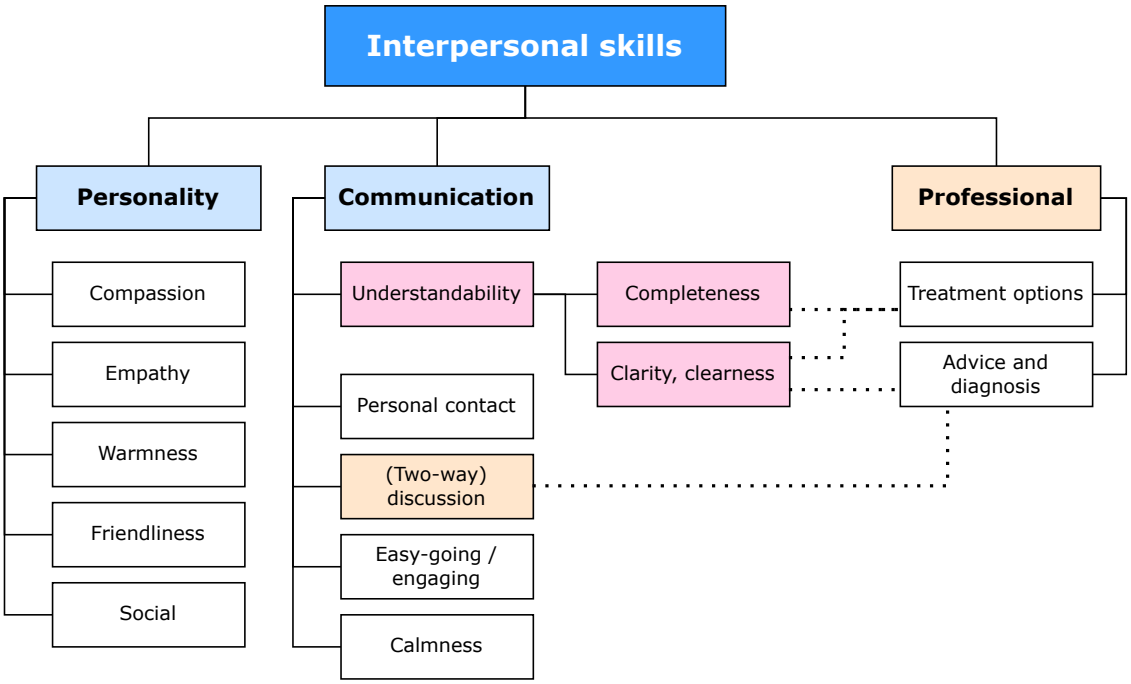

Figure 23: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Interpersonal skills'. The orange colour indicates that the corresponding aspect is mentioned, hence (indirectly) related, to the category 'Professional attitude'. The pink colour indicates that the aspect is related to the 'Transfer of knowledge' category.

4.5.6 Professional Attitude

'Professional attitude' consists of three main subcategories: *communication*, *traits* and *client*. Figure 24 provides the framework. The *traits* subcategory refers to aspects like the veterinarian's personality traits, behaviours and mannerisms. *Client* encompasses the clients' wants and needs, and their own characteristics. Noticeably, the subcategories are somewhat intertwined with one another, which is shown with the dotted lines that cross subcategories and the colours. The 'trust in vet' element of the *client* subcategory is considerably more connected to other elements in the framework than other elements. This may be due to the fact that I identified 'trust' as a potential consequence of other processes and factors. Clients emphasised that they find trust in their veterinarian important. However, trust follows from a veterinarian's actions. From the analysis, I suspect that a client's trust can be won through effective communication and favourable qualities, specifically 'two-way discussions' and 'honesty', respectively.

As shown in Figure 24, *communication* is a major part of the framework. This highlights the importance of communication, particularly as a tool, for adequate professionalism in a veterinarian's job. Furthermore, it conveys the message that a veterinarian is potentially less likely to be considered professional if their communication skills are lacking. Therefore, this begs the question to what extent professionalism is considered a social skill.

Notably, the element horsemanship is also included in this 'Professional attitude' category despite being a main category in Elte et al.'s [31] literature review. From analysing the clusters, I noticed that the word 'horsemanship' itself was frequently mentioned in clusters wherein professionalism was emphasised. Additionally, words related to horse 'training' and handling a horse were mentioned. This may suggest that clients are more likely to find a veterinarian with horsemanship more professional than those without.

Moreover, another focus of the framework is on the veterinarian's traits or characteristics, such as honesty, openness, decisiveness and pragmatism. In this *traits* subcategory, I find that a good portion of the elements are closely related to communication, e.g. honesty, openness and conciseness. From the per-

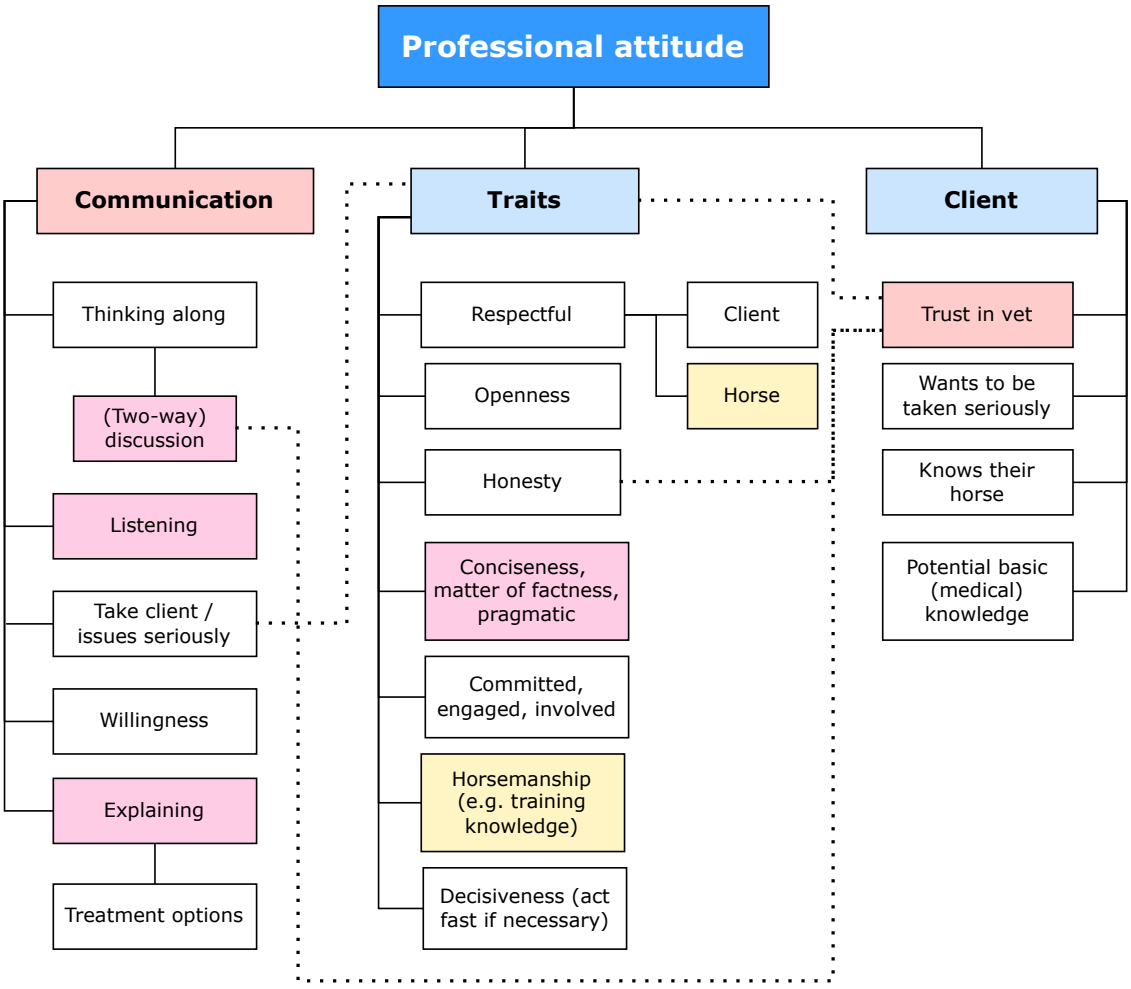

Figure 24: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Professional attitude'. The colour pink indicates that the aspects are related to the 'Transfer of knowledge category, e.g. due to being mentioned in that framework as well. Aspects coloured yellow are considered relevant for the 'Horsemanship' category too, and the red colour refers to the aspects being connected to the 'Interpersonal skills' category.

spective of this framework, the main difference between *communication* and *traits* is that communication is more closely related to behaviour, whereas traits is strongly connected to attitude. For example, one veterinarian may come across as more committed compared to another veterinarian, even though it may be difficult to assign explicit individual behaviours to this perception of 'commitment'. In other words, this perception of commitment is more about a person's temperament, potentially even their personality, rather than particular communication elements or mannerisms. In the *communication* subcategory, 'thinking along' (or "meedenken" in Dutch) was included quite frequently in the topic clusters. However, it is worth mentioning that this expression of "meedenken" is quite particular to the Dutch language, meaning that English speakers may use other types of words to express a similar sentiment, such as 'listening', 'explaining' and 'discussion'. Since these words were also mentioned in the topics that I categorised to be expressing 'Professional attitude', it may confirm my suspicion that English-speaking clients tend to use these words to express the 'thinking along' principle. For the 'listening' element, I also indicated–via a directed arrow–that this may lead to the client's perception of being taken seriously. The need for being taken seriously was explicitly mentioned in the clusters, but I could not find clear relationships between this element and other elements in the framework. However, it remains unclear to what extent these traits

can be trained, and to what extent the perception of these traits may be influenced by the veterinarian's social skills as well.

4.5.7 Transfer of Knowledge

The 'Transfer of knowledge' framework, shown in Figure 25, is one of the smaller frameworks, wherein I identified *understandability* and *communication* as the two main subcategories of which it consists of. Understandability is an essential part of transferring knowledge, since a veterinarian can clearly communicate something if the given explanation (directly) answers a client's question or if the veterinarian explains treatment options, their concluded diagnosis and the relevant treatments in a concise manner. Naturally, communication is necessary in order to convey information. From the analysis, I found that clients tend to respond well to calm discussions, wherein the veterinarian displays a willingness to engage with the conversation. Moreover, clients tend to prefer a two-way discussion, rather than a one-sided conversation.

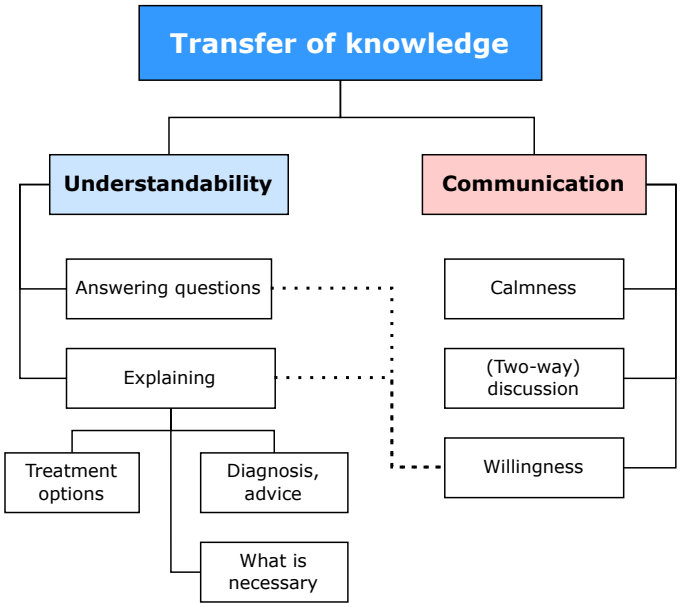

Figure 25: Framework of the main themes identified from the bilingual (combined) analysis from the LDA 1, LDA 2 and k-means clustering results for the main category 'Transfer of knowledge'. The red coloured 'communication' subcategory has a connection to the 'Interpersonal skills' category, as that category also consists of this subcategory.

4.6 UpSet Plots: Combinations of Categories

Besides the frameworks, I created UpSet plots of the results for each questionnaire question per topic detection method (LDA or k-means). Here, I discuss several of the most interesting plots, in my opinion. These plots are interesting due to aspects such as overarching categories, patterns that may be expected or not, or similar categories being mentioned together. The rest of the UpSet plots can be found in Appendix J (Section 6). My aim with the UpSet plot is to provide the reader with more insight into what categories I specifically identified per questionnaire question, dataset and data analysis method. Additionally, the UpSet plots provide more insight into how frequently particular categories were mentioned, as well as how frequently different kinds of categories were mentioned in combination with others. I describe the results according to the plots given in this section, though I provide references to other UpSet plots that present similar findings in the appendix.

The UpSet plots describe two main stories: (1) what categories were mentioned in total and how frequently, and (2) what combinations of categories were mentioned with a particular frequency. As such, in

the following UpSet plots, the graphs have to be read as follows: the light green bars on the left-hand side of the figure positioned vertically display aspect one, describing what categories were the most popular for that particular questionnaire question according to the k-means or LDA data analysis methods. On the other hand, the larger light blue bars positioned horizontally in the figure communicate how many times a particular combination of categories was mentioned in the topics. These combinations of categories are declared with the darker blue dots and the dark blue connections between the dots, positioned below the bars. The dark blue dots correspond to a particular category, which are denoted on the left-hand side of the figure, paired with the light green bars. In other words, if the dots are coloured in dark blue for 'Quality of care' and 'Costs of service' in a horizontal manner, then these two categories were mentioned in the same topics.

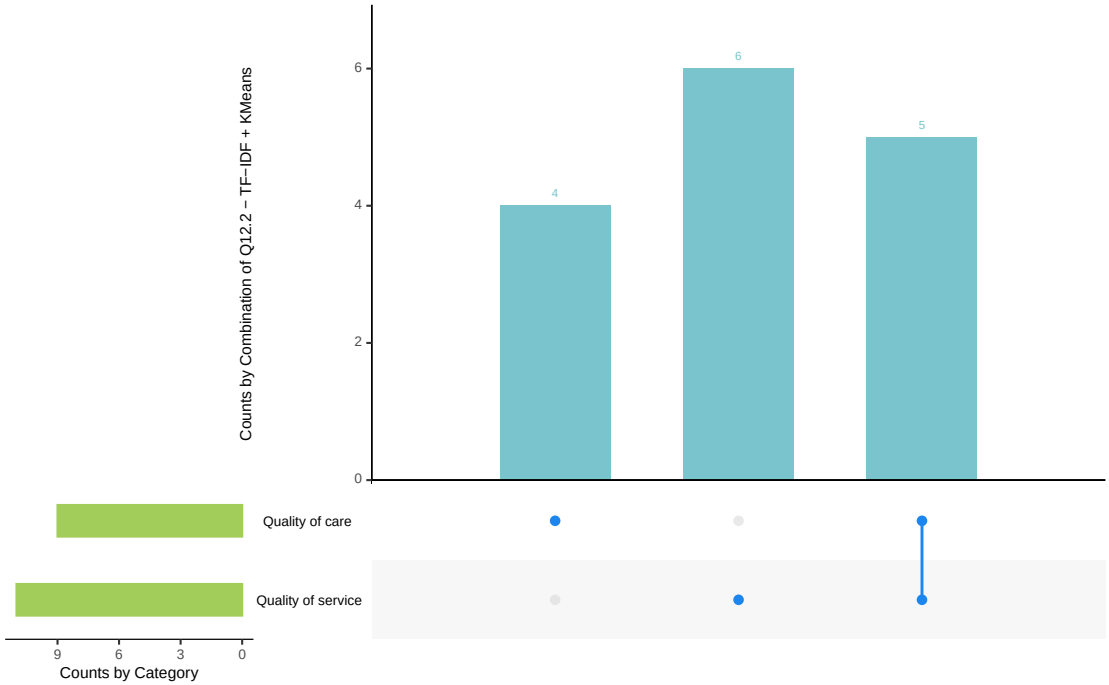

Figure 26: UpSet Plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the k-means clustering results for the bilingual data.

4.6.1 Reasons for Using Multiple Veterinarians

First, I discuss the UpSet plots based on the questionnaire questions regarding using multiple veterinarians. These plots may provide insight into the underlying reasons as to why horse owners may opt for more than one veterinarian, which may be helpful in understanding the different types of equine veterinary clients, a.k.a. the 'personas'.

The first UpSet plot, displayed in Figure 26, shows that the 'Quality of care' and 'Quality of service' are the main categories mentioned by the participants for questionnaire question 12 (specifically question 12_2). This observation is the same for the other UpSet plots in the appendix as well (Figures 46, 47). Generally, this shows that the option to have multiple veterinarians is mostly based on aspects such as specialist types of care, the pragmatics around making appointments, and a veterinary practice's availability, amongst others.

4.6.2 Baseline Quality

In this section, I focus on the results from question 15.2 "Have you ever stopped using a particular vet (practice)?" An interesting UpSet plot is given in Figure 27. From this figure, it becomes apparent that the 'Quality of service' category can be considered like an all-encompassing category over the others. The importance of 'Quality of service' is also visible in Figures 51 and 52 from Appendix J (Section 6). Question 15 asked the participant what their reasoning was for stopping using a particular veterinarian's services or a practice's services. Since the 'Quality of service' category's focus is mainly concerned with the quality of the services offered in a veterinary practice and the degree of accessibility of necessary services, it may suggest that this category covers the quality aspect of what the client expects, whereas the other categories that were identified in combination with 'Quality of care' may be related to the specifics of what a client wants, like the degree of interpersonal skills or the quality of care. Furthermore, this indicates that clients expect at least a particular baseline of quality when using a vet's services, and that a lack of such quality is a definite reason for a client to stop relying on the services of a particular veterinarian or practice.

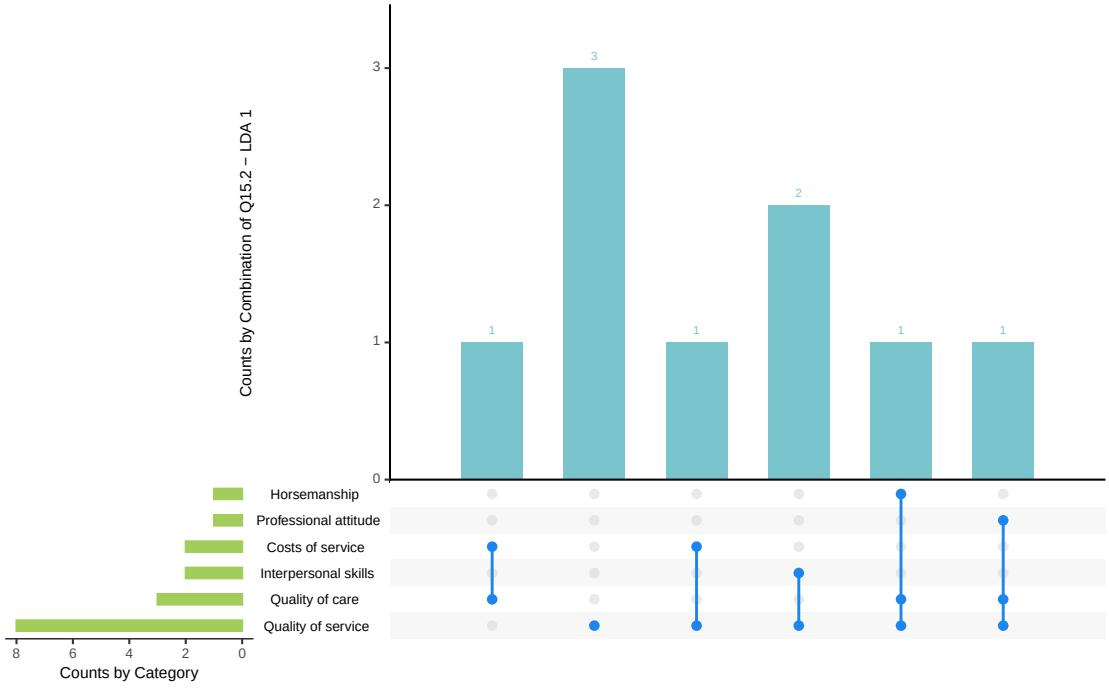

Figure 27: UpSet Plot for question 15.2 "Have you ever stopped using a particular vet (practice)?" where the participant previously selected "Yes" of the LDA 1 results for the bilingual data.

4.6.3 Distinction for Excellence: Communication

The last UpSet plot describes the importance of particular (combinations) of categories for questionnaire question 46. With question 46, participants were asked what they appreciated most in their (primary) veterinarian. Although for question 15, I found that 'Quality of service' is a common reason for clients to quit using a particular veterinarian's services, the results from question 46 seem to suggest that other types of categories tend to stand out to the clients when the veterinarian has met their baseline 'quality' requirements in order to continue their services. As shown in Figure 28, categories 'Professional attitude', 'Quality of care', 'Transfer of knowledge' and 'Quality of service' are the four most commonly mentioned categories. Category 'Interpersonal skills' was also mentioned several times by the participants, but noticeably less than the others. In fact, the combination of the four most frequently mentioned categories was the most

popular amongst all combinations (4 clusters had this combination). Besides that, it is shown in the plot that the 'Quality of care' and 'Professional attitude' categories were frequently used in combination with other categories (this is visible with the number of dark blue dots on the horizontal axis for that category). Moreover, as these categories were mentioned all relatively frequently, with no particular category surpassing other categories significantly, it is possible that different types of clients may differ in their opinions as to what characteristics they prefer the most in their veterinarian.

Given that 'Quality of care' is a frequently mentioned category, clients tend to appreciate a veterinarian's knowledge and skills. Since the 'Quality of care' category encompasses a variety of aspects, such as the different kinds of specialty care, there is a possibility that clients tend to appreciate it when a veterinarian can offer a specific type of care that is relevant for the purposes with which the client keeps horses, e.g. competitions or breeding. It is also possible that clients tend to appreciate it when a veterinarian can offer care that is specific to horses, such as lameness or colic, which is also one of the reasons that I included lameness in the 'Horsemanship' framework.

From this UpSet plot, it is also noticeable that at least three of five mentioned categories are related to communication skills, namely 'Transfer of knowledge', 'Professional attitude' and 'Interpersonal skills'. This communication component is displayed in the previously discussed frameworks. This could indicate that communication skills are skills with which a veterinarian could make themselves stand out from their colleagues. This also highlights the necessity for communication training during veterinary school and other related courses.

In conclusion, the 'Quality of service' may be a requirement typically used by clients to determine whether they find a veterinarian "good enough", whereas other categories related to communication, sociability and professionalism are what in the end distinguish the excellent veterinarians from the average or good veterinarians.

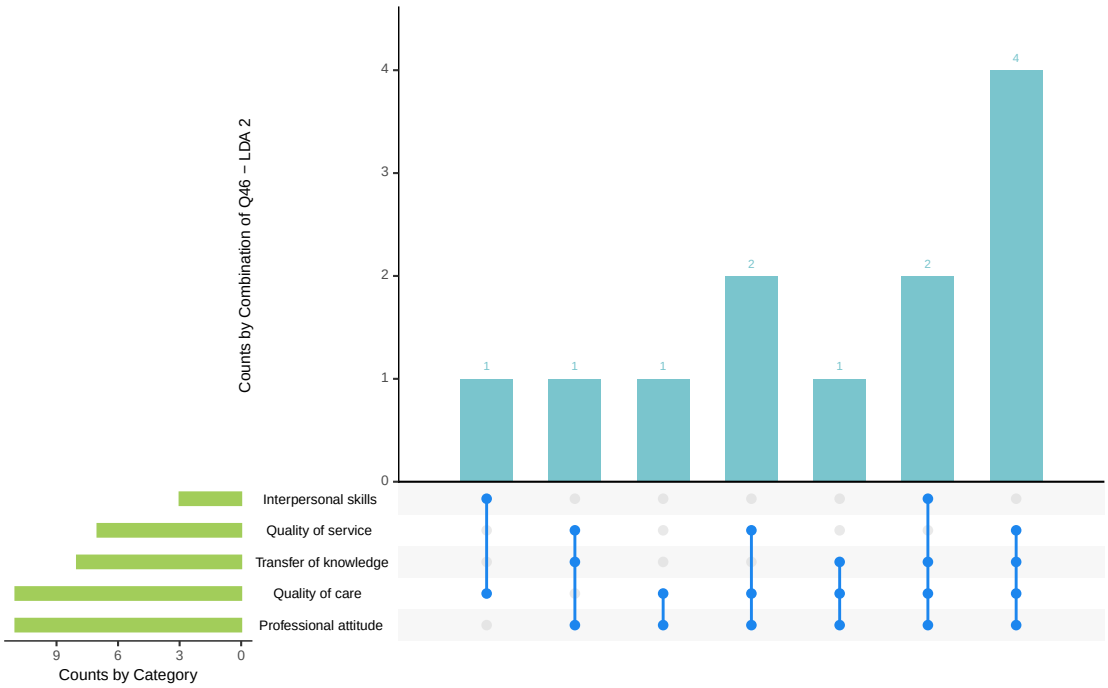

Figure 28: UpSet Plot for question 46 "What do you appreciate most in your veterinarian?" of the LDA 2 results for the bilingual data.

4.6.4 Differences between Monolingual and Bilingual Results

In this section, I shortly describe some potential differences I observed between the UpSet plots made from the monolingual data and the bilingual data, which may indicate the differences between different types of clients, such as Dutch versus American clients.

Question 15.2: Baseline Quality
As for question 15.2, which is concerned with the reasons as to why clients quit a veterinarian's services, I found that the Dutch clients tend to emphasise 'Quality of service' somewhat less than the English-speaking clients. For example, monolingual Dutch LDA Version 1, has 'Quality of care' as the largest and all-encompassing category (see Figure 79). The monolingual Dutch k-means clustering results has all kinds of solo categories ('Professional attitude', 'Interpersonal skills', 'Quality of service', 'Quality of care' and 'Costs of service') with one large combination of categories (see Figure 81). Although the k-means results on the bilingual data included a large number of solo categories as well, 'Quality of service' remained the most important one (Figure 52). Monolingual Dutch LDA Version 2 shows that 'Quality of care' and 'Quality of service' are the two largest categories, and they are both mentioned in all other combinations with other categories (see Figure 80), which is somewhat different to the bilingual results, as the bilingual results solely denoted 'Quality of service' as an overarching category.

On the other hand, the monolingual English results were comparable to the bilingual results. LDA Version 1 and k-means clustering had 'Quality of service' as largest category. See Figures 64 and 66, respectively. LDA Version 2 had 'Quality of service' as an all-encompassing category (Figure 65).

Question 46: What Clients Appreciate Most
The other relevant question to my research, question 46, also presents some differences between the monolingual and bilingual results. For the monolingual English results, I noticed that 'Quality of service' is frequently mentioned in this question as well, rather than solely for question 15.2. Together with 'Quality of care', 'Quality of service' is an encompassing category in both the k-means (Figure 72) and LDA Version 2 (Figure 71) results. For all analysis methods, including LDA Version 1 (Figure 70), 'Quality of care' and 'Quality of service' were amongst the most frequently mentioned categories.

As for the monolingual Dutch results, category 'Professional attitude' was most frequently mentioned across all data analysis methods: k-means (Figure 87), LDA Version 1 (Figure 85) and LDA Version 2 (Figure 86). Additionally, I interpreted 'Professional attitude' as an all-encompassing category for all data analysis methods due to how frequently it was mentioned in combination with other categories. For LDA Version 2, 'Quality of care' and 'Quality of service' were often mentioned with other categories as well. Though, all in all, the results are comparable in terms of what categories are declared by participants. For example, 'Professional attitude', 'Interpersonal skills' and 'Transfer of knowledge' are identified in all data analysis methods. Similarly, 'Costs of service' was mentioned in the results of all data analysis methods too, but as the least frequently mentioned solo category.

5 Discussion

In this chapter, I summarise the findings of the research, including what contributions this thesis provides for the field of veterinary medicine. I discuss the limitations of the study and what opportunities there are for future research in the study of improving client satisfaction in the veterinary profession.

5.1 Findings & Contributions

One of the main contributions of my work is the identification of the main reasons that contribute to a client's decision to quit a veterinarian's services, as well as the reasons that may distinguish an average veterinarian from an excellent one.

5.1.1 Baseline versus Apex

From my analysis, it was apparent that clients want at least some degree of baseline quality to remain using a veterinarian's services. I recognised this category as an overarching theme, meaning that despite clients' declarations of other reasons as to why they may quit a veterinarian's services (e.g. poor communication), the quality aspect was a recurring condition. If a veterinarian is difficult to reach, it takes a long time to be able to make an appointment, or is rarely available for emergencies, a client is likely to consider changing veterinarian practices. On the other hand, I found that the personal and social aspects, such as communication, honesty, professionalism, clarity and a willingness to explain the rationales for particular treatments are what clients tend to appreciate the most in a veterinarian. In other words, these concepts form the apex of client satisfaction. If I were to reconstruct the categories in a similar pyramid structure as *Maslow's Hierarchy of Needs* (e.g. [75]), quality of a service would be positioned at the bottom, whereas concepts like interpersonal skills and professionalism would be positioned more towards the top of the pyramid. In other words, a client cannot arrive at appreciation for a veterinarian's social skills and more if a baseline quality of service is not met. Additionally, I identified that veterinarians can distinguish themselves through the quality of care they provide, such as the specific types of care (that might typically be associated with horses). I established a possible explanation for this: people tend to keep horses for a large variety of reasons, which in turn calls for specialised care.

5.1.2 Observations from the Frameworks

Moreover, besides the identification of these reasons and causes, I contribute concrete frameworks that describe the way in which these categories are structured and connected to one another. Furthermore, the frameworks roughly describe to what extent some categories seem to overlap. For example, 'Professional attitude', 'Interpersonal skills' and 'Transfer of knowledge' overlap with their subcategory *communication*. Additionally, these frameworks open up the discussion as to whether or not some of these categories should be further analysed for appropriate updates, as well as the possibility that other types of categories can be constructed based on the knowledge that exists in the veterinary field.

In the 'Professional attitude' framework, I included *horsemanship* as an element that is relevant for clients in order to deem a equine veterinarian as professional. This is a particularly interesting finding, considering that 'Horsemanship' was identified as a separate category in Elte et al.'s [31] literature review. In line with this, I categorised *lameness* in the 'Horsemanship' framework. This was due to the fact that the clusters seemed to suggest that clients find the ability to identify particular problems in a horse, such as lameness, as a basic ability that horse owners should have or learn about. Therefore, despite the fact that I found that lameness is a main element for the 'Quality of care' category, I considered it as a relevant one for 'Horsemanship' as well.

5.1.3 Establishment for Research on Different Types of Clients

Another contribution is the identification of the similarities and differences in opinion depending on the type of client. For example, I found that Dutch clients tend to find 'Quality of service' potentially less important than English-speaking clients. More noticeable though, is that English-speaking clients mentioned

'Quality of service' as an aspect that they appreciate in a veterinarian, rather than merely as a baseline condition for deciding upon quitting a veterinarian's services. Moreover, 'Professional attitude' is overwhelmingly emphasised among Dutch clients as a characteristic they appreciate in their veterinarian, as this was the most frequently mentioned category across all data analysis methods.

Besides the aim to identify differences in the Dutch and English data, I contributed a small setup to potential persona identification, hence types of horse owners, that may exist in the equine veterinary medicine sphere. Some notable findings were the differences between clients' spending behaviour. Competitors seem to spend more money on veterinary care. Additionally, horse owners that use the services of more than two veterinarians are more likely to be competitors compared to those who merely visit one or two veterinarians. Moreover, horse owners that have higher expectations of the veterinarian may also be more likely to be willing to spend larger amounts of money, given that the care is of adequate quality. Lastly, I noticed that those who opt for the services of merely one veterinarian are also more likely to promote that veterinarian to others compared to those who use the services of two or more veterinarians. This may suggest that if a client is content with the service they are given, they are less likely to seek out the services of another. From a business point of view, this may be useful for veterinarians to know. For example, provided that my other findings are accurate, a veterinarian could aim to improve theirs clients' satisfaction by focusing on improving their communication skills, being more honest, trying to conduct themselves in a more professional manner and participating in more open conversations with the client, with the hope that their clients will be less likely to seek out the services of other veterinarians in the area, hence improving their own business.

5.1.4 Psychological Distress in Veterinary Medicine

Although I was able to identify trends in the data, my study did not aim to identify the causes for the trends in the data. For example, whenever it was mentioned that the way the veterinarian handled horses or communicated was unsatisfactory, the participant could not provide a potential cause as to why the veterinarian behaved as such. Since veterinarians were not recruited for this questionnaire, it remains unclear as to what the exact reasons were for veterinarians' behaviours or opinions. Therefore, I explore potential reasons and causes by searching through the veterinary medicine literature.

In the questionnaire, two participants mentioned that one of their veterinarians had died. One participant explicitly mentioned suicide. In the literature, it has been reported that veterinarians are more likely to experience mood disorders like depression and anxiety, even suicidal ideation, compared to other professions [37, 98]. In fact, veterinarians are four times more at risk for suicide compared to the population as a whole [14, 25, 59, 63, 68, 79, 82, 98, 111]. One study even reported that in a sample of 701 veterinarians, a staggering 66% of them had reported that they had been clinically depressed at some point, and 24% reported having considered suicide since starting veterinary school [116]. In particular, veterinarians are at risk for symptoms typically characterised with the mood disorder depression [37, 38, 52]. The performance of euthanasia has been suggested as a potential reasoning for psychological distress, modeled into mood disorders, and even suicide risk in veterinarians [7, 8].

5.1.5 Stress, Psychological Demands and Coping Mechanisms

In the Related Work section (section 2), I shortly discussed the possibility that empathy fatigue may be one of the factors that could influence a veterinarian's job performance. Other potential reasons could include stress, or even burnout. In fact, there is a possibility that stress is a precursor to empathy fatigue.

It has even been reported that the stress and demands of professions like veterinary medicine, including law school, medical school, dental school and nursing school, start earlier than one's career, namely during the professional degree programs [106, 87, 60, 53, 41, 114]. However, there is some evidence to suggest that students in veterinary medicine programs tend to experience depression and anxiety at the highest rate of all professional degree programs [47]. Killinger et al. [65] conducted a study with North American students in veterinary medicine school, and they confirmed previous work, as they found that these students experienced both high levels of stress and depression. Additionally, female students tended to experience more stress and depression than male students [65].

However, there is still a debate as to what causes higher levels of psychological issues in veterinarians. Research has no consensus as to what concrete factors may contribute to the high rates of suicide and psychological problems in the veterinarian profession [39, 35, 6].

Unfortunately, depressive symptoms and other mental-health related issues may result in unhealthy coping mechanisms and negative behaviour changes. For example, Diulio et al. [30] recruited veterinary students and found that depressive symptoms may result in harmful drinking patterns. In the questionnaire, I also noticed that one participant had mentioned that their ex-veterinarian had arrived to the appointment intoxicated. A potential reason as to why such an extreme case of malpractice was reported is due to the stressors of the job.

5.2 Limitations

In this section, I describe the limitations of my study. The limitations are described in terms of analysing questionnaire data,

5.2.1 Questionnaires and the Context of a Participant's Answer

I acknowledge that this study has several limitations. The first limitation is the fact that the open text fields in the survey were not mandatory to fill in for the participants. As such, essential information on participants' opinions may be missing with regards to what they find important in a veterinarian or not. Consequently, this complicated the process of identifying whether or not participants remained consistent in their answers across the surveys, given that participants did not provide explanations for all of their answers.

Moreover, it is worth noting that topic modeling may not provide the full context of a participant's answer. For example, participants indicated that their decision to use multiple veterinarians is dependent on the specific issue with their horse. Therefore, for the questionnaire question "What do you appreciate most in your veterinarian?" (Q46), it is possible that they answered that question with a particular veterinarian in mind, even though they may make regular use of other veterinarians' services as well. For example, clients may request better skills and knowledge of a veterinarian with a specific specialty, whereas general veterinarians may require better interpersonal skills in order to communicate the options and most logical follow-up steps, e.g. a visit to a specialised veterinarian. However, from the topics created on the participants' answers for Q46, it was not possible to extract that type of nuance. In line with this, it was not possible to identify the different types of clients from the created clusters from the topic detection analysis. For instance, I could not identify what a competitor versus a non-competitor had written in their answers based on the clusters. This is a potential limitation, since competitors and non-competitors may have different opinions and needs with regards to the care of their horse, as well as their overall requirements for the veterinarian.

Also, not all participants provided extensive argumentation for their given answers. For example, some participants mentioned that they felt their veterinarian was not good in handling in their horse. However, they would frequently omit both detailed information as to what the veterinarian did–that the participant did not approve of–and what exact behaviours or skills they would have approved of instead. Some participants would even mention aspects like "not having a good connection" as one of their reasons for quitting a veterinarian's services. However, more often than not, participants would not specify as to why their connection was not as good.

5.2.2 Variations and Objectivity of the Analysis

The principle of subjective examination was also part of the final analysis. To determine the subcategories from the main categories in Elte et al.'s [31] literature review, I used affinity diagramming and open coding in order to identify themes and topics in the data. However, affinity diagramming and open coding are qualitative analysis techniques, and are therefore not considered objective. Thus, other researchers might code the results differently from me. Though, to minimise inter-subjective variation and to increase replicability of my research, I provided extensive and detailed explanations of how I coded the data.

Secondly, as is the case in most versions of natural language processing analyses, people may spell words incorrectly or use informal language to describe their argumentation. During the pre-processing steps, I took this into consideration by iteratively extending the list of words that had to be eliminated from the participants' answers, including non-important words with spelling errors in them. However, it is possible that I have missed some in the process. Moreover, this identification of non-essential words to eliminate, requires a subjective examination. Therefore, it is possible that some words that could be considered useful by others may have been removed as well.

Lastly, I pre-processed the data for all questionnaire questions the same. Furthermore, when iteratively adding more stopwords to exclude from the data, I particularly focused on questions that were essential to my research question, namely questions "How many veterinarians do you use?" (Q12), "Have you ever stopped using a particular vet (practice)?" (Q15), and "What do you appreciate most in your veterinarian?" (Q46). Hence, I noticed that for question 45, which was related to pre-purchase exams, the topics were not as useful due to my lack of focus on this particular question.

5.3 Future Research

In this section, I describe in what ways future research could build upon my work. The suggestions for future research are partially based on the limitations discussed in the previous section. I describe possibilities for future research in relation to different study methodologies, to generalise my findings further for a wider variety of applications in equine veterinary care, and to identify more practical solutions that can be deployed in the field.

5.3.1 Methodology

In this thesis, I used an exploratory research approach in order acquire more substantial basis for theories surrounding client satisfaction in the field of veterinary medicine, as well as to gain a deeper understanding for future research directions. As such, the findings and the corresponding framework will have to be peer-reviewed in future research, wherein this framework is either confirmed or updated according to more extensive research, or both. After more exploratory research has been conducted, future research may have to consider study approaches that are tailored towards confirming theories and hypotheses that can be constructed from the frameworks, such as statistical tests performed on quantitative data collected from participants' answers.

As mentioned in the previous section (section 5.2), participants did not always provide extensive details and descriptions as to why they had particular opinions. This may have been due to the usage of a questionnaire, rather than conducting interviews with the participants, as one of the disadvantages of questionnaires is that they typically cannot catch the relevant contexts that interviews can reveal [95]. Questionnaires are the most effective when the participant has to provide short (quick) answers [95]. Thus, future research may have to consider interviews with participants so that the contexts' of participants' opinions can be interrogated in more depth, as well as ask for more clarification.

Furthermore, future studies should consider using different pre-processing steps for the different questions. As mentioned in Section 5.2, the topics for question 45 were not as useful due to my focus on the other questionnaire questions. Due to the different phrasings of the questions, it might be useful to pre-process the data for the questions differently, as the importance of some words may differ depending on the context of the question. In addition, even in the final clusters, I noticed some words with spelling errors in them were included, despite my several rounds of pre-processing steps wherein I aimed to exclude as many irrelevant words with spelling mistakes as possible. Therefore, future research may have to consider using more drastic lemmatisation methods so that words with spelling mistakes can still be included in the analysis without having the error.

Additionally, as I mentioned in the Results section (Section 4), I manually observed that the LDA topics were of lower quality than the k-means topics due to redundancy in a superficial manner. However, I observed this redundancy mostly in Version 1 of the LDA analysis, and not as much in Version 2. Therefore, future research may have to consider more carefully what topic modeling approach fits best for this type of data by using more systematic and objective evaluation approaches.

5.3.2 Generalisability

Although this framework provides a stepping stone for the concrete identification of different types of horse owners and their needs, which I called 'personas' in this thesis, future research will have to study this in more detail. Though, the types of horse owners that I identified are data-driven constructs, and since the questionnaire contained some degree of variability in the participants, the frameworks may be applicable for the variety of participants that were recruited for the survey. But the frameworks that I presented in this thesis may not be applicable for all scenarios in the equine industry due to the lack of consideration of the different scenarios in my analysis, which were also presented in the questionnaire. Hence, the frameworks' generalisability may be somewhat poor in that area. Future research should aim to improve the generalisability of my frameworks, or improved versions of my frameworks, either by creating different kinds of frameworks for a variety of personas or through a more abstract framework that is applicable to the majority of clients in the equine industry. In this thesis, I made a start with this by conducting some superficial, potentially premature, analyses to identify different kinds of horse owners and their needs. Notably, this analysis should be extended in future studies in order to identify the personas' characteristics and their corresponding needs. In line with this, future research should take into consideration that participants' opinions may differ depending on whether or not they are a competitor or non-competitor in horse competitions. For example, it is possible that competitors may have a different opinion on what is considered a special type of care or a regular type of care compared to non-competitors.

5.3.3 Practical Solutions

Lastly, this thesis provides a first indication as to what requirements should be met in order to satisfy a client with a veterinarian's service. At the same time, I explored the reasoning as to why clients may eventually decide to leave a particular veterinarian or practice. However, despite this exploration, it does not directly provide solutions as to how these issues in a veterinarian practice can be resolved. For example, some participants indicated in the survey that they left a practice due to poor communication or interpersonal skills. However, it remains somewhat unclear as to what may cause these issues, like the lack of interpersonal skills, as well as how veterinarians could improve this. In this thesis, I explored some potential explanations as to why particular issues may arise, including communication problems, through empathy fatigue, burnout, stress, veterinary education, and support systems. But all in all, more research is needed in order to discover the exact causes for these issues in the veterinary field.

6 Conclusion

In this thesis, I aimed to answer the following research question: "What do horse owners appreciate most in their veterinarian, and why do they leave?" To answer this research question, I performed EDA, TF-IDF, k-means clustering and LDA.

All in all, I found that clients expect at least a baseline quality level for the service provided, otherwise they are quickly to decide to stop using a veterinarian's services. At the same time, the overall quality of service is not the main condition clients mention when describing what they appreciate the most in their veterinarian(s). Instead, clients tend to mention professionalism, interpersonal skills, quality of care and transfer of knowledge. For now, I structured these concepts into general frameworks through qualitatively analysing the full clusters, wherein I manually interpreted the meaning of the clusters with the help of colour coding. Additionally, I proposed the possibility that clients' needs can possibly be reconstructed in a similar manner to *Maslow's Hierarchy of Needs*. However, more research basis is needed in order to successfully complete such a pyramid structure. Future research should consider more objective analyses to confirm my findings.

Although my analysis mainly focused on the bilingual data due to a higher level of cohesiveness in the clusters, I did find that Dutch and English-speaking clients, i.e. Americans, tend to slightly differ in what they consider the baseline or the pinnacle of what is to be expected of a veterinarian, which may suggest that cultural, situational or even geographic differences may play a role in clients' priorities and expectations. The most notable findings were that Dutch clients strongly prefer professionalism over other aspects, and that English-speaking clients highlight the quality of a service as a factor they appreciate despite it also being mentioned as the main reason for stopping paying visits to a veterinarian. This finding regarding the quality of a service may contradict my suggestion that the concepts can be concretely structured in a pyramid structure, as the quality of a service may be considered both as a baseline and as an apex to meet client satisfaction, depending on the type of client. However, more research is needed in order to get conclusive results on the different types of horse owners and their needs.

Additionally, I acknowledge several limitations to my research and suggest directions for future research which can build upon my own research. With the help of my frameworks for equine client satisfaction, I have created a first standard for concrete definitions of the categories. My frameworks could help guide future researchers in their endeavors to gain further insights into how these categories are related to meeting clients' needs. My research can hopefully provide more concrete guidance as to how veterinarians' education can be redesigned for more effective equine care. All in all, my research contributes a building block for a basis of knowledge on how to satisfy clients' needs in equine veterinary practice.

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Appendices

Appendix A: Overview Questionnaire

In this Appendix, I explain what each question entailed, as well the format in which the participant's answer had to be given. In bullet points is given the literal phrasing directly taken from the questionnaire. The numbering of the questions is based on how the data was structured when conducting the topic detection analysis.

Question 1: This question includes a lot of information on how the participant's data is used, that the participants remain anonymous, and other relevant information in order to be able to consent to the study. Then the participant is asked to agree with the statements so that they can move on to the rest of the questionnaire.

Unofficial question: Participants are asked to fill in the country they are from.

Question 2: What gender the participant identifies with. This question is formatted as a multiple choice question.

- Are you?

Question 40: How old the participant is.

- What is your age (in years)?

Question 6: Whether the participant keeps horses for professional reasons or not. The participant has to select either the 'yes' option or the 'no' option.

- Do you keep horses for professional reasons?

Question 5: How many horses the participant has in their care. The participant should provide a numerical answer.

- How many horses (incl. ponies, foals, etc.) are in your care? (Numerical answer only)

Question 7: For what purposes the participants keep horses in their care. They were allowed to select a maximum of 3 purposes.

- For what purpose do you keep your horse(s)? Please select the most important one(s). Max. 3

Question 7_11_TEXT - Other: In case the participant selected 'Other' for Question 7, they were given the option to fill in their own manual answer in text.

Question 8: Whether or not the participant partakes in competitions. 'Yes' or 'no' answers only.

- Do you and/or your horse(s) participate in competitions?

Question 9: In case the participant's answer to the former question was 'yes', the participant has to indicate in what competitions they partake in, as well as the difficulty level (basic level, national level, international level).

- In which discipline, and at what level do you and/or the horse(s) in your care compete? Select all that apply to your situation.

Question 11: Participant has to indicate how many times they tend to use a veterinarian's services. This question is formatted as a multiple choice question.

- How often do you, on average, use veterinary services?

Question 4: Participant has to answer how much money they spend on their veterinarian(s). This question is formatted as a multiple choice question.

- How much, on average, do you spend on veterinary costs per horse per year?

Question 12: Indicating how many veterinarians or veterinary practices the participant uses their/its services from. The participant is given 3 options: 1 veterinarian/practice, 2 veterinarians/practices, or 3(+) veterinarians/practices.

- How many veterinarians/practices do you use?

Question 12_2_TEXT: A optional question wherein the participant has to provide a reasoning for using 2 veterinarians/practices, in case the participant has chosen the option '2 veterinarians/practices' in Question 12.

- I use 2 veterinarians/practices. (You can explain why if you want.)

Question 12_3_TEXT: A optional question wherein the participant has to provide a reasoning for using 3 or more veterinarians/practices, in case the participant has chosen the option '3(+) veterinarians/practices' in Question 12.

- I use 3 or more veterinarians/practices. (You can explain why if you want.)

Question 15: Asking the participant whether or not they have stopped using a veterinarian's or practice's service. The participant is given two options to choose from: 'yes' or 'no'.

- Have you ever stopped using a particular vet (practice)?

Question 15_2_TEXT: A optional question wherein the participant has to provide a reasoning for having stopped the services of a veterinarian/practice, in case the participant has chosen the option 'yes' in Question 15.

- Yes. Please tell us the main reason why.

Question 13: The participant has to give an indication as to how long they have been using their current/primary vet's services. The participants are given a wide range of options: 'less than a year', '1 year', '2 years', '3 years', '4 years', '5 years', '6 years', '7 years', '8 years', '9 years', '10 years', '11 years', '12 years', '13 years', '14 years', '15 years', '16-20 years', '20-25 years', and '$>$ 25 years'.

- How long are you using the services of your current, primary, vet (practice)?

Question 14: In this question, participants are asked to indicate whether or not they would recommend their current/primary vet by either answering they are 'passive', a 'promoter' for their veterinarian, or a 'detractor'.

- How likely is it that you would recommend your (primary) veterinarian to friends or colleagues?

Question 46: Here the participant has to provide a manually inputted answer as to is an open-ended question, saying what they appreciate in their veterinarian.

- What do you appreciate most in your veterinarian?

Scenario 1:

- It's time for the annual influenza vaccination. Which aspect do you find most important surrounding and during that visit from your vet? Below you will find the aforementioned seven aspects of the veterinary care provided. See the infographic (on the previous page) for more information. Put the aspect most important to you at number 1 and the least important at number 7 by sliding the options.

Scenario 2:

- It's early evening, you get a phone call that there is something the matter with your horse. You panic and rush to the stable. By the time you get there your horse has got cast in his stable. He is soaked in sweat, covered in straw with a scrape above his eye. The bed looks completely trashed. You enlist the help of a few people at the yard and together you manage to get him on his feet. Your horse paws at the ground and immediately wants to lie down again. The afternoon feed has been left untouched in the manger. You manage to get him to the arena, but once there, he immediately lies down again. What will you do?

Question 34: The participant is asked what their second choice would be in scenario 2, the previous question. This is a multiple choice question where the participant is given the following options: 'you ask someone at the stable for advice', 'you wait/treat him yourself', 'you ask your trainer for advice', 'you Google your question', 'you ask your question on social media', 'you context your osteopath or other equine professional', or 'you call your vet'.

- What would be your second choice?

Question 19:

- Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Question 20:

- You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Scenario 3:

- It is a beautiful late summer evening. Dusk is falling, but the horses are still in the field. You are busy in the yard and suddenly you see that the horses are all running across the field, heading straight for the fence. Most of them manage to stop in time. Only your horse jumps the fence. He's clumsy and, on landing, he slips on the dirt track leading to the field. He gets up straight away and trots into the yard. At first glance he doesn't seem lame and you can't see any injuries. You put him in the stable. The next day though the horse seems a bit stiff which, even after a few days, doesn't get any better. What will you do?

Question 35: The participant is asked a similar question to Question 34: what their second choice would be in scenario 3, the previous question. This is a multiple choice question where the participant is given the following options: 'you ask someone at the stable for advice', 'you wait/treat him yourself', 'you ask your trainer for advice', 'you Google your question', 'you ask your question on social media', 'you context your osteopath or other equine professional', or 'you call your vet'.

- What would be your second choice?

Question 31:

- Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Question 30:

- You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Scenario 4:

- You've been scanning adverts and traveling up and down the country for weeks, in search of a new horse (for yourself or for a client). The search hasn't been in vain. You've found a lovely horse and want to buy it. What will you do?

Question 36: The participant is asked a similar question to Questions 34 and 35: The participant is asked what their second choice would be in scenario 4, the previous question. This is a multiple choice question where the participant is given the following options: 'you ask someone at the stable for advice', 'you judge the horse yourself', 'you ask your trainer for advice', 'you Google your question', 'you ask your question on social media', 'you context your osteopath or other equine professional', or 'you schedule an appointment with your/a vet'.

- What would be your second choice?

Question 29:

- Which aspect do you find most important around and during that visit from/ to your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Question 32:

- You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7.

Question 45: Here the participant has to provide a manually inputted answer as to is an open-ended question, asking if the participant would like any kind of clarification to their answers previously.

- Would you like to explain any of your answers? You can do that here. (optional)

Appendix B: Descriptive Statistics

Q5 How many horses (incl. ponies, foals etc) are in your care? (numerical answer only)		**Q12 How many veterinarians/ practices do you use? (1/2/3(+)) - Selected Choice**	
count	1389.000000	count	1320.000000
mean	4.628870	mean	1.721212
std	8.753547	std	0.709198
min	0.000000	min	1.000000
25%	1.000000	25%	1.000000
50%	2.000000	50%	2.000000
75%	4.000000	75%	2.000000
max	140.000000	max	3.000000
Q19_1 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of care		**Q19_2 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of service**	
count	1134.000000	count	1134.000000
mean	1.735450	mean	3.263668
std	1.158504	std	1.656825
min	1.000000	min	1.000000
25%	1.000000	25%	2.000000
50%	1.000000	50%	3.000000
75%	2.000000	75%	4.750000
max	7.000000	max	7.000000
Q19_3 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Horsemanship of the veterinarian		**Q19_4 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Interpersonal skills**	
count	1134.000000	count	1134.000000
mean	3.790123	mean	5.154321
std	1.883184	std	1.447521
min	1.000000	min	1.000000
25%	2.000000	25%	4.000000
50%	4.000000	50%	5.000000
75%	5.000000	75%	6.000000
max	7.000000	max	7.000000

Table 3: Overview of the descriptive statistics of the survey questions, including the number of answers (count), mean, standard deviations, minima, maxima, 25th percentile (25%), 50th percentile (50%) and 75th percentile (75%).

Q19_5 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Transfer of knowledge		**Q19_6 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Cost of service**	
count	1134.000000	count	1134.000000
mean	4.141093	mean	5.930335
std	1.531495	std	1.404663
min	1.000000	min	1.000000
25%	3.000000	25%	5.000000
50%	4.000000	50%	7.000000
75%	5.000000	75%	7.000000
max	7.000000	max	7.000000
Q19_7 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Professionalism		**Q20_1 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of care**	
count	1134.000000	count	94.000000
mean	3.985009	mean	2.244681
std	1.781722	std	1.434492
min	1.000000	min	1.000000
25%	3.000000	25%	1.000000
50%	4.000000	50%	2.000000
75%	5.000000	75%	3.000000
max	7.000000	max	7.000000
Q32_5 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Transfer of knowledge		**Q32_6 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Financial aspects**	
count	431.000000	count	431.000000
mean	3.218097	mean	5.167053
std	1.759690	std	1.847671
min	1.000000	min	1.000000
25%	2.000000	25%	4.000000
50%	3.000000	50%	5.000000
75%	4.000000	75%	7.000000
max	7.000000	max	7.000000

Table 4: Overview of the descriptive statistics of the survey questions, including the number of answers (count), mean, standard deviations, minima, maxima, 25th percentile (25%), 50th percentile (50%) and 75th percentile (75%).

Q32_7 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Professionalism		**Scenario 1_1**	
count	431.000000	count	1254.000000
mean	3.825986	mean	2.467305
std	1.976577	std	1.573463
min	1.000000	min	1.000000
25%	2.000000	25%	1.000000
50%	4.000000	50%	2.000000
75%	6.000000	75%	3.000000
max	7.000000	max	7.000000
Scenario 1_2		**Scenario 1_3**	
count	1254.000000	count	1254.000000
mean	3.385965	mean	3.505582
std	1.640274	std	2.061206
min	1.000000	min	1.000000
25%	2.000000	25%	2.000000
50%	3.000000	50%	3.000000
75%	5.000000	75%	5.000000
max	7.000000	max	7.000000
Scenario 1_4		**Scenario 1_5**	
count	1254.000000	count	1254.000000
mean	5.017544	mean	4.692185
std	1.568244	std	1.681120
min	1.000000	min	1.000000
25%	4.000000	25%	3.000000
50%	5.000000	50%	5.000000
75%	6.000000	75%	6.000000
max	7.000000	max	7.000000
Scenario 1_6		**Scenario 1_7**	
count	1254.000000	count	1254.000000
mean	4.996810	mean	3.934609
std	2.091671	std	1.859948
min	1.000000	min	1.000000
25%	3.000000	25%	2.000000
50%	6.000000	50%	4.000000
75%	7.000000	75%	5.000000
max	7.000000	max	7.000000

Table 5: Overview of the descriptive statistics of the survey questions, including the number of answers (count), mean, standard deviations, minima, maxima, 25th percentile (25%), 50th percentile (50%) and 75th percentile (75%).

Q5 How many horses (incl. ponies, foals etc) are in your care? (numerical answer only) – Q12 How many veterinarians/ practices do you use?	
1.0	3.995495
2.0	4.448718
3.0	6.979798
Q19_1 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of care – Q12 How many veterinarians/ practices do you use?	
1.0	1.742394
2.0	1.707527
3.0	1.789773
Q19_2 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of service – Q12 How many veterinarians/ practices do you use?	
1.0	3.247465
2.0	3.298925
3.0	3.215909
Q19_3 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Horsemanship of the veterinarian – Q12 How many veterinarians/ practices do you use?	
1.0	3.849899
2.0	3.793548
3.0	3.613636
Q19_4 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Interpersonal skills – Q12 How many veterinarians/ practices do you use?	
1.0	5.075051
2.0	5.212903
3.0	5.221591
Q19_5 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Transfer of knowledge – Q12 How many veterinarians/ practices do you use?	
1.0	4.089249
2.0	4.172043
3.0	4.204545
Q19_6 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Cost of service – Q12 How many veterinarians/ practices do you use?	
1.0	6.048682
2.0	5.851613
3.0	5.806818

Table 6: Overview of what type of ranking participants tend to give to categories defined by Elte et al. [31], provided that they visit a particular amount of veterinarians.

Q19_7 Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Professionalism – Q12 How many veterinarians/ practices do you use?	
1.0	3.947262
2.0	3.963441
3.0	4.147727
Q20_1 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of care – Q12 How many veterinarians/ practices do you use?	
1.0	2.200000
2.0	2.261905
3.0	2.333333
Q20_2 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Quality of service – Q12 How many veterinarians/ practices do you use?	
1.0	3.350000
2.0	3.142857
3.0	2.833333
Q32_5 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Transfer of knowledge – Q12 How many veterinarians/ practices do you use?	
1.0	3.028302
2.0	3.411392
3.0	3.377049
Q32_6 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Financial aspects – Q12 How many veterinarians/ practices do you use?	
1.0	5.316038
2.0	4.955696
3.0	5.196721
Q32_7 You decide to call a vet. Which aspect do you find most important around and during that visit from your vet? Put the aspect most important to you at number 1 and the least important at number 7. - Professionalism – Q12 How many veterinarians/ practices do you use?	
1.0	3.622642
2.0	3.936709
3.0	4.245902
Scenario 1_1 – Q12 How many veterinarians/ practices do you use?	
1.0	2.331492
2.0	2.496169
3.0	2.777778
Scenario 1_2 – Q12 How many veterinarians/ practices do you use?	
1.0	3.359116
2.0	3.375479
3.0	3.492063

Table 7: Overview of what type of ranking participants tend to give to categories defined by Elte et al. [31], provided that they visit a particular amount of veterinarians.

Scenario 1_3 – Q12 How many veterinarians/ practices do you use?	
1.0	3.613260
2.0	3.498084
3.0	3.216931
Scenario 1_4 – Q12 How many veterinarians/ practices do you use?	
1.0	4.931860
2.0	5.084291
3.0	5.079365
Scenario 1_5 – Q12 How many veterinarians/ practices do you use?	
1.0	4.548803
2.0	4.823755
3.0	4.740741
Scenario 1_6 – Q12 How many veterinarians/ practices do you use?	
1.0	5.335175
2.0	4.800766
3.0	4.566138
Scenario 1_7 – Q12 How many veterinarians/ practices do you use?	
1.0	3.880295
2.0	3.921456
3.0	4.126984

Table 8: Overview of what type of ranking participants tend to give to categories defined by Elte et al. [31], provided that they visit a particular amount of veterinarians.

Appendix C: Quote Translations

Original quote in Dutch (Q15_2_TEXT)	Translated to English
bij euthanaseren van mijn paard na heftige koliek, zei veearts dat ik erg makkelijk was in het maken van de beslissing dat het genoeg was voor mijn paard. ik vind dat men dit niet kan maken, je bent als eigenaar al kapot van het feit dat je dier ziek is en gewoon niet meer verder kan. ik vond het een heel ongepaste opmerking.	when euthanising my horse after a severe colic, the veterinarian told me that I very easily made the decision for my horse that it had been enough. I don't think that someone can do that, as an owner you are already cut up with the fact that your animal is ill and can no longer go on. I found it an inappropriate comment.
Enorme prijsverschillen met de huidige dierenarts en het vertikken om een paard met wekenlange groene neusuitvloeiing en koorts niet met AB te behandelen	Huge price differences with the current veterinarian and refusing to treat a horse green nasal discharge and fever with AB
Te weinig begrip voor de emotionele kant van het verhaal.	Too little understanding for the emotional side of the story.
De dame in kwestie wilde niet komen als ze "alleen maar" mijn "spoed arts" en "inent arts" mocht zijn. Ze wilde alles of niets. Nou dan dus niets en doei.	The lady in question did not want to visit if she would "only" be my "emergency doctor" and "vaccination doctor". She wanted all or nothing. Well then nothing and bye.
Half werk leveren en mishandelen paard	Providing half-hearted work and ill-treating horse
Verkeerd geprikt met enten.	Incorrect injection with vaccination.
Onkundig en veel te duur!!	Incompetent and much too expensive!!
Ik ben zelf chirorug en leidt al jaren jonge artsen op tot chirurg. Het verbaast me telkens weer hoe verbaal incompetent vele dierenartsen zijn, ze zijn niet in staat te levellen met hun klant en rustig uit te leggen wat ze zien bij klinischnonderzoek, wat dat te betekenen heeft en laat staan te communiceren wat hin plan van aanpak is.	I am a surgeon myself and train young doctors to become a surgeon. It surprises me every time how verbally incompetent many veterinarians are, they are unable to level with their client and patiently explain what they noticed in their clinical examination, what this means and never mind communicating what their course of action is.
Paard stond niet op de eerste plek, handeling lukte niet wegens gebrekkig gereedschap, daarna onbeschofte behandeling toen we aandrongen tot een oplossing.	Horse was not the priority, [treatment] was unsuccessful due to defective equipment, then rude treatment when we insisted on a solution.
Als ik aangaf dat er iets met mijn sportpaard was werd dit (meerdere keren en zeer denigrerend) ontkend. Regide gebruik van medicatie, bijwerkingen werden ontkend	If I expressed that something was going on with my sport horse it would get denied (multiple times and very demeaning). Regular usage of medication, symptoms were denied
Er werd niet goed naar mij als eigenaar geluisterd	I was insufficiently listened to as owner

Vanwege verhuizing, maar ook vanwege het te vaak té moeilijk doen over bepaalde minimale oneffenheden op foto's waar een hoop andere dierenartsen dan weer veel nuchterder tegenaan keken. Daar wordt niemand beter van want uiteindelijk presteert een paard niet op z'n foto's. Al snappen wij ook heel goed hoe moeilijk het is om als dierenarts aan te geven dat je iets geen probleem vindt in deze tijd want je hebt zo een rechtszaak aan je broek hangen.	Due to moving house, but also because of acting difficult too often regarding minimal blemishes on pictures whereby a lot of other veterinarians would have a more down-to-earth stance on it. Nobody would profit from [pulling the alarm on every single small matter] because ultimately a horse does not achieve results with its images. Though we understand all too well how difficult it is as a veterinarian to define that you don't find something problematic at this time because you can receive a lawsuit at your doorstep just like that.
Slechte zorg voor mijn paard	Bad care for my horse

Table 9: Overview of Dutch quotes from some participants on question 15.2 "Have you ever stopped using a particular vet (practice)?" where the participant previously selected "Yes", which are translated to English.

Original quote in Dutch (Q12_2_TEXT)	**Translated to English**
Inentingen en worm onderzoek door de dierenarts uit de buurt en de andere zaken alleen bij een kliniek	Vaccinations and worm investigation [is performed] by the veterinarian in the area and the other stuff only with a clinic
Mijn vaste dierenarts heeft geen 24 uurs zorg. Als mijn paarden dat nodig hebben ga ik naar een arts/ kliniek die dat wel heeft.	My regular veterinatrian does not provide care 24 hours. If my horses need that, I go to a doctor/clinic that does.
Een zelfstandige voor de kleine dingen, een kliniek voor de ingewikkelde zaken	An independent for small matters, a clinic for more complicated things

Table 10: Overview of Dutch quotes from some participants on question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices", which are translated to English.

Original quote in Dutch (Q12_3_TEXT)	**Translated to English**
Naast DA die op stal komt, van een meer gespecialiseerde kliniek én van een orthopedisch specialist	Besides the veterinarian that comes to the stable, a more specialised clinic and an orthopaedic specialist
Meerdere klinieken in de omgeving, keuze afhankelijk van de klacht.	Multiple clinics in the area, choice dependent on the issue.
Weinig dierensartsen, vandaar alles wat kan komen op die dag	Not many veterinarians, hence everything that can come over that day

Table 11: Overview of Dutch quotes from some participants on question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices", which are translated to English.

Original quote in Dutch (Q45_TEXT)	**Translated to English**
Als je goed bereikbaar bent ook om 02:00h, het paard goed behandeld, dan maakt het mij niet uit of je een hork bent, ik kan wel wat hebben maar ik eis het beste voor m'n paarden.	If you are within easy reach even at around 02:00 AM, treat my horse right, then it does not matter to if you are a slob, I can handle that but I do require the best for my horses.
Ik vind het belangrijk dat de dierenarts kennis van zaken heeft en die kennis overdraagt. Tevens heb ik zelf al heel lang paarden en ken.mijn paarden goed. Daarom is het belangrijk dat de dierenarts ook goed naar mij luistert. Er moet oog zijn voor realiteit en kwaliteit van leven voor het paard in de eerste instantie maar ook oog voor de financiële kant De 7 keuzes zijn hier en daar wat lastig te onderscheiden. Ik vind het belangrijk dat een dierenarts weet waar hij of zij over praat. En me duidelijk zonder dingen te versluieren verteld wat er aan de hand is. ook als dit wat ernstigs is. Ik wil graag weten waar ik aan toe ben, ook als het een onprettige boodschap is. Kleding daarintegen kan me niet zoveel schelen. En natuurlijk moet hij/zij mijn paard met respect behandelen en niet bij het minste of geringste slaan.	I find it important that a veterinarian has expertise and conveys this knowledge. Besides, I have had horses for a long time and I know my horses well. Therefore, it is important that the veterinarian listens to me. [The veterinarian] must have an eye for reality and quality of life with regards to the horse in the first place but also have an eye for the financial side. The 7 options are here and there somewhat difficult to distinguish. I find it important that a veterinarian knows what they are talking about. And to tell me clearly without glossing over things what is going on. Even if it is worrying. I want to know where I stand, even if it is an unpleasant message. On the other hand, I don't mind the clothes that much. Of course, [the veterinarian] has to treat my horse with respect and not hit it with the least or the slightest.

Table 12: Overview of Dutch quotes from some participants on question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams, which are translated to English

Appendix D: Persona Identification

Q2 Are you?	Q4 How much, on average, do you spend on veterinary costs per horse per year?	Count
Female	< 200 euro/dollar	180
Female	201 - 500 euro/dollar	386
Female	501 - 1500 euro/dollar	364
Female	1501 - 5000 euro/dollar	222
Female	5001 - 10.000 euro/dollar	27
Female	Don't know	140
Female	Over 10.000 euro/dollar	13
Female	Rather not say	3
Non-binary	< 200 euro/dollar	9
Non-binary	201 - 500 euro/dollar	13
Non-binary	501 - 1500 euro/dollar	9
Non-binary	1501 - 5000 euro/dollar	9
Non-binary	5001 - 10.000 euro/dollar	1
Non-binary	Don't know	5
Non-binary	Over 10.000 euro/dollar	1
Non-binary	Rather not say	1
Male	< 200 euro/dollar	0
Male	201 - 500 euro/dollar	1
Male	501 - 1500 euro/dollar	0
Male	1501 - 5000 euro/dollar	2
Male	5001 - 10.000 euro/dollar	0
Male	Don't know	0
Male	Over 10.000 euro/dollar	0
Male	Rather not say	0
Rather not say	< 200 euro/dollar	0
Rather not say	201 - 500 euro/dollar	1
Rather not say	501 - 1500 euro/dollar	3
Rather not say	1501 - 5000 euro/dollar	1
Rather not say	5001 - 10.000 euro/dollar	0
Rather not say	Don't know	2
Rather not say	Over 10.000 euro/dollar	0
Rather not say	Rather not say	0
Other	< 200 euro/dollar	0
Other	201 - 500 euro/dollar	1
Other	501 - 1500 euro/dollar	0
Other	1501 - 5000 euro/dollar	1
Other	5001 - 10.000 euro/dollar	0
Other	Don't know	42
Other	Over 10.000 euro/dollar	0
Other	Rather not say	0

Table 13: Distribution of the intersection for questions 2 and 4.

Q2 Are you?	Q8 Do you and/or your horse(s) participate in competitions?	Count
Female	No	682
Female	Yes	653
Non-binary	No	2

Non-binary	Yes	0
Male	No	14
Male	Yes	34
Rather not say	No	5
Rather not say	Yes	2
Other	No	42
Other	Yes	2

Table 14: Distribution of the intersection for questions 2 and 8.

Q12 How many veterinarians/ practices do you use? - Selected Choice	**Q4 How much, on average, do you spend on veterinary costs per horse per year?**	**Count**
I use 2 veterinarians/ practices.	$<$ 200 euro/dollar	64
I use 2 veterinarians/ practices.	201 - 500 euro/dollar	176
I use 2 veterinarians/ practices.	501 - 1500 euro/dollar	167
I use 2 veterinarians/ practices.	1501 - 5000 euro/dollar	95
I use 2 veterinarians/ practices.	5001 - 10.000 euro/dollar	16
I use 2 veterinarians/ practices.	Don't know	21
I use 2 veterinarians/ practices.	Over 10.000 euro/dollar	4
I use 2 veterinarians/ practices.	Rather not say	3
I use one vet(practice)	$<$ 200 euro/dollar	29
I use one vet(practice)	201 - 500 euro/dollar	43
I use one vet(practice)	501 - 1500 euro/dollar	54
I use one vet(practice)	1501 - 5000 euro/dollar	46
I use one vet(practice)	5001 - 10.000 euro/dollar	7
I use one vet(practice)	Don't know	13
I use one vet(practice)	Over 10.000 euro/dollar	6
I use one vet(practice)	Rather not say	0
I use 3 or more veterinarians/ practices.	$<$ 200 euro/dollar	96
I use 3 or more veterinarians/ practices.	201 - 500 euro/dollar	182
I use 3 or more veterinarians/ practices.	501 - 1500 euro/dollar	155
I use 3 or more veterinarians/ practices.	1501 - 5000 euro/dollar	94
I use 3 or more veterinarians/ practices.	5001 - 10.000 euro/dollar	5
I use 3 or more veterinarians/ practices.	Don't know	155
I use 3 or more veterinarians/ practices.	Over 10.000 euro/dollar	4
I use 3 or more veterinarians/ practices.	Rather not say	1

Table 15: Distribution of the intersection for questions 4 and 12.

Q4 How much, on average, do you spend on veterinary costs per horse per year?	**Q40 What is your age (in years)?**	**Count**
$<$ 200 euro/dollar	30	0
201 - 500 euro/dollar	30	0
501 - 1500 euro/dollar	30	0
1501 - 5000 euro/dollar	30	0
5001 - 10.000 euro/dollar	30	0
Don't know	30	0
Over 10.000 euro/dollar	30	0

Rather not say	30	0
< 200 euro/dollar	45 - 54	47
201 - 500 euro/dollar	45 - 54	107
501 - 1500 euro/dollar	45 - 54	84
1501 - 5000 euro/dollar	45 - 54	57
5001 - 10.000 euro/dollar	45 - 54	6
Don't know	45 - 54	22
Over 10.000 euro/dollar	45 - 54	2
Rather not say	45 - 54	1
< 200 euro/dollar	35 - 44	49
201 - 500 euro/dollar	35 - 44	87
501 - 1500 euro/dollar	35 - 44	71
1501 - 5000 euro/dollar	35 - 44	49
5001 - 10.000 euro/dollar	35 - 44	10
Don't know	35 - 44	36
Over 10.000 euro/dollar	35 - 44	4
Rather not say	35 - 44	1
< 200 euro/dollar	25 - 34	28
201 - 500 euro/dollar	25 - 34	62
501 - 1500 euro/dollar	25 - 34	65
1501 - 5000 euro/dollar	25 - 34	19
5001 - 10.000 euro/dollar	25 - 34	6
Don't know	25 - 34	37
Over 10.000 euro/dollar	25 - 34	1
Rather not say	25 - 34	0
< 200 euro/dollar	55 - 64	30
201 - 500 euro/dollar	55 - 64	74
501 - 1500 euro/dollar	55 - 64	84
1501 - 5000 euro/dollar	55 - 64	55
5001 - 10.000 euro/dollar	55 - 64	3
Don't know	55 - 64	22
Over 10.000 euro/dollar	55 - 64	6
Rather not say	55 - 64	0
< 200 euro/dollar	18 - 24	13
201 - 500 euro/dollar	18 - 24	20
501 - 1500 euro/dollar	18 - 24	17
1501 - 5000 euro/dollar	18 - 24	17
5001 - 10.000 euro/dollar	18 - 24	1
Don't know	18 - 24	17
Over 10.000 euro/dollar	18 - 24	1
Rather not say	18 - 24	0
< 200 euro/dollar	65 - 74	17
201 - 500 euro/dollar	65 - 74	46
501 - 1500 euro/dollar	65 - 74	50
1501 - 5000 euro/dollar	65 - 74	31
5001 - 10.000 euro/dollar	65 - 74	2
Don't know	65 - 74	12
Over 10.000 euro/dollar	65 - 74	0
Rather not say	65 - 74	2
< 200 euro/dollar	75 - 84	4
201 - 500 euro/dollar	75 - 84	5
501 - 1500 euro/dollar	75 - 84	4
1501 - 5000 euro/dollar	75 - 84	5
5001 - 10.000 euro/dollar	75 - 84	0

Don't know	75 - 84	0
Over 10.000 euro/dollar	75 - 84	0
Rather not say	75 - 84	0
< 200 euro/dollar	Under 18	1
201 - 500 euro/dollar	Under 18	0
501 - 1500 euro/dollar	Under 18	1
1501 - 5000 euro/dollar	Under 18	2
5001 - 10.000 euro/dollar	Under 18	0
Don't know	Under 18	43
Over 10.000 euro/dollar	Under 18	0
Rather not say	Under 18	0

Table 16: Distribution of the intersection for questions 4 and 40.

Q12 How many veterinarians/ practices do you use? - Selected Choice	**Q14_NPS_GROUP How likely is it that you would recommend your (primary) veterinarian to friends or colleagues? - Group**	**Count**
I use 2 veterinarians/ practices.	Passive	251
I use 2 veterinarians/ practices.	Promoter	220
I use 2 veterinarians/ practices.	Detractor	75
I use one vet(practice)	Passive	217
I use one vet(practice)	Promoter	302
I use one vet(practice)	Detractor	41
I use 3 or more veterinarians/ practices.	Passive	84
I use 3 or more veterinarians/ practices.	Promoter	83
I use 3 or more veterinarians/ practices.	Detractor	31

Table 17: Distribution of the intersection for questions 12 and 14.

Q4 How much, on average, do you spend on veterinary costs per horse per year?	**Q8 Do you and/or your horse(s) participate in competitions?**	**Count**
< 200 euro/dollar	No	124
< 200 euro/dollar	Yes	65
201 - 500 euro/dollar	No	231
201 - 500 euro/dollar	Yes	170
501 - 1500 euro/dollar	No	173
501 - 1500 euro/dollar	Yes	203
1501 - 5000 euro/dollar	No	88
1501 - 5000 euro/dollar	Yes	147
5001 - 10.000 euro/dollar	No	8
5001 - 10.000 euro/dollar	Yes	20
Don't know	No	117
Don't know	Yes	72
Over 10.000 euro/dollar	No	2
Over 10.000 euro/dollar	Yes	12

Rather not say	No	2
Rather not say	Yes	2

Table 18: Distribution of the intersection for questions 4 and 8.

Q12 How many veterinarians/ practices do you use? - Selected Choice	**Q8 Do you and/or your horse(s) participate in competitions?**	**Count**
I use 2 veterinarians/ practices.	No	248
I use 2 veterinarians/ practices.	Yes	298
I use one vet(practice)	No	328
I use one vet(practice)	Yes	232
I use 3 or more veterinarians/ practices.	No	127
I use 3 or more veterinarians/ practices.	Yes	203

Table 19: Distribution of the intersection for questions 8 and 12.

Q12 How many veterinarians/ practices do you use? - Selected Choice	**Q15 Have you ever stopped using a particular vet(practice)? - Selected Choice**	**Count**
I use 2 veterinarians/ practices.	No	171
I use 2 veterinarians/ practices.	Yes	375
I use one vet(practice)	No	239
I use one vet(practice)	Yes	321
I use 3 or more veterinarians/ practices.	No	40
I use 3 or more veterinarians/ practices.	Yes	290

Table 20: Distribution of the intersection for questions 12 and 15.

Q14_NPS_GROUP How likely is it that you would recommend your (primary) veterinarian to friends or colleagues? - Group	**Q15 Have you ever stopped using a particular vet(practice)? - Selected Choice**	**Count**
Passive	No	184
Passive	Yes	368
Promoter	No	182
Promoter	Yes	423
Detractor	No	44
Detractor	Yes	103

Table 21: Distribution of the intersection for questions 14 and 15.

Q8 Do you and/or your horse(s) participate in competitions?	**Q15 Have you ever stopped using a particular vet(practice)? - Selected Choice**	**Count**
No	No	221
No	Yes	482
Yes	No	229
Yes	Yes	504

Table 22: Distribution of the intersection for questions 8 and 15.

Q4 How much, on average, do you spend on veterinary costs per horse per year?	**Q15 Have you ever stopped using a particular vet(practice)? - Selected Choice**	**Count**
$<$ 200 euro/dollar	No	78
$<$ 200 euro/dollar	Yes	111
201 - 500 euro/dollar	No	123
201 - 500 euro/dollar	Yes	278
501 - 1500 euro/dollar	No	128
501 - 1500 euro/dollar	Yes	248
1501 - 5000 euro/dollar	No	88
1501 - 5000 euro/dollar	Yes	147
5001 - 10.000 euro/dollar	No	11
5001 - 10.000 euro/dollar	Yes	17
Don't know	No	19
Don't know	Yes	170
Over 10.000 euro/dollar	No	2
Over 10.000 euro/dollar	Yes	12
Rather not say	No	1
Rather not say	Yes	3

Table 23: Distribution of the intersection for questions 4 and 15.

Appendix E: Overview of Used Research Methods

In this Appendix, I provide an overview of what the different research methods entailed, including all the steps that I experimented with in order to get to the final selection of steps to get the best results. Note that that all the steps described are the same for each open-ended questionnaire question that was analysed.

Used Techniques & (Pre-Processing) Steps

K-means Clustering:

1. Vectorize and calculate TF-IDF with the function TfidfVectorizer from the sklearn.feature_extraction.text library
2. Fit the k-means model with function KMeans from library sklearn.cluster on the TF-IDF results
3. Calculate optimal number of clusters with KneeLocator
4. Create the k-means model with the found optimal number of clusters
5. Print the top 10 words for every cluster created by the k-means model
6. Each k-means cluster has a unique number, and these assigned numbers are saved with the corresponding (cleaned) answers from the participants

LDA Version 1:

1. Create a dictionary of the data with the Dictionary function from the gensim.corpora library
2. Create an LDA model based on this dictionary and a coherence model with coherence scores
3. Determine the optimal number of clusters based on the coherence scores, which is determined by taking the highest coherence score's index adding two to it
4. Use the pre-processed data to fit a Document-Term Matrix (DTM)
5. The LDA model we created earlier is now fitted according to the DTM
6. Provide top 10 words for every cluster created by the LDA model

LDA Version 2:

1. Create a dictionary of the data with the Dictionary function from the gensim.corpora library
2. Create an LDA model based on this dictionary and a coherence model with coherence scores
3. Determine the optimal number of clusters based on the coherence scores, which is determined by taking the highest coherence score's index adding two to it
4. Convert the text to a bag-of-words (BoW) representation and perform LDA on it
5. Provide top 10 words for every cluster created by the LDA model

Iterative Process of Improving Pre-Processing Steps

Round 1:

- PorterStemmer
- No feature processing
- Elimination of Dutch stopwords from spaCy's nl_core_news_sm library
- Elimination of English stopwords from spaCy's en_core_news_sm library
- Elimination of extra stopwords: 'ivm', 'dierenartsen', 'dierenarts', 'ss', 'hhh', 'x', 'n', 'nvt', 'ja', 'nee', 'paard', 'paarden', 'de', 'het', 'een', 'to', 'i', 'a', 'not', 'the', 'didnt', 'use', 'i', 'niet', 'geen'

Round 2:

- PorterStemmer
- No feature processing
- Elimination of Dutch stopwords from spaCy's nl_core_news_sm library

- Elimination of English stopwords from spaCy's en_core_news_sm library
- Elimination of extra stopwords: 'paardendierenarts', 'paardenarts', 'nogal', 'verder', 'bijv', 'miss', 'én', 'ie', 'etc', 'mn', 'would', 'need', 'xierenarts', 'also', 'vs', 'keek', 'deed', 'zei', 'vaak', 'heel', 'erg', 'doei', 'ect', 'evt', 'echt', 'wel', 'daarna', 'komt', 'like', 'horsr', 'k', 'hele', 'dierenartspraktijk', 'dierenartsenpraktijk', 'equine', 'dap', 'oa', 'one', 'two', 'three', 'ivm', 'da', 'dierenartsen', 'dierenarts', 'veterinarian', 'veterinarians', 'vet', 'ss', 'hhh', 'x', 'n', 'nvt', 'ja', 'nee', 'paard', 'paarden', 'horse', 'horses', 'de', 'het', 'een', 'to', 'i', 'a', 'not', 'the', 'didnt', 'use', 'i', 'niet', 'geen', 'vandaar', 'ieder', 'gewoon', 'get', 'nou', 'doei', 'steeds', 'waardoor', 'moest', 'moet', 'moeten', 'misschien', 'nadat', 'eerst', 'waar', 'fijn', 'vanwege', 'vindt', 'vind', 'laten', 'staat', 'staan', 'might', 'should', 'terwijl', 'gaan', 'tbv', 'totdat', 'hierdoor', 'zowel', 'later', 'helaas', 'either', 'zeer', 'eventueel', 'aangezien', 'another', 'teveel', 'zeggen', 'nooit', 'via', 'juist', 'én', 'immers', 'meestal', 'allemaal', 'weet', 'twee', 'she', 'eén', 'zodat', 'één', 'jij', 'ahead', 'weer', 'eg', 'bent', 'kijkt', 'dergelijk', 'put', 'will', 'hen', 'ietwat', 'genoeg', 'komen', 'though', 'uiteraard', 'indien', 'mogelijk', 'rondom', 'daarin', 'regarding', 'regards', 'regard', 'much', 'ongeveer', 'elk', 'eraan', 'per', 'must', 'b', 'because', 'cause', 'zomaar', 'lot', 'including', 'include', 'well', 'seem', 'own', 'bijvoorbeeld', 'jammer', 'gaat', 'w', 'onze', 'ons', 'naast', 'wanneer', 'vooral', 'best', 'qua', 'alleen', 'ten', 'hello', 'hallo', 'still', 'doesnt', 'does', 'goes', 'everything', 'given', 'give', 'often', 'see', 'thing', 'upon', 'led', 'said', 'may', 'even', 'course', 'however', 'except', 'anything', 'mbt', 'z', 'mooi', 'ofwel', 'daarvan', 'ongeacht', 'soort', 'tm', 'geval', 'ermee', 'beetje', 'mij', 'bijna', 'tenslotte', 'waarvoor', 'all', 'alle', 'let', 'perhaps', 'big', 'us', 'other', 'without', 'particular', 'particularly', 'wél', 'helemaal', 'bedoel', 'bedoelde', 'jou', 'zóveel', 'hopelijk', 'obvious', 'nice', 'super', 'anyone', 'unless', 'especially', 'example', 'never', 'actual', 'actually', 'far', 'likewise', 'totally', 'something', 'anyway', 'voordat', 'vd', 'wij', 'zozeer', 'daarmee', 'allebei', 'dmv', 'erop', 'daarom', 'pré', 'kan', 'eeerste', 'instantie', 'tevens', 'hoor', 'enorm', 'noch', 'bvb', 'guess', 'eigenlijk', 'least', 'f', 'bc', 'ene', 'natuurlijk', 'find', 'zeker', 'bovenstaands', 'hierboven', 'due', 'sometimes', 'sometime', 'nl', 'bedoeld', 'lijkt', 'zéér', 'always', 'way', 'waarop', 'uiteindelijk', 'voornamelijk', 'isnt', 'think', 'gehad', 'hoever', 'paar', 'redelijk', 'stel', 'waar', 'af', 'dont', 'im', 'zonder', 'aantal', 'idem', 'liever', 'inmiddels', 'simpelweg', 'therefore', 'primarili', 'yet', 'sought', 'certain', 'certainly', 'toendertijd', 'huidig', 'meest', 'particularli', 'waarom', 'net', 'sommigen', 'sommige', 'houdt', 'houd', 'enig', 'enigszin', 'degene', 'ok', 'okay', 'he', 'toward', 'towards', 'jullie', 'what', 'vanuit', 'heen', 'obviously', 'welk', 'welke', 'allen', 'toe', 'behind', 'whole', 'rather', 'total', 'maybe', 'necessarily', 'since'

Round 3:

- Remove punctuation
- Lowercasing
- Removing diacritrics
- Tokenization with NLTK
- Lemmatization with WordNetLemmatizer from NLTK
- Only proper nouns, nouns, and adjectives (so no verbs or adverbs)
- Elimination of Dutch stopwords from spaCy's nl_core_news_sm library
- Elimination of English stopwords from spaCy's en_core_news_sm library
- Elimination of extra stopwords: 'paardendierenarts', 'paardenarts', 'nogal', 'verder', 'bijv', 'miss', 'én', 'ie', 'etc', 'mn', 'would', 'need', 'xierenarts', 'also', 'vs', 'keek', 'deed', 'zei', 'vaak', 'heel', 'erg', 'doei', 'ect', 'evt', 'echt', 'wel', 'daarna', 'komt', 'like', 'horsr', 'k', 'hele', 'dierenartspraktijk', 'dierenartsenpraktijk', 'equine', 'dap', 'oa', 'one', 'two', 'three', 'ivm', 'da', 'dierenartsen', 'dierenarts', 'veterinarian', 'veterinarians', 'vet', 'ss', 'hhh', 'x', 'n', 'nvt', 'ja', 'nee', 'paard', 'paarden', 'horse', 'horses', 'de', 'het', 'een', 'to', 'i', 'a', 'not', 'the', 'didnt', 'use', 'i', 'niet', 'geen', 'vandaar', 'ieder', 'gewoon', 'get', 'nou', 'doei', 'steeds', 'waardoor', 'moest', 'moet', 'moeten', 'misschien', 'nadat', 'eerst', 'waar', 'fijn', 'vanwege', 'vindt', 'vind', 'laten', 'staat', 'staan', 'might', 'should', 'terwijl', 'gaan', 'tbv', 'totdat', 'hierdoor', 'zowel', 'later', 'helaas', 'either', 'zeer', 'eventueel', 'aangezien', 'another', 'teveel', 'zeggen', 'nooit', 'via', 'juist', 'én',

‘immers’, ‘meestal’, ‘allemaal’, ‘weet’, ‘twee’, ‘she’, ‘eén’, ‘zodat’, ‘één’, ‘jij’, ‘ahead’, ‘weer’, ‘eg’, ‘bent’, ‘kijkt’, ‘dergelijk’, ‘put’, ‘will’, ‘hen’, ‘ietwat’, ‘genoeg’, ‘komen’, ‘though’, ’uiteraard’, ‘indien’, ‘mogelijk’, ‘rondom’, ‘daarin’, ‘regarding’, ‘regards’, ’regard’, ’much’, ‘ongeveer’, ‘elk’, ‘eraan’, ‘per’, ‘must’, ‘b’, ‘because’, ‘cause’, ‘zomaar’, ‘lot’, ‘including’, ‘include’, ‘well’, ‘seem’, ‘own’, ‘bijvoorbeeld’, ‘jammer’, ‘gaat’, ‘w’, ‘onze’, ‘ons’, ‘naast’, ‘wanneer’, ‘vooral’, ‘best’, ‘qua’, ‘alleen’, ‘ten’, ‘hello’, ‘hallo’, ‘still’, ‘doesnt’, ‘does’, ‘goes’, ‘everything’, ‘given’, ‘give’, ‘often’, ‘see’, ‘thing’, ‘upon’, ‘led’, ‘said’, ‘may’, ‘even’, ‘course’, ‘however’, ‘except’, ‘anything’, ’mbt’, ‘z’, ‘mooi’, ‘ofwel’, ‘daarvan’, ‘ongeacht’, ‘soort’, ‘tm’, ‘geval’, ‘ermee’, ‘beetje’, ’mij’, ‘bijna’, ‘tenslotte’, ‘waarvoor’, ‘all’, ‘alle’, ‘let’, ‘perhaps’, ‘big’, ‘us’, ‘other’, ‘without’, ‘particular’, ‘particularly’, ‘wél’, ‘helemaal’, ‘bedoel’, ‘bedoelde’, ‘jou’, ‘zóveel’, ‘hopelijk’, ‘obvious’, ‘nice’, ‘super’, ‘anyone’, ‘unless’, ‘especially’, ‘example’, ‘never’, ‘actual’, ‘actually’, ‘far’, ‘likewise’, ‘totally’, ‘something’, ‘anyway’, ‘voordat’, ‘vd’, ‘wij’, ‘zozeer’, ‘daarmee’, ‘allebei’, ‘dmv’, ‘erop’, ‘daarom’, ‘pré’, ‘kan’, ‘eeerste’, ‘instantie’, ‘tevens’, ‘hoor’, ‘enorm’, ‘noch’, ‘bvb’, ‘guess’, ‘eigenlijk’, ‘least’, ‘f’, ‘bc’, ‘ene’, ‘natuurlijk’, ‘find’, ‘zeker’, ‘bovenstaands’, ‘hierboven’, ‘due’, ‘sometimes’, ‘sometime’, ‘nl’, ‘bedoeld’, ‘lijkt’, ‘zéér’, ‘always’, ‘way’, ‘waarop’, ‘uiteindelijk’, ‘voornamelijk’, ‘isnt’, ‘think’, ‘gehad’, ‘hoever’, ‘paar’, ‘redelijk’, ‘stel’, ‘waar’, ‘af’, ’dont’, ‘im’, ’zonder’, ‘aantal’, ‘idem’, ‘liever’, ‘inmiddels’, ‘simpelweg’, ‘therefore’, ‘primarili’, ‘yet’, ‘sought’, ‘certain’, ‘certainly’, ‘toendertijd’, ‘huidig’, ‘meest’, ‘particularli’, ’waarom’, ‘net’, ‘sommigen’, ‘sommige’, ‘houdt’, ‘houd’, ‘enig’, ‘enigszin’, ‘degene’, ‘ok’, ‘okay’, ‘he’, ‘toward’, ‘towards’, ‘jullie’, ‘what’, ‘vanuit’, ‘heen’, ‘obviously’, ‘welk’, ‘welke’, ‘allen’, ‘toe’, ‘behind’, ‘whole’, ‘rather’, ‘total’, ‘maybe’, ‘necessarily’, ‘since’, ’doet’, ‘laat’, ‘denkt’, ‘stellen’, ’take’, ‘daardoor’, ‘erbij’, ‘hiermee’, ‘daaruit’, ‘mogen’, ‘hoeverre’, ‘waaronder’, ‘kwam’, ’gaf’, ‘ter’, ‘plekke’, ‘vandaaruit’, ‘vervolgens’, ‘fourth’, ‘potential’, ‘potentieel’, ‘everyone’, ‘say’, ‘vooraf’, ‘ondanks’, ‘eventuele’, ‘haalt’, ‘waarbij’, ‘daarnaast’, ‘pure’, ‘jouw’, ‘various’, ’way’, ‘man’, ‘schrijf’, ‘schrijft’, ‘tussen’, ‘ookal’, ‘vanaf’, ‘telkens’, ‘kunt’, ‘nsaid’, ‘enz’, ‘v’, ‘eerder’, ‘ander’, ‘anders’, ‘meteen’, ‘zegt’, ‘hierin’, ‘go’, ’ga’, ’hebt’, ‘mine’, ‘anytime’, ‘enige’, ‘vond’, ‘vonden’, ‘gebeurd’, ‘zoals’, ‘zoal’, ‘daarover’, ‘ij’, ‘tweede’, ‘first’, ‘enough’, ‘ineens’, ‘volgende’, ‘volgens’, ‘afterwards’, ‘beiden’, ‘beide’, ‘velen’, ‘vele’, ‘groot’, ‘dergelijke’, ‘four’, ‘third’, ‘second’, ‘fir’, ‘became’, ‘become’, ‘previous’, ‘along’, ‘over’, ’almost’, ‘bit’, ‘momenteel’, ‘dezelfde’, ‘deze’, ‘keep’, ‘whoever’, ‘thank’, ‘dame’, ‘wasrvan’, ‘daarop’, ‘zit’, ‘gebeurde’, ‘hetzelfde’, ‘ervanuit’, ‘none’, ’zero’, ‘moreover’, ‘word’, ‘wordt’, ‘bv’, ‘hoi’, ‘ipv’, ‘iedere’, ‘iedereen’, ‘zonodig’, ‘daarvoor’, ‘hierover’, ‘sinds’, ’mate’, ‘geworden’, ‘liet’, ‘lag’, ‘allerlei’, ‘moment’, ‘dingetje’, ‘hiervoor’, ‘soms’, ‘whichever’, ‘recent’, ‘recently’, ‘overig’, ‘overige’, ‘veterinair’, ‘could’, ‘got’, ‘foremost’, ‘mezelf’, ‘waarin’, ‘principe’, ‘blijf’, ‘dr’, ‘nan’

Round 4:

- PorterStemmer
- No feature processing
- Elimination of Dutch stopwords from spaCy’s nl_core_news_sm library
- Elimination of English stopwords from spaCy’s en_core_news_sm library
- Elimination of extra stopwords: ‘paardendierenarts’, ‘paardenarts’, ‘nogal’, ‘verder’, ‘bijv’, ‘miss’, ‘én’, ‘ie’, ‘etc’, ‘mn’, ‘would’, ‘need’, ‘xierenarts’, ‘also’, ‘vs’, ‘keek’, ‘deed’, ‘zei’, ‘vaak’, ‘heel’, ‘erg’, ’doei’, ‘ect’, ‘evt’, ‘echt’, ‘wel’, ‘daarna’, ‘komt’, ‘like’, ‘horsr’, ‘k’, ‘hele’, ‘dierenartspraktijk’, ‘dierenartsenpraktijk’, ‘equine’, ‘dap’, ‘oa’, ‘one’, ‘two’, ‘three’, ‘ivm’, ‘da’, ‘dierenartsen’, ‘dierenarts’, ‘veterinarian’, ‘veterinarians’, ‘vet’, ‘ss’, ‘hhh’, ‘x’, ‘n’, ‘nvt’, ‘ja’, ‘nee’, ‘paard’, ‘paarden’, ‘horse’, ‘horses’, ‘de’, ‘het’, ‘een’, ‘to’, ‘i’, ‘a’, ‘not’, ‘the’, ‘didnt’, ‘use’, ‘i’, ‘niet’, ‘geen’, ‘vandaar’, ‘ieder’, ‘gewoon’, ‘get’, ‘nou’, ‘doei’, ‘steeds’, ‘waardoor’, ‘moest’, ‘moet’, ‘moeten’, ‘misschien’, ‘nadat’, ‘eerst’, ‘waar’, ‘fijn’, ’vanwege’, ‘vindt’, ‘vind’, ‘laten’, ‘staat’, ‘staan’, ‘might’, ‘should’, ‘terwijl’, ‘gaan’, ‘tbv’, ‘totdat’, ‘hierdoor’, ‘zowel’, ‘later’, ‘helaas’, ‘either’, ‘zeer’, ‘eventueel’, ‘aangezien’, ‘another’, ‘teveel’, ‘zeggen’, ‘nooit’, ‘via’, ‘juist’, ‘én’, ‘immers’, ‘meestal’, ’allemaal’, ‘weet’, ‘twee’, ‘she’, ‘eén’, ‘zodat’, ‘één’, ‘jij’, ‘ahead’, ‘weer’, ‘eg’, ‘bent’, ’kijkt’, ‘dergelijk’, ‘put’, ‘will’, ‘hen’, ‘ietwat’, ‘genoeg’, ‘komen’, ‘though’, ‘uiteraard’, ‘indien’, ‘mogelijk’, ‘rondom’, ‘daarin’, ‘regarding’, ‘regards’, ‘regard’, ‘much’, ‘ongeveer’,

‘elk’, ‘eraan’, ‘per’, ‘must’, ‘b’, ‘because’, ‘cause’, ‘zomaar’, ‘lot’, ’including’, ‘include’, ‘well’, ‘seem’, ‘own’, ‘bijvoorbeeld’, ‘jammer’, ’gaat’, ‘w’, ’onze’, ’ons’, ’naast’, ‘wanneer’, ‘vooral’, ‘best’, ‘qua’, ‘alleen’, ‘ten’, ‘hello’, ‘hallo’, ’still’, ’doesnt’, ‘does’, ‘goes’, ‘everything’, ‘given’, ‘give’, ‘often’, ‘see’, ‘thing’, ‘upon’, ‘led’, ’said’, ‘may’, ‘even’, ‘course’, ‘however’, ‘except’, ‘anything’, ‘mbt’, ’z’, ‘mooi’, ‘ofwel’, ‘daarvan’, ‘ongeacht’, ‘soort’, ‘tm’, ‘geval’, ‘ermee’, ’beetje’, ‘mij’, ‘bijna’, ‘tenslotte’, ‘waarvoor’, ‘all’, ‘alle’, ‘let’, ‘perhaps’, ‘big’, ‘us’, ‘other’, ‘without’, ‘particular’, ‘particularly’, ‘wél’, ‘helemaal’, ‘bedoel’, ‘bedoelde’, ‘jou’, ‘zóveel’, ‘hopelijk’, ‘obvious’, ‘nice’, ‘super’, ‘anyone’, ‘unless’, ‘especially’, ‘example’, ‘never’, ‘actual’, ‘actually’, ‘far’, ‘likewise’, ‘totally’, ‘something’, ‘anyway’, ‘voordat’, ‘vd’, ‘wij’, ’zozeer’, ’daarmee’, ‘allebei’, ‘dmv’, ‘erop’, ‘daarom’, ‘pré’, ‘kan’, ‘eeerste’, ‘instantie’, ’tevens’, ’hoor’, ‘enorm’, ‘noch’, ‘bvb’, ‘guess’, ‘eigenlijk’, ‘least’, ‘f’, ‘bc’, ‘ene’, ‘natuurlijk’, ‘find’, ‘zeker’, ‘bovenstaands’, ‘hierboven’, ‘due’, ‘sometimes’, ‘sometime’, ‘nl’, ‘bedoeld’, ‘lijkt’, ‘zéér’, ‘always’, ‘way’, ‘waarop’, ‘uiteindelijk’, ‘voornamelijk’, ’isnt’, ‘think’, ‘gehad’, ‘hoever’, ‘paar’, ‘redelijk’, ‘stel’, ‘waar’, ‘af’, ‘dont’, ‘im’, ‘zonder’, ‘aantal’, ‘idem’, ‘liever’, ‘inmiddels’, ‘simpelweg’, ‘therefore’, ‘primarili’, ‘yet’, ‘sought’, ‘certain’, ‘certainly’, ‘toendertijd’, ‘huidig’, ‘meest’, ‘particularli’, ‘waarom’, ‘net’, ‘sommigen’, ‘sommige’, ‘houdt’, ‘houd’, ‘enig’, ‘enigszin’, ‘degene’, ‘ok’, ‘okay’, ‘he’, ‘toward’, ‘towards’, ‘jullie’, ‘what’, ‘vanuit’, ‘heen’, ‘obviously’, ‘welk’, ‘welke’, ‘allen’, ‘toe’, ‘behind’, ‘whole’, ‘rather’, ‘total’, ‘maybe’, ‘necessarily’, ‘since’, ‘doet’, ‘laat’, ‘denkt’, ‘stellen’, ‘take’, ‘daardoor’, ‘erbij’, ’hiermee’, ‘daaruit’, ‘mogen’, ‘hoeverre’, ’waaronder’, ‘kwam’, ’gaf’, ‘ter’, ‘plekke’, ‘vandaaruit’, ‘vervolgens’, ‘fourth’, ‘potential’, ‘potentieel’, ‘everyone’, ‘say’, ‘vooraf’, ‘ondanks’, ’eventuele’, ‘haalt’, ‘waarbij’, ‘daarnaast’, ‘pure’, ‘jouw’, ‘various’, ‘way’, ‘man’, ’schrijf’, ‘schrijft’, ‘tussen’, ‘ookal’, ‘vanaf’, ‘telkens’, ‘kunt’, ‘nsaid’, ‘enz’, ‘v’, ‘eerder’, ’ander’, ‘anders’, ‘meteen’, ‘zegt’, ‘hierin’, ‘go’, ‘ga’, ‘hebt’, ‘mine’, ‘anytime’, ’enige’, ‘vond’, ‘vonden’, ‘gebeurd’, ‘zoals’, ‘zoal’, ‘daarover’, ‘ij’, ‘tweede’, ‘first’, ‘enough’, ’ineens’, ‘volgende’, ‘volgens’, ‘afterwards’, ‘beiden’, ‘beide’, ‘velen’, ’vele’, ‘groot’, ‘dergelijke’, ‘four’, ‘third’, ‘second’, ‘fir’, ‘became’, ‘become’, ‘previous’, ‘along’, ‘over’, ‘almost’, ‘bit’, ‘momenteel’, ‘dezelfde’, ‘deze’, ‘keep’, ‘whoever’, ‘thank’

Round 5:

- Remove punctuation
- Lowercasing
- Removing diacritics
- Tokenization with NLTK
- Lemmatization with WordNetLemmatizer from NLTK
- Only nouns, verbs, and adjectives
- Elimination of Dutch stopwords from spaCy’s nl_core_news_sm library
- Elimination of English stopwords from spaCy’s en_core_news_sm library
- Elimination of extra stopwords: ‘paardendierenarts’, ‘paardenarts’, ‘nogal’, ‘verder’, ‘bijv’, ‘miss’, ‘én’, ‘ie’, ‘etc’, ‘mn’, ‘would’, ‘need’, ‘xierenarts’, ‘also’, ‘vs’, ‘keek’, ‘deed’, ‘zei’, ‘vaak’, ‘heel’, ‘erg’, ‘doei’, ‘ect’, ‘evt’, ‘echt’, ‘wel’, ‘daarna’, ‘komt’, ‘like’, ‘horsr’, ‘k’, ‘hele’, ‘dierenartspraktijk’, ‘dierenartsenpraktijk’, ‘equine’, ‘dap’, ‘oa’, ‘one’, ‘two’, ’three’, ‘ivm’, ‘da’, ‘dierenartsen’, ‘dierenarts’, ‘veterinarian’, ‘veterinarians’, ‘vet’, ‘ss’, ‘hhh’, ’x’, ‘n’, ‘nvt’, ‘ja’, ‘nee’, ‘paard’, ‘paarden’, ‘horse’, ‘horses’, ‘de’, ‘het’, ‘een’, ‘to’, ’i’, ’a’, ‘not’, ‘the’, ‘didnt’, ‘use’, ‘i’, ‘niet’, ‘geen’, ‘vandaar’, ‘ieder’, ‘gewoon’, ‘get’, ’nou’, ’doei’, ‘steeds’, ‘waardoor’, ‘moest’, ‘moet’, ‘moeten’, ‘misschien’, ‘nadat’, ‘eerst’, ‘waar’, ‘fijn’, ‘vanwege’, ‘vindt’, ‘vind’, ‘laten’, ‘staat’, ‘staan’, ‘might’, ‘should’, ‘terwijl’, ’gaan’, ’tbv’, ‘totdat’, ‘hierdoor’, ‘zowel’, ‘later’, ‘helaas’, ‘either’, ‘zeer’, ‘eventueel’, ’aangezien’, ‘another’, ‘teveel’, ‘zeggen’, ‘nooit’, ‘via’, ‘juist’, ‘én’, ‘immers’, ‘meestal’, ’allemaal’, ‘weet’, ‘twee’, ‘she’, ‘eén’, ‘zodat’, ‘één’, ‘jij’, ‘ahead’, ‘weer’, ‘eg’, ‘bent’, ’kijkt’, ‘dergelijk’, ‘put’, ’will’, ‘hen’, ‘ietwat’, ‘genoeg’, ‘komen’, ‘though’, ‘uiteraard’, ‘indien’, ‘mogelijk’, ‘rondom’, ‘daarin’, ‘regarding’, ‘regards’, ‘regard’, ’much’, ‘ongeveer’, ‘elk’, ‘eraan’, ‘per’, ‘must’, ‘b’, ‘because’, ‘cause’, ‘zomaar’, ‘lot’, ‘including’, ‘include’, ‘well’, ‘seem’, ‘own’, ‘bijvoorbeeld’, ‘jammer’, ‘gaat’, ‘w’, ‘onze’, ‘ons’, ‘naast’, ‘wanneer’, ‘vooral’, ‘best’, ‘qua’, ‘alleen’, ‘ten’, ‘hello’, ‘hallo’, ‘still’, ‘doesnt’, ‘does’, ‘goes’, ‘everything’, ‘given’,

‘give’, ‘often’, ‘see’, ‘thing’, ‘upon’, ‘led’, ’said’, ‘may’, ‘even’, ‘course’, ‘however’, ‘except’, ‘anything’, ‘mbt’, ’z’, ‘mooi’, ‘ofwel’, ‘daarvan’, ‘ongeacht’, ‘soort’, ‘tm’, ‘geval’, ‘ermee’, ’beetje’, ‘mij’, ‘bijna’, ‘tenslotte’, ‘waarvoor’, ‘all’, ‘alle’, ‘let’, ‘perhaps’, ‘big’, ‘us’, ‘other’, ‘without’, ‘particular’, ‘particularly’, ‘wél’, ‘helemaal’, ‘bedoel’, ‘bedoelde’, ‘jou’, ‘zóveel’, ‘hopelijk’, ‘obvious’, ‘nice’, ‘super’, ‘anyone’, ‘unless’, ‘especially’, ‘example’, ‘never’, ‘actual’, ‘actually’, ‘far’, ‘likewise’, ‘totally’, ‘something’, ‘anyway’, ‘voordat’, ‘vd’, ‘wij’, ’zozeer’, ’daarmee’, ‘allebei’, ‘dmv’, ‘erop’, ‘daarom’, ‘pré’, ‘kan’, ‘eeerste’, ‘instantie’, ’tevens’, ’hoor’, ‘enorm’, ‘noch’, ‘bvb’, ‘guess’, ‘eigenlijk’, ‘least’, ‘f’, ‘bc’, ’ene’, ’natuurlijk’, ‘find’, ‘zeker’, ‘bovenstaands’, ‘hierboven’, ‘due’, ‘sometimes’, ‘sometime’, ’nl’, ‘bedoeld’, ‘lijkt’, ‘zéér’, ‘always’, ‘way’, ‘waarop’, ‘uiteindelijk’, ‘voornamelijk’, ’isnt’, ‘think’, ‘gehad’, ‘hoever’, ‘paar’, ‘redelijk’, ‘stel’, ‘waar’, ‘af’, ‘dont’, ‘im’, ‘zonder’, ‘aantal’, ‘idem’, ‘liever’, ‘inmiddels’, ‘simpelweg’, ‘therefore’, ‘primarili’, ‘yet’, ‘sought’, ‘certain’, ‘certainly’, ‘toendertijd’, ‘huidig’, ‘meest’, ‘particularli’, ‘waarom’, ‘net’, ‘sommigen’, ‘sommige’, ‘houdt’, ‘houd’, ‘enig’, ‘enigszin’, ‘degene’, ‘ok’, ‘okay’, ‘he’, ‘toward’, ‘towards’, ‘jullie’, ‘what’, ‘vanuit’, ‘heen’, ‘obviously’, ‘welk’, ‘welke’, ‘allen’, ‘toe’, ‘behind’, ‘whole’, ‘rather’, ‘total’, ‘maybe’, ‘necessarily’, ‘since’, ‘doet’, ‘laat’, ‘denkt’, ‘stellen’, ‘take’, ‘daardoor’, ‘erbij’, ’hiermee’, ‘daaruit’, ‘mogen’, ‘hoeverre’, ’waaronder’, ‘kwam’, ’gaf’, ‘ter’, ‘plekke’, ‘vandaaruit’, ‘vervolgens’, ‘fourth’, ‘potential’, ‘potentieel’, ‘everyone’, ‘say’, ‘vooraf’, ‘ondanks’, ’eventuele’, ‘haalt’, ‘waarbij’, ‘daarnaast’, ‘pure’, ‘jouw’, ‘various’, ‘way’, ‘man’, ’schrijf’, ‘schrijft’, ‘tussen’, ‘ookal’, ‘vanaf’, ‘telkens’, ‘kunt’, ‘nsaid’, ‘enz’, ‘v’, ‘eerder’, ’ander’, ‘anders’, ‘meteen’, ‘zegt’, ‘hierin’, ‘go’, ‘ga’, ‘hebt’, ‘mine’, ‘anytime’, ’enige’, ’vond’, ‘vonden’, ‘gebeurd’, ‘zoals’, ‘zoal’, ‘daarover’, ‘ij’, ‘tweede’, ‘first’, ‘enough’, ’ineens’, ‘volgende’, ‘volgens’, ‘afterwards’, ‘beiden’, ‘beide’, ‘velen’, ’vele’, ‘groot’, ‘dergelijke’, ‘four’, ‘third’, ‘second’, ‘fir’, ‘became’, ‘become’, ‘previous’, ‘along’, ‘over’, ‘almost’, ‘bit’, ‘momenteel’, ‘dezelfde’, ‘deze’, ‘keep’, ‘whoever’, ‘thank’, ‘dame’, ‘wasrvan’, ‘daarop’, ‘zit’, ‘gebeurde’, ‘hetzelfde’, ‘ervanuit’, ‘none’, ‘zero’, ‘moreover’, ‘word’, ‘wordt’, ‘bv’, ‘hoi’, ‘ipv’, ‘iedere’, ‘iedereen’, ‘zonodig’, ‘daarvoor’, ‘hierover’, ‘sinds’, ‘mate’, ‘geworden’, ‘liet’, ‘lag’, ‘allerlei’, ‘moment’, ’dingetje’, ‘hiervoor’, ‘soms’, ‘whichever’, ‘recent’, ‘recently’, ‘overig’, ‘overige’, ‘veterinair’, ‘could’, ‘got’, ‘foremost’, ‘mezelf’, ‘waarin’, ‘principe’, ‘blijf’, ‘dr’, ‘nan’, ‘hijzij’, ‘x000d’, ‘sure’, ‘many’, ‘kentx000d’, ‘goed’, ‘goede’, ‘important’, ‘better’, ‘juiste’, ‘belangrijk’, ‘belangrijker’, ‘praktijk’, ‘kliniek’, ‘slechte’, ‘slecht’, ‘slechter’

Appendix F: KneeLocator Graphs for TF-IDF and K-Means Clustering

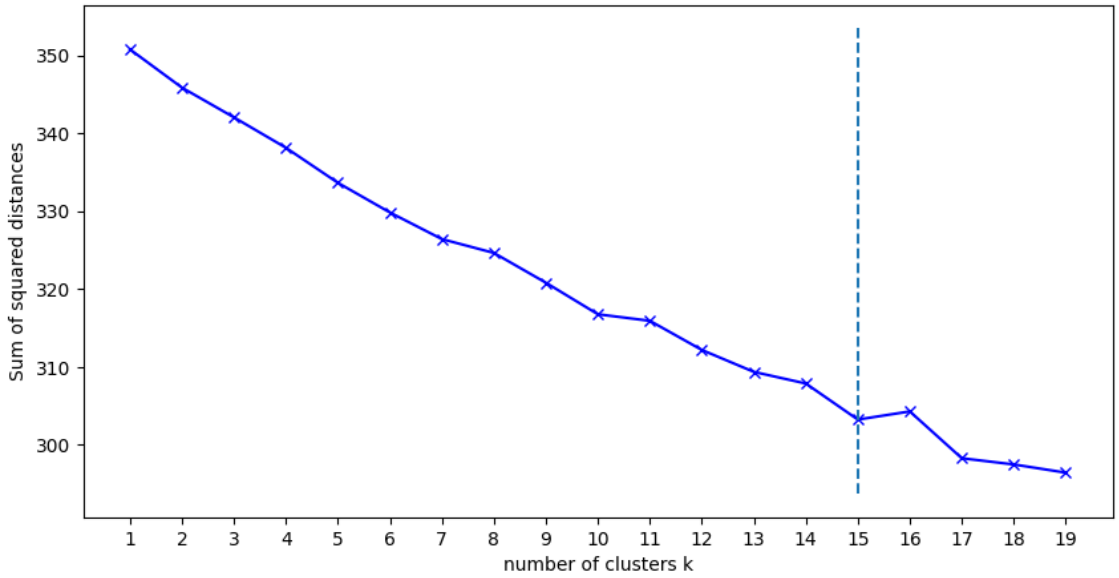

Figure 29: KneeLocator plot of question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected “I use 2 veterinarians / practices” for the bilingual data (Dutch and English).

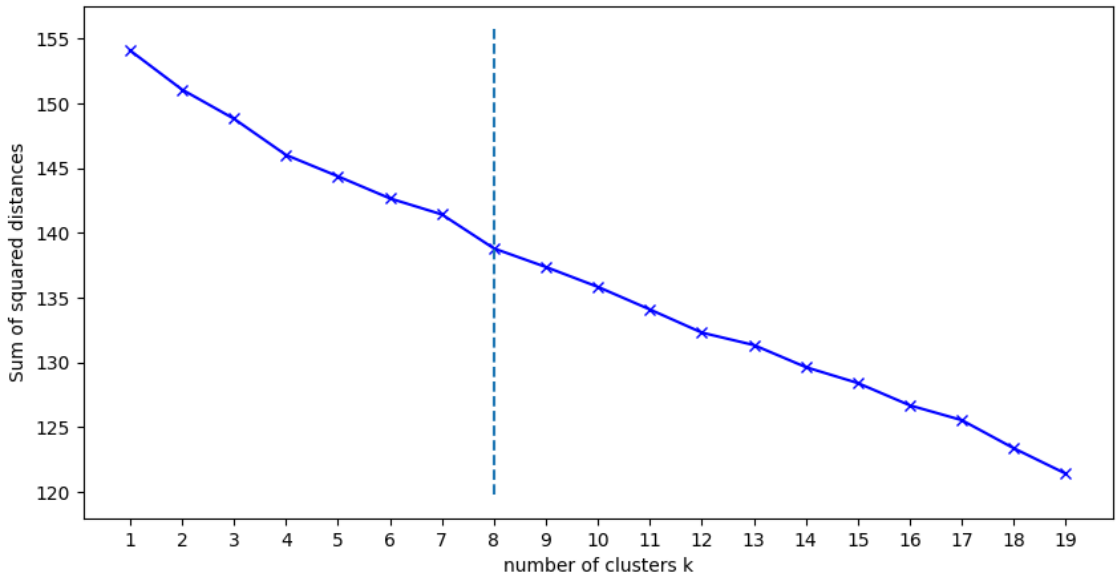

Figure 30: KneeLocator plot of question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” for the bilingual data (Dutch and English).

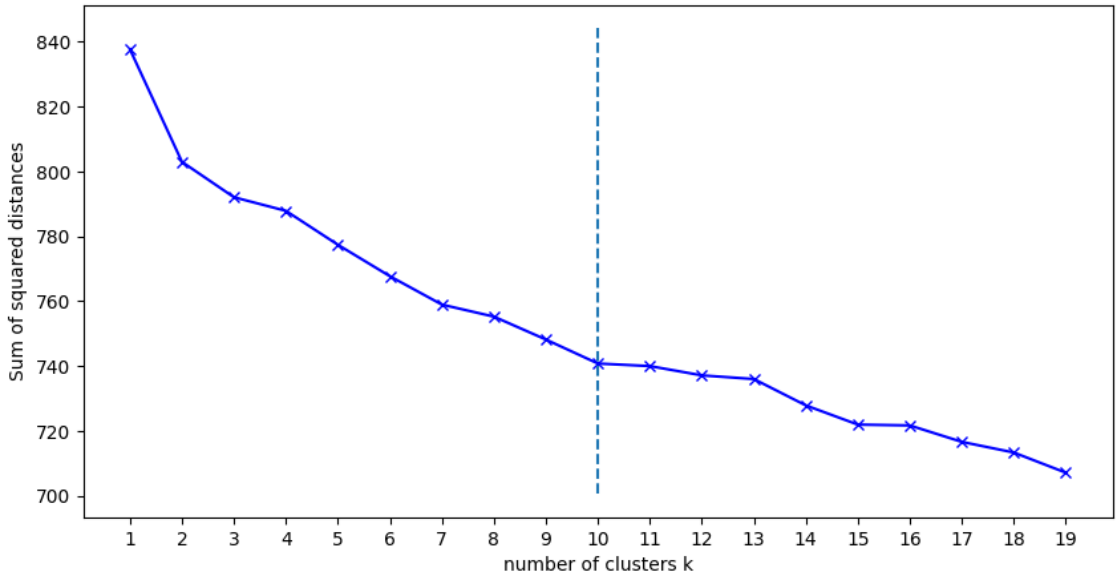

Figure 31: KneeLocator plot of question 15.2 "Have you ever stopped using a particular vet (practice)?" where the participant previously selected "Yes" for the bilingual data (Dutch and English).

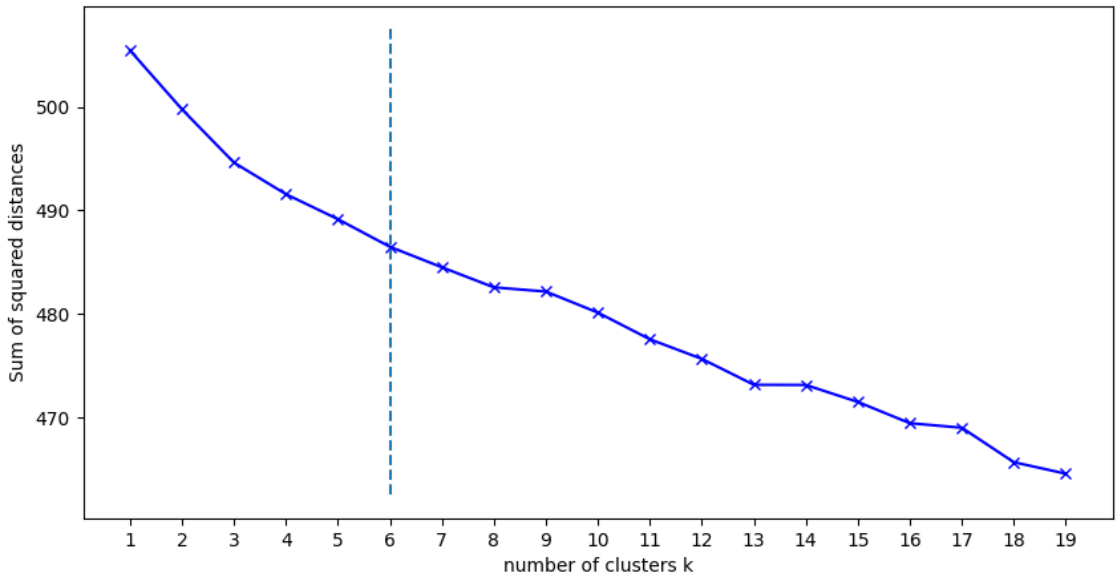

Figure 32: KneeLocator plot of question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams for the bilingual data (Dutch and English).

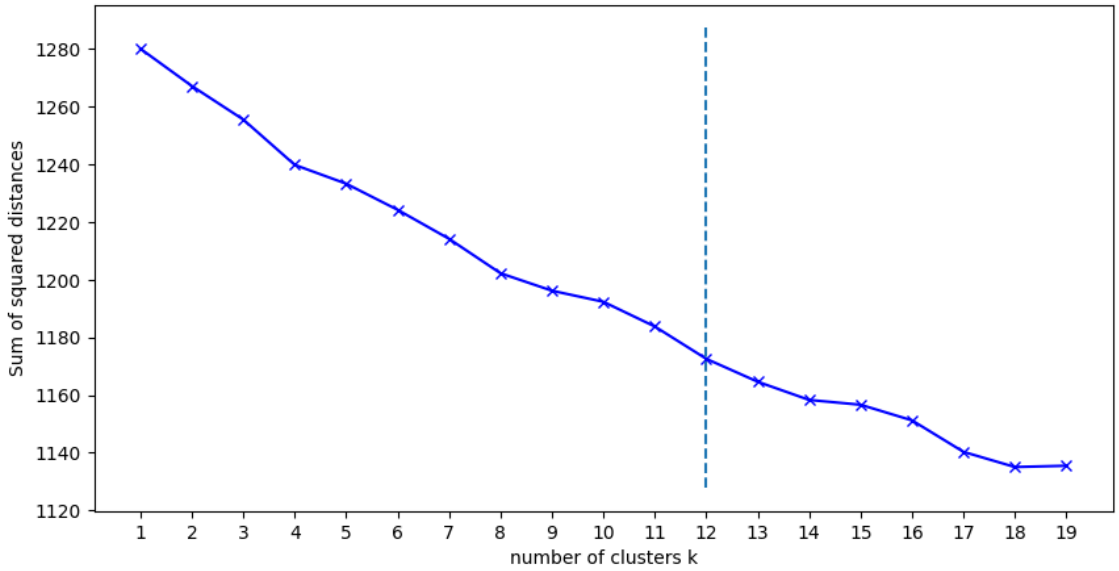

Figure 33: KneeLocator plot of question 46 “What do you appreciate most in your veterinarian?” for the bilingual data (Dutch and English).

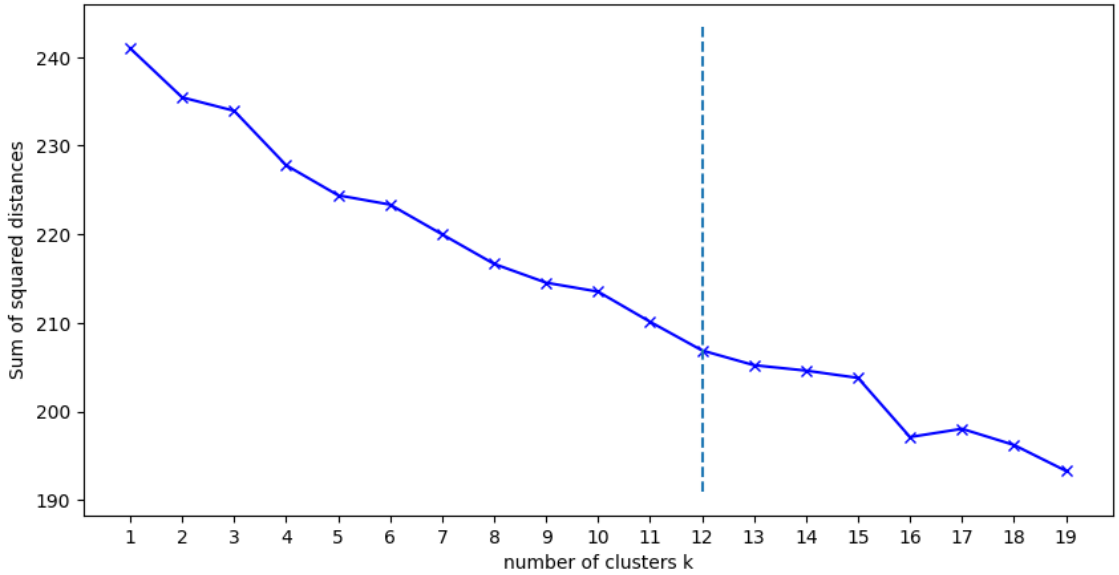

Figure 34: KneeLocator plot of question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected “I use 2 veterinarians / practices” for the monolingual Dutch data.

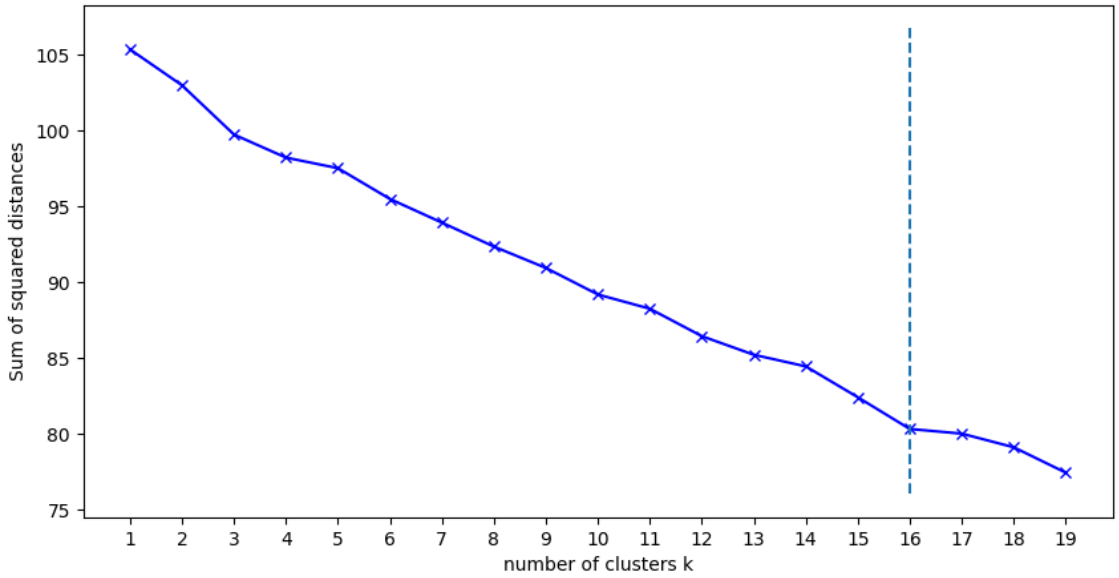

Figure 35: KneeLocator plot of question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” for the monolingual Dutch data.

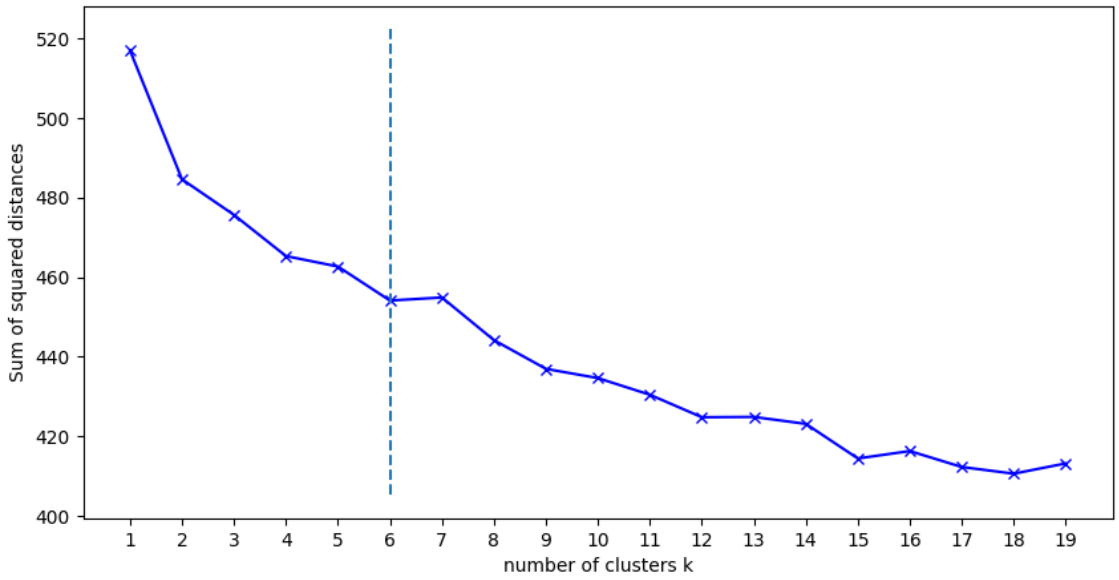

Figure 36: KneeLocator plot of question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” for the monolingual Dutch data.

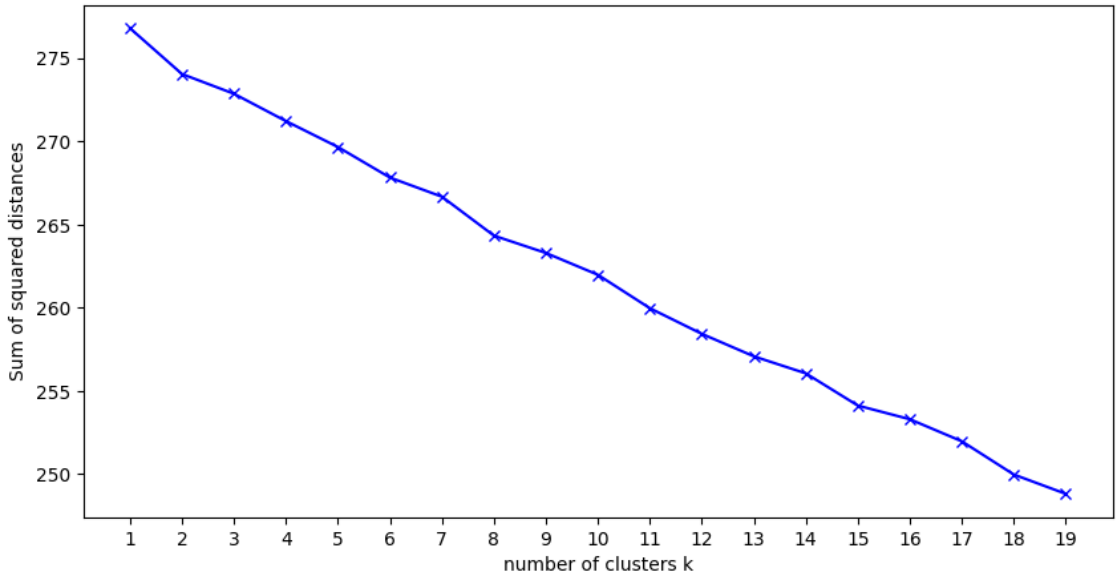

Figure 37: KneeLocator plot of question 45 “Would you like to explain any of your answers?” for the questionnaire questions concerning pre-purchase exams for the monolingual Dutch data.

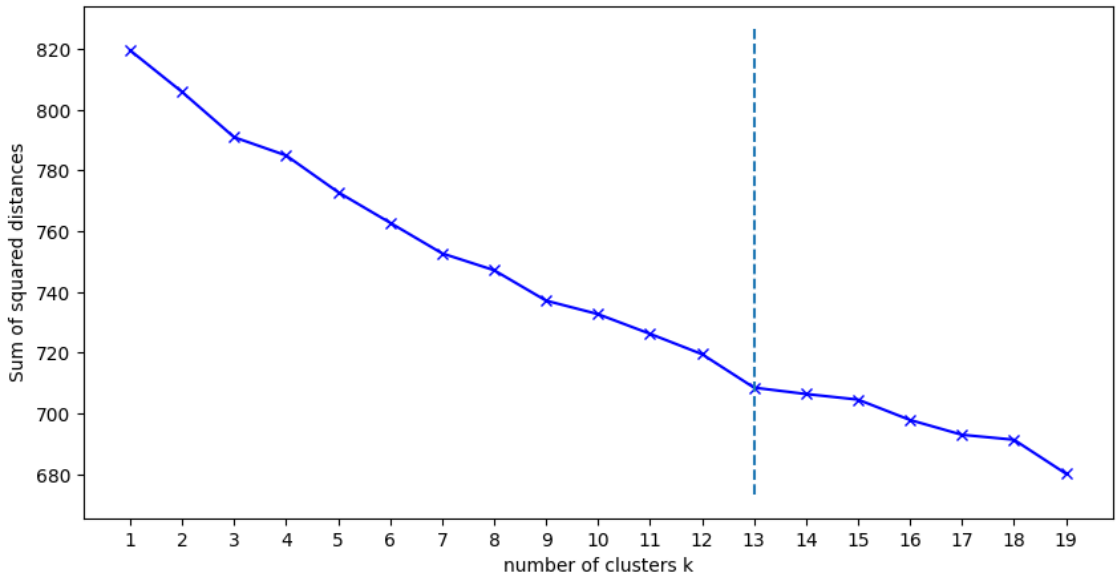

Figure 38: KneeLocator plot of question 46 “What do you appreciate most in your veterinarian?” for the monolingual Dutch data.

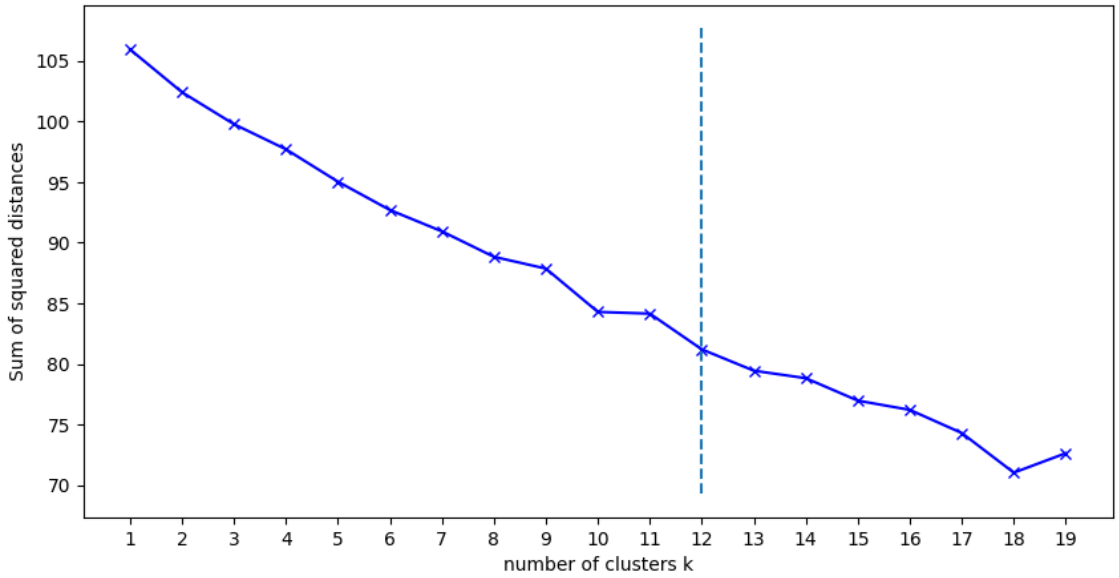

Figure 39: KneeLocator plot of question 12.2 ”How many veterinarians / practices do you use?” where the participant previously selected ”I use 2 veterinarians / practices” for the monolingual English data.

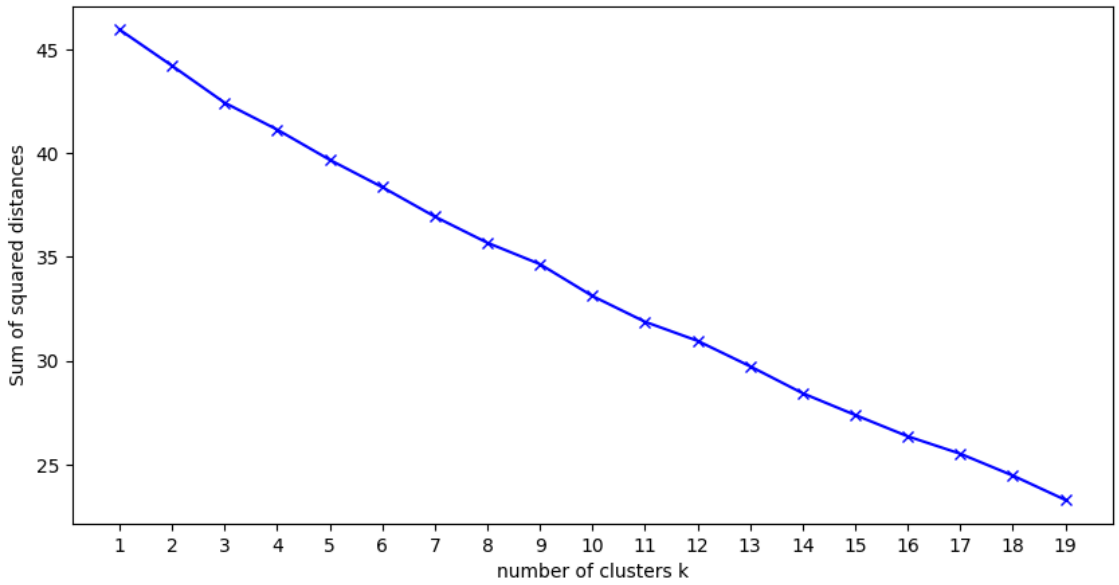

Figure 40: KneeLocator plot of question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” for the monolingual English data.

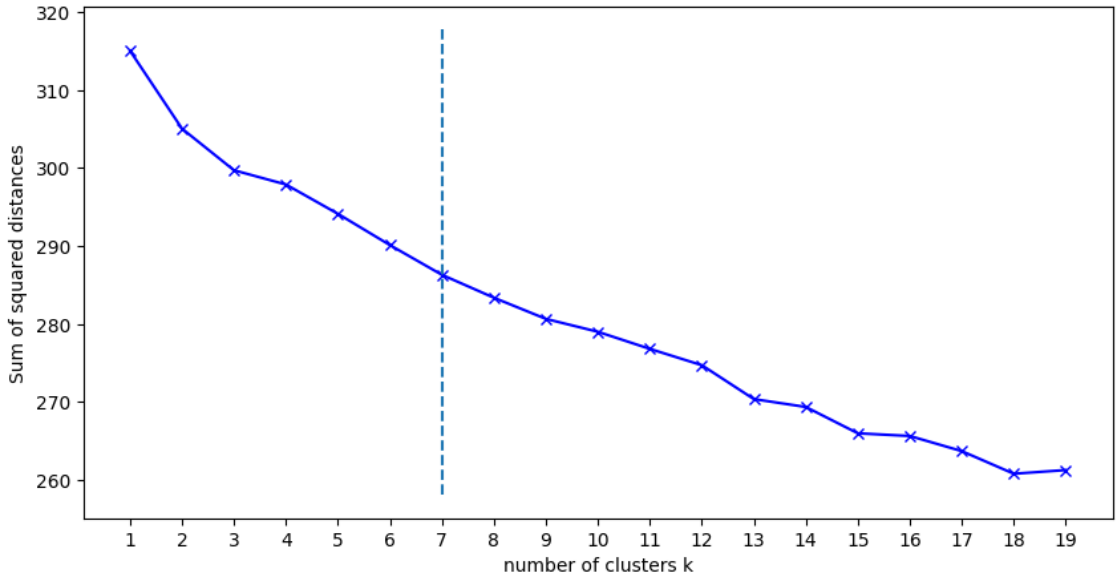

Figure 41: KneeLocator plot of question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” for the monolingual English data.

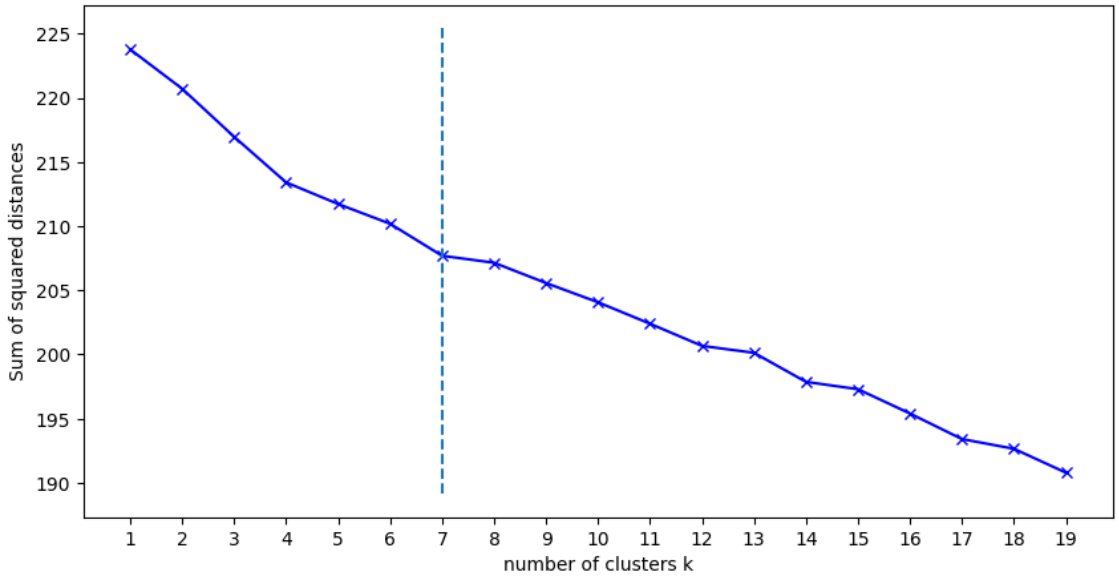

Figure 42: KneeLocator plot of question 45 “Would you like to explain any of your answers?” for the questionnaire questions concerning pre-purchase exams for the monolingual English data.

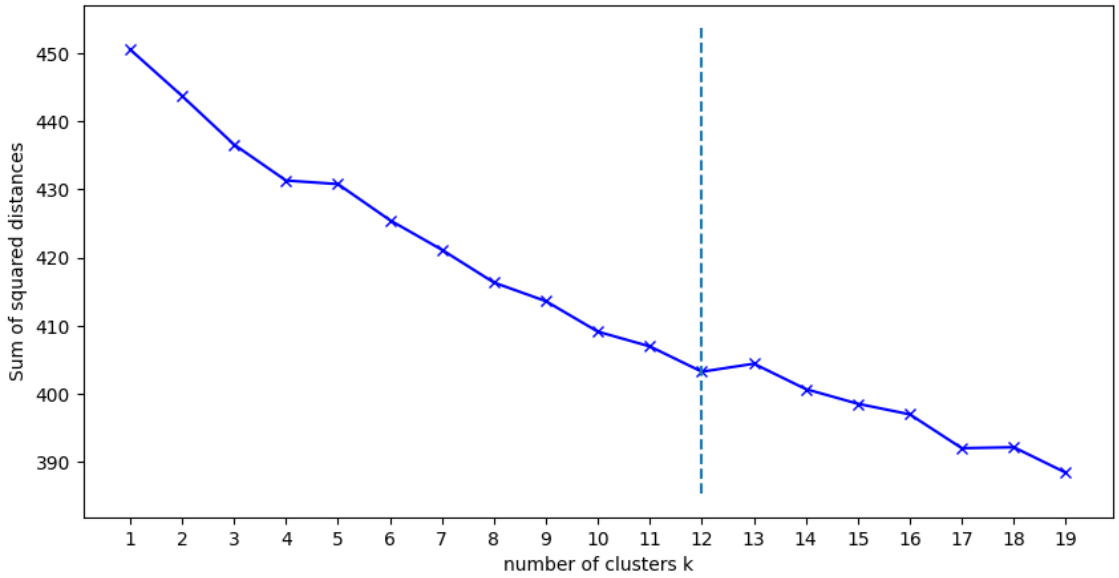

Figure 43: KneeLocator plot of question 46 “What do you appreciate most in your veterinarian?” for the monolingual English data.

Appendix G: R Code for Participant Age Calculation

```
# Create a dataframe of the data that we have of the participants
official_age_column <- c("Under 18", "18 - 24", "25 - 34", "35 - 44", "45 - 54", "55 - 64", "65 - 74", "75 - 84", "85 or older")

rounded_age_column <- c(17, 21, 29.5, 39.5, 49.5, 59.5, 69.5, 79.5, 86)
count_column <- c(5, 86, 217, 307, 325, 274, 160, 18, 0)

participants <- data.frame(age_column, rounded_age_column, count_column)
participants
```

Description: df [9 x 3]

age_column <chr>	rounded_age_column <dbl>	count_column <dbl>
17	17.0	5
18 - 24	21.0	86
25 - 34	29.5	217
35 - 44	39.5	307
45 - 54	49.5	325
55 - 64	59.5	274
65 - 74	69.5	160
75 - 84	79.5	18
85 or older	86.0	0

9 rows

Figure 44: What the table looks like after having given it two extra columns named 'rounded_age_column' and 'count_column', which represents the center of the corresponding age range, as well as how many participants fell in that particular range.

```
# Multiply the participants' rounded age with the number of participants (necessary for mean)
participants$multiplication <- participants$rounded_age_column * participants$count_column
participants
```

Description: df [9 x 4]

age_column <chr>	rounded_age_column <dbl>	count_column <dbl>	multiplication <dbl>
17	17.0	5	85.0
18 - 24	21.0	86	1806.0
25 - 34	29.5	217	6401.5
35 - 44	39.5	307	12126.5
45 - 54	49.5	325	16087.5
55 - 64	59.5	274	16303.0
65 - 74	69.5	160	11120.0
75 - 84	79.5	18	1431.0
85 or older	86.0	0	0.0

9 rows

Figure 45: What the table looks like after having given it another extra column named 'multiplication' which is calculcated by multipling the rounded age with the number of participants ('count') that fall in that particular age range.

```
sum_rounded_age_column <- sum(participants$rounded_age_column)
sum_rounded_age_column

# output:
# [1] 451

sum_rounded_count_column <- sum(participants$count_column)
sum_rounded_count_column

# output:
# [1] 1392

sum_rounded_multiplication_column <- sum(participants$multiplication)
sum_rounded_multiplication_column

# output:
# [1] 65360.5

# Calculate mean:
mean_age <- sum_rounded_multiplication_column / sum_rounded_count_column
mean_age

# output:
# [1] 46.95438

# Get the standard deviation of age
population_mean <- 46.95438
number_in_population <- 1392

age_17_sum <- 5 * ((17 - population_mean)^2)
age_21_sum <- 86 * ((21 - population_mean)^2)
age_29_sum <- 217 * ((29.5 - population_mean)^2)
age_39_sum <- 307 * ((39.5 - population_mean)^2)
age_49_sum <- 325 * ((49.5 - population_mean)^2)
age_59_sum <- 274 * ((59.5 - population_mean)^2)
age_69_sum <- 160 * ((69.5 - population_mean)^2)
age_79_sum <- 18 * ((79.5 - population_mean)^2)
#age_86_sum <- 0 * ((86 - population_mean)^2)

total_sum <- age_17_sum + age_21_sum + age_29_sum + age_39_sum + age_49_sum + age_59_sum +
age_69_sum + age_79_sum

inner_std <- total_sum / number_in_population

std_age <- sqrt(inner_std)
std_age

# output:
# [1] 14.46395
```

Appendix H: Cluster Distributions

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	223	0	130
6	31	1	27
3	29		
1	21		
4	20		
2	19		
5	12		
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers? You can do that here.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	459	6	116
7	79	0	106
8	61	5	82
2	49	2	59
6	47	1	58
3	47	3	55
5	37	4	35
1	35		
4	31		

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
0	252
1	180
6	167
5	108
9	107
3	106
7	88
10	84
2	82
4	62
8	57

Table 24: Overview of the cluster distributions for the LDA Version 1 analysis on the bilingual data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	57	1	81
7	50	0	76
3	46		
2	46		
1	44		
5	42		
6	39		
4	31		
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers? You can do that here.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
1	162	1	257
3	153	0	254
4	151		
0	136		
5	126		
2	117		

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
11	174
10	167
7	158
5	116
1	106
8	104
2	95
0	85
6	77
4	74
3	71
9	66

Table 25: Overview of the cluster distributions for the LDA Version 2 analysis on the bilingual data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		**Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	164	5	76
4	28	0	18
8	25	7	14
2	20	1	11
7	15	3	11
13	13	6	11
1	13	4	10
11	13	2	6
14	13		
3	12		
5	11		
10	10		
6	8		
9	7		
12	3		
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers? You can do that here.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
7	619	5	310
1	47	1	75
6	42	2	35
9	42	3	32
3	27	4	31
2	23	0	28
8	19		
0	12		
4	10		
5	4		

Table 26: Part 1: Overview of the cluster distributions for the k-means clustering analysis on the bilingual data.

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
6	698
8	146
11	63
4	60
1	56
9	54
3	53
7	48
10	38
5	33
0	26
2	18

Table 27: Part 2: Overview of the cluster distributions for the k-means clustering analysis on the bilingual data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		**Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	144	0	92
1	36	1	16
4	27		
2	26		
3	12		

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers? You can do that here.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	302	0	66
1	106	12	28
2	66	11	28
3	51	1	23
		7	19
		5	18
		3	18
		4	16
		6	16
		9	15
		8	14
		10	13
		2	7

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
0	168
9	88
5	73
6	64
2	61
11	57
3	52
7	50
12	47
13	44
10	36
1	33
8	31
4	29

Table 28: Overview of the cluster distributions for the LDA Version 1 analysis on the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text	
Cluster #	**Document #**	**Cluster #**	**Document #**
3	63	1	57
2	58	0	51
0	49		
1	43		
4	32		

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		Q45 Would you like to explain any of your answers?	
Cluster #	**Document #**	**Cluster #**	**Document #**
5	111	3	32
3	104	0	30
0	84	12	29
2	77	1	25
1	76	4	24
4	73	6	23
		13	19
		11	18
		5	17
		8	15
		9	15
		7	14
		2	13
		10	7

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
2	97
3	90
9	90
10	77
4	66
11	64
0	60
5	56
1	53
6	41
8	40
12	37
13	31
7	31

Table 29: Overview of the cluster distributions for the LDA Version 2 analysis on the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want) - Text		Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices. (you can explain why if you want) - Text	
Cluster #	**Document #**	**Cluster #**	**Document #**
5	104	0	26
1	27	10	12
2	26	6	9
6	17	1	7
0	13	13	7
9	13	8	6
10	13	5	6
8	12	2	6
4	8	4	5
3	6	12	5
7	3	11	4
11	3	3	3
		9	3
		14	3
		7	3
		15	3

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		Q45 Would you like to explain any of your answers?	
Cluster #	**Document #**	**Cluster #**	**Document #**
3	402	0	149
0	44	2	46
5	31	1	37
2	26	3	29
1	19	4	20
4	3		

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
11	424
7	57
0	55
2	42
5	40
8	35
9	32
6	31
12	30
1	27
3	25
4	18
10	17

Table 30: Overview of the distribution of the topics for the TF-IDF and k-means clustering results of the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.		**Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	59	0	32
3	12	4	11
2	12	7	6
8	10		
4	8		
12	5		
7	4		

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers?**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	146	0	50
6	30	4	34
8	26	2	32
9	25	5	28
4	17	3	27
2	16	1	24
3	16	7	18
7	12	6	17
5	11		
11	11		
10	9		
1	1		

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
0	69
7	46
13	44
3	38
5	33
11	28
6	28
2	27
8	27
1	27
9	27
12	25
10	22
4	19

Table 31: Overview of the distribution of the topics for the LDA Version 1 results of the monolingual English data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.		**Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
1	41	0	27
0	41	1	22
2	28		
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers?**	
Cluster #	**Document #**	**Cluster #**	**Document #**
11	36	10	33
6	35	11	27
5	33	13	26
3	30	4	24
1	27	5	20
2	26	8	17
7	25	12	14
8	25	1	12
9	22	2	12
4	21	6	12
0	21	9	9
10	19	0	8
		7	8
		3	8

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
10	56
5	50
0	38
1	35
3	34
7	32
8	31
6	30
9	30
2	28
13	27
4	25
12	23
11	21

Table 32: Overview of the distribution of the topics for the LDA Version 2 results of the monolingual English data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.		**Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.**	
Cluster #	**Document #**	**Cluster #**	**Document #**
0	26	1	14
2	13	2	13
1	12	4	10
3	10	3	8
4	10	0	4
5	7		
10	7		
11	7		
6	5		
8	5		
7	5		
9	3		
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.		**Q45 Would you like to explain any of your answers?**	
Cluster #	**Document #**	**Cluster #**	**Document #**
4	177	0	69
2	53	3	39
6	23	2	34
3	21	6	29
1	21	1	29
0	18	5	15
5	7	4	15

Q46 What do you appreciate most in your veterinarian?	
Cluster #	**Document #**
3	137
11	48
10	41
9	40
2	30
7	30
5	29
8	26
4	23
0	22
1	22
6	12

Table 33: Overview of the distribution of the topics for the TF-IDF and k-means clustering results of the monolingual English data.

Appendix I: Topics

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.	
Topic #	**Top 10 Words**
1	eigen, nodig, tandarts, zaken, different, practice, lameness, specialist, care, emergency
2	zaken, dingen, emergency, enten, lameness, onderzoek, specialist, huis, spoed, practice
3	zorg, spoed, huis, dingen, vaste, specialist, onderzoek, enten, zaken, nodig
4	emergency, specialist, nodig, onderzoek, lameness, zorg, spoed, different, vaste, tandarts
5	tandarts, specialist, spoed, huis, gespecialiseerde, zorg, onderzoek, zaken, enten, dingen
6	nodig, spoed, zaken, huis, vaste, tandarts, zorg, enten, dingen, gespecialiseerde
7	dingen, enten, vaste, specialist, nodig, spoed, zaken, onderzoek, zorg, eigen
Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	local, lameness, emergency, tandarts, dingen, spoed
2	dingen, spoed, tandarts, emergency, lameness, local
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	stal, kosten, duur, tijd, onvoldoende, kennis, diagnose, ervaring, behandeling, verhuizing
2	lack, gevoel, time, diagnosis, emergency, service, onvoldoende, appointment, communication, poor
3	service, vertrouwen, stal, kennis, tevreden, onvoldoende, behandeling, verhuizen, gevoel, communicatie
4	service, practice, diagnosis, moved, appointment, new, barn, care, time, vet
5	tevreden, onvoldoende, behandeling, zorg, verhuizing, kennis, verhuizen, tijd, stal, kosten
6	communication, service, care, vet, emergency, new, retired, moved, art, practice
7	art, diagnose, communication, stal, retired, onvoldoende, vertrouwen, zorg, tevreden, lack
8	service, diagnosis, onvoldoende, ervaring, behandeling, kennis, emergency, duur, verkeerde, diagnose
9	appointment, lack, new, vet, emergency, retired, diagnosis, area, moved, service

Table 34: Part 1 - Overview of the topics for the LDA Version 1 results of the bilingual data (English and Dutch).

Q45 Would you like to explain any of your answers?	
Topic #	**Top 10 Words**
1	overleg, geven, onderzoek, behandelen, kijken, advies, horsemanship, behandeling, mean, eigenaar
2	art, belang, overleg, vaardigheden, kosten, aspect, aspecten, financiële, kwaliteit, zorg
3	opinion, make, able, trainer, information, buying, check, pre, purchase, exam
4	spoed, nodig, duidelijk, vragen, contact, dingen, maken, koliek, snel, bel
5	vertrouwen, service, professionaliteit, question price, available, professional, ask, care, quality
6	beste, aankoopkeuring, bellen, keuren, verwacht, aankoop, eigen, ervaring, keuring, kennis
7	good, issue, owner, treatment, skill, cost, knowledge, vet, know, care
Q46 What do you appreciate most in your veterinarian?	
Topic #	**Top 10 Words**
1	listen, explains, approach, kind, time, answer, treatment, willing, question, knowledge
2	maken, bereikbaar, snel, open, duidelijk, denken, eerlijkheid, advies, kundig, eerlijk
3	meedenkend, onnodige, snel, dingen, behandelingen, vertrouwen, vragen, vriendelijk, nodig, overleg
4	informatie, kwaliteit, practical, kosten, duidelijke, knowledgeable, zorg, deskundigheid, open, communicatie
5	diagnose, reasonable, respect, kennis, cost, try, honest, kunde, experience, treatment
6	listens, quality, new, option, persoonlijk, issue, time, contact, good, care
7	kent, pony, eerlijkheid, zaken, omgang, meedenken, kundigheid, betrokkenheid, bereikbaarheid, kennis
8	duidelijke, tijd, compassion, rust, eigenaar, behandeling, geven, nemen, luisteren, uitleg
9	legt, professional, rustig, expertise, ability, willingness, bereikbaar, availability, communication, skill
10	hour, good, know, care, great, honesty, vet, service, practice, emergency
11	duidelijk, eerlijkheid, area, bereikbaar, klant, neemt, come, tijd, snel, duidelijkheid

Table 35: Part 2 - Overview of the topics for the LDA Version 1 results of the bilingual data (English and Dutch).

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.	
Topic #	**Top 10 Words**
1	bel, faculteit, locatie, koliek, vaste, lijn, regulier, onderzoek, spoed, afhankelijk
2	basic, medicine, specialisme, sport, kleine, dingen, routine, lameness, emergency, care
3	werk, praktijken, main, specialistische, hospital, clinic, emergency, regular, vaste, zorg
4	inenting, case, practice, location, barn, vet, primary, availability emergency, different
5	onderzoek, maak, kreupelheden, vet, problemen, local, holistische, zaken, buurt, nodig
6	gebruik, tanden, tandarts, behandeling, kleine, enten, art, eerste, dingen, eigen
7	doorverwijzing, zaken, eigen, zorg, dichtbij, reguliere, entingen, dingen, gespecialiseerde, stal
8	needed, enten, home, work, spoed, practice, huis, tandarts, dingen, specialist
Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	clinic, care, enten, different, issue, general, emergency, practice, lameness, local
2	klinieken, specialistische, vaste, eigen, gespecialiseerde, buurt, afhankelijk, tandarts, dingen, spoed
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	work, verschillende, treatment, willen, animal, practice, time, verhuizen, diagnose, verkeerde
2	unavailable, time, vet call, stal, poor, zorg, emergency, service, verhuizing
3	problem, vet, behandeling, diagnosis, kennis, availability, lack, diagnose, tevreden, communicatie
4	care, spoed, opinion, ervaring, stal, lang, behandeling, kosten, practice, art
5	medication, practice, vet, retired, vertrouwen, bereikbaar, gevoel, area, duur, moved
6	communication, service, vet, practice, new, ray, poor, onkunde, expensive, diagnosis
Q45 Would you like to explain any of your answers? You can do that here.	
Topic #	**Top 10 Words**
1	skill, vet, cost, pre, know, quality, knowledge, purchase, exam, care
2	check, ervaring, aspecten, eerlijk, snel, vaardigheden, kwaliteit, keuring, zorg, kennis

Table 36: Part 1 - Overview of the topics for the LDA Version 2 results of the bilingual data (English and Dutch).

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	decision, situatie, zaken, communicatie, available, option, knowledgeable, kennis, treatment, bereikbaarheid
2	kind, listens, approach, show, question, open, detail, emergency, answer, treatment
3	onderzoek, diagnose, expertise, nemen, compassion, ervaring, area, uitleg, bereikbaarheid, kennis
4	nodig, rustig, denken, open, overleg bereikbaar, duidelijk, kundig, snel, eerlijk
5	gelijk, persoonlijke, care, work, luistert, call, practice, experience, easy, vet
6	option, time, nuchterheid, honesty, advies, openheid, thorough, good, eerlijk, know
7	meedenken, tijd, betrokkenheid, kennis, uitleg, duidelijke, kundigheid, communicatie, duidelijkheid, eerlijkheid
8	snelle, understanding, mogelijkheid, knowledge, skill, need, treatment, nodig, practical, honest
9	time, come, service, good, skill, emergency, knowledge, availability, communication, care
10	bereikbaar, serieus, zorg, kwaliteit, issue, cost, kunde, care, neemt, kennis
11	geduld, handelen, omgang, vragen, kennis, knowledge, betrokkenheid, persoonlijk, deskundigheid, contact
12	good, contact, option, explains, fijne, discus, duidelijk, kennis, eerlijk, meedenken

Table 37: Part 2 - Overview of the topics for the LDA Version 2 results of the bilingual data (English and Dutch).

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.

Topic #	Top 10 Words
1	spoed, afhankelijk, buurt, different, availability, bel, enten, stal, location, specialisme
2	specialist, referred, work, orthopedisch, doorverwijzing, paardentandarts, general, necessary, injury, access
3	care, lameness, routine, general, basic, shot, emergency, local, specialized, medicine
4	clinic, vaccination, barn, mobile, emergency, annual, available, dental, needed, work
5	emergency, regular, available, vet, specialisme, practice, main, regulier, primary, rural
6	tandarts, behandeling, werkt, specialist, dingen, gebruik, lijnszorg, 2e, algemene, orthopedie
7	nodig, zaken, licht, denk, basisvakken, orthopedischekreupelheidsonderzoeken, nood,aandoening, ernst, hangt
8	eigen, specialisaties, dart, specialiteiten, art, mogelijkheden, pensionstalling, overlegd, merries, scan
9	dingen, kleine, bereikbaarheid, dichtbij, gespecialiseerde, normale, grotere, simpele, ingewikkelde, enten
10	eerste, lijn, aanbiedt, bepaalde, dienst, operatie, dierenarst, homeopathische, nstntie, aanleg
11	huis, sportpaarden, kreupelheden, spoed,blessures, dingen, merriebegeleiding, enten, spannende, specialistisch
12	zorg, specialistische, spoedeisende, basiszorg, basis, lokale, tandverzorging, nodige, paardenartskliniek, specifieke
13	home, emergency, vaste, specialist, tandarts, eigen, local, enten, specialistische, eerste
14	reguliere, problemen, specialisten, keuring, verschillende, holistische, paardenkliniek, land, gespecialiseerde, holistisch
15	vaste, stal, nodig, tandarts, veearts, peesproblemen, uurs, diensten, vervanger,diepgaand

Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.

Topic #	Top 10 Words
1	practice, emergency, general, lameness, local, care,vet, veterinary, reproduction, vaccination
2	afhankelijk, klacht, ky, beschikbaarheid, probleem, vaste, doel, specialismeklacht, enting, mestonderzoek
3	specialist, stal, gespecialiseerd, orthopedisch, woonplaats, patient, farm, gespecialiseerde, call, knie
4	nodig, specialisatie, vaste, eigen, klinieken, licht, afstand, pensioen, enting, zoekende
5	buurt, holistisch, spoed, dingen, gespecialiseerde, tandarts, bodywarmer, tanden, reguliere, holistische
6	enten, spoed, lameness, local, issue, dingen, depends, problemen, hangt, needed
7	different, location, travel, vet, specialty, speciality,issue, dentistry, physical, home
8	tandarts, entingen, kreupelheid, aangesloten, dingen, anderen, osteopaat, onderzoek, osteopathie, dichtstbijzijnde

Table 38: Part 1 - Overview of the topics for the TF-IDF and k-means clustering results of the bilingual data (English and Dutch).

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.

Topic #	Top 10 Words
1	vertrouwen, daadkracht, verminderd, verloren, kunde, spoeddiensten, kwijt, financiële, aspect, verkeerde
2	verhuizing, regio, afstand, bevallen, werk, dienstverlening, locatie, ontevreden, stal, werkzaam
3	moved, area, state, practice, service, changed, house, radius, served, close
4	communicatie, verschillende, behandeling, wisselen, gebrek, fijne, optimaal, onprettig, diagnostiek, bereikbaar
5	verhuizen, stal, verhuizing, stopped, ver, nonchalant, bot, voldoende, week, switch
6	hoge, prijzen, belachelijke, bereikbaarheid, kosten, vertrok, absurd, voorrijkosten, service, vaste
7	diagnose, verkeerde, foutieve, behandeling, gesteld, rekening, diagnosis, geld, gegeven, tevreden
8	practice, zorg, lack, retired, tevreden, gevoel, bereikbaar, diagnosis, art, availability
9	duur, diensten, onkunde, onkundig, klikte, praktijken, onzorgvuldig, overgang, onprettig, geholpen
10	poor, service, communication, horsemanship, emergency, quality, happy, unhappy, care, business

Q45 Would you like to explain any of your answers?

Topic #	Top 10 Words
1	knowledge, transfer, experience, cost, vet, situation, know, care, skill, year
2	eerlijk, kennis, zorg,snel, kwaliteit, vragen,nodig, bel, belang, koliek
3	care, quality, service, cost, expensive, good, skill, understand, treat, call
4	keuring, duidelijk, aankoop, willen, advies, aspecten, onderzoek, vriendelijk, fotos, beoordelen
5	exam, purchase, pre, prepurchase, done, getting, buying, know, trainer, ray
6	kennis, horsemanship, check, know, treatment, vet, able, issue, aspect, call

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	contact, persoonlijk, vriendelijk, geschiedenis, direct, advies, bereikbaarheid, eerlijkheid, meedenkend, persoonlijke
2	eerlijkheid, betrokkenheid, kundigheid, duidelijkheid, openheid, kennis, kunde, nuchterheid, vakkundigheid, omgaan
3	deskundigheid, nemen, bereikbaarheid, behulpzaamheid, keuren, betrouwbaarheid, meedenken, snelheid, eerlijkheid, communicatie
4	snel, bereikbaar, nodig, aanwezig, spoed, afspraken, afspraak, snelle, terecht, eerlijk
5	kennis, kunde, meedenken, zaken, handelen, omgang, bereikbaarheid, betrokkenheid, adequaat, geduld
6	tijd, neemt, nemen, genomen, duidelijk, aandacht, snel, vragen, leggen, beantwoorden
7	bereikbaarheid, duidelijkheid, availability, kundigheid, good, uitleg, knowledgeable, communication, meedenken, nodig
8	communicatie, duidelijke, open, heldere, fijne, zorg, kennis, uitleg, zaken, eigenaar
9	care, treatment, time, honesty, option, cost, willing, explain, question, listen
10	knowledge, compassion, expertise, ability, experience, understanding, transfer, skill, date, care
11	kundig, eerlijk, rustig, vriendelijk, snel, nuchter, advies, snelle, doortastend, eerlijkrealistisch
12	eerlijk, duidelijk, advies, meedenken, open, denken, realistisch, betrouwbaar, bereikbaar, nuchter

Table 39: Part 2 - Overview of the topics for the TF-IDF and k-means clustering results of the bilingual data (English and Dutch).

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.

Topic #	Top 10 Words
1	eigen, zaken, tandarts, zorg, onderzoek, gespecialiseerde, dingen, spoed, huis, enten
2	huis, nodig, onderzoek, zorg, zaken, enten, spoed, tandarts, gespecialiseerde, dingen
3	eigen, enten, onderzoek, vaste, tandarts, dingen, gespecialiseerde, zaken, nodig, zorg
4	dingen, zaken, zorg, eigen, gespecialiseerde, onderzoek, nodig, spoed, tandarts, vaste
5	tandarts, huis, vaste, enten, nodig, dingen, zaken, spoed, onderzoek, eigen

Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.

Topic #	Top 10 Words
1	tandarts, spoed, dingen
2	dingen, spoed, tandarts
3	dingen, tandarts, spoed

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.

Topic #	Top 10 Words
1	tevreden, onvoldoende, verhuizing, verkeerde, kennis, diagnose, behandeling, verhuizen, ervaring, duur
2	tevreden, vertrouwen, onvoldoende, kennis, ervaring, behandeling, zorg, verkeerde, diagnose, verhuizing
3	behandeling, diagnose, zorg, onvoldoende, tijd, gevoel, vertrouwen, kennis, art, tevreden
4	ervaring, vertrouwen, tijd, tevreden, onvoldoende, kennis, diagnose, kosten, behandeling, communicatie

Q45 Would you like to explain any of your answers?

Topic #	Top 10 Words
1	eigenaar, aankoop, aspecten, vraag, duidelijk, onderzoek, mi, kosten, maken, keuring
2	vraag, koliek, bellen, nodig, duidelijk, geven, spoed, eerlijk, vragen, advies
3	koliek, vraag, financiële, aspecten, kennis, vertrouwen, bellen, zorg, kosten, art
4	vaardigheden, mi, koliek, advies, duidelijk, verwacht, keuring, aankoopkeuring, keuren, aankoop
5	kosten, nodig, spoed, aspecten, zorg, belangrijkste, kwaliteit, dingen, aspect, financiële
6	professionaliteit, duidelijk, dingen, eerlijk, nodig, ervaring, beste, geven, aspecten, overleg
7	duidelijk, vragen, vaardigheden, spoed, kosten, bel, ervaring, mi, onderzoek, behandeling
8	nodig, ervaring, dingen, eerlijk, verwacht, horsemanship, belangrijkste, vraag, behandelen, eigenaar
9	vraag, belangrijkste, horsemanship, behandelen, bellen, belang, professionaliteit, ervaring, koliek, vertrouwen
10	vraag, bellen, vaardigheden, zorg, koliek, financiële, vragen, verwacht, eigen, bel
11	dingen, bellen, koliek, behandelen, eerlijk, spoed, beste, nodig, duidelijk, snel
12	beste, vraag, professionaliteit, aspecten, belang, horsemanship, kijken, vaardigheden, kwaliteit, zorg
13	financiële, ervaring, vertrouwen, eigen, behandelen, vaardigheden, belangrijkste, eerlijk, bellen, kennis

Table 40: Part 1 - Overview of the topics for the LDA Version 1 results of the monolingual Dutch data.

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	denken, neemt, luistert, snel, willen, eigenaar, maken, serieus, kosten, bereikbaar
2	kwaliteit, betrokken, gevoel, legt, nuchter, direct, probleem, denken, open, duidelijk
3	klant, kennis, snel, eigenaar, overleg, betrokken, open, duidelijke, nodig, communicatie
4	nemen, direct, behandelingen, serieus, luisteren, persoonlijk, kennis, kunde, overleg, contact
5	afspraak, advies, beste, openheid, handelen, luisteren, rust, persoonlijke, kijken, kent
6	diagnose, behandelingen, beste, handelen, openheid, eigenaar, meedenkend, informatie, eerlijkheid, kennis
7	legt, eigen, rustig, eerlijk, gevoel, luistert, deskundigheid, vragen, vriendelijk, kundig
8	uitleg, diagnose, eigenaar, eigen, gevoel, klant, ervaring, geven, behandeling, bereikbaarheid
9	eigenaar, persoonlijk, serieus, kwaliteit, legt, rust, snelle, neemt, nemen, tijd
10	betrokken, spoed, dingen, eigenaar, behandelingen, onnodige, duidelijk, advies, snel, eerlijk
11	beste, luistert, eigen, snel, spoed, dingen, afspraken, eerlijke, rustig, zaken
12	kijken, luisteren, rust, maken, afspraak, diagnose, duidelijke, onderzoek, uitleg, meedenken
13	behandelingen, communicatie, rust, klant, snelle, kwaliteit, vertrouwen, omgang, zorg, duidelijkheid
14	eigen, willen, kunde, denken, persoonlijke, behandelingen, omgang, eerlijkheid, kundigheid, betrokkenheid

Table 41: Part 2 - Overview of the topics for the LDA Version 1 results of the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.	
Topic #	**Top 10 Words**
1	koliek, tandarts, dichtbij, specialist, onderzoek, vaste, enten, stal, dingen, eigen
2	specialistische, enten, kleine, vaste, zaken, buurt, huis, gespecialiseerde, dingen, zorg
3	spoed, sportpaarden, onderzoek, veearts, problemen, specialistische, bereikbaarheid, bel, nodig, zaken
4	maak, vaccinaties, plaatselijke, gebruik, verschillende, faculteit, zorg, behandeling, spoed, eerste
5	kreupelheden, dingen, specifieke, holistische, rest, normale, reguliere, specialisme, entingen, tandarts

Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	bel, problemen, tandarts, basis, specialistische, dichtstbijzijnde, vaste, entingen, spoed, dingen
2	specialisatie, eigen, spoed, gespecialiseerde, nodig, klinieken, praktijken, afhankelijk, buurt, tandarts

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	spoed, bereikbaarheid, rekening, advies, nodig, fouten, kosten, art, verhuizen, communicatie
2	serieus, maken, ervaring, klik, ging, artsen, onkunde, veearts, genomen, tevreden
3	ervaring, bleek, vaste, art, beter, regio, wilde, tijd, tevreden, verhuizing
4	maken, gespecialiseerd, behandelen, vertrouwen, kennis, gevoel, verkeerde, onvoldoende, diagnose bereikbaar
5	foutieve, afspraken, diagnosis, verschillende, advies, communicatie, zorg, behandeling, verkeerde, diagnose
6	onkundig, lang, nieuwe, wachten, fijne, kwaliteit, vertrouwen, kennis, stal, duur

Q45 Would you like to explain any of your answers?	
Topic #	**Top 10 Words**
1	eigenaar, nodig, belang, vaardigheden, kennis, behandeling, aspect, kwaliteit, financiële, zorg
2	beoordelen, keuren, vaardigheden, zorg, hand, overleggen, duidelijk, eigenaar, bel, kennis
3	prijs, nodig, tijd, snel, horsemanship, eigen, zorg, kunde, beste, kennis
4	eerlijkheid, kosten, kijken, weten, behandelen, eerlijk, belangrijkste, kennis, spoed, kwaliteit
5	krijgt, keuren, antwoord art, snel, vraag, keuring, medische, ervaring, kennis
6	professionaliteit, duidelijk, plaatje, ervaring, belang, kennis, vragen, onderzoek, aspecten behandelplan
7	bellen, ingevuld, kosten, opties, tarieven, keuring, geven, aankoop, advies, vraag
8	prijzen, aankoop, rest, horsemanship, punten, basis, koliek, overleg, keuring, onderzoek
9	vraag, neem, keuze, vragen, kundig, bellen, spoed, contact, aankoopkeuring, eerlijk
10	snel, omgegaan, duidelijk, direct, eigenaar, vragen, nodig, eerlijk, kennis, geeft
11	werkt, mankeert, willen, mensen, nieuw, aankoop, eigenaren, keuring, geven, kennis
12	behandeld, aankoop, kopen, dieren, bellen, advies, maakt, kijken, verwacht, keuring
13	klant, uitleggen, koop, zorg, eigen, snel, vertrouwen, koliek, aspecten, bel
14	dienstverlening, vaardigheden, osteopaat, eerste, kwaliteit, omgang, financiële, zorg, behandeling, kennis

Table 42: Part 1 - Overview of the topics for the LDA Version 2 results of the monolingual Dutch data.

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	echo, verstand, medische, artsen, aanwezig, geduld, rust, snel, duidelijke, uitleg
2	kundig, eerlijk, legt, samenwerking, meedenkt, bereikbaar, genomen, bel, duidelijk, willen
3	betrouwbaar, open, meedenkend, direct, vriendelijk, rustig, denken, duidelijk, kundig, eerlijk
4	bereikbaar, overleggen, reactie, kosten dingen, onnodig, service, advies snelle, nodig
5	geld, nakomen, prognose, eigenaar, afspraken, open, fijne, heldere, duidelijke, communicatie
6	meedenken, makkelijk, onderzoeken, kennis, vertrouwen, uitleg, serieus, nemen, neemt, tijd
7	raap, empathie, open, eigenaar, welzijn, adequaat, recht, handelen, deskundigheid, kundigheid
8	ervaring, maken, omgang, realistisch, kosten, luisteren, eerlijk, duidelijkheid, kennis, meedenken
9	werk, ervaren, gespecialiseerd, nodig, advies, vragen, pony, zorg, kennis, bereikbaar
10	denken, afspraken, problemen, vakkundigheid, behandelingen, vragen, vaste, open, geven, onnodige
11	kennis, snelle, nodig, eerlijk, snelheid, onderzoek, overleg, uitleg, duidelijk, bereikbaarheid
12	diagnose, nuchterheid, omgang, zaken, openheid, duidelijkheid, kunde, betrokkenheid, eerlijkheid, kennis
13	doortastend, bellen, collegas, afspraak, informatie, open, snel, mogelijkheid, maken, overleg
14	zorg, advies, benadering, persoonlijke, nodig, kwaliteit, eerlijk, persoonlijk, contact, snel

Table 43: Part 2 - Overview of the topics for the LDA Version 2 results of the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.

Topic #	Top 10 Words
1	eigen, specialiteiten, specialisaties, dart, art, mogelijkheden, pensionstalling, overlegd, scan, merries
2	dingen, spoed, buurt, specialisten, kleine, gespecialiseerde, zaken, normale, ingewikkelde, huis
3	nodig, zaken, koliek, werk, faculteit, afhankelijk, regulier, specialistische, veearts, plaatselijke
4	specialisme, weekenddiensten, kreupelheden, entingen, dingendiagnose, keuze, normale, basis, maak, zaken
5	eerste, lijn, lijnszorg, 2e, bepaalde, aanbiedt, dienst, operatie, dierenarst, homeopathische
6	vaste, gespecialiseerde, stal, specialist, bel, afhankelijk, huisdieren, doorverwijzing, behandeld, problemen
7	huis, enten, simpele, dingen, blessures, ziektebehandeling ,koliek, vaccineren, gebit, tanden
8	redenen, ovulatie, vraag, praktische, kleinere, dingen, inenting, denk, echo,complexe
9	tandarts, vaste, werkt, specialist, dingen, stal, algemene, orthopedie, behandeling, entingen
10	reguliere, holistische, gebruik, tanden, maak, rest, specialistische, nodig, holistisch, aanverkoop
11	zorg, specialistische, spoedeisende, basiszorg, basis, lokale, tandverzorging, nodige, uurs, paardenartskliniek
12	bereikbaarheid, dingen, vaste, nodig, kleine, simpele, bel, tanden, maak, sportpaarden

Table 44: Part 1 - Overview of the topics for the TF-IDF and k-means clustering results of the monolingual Dutch data.

Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.

Topic #	Top 10 Words
1	oude, buitenland, specialisaties, huis, werk, specialismen, omgeving, paardentandarts, chiropractor, regio
2	onderzoek, dingen, buurt, gespecialiseerde, entingen, holistische, regionale, eenvoudigere, diepgaand, klinieken
3	afhankelijk, beschikbaarheid, doel, specialismeklacht, enting, mestonderzoek, plaats, onmiddellijk, maakt, beroep
4	klacht, afhankelijk, behandeling, keuze,ky, omgeving, klinieken, holistisch, tanden, huis
5	stal, specialist, gespecialiseerd, orthopedisch, woonplaats, gespecialiseerde, merriebegeleiding, beenproblemen, rug, knie
6	eigen, specialisatie, enten, lingehoeve, doorverwijzingen, universiteitskliniek, kosten, combinatie, afstand, klinieken
7	plaatselijke, dingen, specialistische, problemen, kleine, orthopedische, grotere, bewegingsapparaat, algemene, beste
8	ky, zorg, vaste, 1e, discipline, zekere, orthopedist,passend, apparatuur, tandarts
9	tanden, holistisch, reguliere, buurt, werkzaam, enten, aangesloten, dingen, diagnostiek, operatief
10	hangt, specialisme, basiszorg, prima, deskundigheid, hand, koliek, dichtstbijzijnde, problemen, afhankelijk
11	tandarts, spoed, entingen, voortplanting, osteopaat, osteopathie, lijn, regulier, alledrie, orthopeed
12	beter, mogelijkheden, art, behandelingen, creatief, basis, gevallen, contact,lossen, ingewikkelde
13	diensten, bel, weekend, kreupelheden, vervanger,maak, gebruik, dagebitsverzorger, wormonderzoekspuiten, ervaringen
14	vaste, nodig, licht, pensioen, enting, specialisatie, zoekende, huis, gebit, klinieken
15	hulp, acute, veearts, eerstelijnshulp, ingewikkeldespecialistische, handelingen, dichtbij, behandelingen, osteopathie, paardenkliniek
16	probleem, gelang, beste, afhankelijk, specialisatie, holistisch, entingen, tanden, onderzoek, huis

Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.

Topic #	Top 10 Words
1	verhuizing, regio, bevallen, afstand, werk, locatie, dienstverlening, ontevreden, stal, communicatie
2	duur, diensten,onkunde, onkundig, klikte, praktijken, onzorgvuldig, overgang, onprettig, geholpen
3	communicatie, behandeling, verschillende, gebrek, fijne, optimaal, onprettig, diagnostiek, bereikbaar, moeizame
4	verhuizen, zorg, tevreden, vertrouwen, art, bereikbaar, gevoel, ervaring, kosten, onkunde
5	houding, koudbloedras, opinie, deskundige, tevreden, communicatie, verkeerde, vertrouwen, ervaring, kennis
6	verkeerde, diagnose, foutieve, gesteld, diagnosis, behandeling, gegeven, luisteren, eind, eigenaar

Table 45: Part 2 - Overview of the topics for the TF-IDF and k-means clustering results of the monolingual Dutch data.

Q45 Would you like to explain any of your answers?

Topic #	Top 10 Words
1	keuring, kennis,eerlijk, advies, onderzoek, aankoopkeuring, behandeling, verwacht, kundig, aankoop
2	eigenaar, maken, eigen, keuren, kennis, serieus, vertrouwen, luister, manier, mi
3	bel, spoed, snel, nodig, koliek, tijd, vragen, bellen, vraag, duidelijk
4	zorg, kwaliteit, belangrijkste, vaardigheden, kennis, financiële, horsemanship, interpersoonlijke, weten, professionaliteit
5	ervaring, denk, kunde, kennis, mi, kundigheid, zie, zorgverlening, kwaliteit, tevreden

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	kennis, kunde, meedenken, handelen, zaken, samenwerking, adequaat, geduld, vriendelijkheid, uitleg
2	bereikbaarheid, overleg, informatie, duidelijk, snelle, kennis, laagdrempelig, contact, kundige, communicatief
3	eerlijkheid, duidelijkheid, openheid, kennis, nuchterheid, meedenken, persoonlijk, uitleg, contact, vakmanschap
4	betrokkenheid, kundigheid, eerlijkheid, kunde, kennis, betrouwbaar, vakkundigheid, nuchterheid, deskundig, communicatie
5	deskundigheid, nemen, bereikbaarheid, keuren, behulpzaamheid, betrouwbaarheid, snelheid, meedenken, eerlijkheid, communicatie
6	communicatie, duidelijke, open, heldere, fijne, zorg, kennis, zaken, overleg, kunnig
7	duidelijk, eerlijk, denken, direct, uitleg, rustig, nuchter, geven, eigenaar, bereikbaar
8	eerlijk, advies, realistisch, meedenken, denken, betrouwbaar, open, bereikbaar, professioneel,correct
9	snel, bereikbaar, aanwezig, spoed, afspraak, nodig, terecht, handelen, eerlijk, maken
10	kundig, rustig, eerlijk, vriendelijk, snel, nuchter, eerlijkrealistisch, advies, betrouwbaar, overleg
11	kundigheid, eerlijkheid, doortastend, klantgerichtheid, holistisch, bereikbaarheid, beschikking, inzicht, empathie, omgang
12	uitleg, nodig, bereikbaar, meedenken, overleg, zorg, duidelijkheid, advies, rust, contact
13	tijd, neemt, nemen, genomen, aandacht, leggen, snel, klant, vriendelijk, duidelijk

Table 46: Part 3 - Overview of the topics for the TF-IDF and k-means clustering results of the monolingual Dutch data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.	
Topic #	**Top 10 Words**
1	care, different, emergency, lameness, specialist, practice
2	practice, different, specialist, care, lameness, emergency
3	practice, different, emergency, specialist, lameness, care
4	specialist, care, different, practice, lameness, emergency
5	different, emergency, care, practice, lameness, specialist
6	practice, different, specialist, care, lameness, emergency
7	practice, different, specialist, care, lameness, emergency
8	care, different, practice, emergency, specialist, lameness
9	specialist, care, emergency, practice, lameness, different
10	practice, different, specialist, care, lameness, emergency
11	practice, different, specialist, care, lameness, emergency
12	practice, different, specialist, care, lameness, emergency
13	practice, different, specialist, lameness, emergency, care
14	practice, different, specialist, care, lameness, emergency
Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	emergency, local, lameness
2	emergency, local, lameness
3	emergency, local, lameness
4	emergency, local, lameness
5	local, lameness, emergency
6	emergency, local, lameness
7	emergency, local, lameness
8	emergency, lameness, local
9	emergency, local, lameness
10	emergency, local, lameness
11	emergency, local, lameness
12	emergency, local, lameness
13	emergency, local, lameness
14	emergency, local, lameness
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	appointment, poor, emergency, area, vet, lack, practice, moved, new, retired
2	appointment, poor, emergency, moved, time, service, vet, new, communication, practice
3	service, moved, poor, diagnosis, practice, appointment, vet, barn, new, care
4	poor, emergency, moved, new, service, retired, practice, diagnosis, communication, lack
5	practice, service, care, lack, time, appointment, vet, poor, communication, diagnosis
6	moved, poor, area, diagnosis, barn, vet, practice, appointment, new, time
7	retired, care, vet, time, diagnosis, moved, emergency, new, appointment, practice
8	care, vet, poor, lack, moved, diagnosis, appointment, area, emergency, service
9	poor, time, retired, practice, vet, service, new, moved, emergency, area
10	emergency, barn, time, service, vet, care, new, practice, poor, moved
11	area, practice, poor, emergency, time, care, moved, appointment, new, barn
12	care, retired, diagnosis, poor, practice, time, appointment, moved, new, vet

Table 47: Part 1 - Overview of the topics for the LDA Version 1 results of the monolingual English data.

Q45 Would you like to explain any of your answers?	
Topic #	**Top 10 Words**
1	year, vet, look, time, good, able, trainer, pre, purchase, exam
2	treat, knowledge, understand, lameness, know, look, check, buying, price, issue
3	vet, treatment, information, cost, service, make, expensive, owner, quality, care
4	scenario, quality, skill, cost, service, treat, aspect, transfer, care, knowledge
5	trainer, knowledge, advice, horsemanship, opinion, cost, year, check, vet, know
6	make, need, knowledge, vet, trust, know, good, horsemanship, treatment, skill
7	thing, lameness, emergency, scenario, colic, available, animal, ask, day, question
8	vet, horsemanship, available, visit, ask, option, cost, professional, emergency, able
Q46 What do you appreciate most in your veterinarian?	
Topic #	**Top 10 Words**
1	appointment, compassionate, excellent, feel, work, skill, great, practical, communication, knowledgeable
2	cost, available, professional, service, hour, lameness, quality, excellent, practice, care
3	work, time, listen, make, treatment, farm, caring, concern, kind, animal
4	make, farm, hour, need, practice, area, available, vet, come, emergency
5	easy, approach, treatment, emergency, work, reasonable, cost, great, owner, issue
6	text, hour, feel, talk, vet, emergency, appointment, phone, easy, availability
7	need, question, appointment, ability, care, feel, response, expertise, know, skill
8	text, know, make, explain, appreciate, question, honest, answer, willing, time
9	practice, vet, thorough, treat, problem, understands, price, service, communication, good
10	need, date, good, willing, discus, compassionate, cost, information, treatment, option
11	option, question, expertise, treat, talk, thorough, thing, listens, compassion, explains
12	response, willingness, honest, option, practical, problem, try, approach, honesty, treatment
13	care, issue, ability, year, explain, situation, new, thing, willingness, listen
14	animal, expertise, make, professional, discus, ability, practice, date, experience, knowledge

Table 48: Part 2 - Overview of the topics for the LDA Version 1 results of the monolingual English data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices.	
Topic #	**Top 10 Words**
1	work, care, dental, vaccination, home, routine, local, clinic, available, practice
2	basic, primary, specialty, vet, general, lameness, regular, emergency, specialist, care
3	local, specialized, mobile, service, barn ,availability, care, lameness, different, emergency
Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	needed, location, different, medicine, sport, specialty, general, vet, lameness, emergency
2	care, different, clinic, basic, veterinary, emergency, issue, lameness, practice, local
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	exam, treated, multiple, attention, diagnosis, service, expensive, lack, cost, care
2	call, felt, medicine, practicing, personal, communicatie, life, problem, test, appointment
3	checkup, mistake, asked, make, made, different, skill, appointment, time, barn
4	call, come, state, found, needed, time, listen, laminitis, breeding, care
5	recommended, treatment, day, diagnostics, level, started, feel, stopped, left, practice
6	good, caused, staff, large, different, animal, medication, vet, lack, availability
7	bedside, communication, care, happy, manner, client, area, service, mare, practice
8	available, retired, practice, communication, vet, service, emergency, area, poor, moved
9	load, fecal, rough, trainer call, expensive, rude, check, business, poor
10	good, incompetent, difficult, vet, incompetence new, work, knowledge, lack, time
11	practice, poor, treatment, 2nd, diagnosis, appointment, difference, took, ray, opinion
12	switched, know, diagnostics, lack, unprofessional, expensive, retired, wrong, owner, barn
Q45 Would you like to explain any of your answers?	
Topic #	**Top 10 Words**
1	year, worked, try, available, scenario, ability, knowledge, care, emergency, check
2	animal, knowledgeable, informed, quality, emergency, hard, calling, work, professional, call
3	cost, purchase, knowledge, expensive, know, quality owner, issue, care, vet
4	scenario, issue, expect, trust willing, situation, life, emergency, end, call
5	case, service, choice, interpersonal, situation, available, knowledge, emergency, care, skill
6	purchase, pre, vet, year, value, care, option, cost, treatment, exam
7	answer, getting, trust, knowledgeable, treat, overlap, discipline, mean, question, day
8	skill, opinion, professionalism, horsemanship, good, understand, communication, service, care, quality
9	visit, look, opinion, used, cost, vet, transfer, know, situation, knowledge
10	question, ask, experience, check, make, care, call, knowledge, know, owner.
11	good, vetting, horsemanship, exam, trainer, able, purchase, vet, cost, know
12	buying, health issue, test, expensive, check, vet, pre, purchase, exam
13	new, going, student, school, make, buying, purchase, prepurchase, care, exam
14	people, advice, call, horsemanship, young, plan treat, treatment, care, know

Table 49: Part 1 - Overview of the topics for the LDA Version 2 results of the monolingual English data.

Q46 What do you appreciate most in your veterinarian?

Topic #	Top 10 Words
1	problem, talk, know, good, practice, easy, question, available, vet, care
2	kindness, availability, excellent, skill, caring, time, knowledge, communication, quality, care
3	good, treatment, going, option, cost, willing, kind, skill, care, know
4	care, concern, knowledge thing, take, time, listens, explains detail treatment
5	expensive, experience, treatment, respect, answer, staff, reasonable, knowledge, emergency, service
6	good, experienced, listen, knowledge, service, option, emergency patient, contact, care
7	experience, great, explain, time, farm, treatment, practice call emergency, come
8	excellent, response, appreciate, honest, practical, hour, question treatment, care, approach
9	price, information, responsive, date, call, care, willing, good animal, experience
10	show, approach, honesty, call, great, knowledge, emergency, care, professionalism, vet
11	willing, information, care option, discus, issue, treatment, communication, knowledgeable, good
12	knowledgeable, skill, option, ability, communication, professional, expertise, compassion, knowledge availability
13	knowledge, treatment, care, thing, knowledgeable, advice, honest, cost, honesty, practical
14	compassion, competence, take, question, care, knowledge, good, come, answer, time

Table 50: Part 2 - Overview of the topics for the LDA Version 2 results of the monolingual English data.

Q12_2 How many veterinarians/ practices do you use? - I use 2 veterinarians/ practices. (you can explain why if you want)	
Topic #	**Top 10 Words**
1	call, farm, travel, reproductive, therapist, hospital, issue, choice, holiday, imms
2	regular, emergency, primary, routine,day, care, main, work, teeth, reach
3	lameness, care, general, specialist, specialized, routine, shot, emergency, medicine, necessary
4	different, location, barn, service, imaging, expertise, vet, equipment, healthcare, practice
5	practice, dental, work, specialist, x1, veterinary, experience, injury, colt, geld
6	mobile, main, service, specialist, hour, referred, clinic, convenient, property, come
7	availability, needed, emergency, part, time, rural, live, close, issue, injury
8	vaccination, annual, emergency, dental, dentistry, soundness, barn, care, clinic, out
9	basic, care, specialty, needed, performance, focused, shot, others, maintenance, medicine
10	home, emergency, vaccination, local, service, call, dental, large, case, husband
11	available, ara, one, rural, vet, baby, option, open, main, plan
12	local, specialised, vet, bigger, ppid, ucdavis, lameness, maintenance, major, practice
Q12_3 How many veterinarians/ practices do you use? - I use 3 or more veterinarians/ practices.	
Topic #	**Top 10 Words**
1	location, vet, physical, home, trainer, availability, rural, share, available, service
2	local, needed, lameness, sport, mile, state, special, depends, care, procedure
3	emergency, specialty, lameness, come, issue, vaccination, availability, farm, dichtstbijzijnde, enten
4	different, speciality, issue, travel, depending, depends, location, serious, specialty, vet
5	practice, general, chiropractic, multiple, local, repro, veterinary, lameness, dental, dentist
Q15_2 Have you ever stopped using a particular vet(practice)? - Yes.	
Topic #	**Top 10 Words**
1	different, stopped, using, closed, barn,exam, area, service, emergency, attention
2	poor, communication, horsemanship, outcome, repeated, business, bossy, quality, interpersonal, skill
3	emergency, time, appointment, vet, unavailable, available, incompetence, made, make, call
4	moved, area, state, service, house, radius, served, close, work, location
5	lack, availability, expensive, care, service, cost, rude, treatment, call, area
6	retired, quit4, switch, new, moved, communication, emergency, lack, manner, cost
7	practice, left, animal, started, business, small, changed, large, moved, switched

Table 51: Part 1 - Overview of the topics for the TF-IDF and k-means clustering results of the monolingual English data.

Q45 Would you like to explain any of your answers?	
Topic #	**Top 10 Words**
1	call, thanks, knowledge, professional, trust, question, day, difficult, aspect, make
2	exam, purchase, pre, prepurchase, done, trainer, getting, knowledge, schedule, faith
3	know, vet, owner, animal, mean, horsemanship, expertise, trainer, knowledge, people
4	care, quality, service, cost, treat, good, transfer, information, knowledge, situation
5	opinion, vetting, price, seeing, arrive, missed, understand, thorough, purchase, see
6	check, buying, buy,full, heart, expensive, compete, lung, health, ethical
7	skill, issue, able, treatment, horsemanship, medical, situation, interpersonal, discus, approach
Q46 What do you appreciate most in your veterinarian?	
Topic #	**Top 10 Words**
1	knowledge, understanding, skill, approachability, transfer, illness, professional, reasonableness, issue, empathy
2	experience, knowledge, practicality, depth,time,price, non, respect,friendliness, availability
3	care,quality, animal, follow, honesty, communication, experienced, option, depth, continuity
4	honesty, easy, date, cost, available, talk, kind, practice,area, knowledge
5	availability, professionalism, communication, skill, appointment, resource, home, hour, reliability, good
6	knowledgeable, caring, practical, care, patient, great, good, option, discus, mobile
7	compassion, expertise, competence, animal, honesty, experience, ability, base, knowledge, professionalism
8	vet, animal, know, practice, small, care, change, call, personal, easy
9	emergency, come, show, call, service, weekend, contact, available, need, decision
10	honest, practical, treatment, suggest, approach, try, earth, advice, option, diagnosis
11	good, communication, skill, call, kindness, direct, clinical, explanation, price, level
12	time, willingness, explain, question, answer, listen, issue, care, thing, ability

Table 52: Part 2 - Overview of the topics for the TF-IDF and k-means clustering results of the monolingual English data.

Appendix J: UpSet Plots

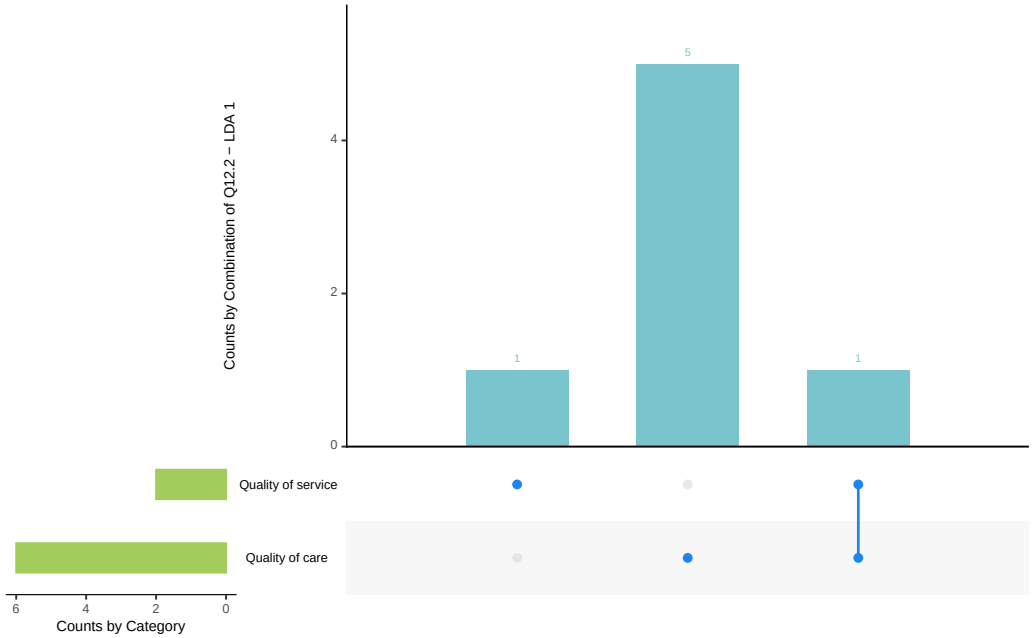

Figure 46: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the LDA Version 1 results for the bilingual data (Dutch and English).

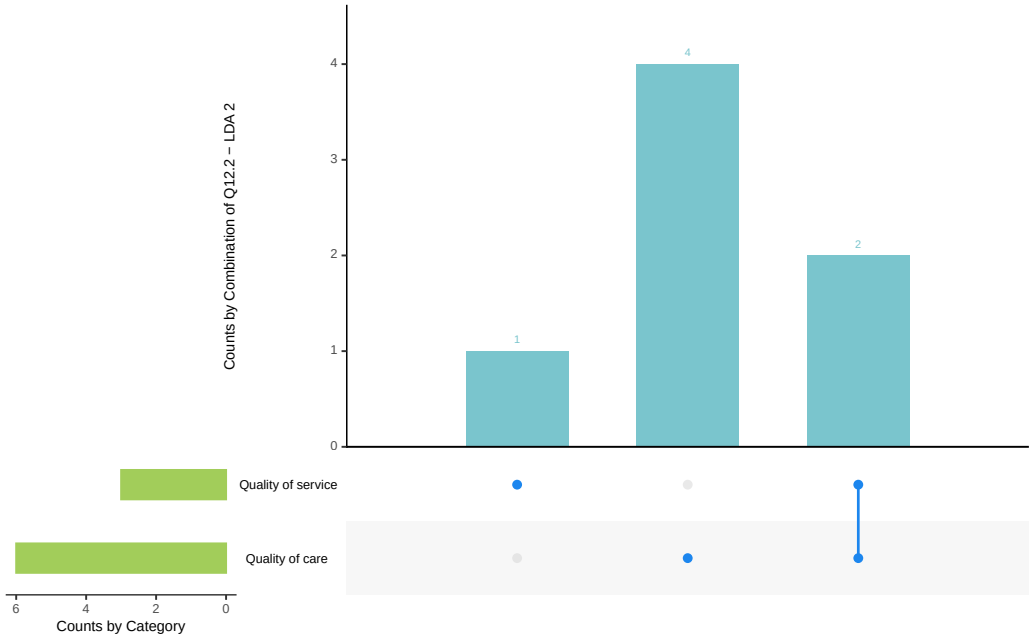

Figure 47: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the LDA Version 2 results for the bilingual data (Dutch and English).

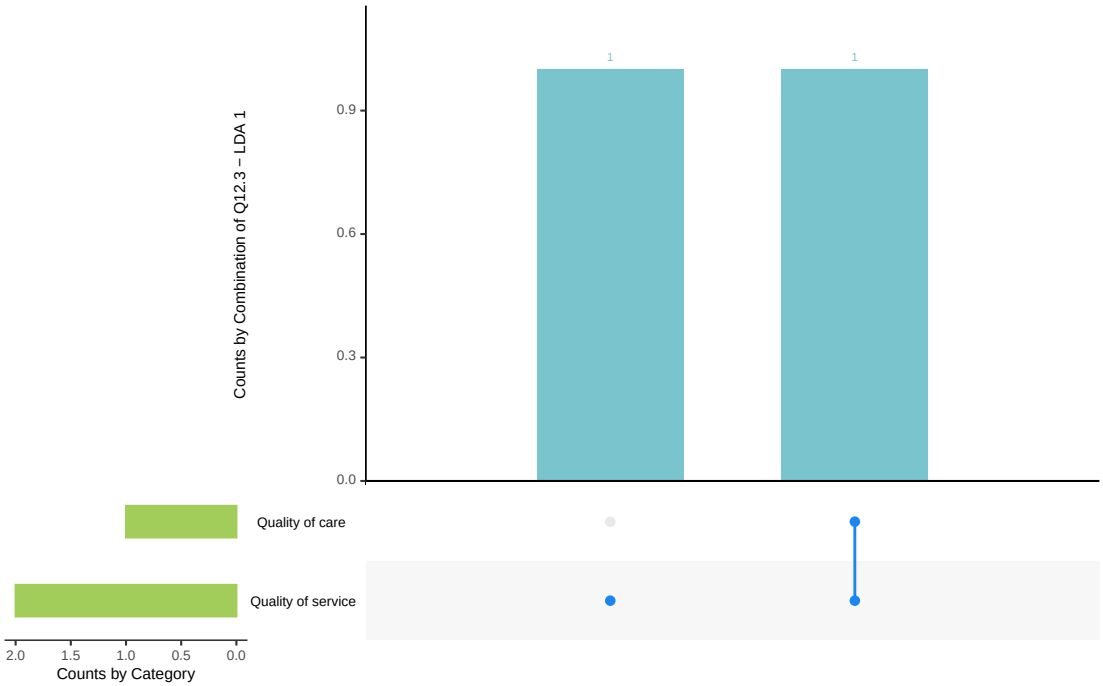

Figure 48: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the LDA Version 1 results for the bilingual data (Dutch and English).

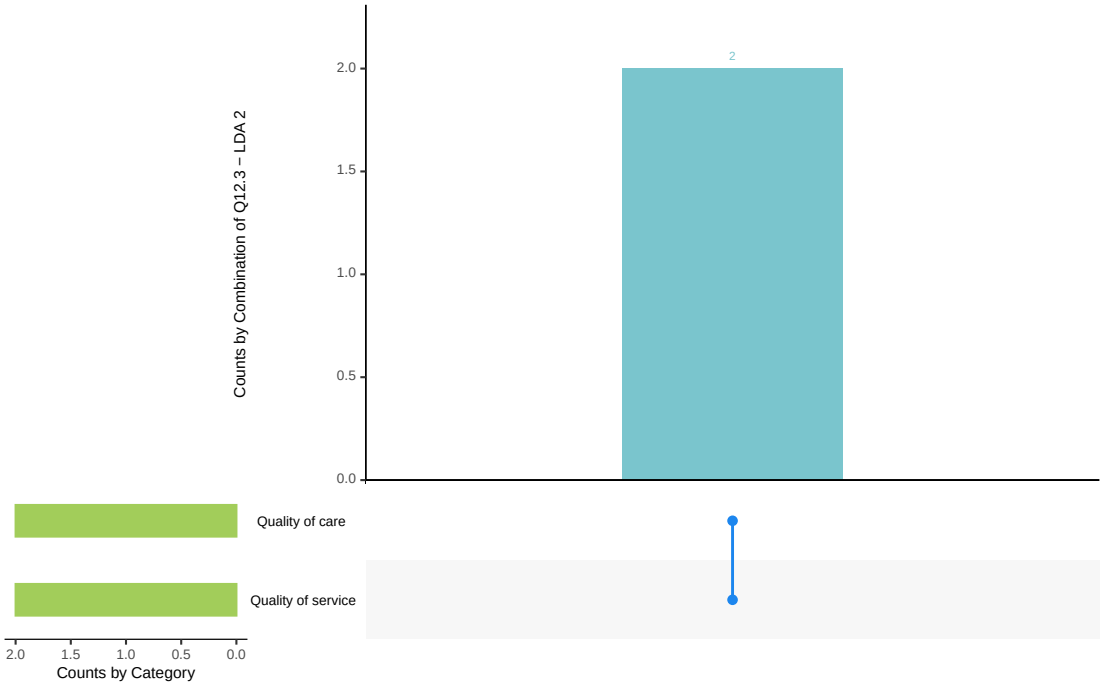

Figure 49: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the LDA Version 2 results for the bilingual data (Dutch and English).

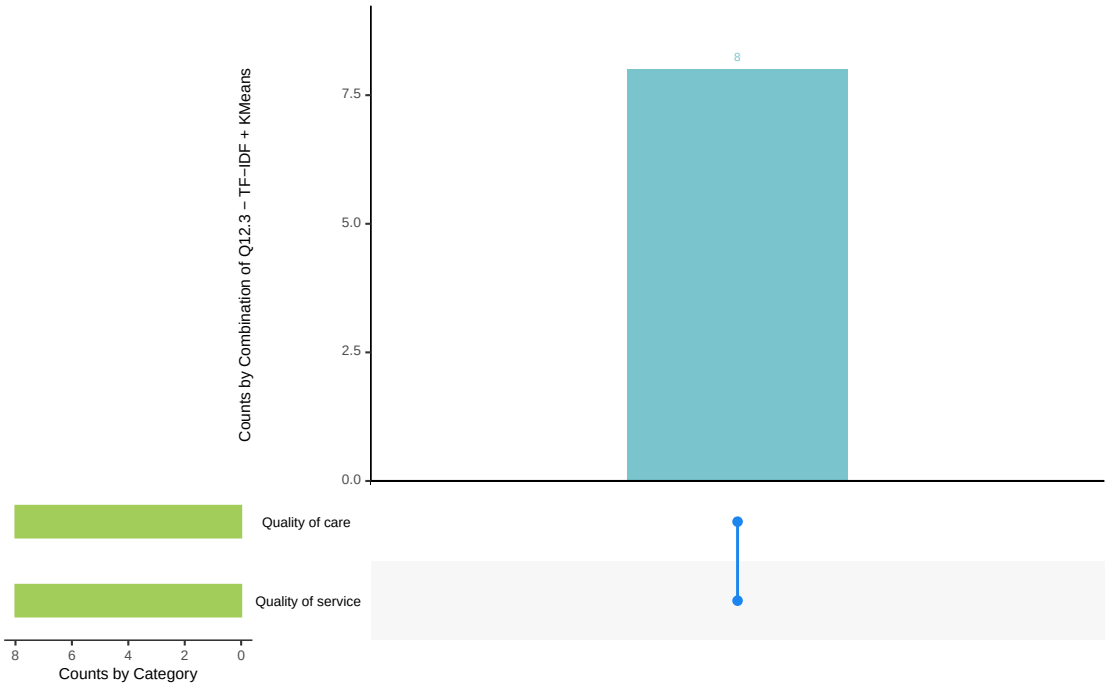

Figure 50: UpSet plot for question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” of the TF-IDF and k-means clustering results for the bilingual data (Dutch and English).

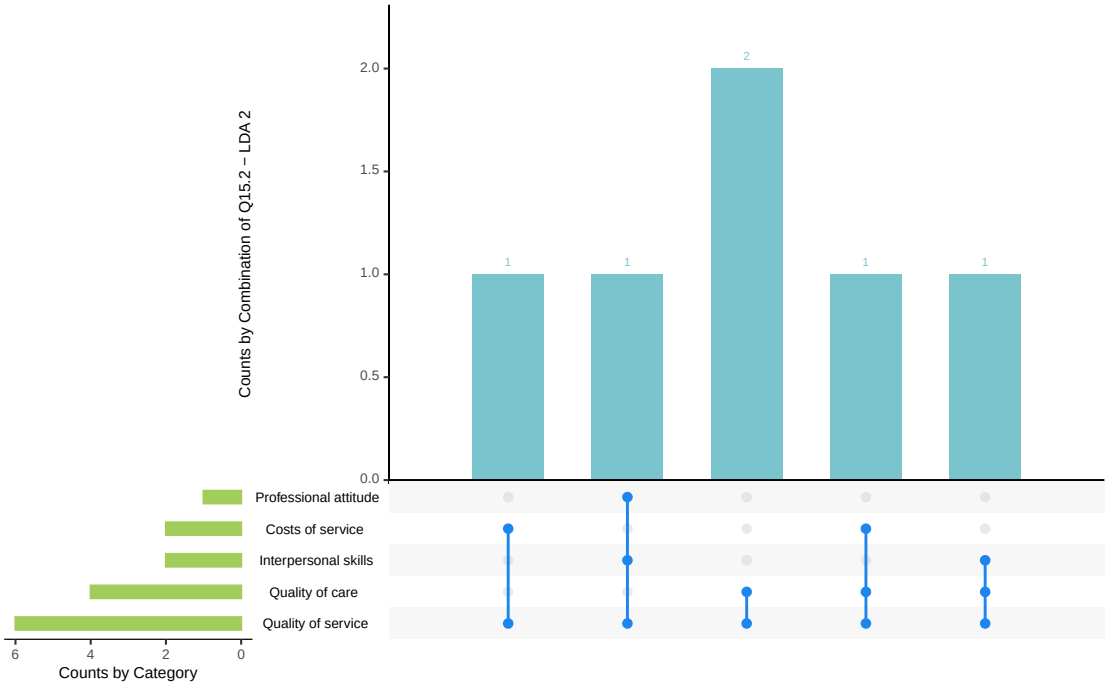

Figure 51: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the LDA Version 2 results for the bilingual data (Dutch and English).

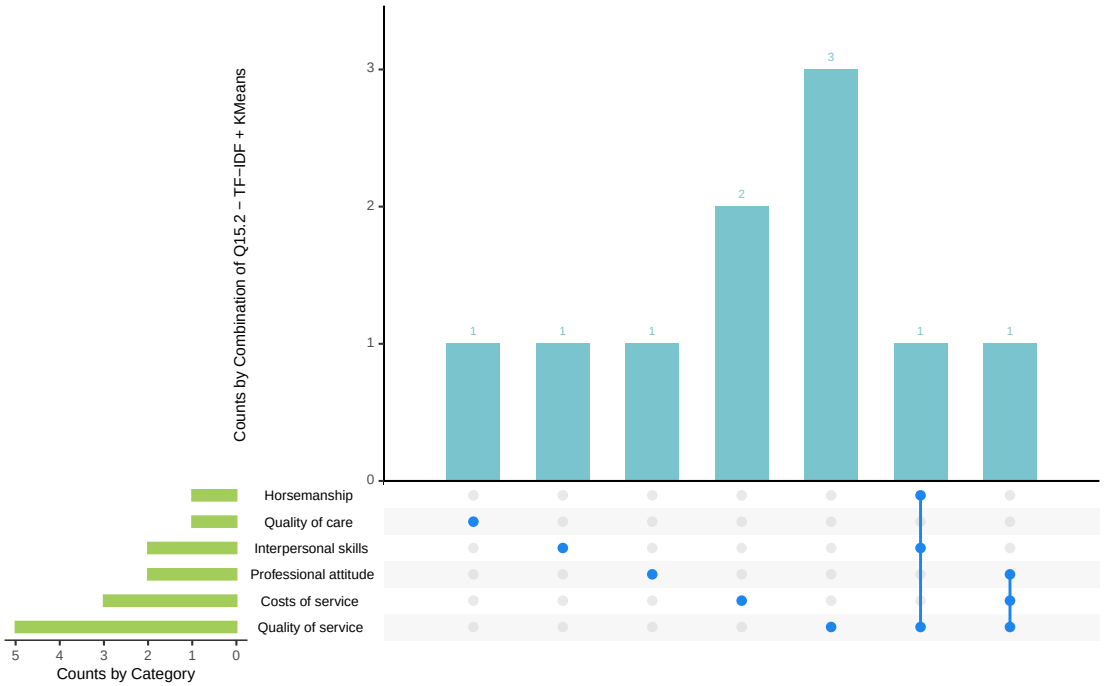

Figure 52: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the TF-IDF and k-means clustering results for the bilingual data (Dutch and English).

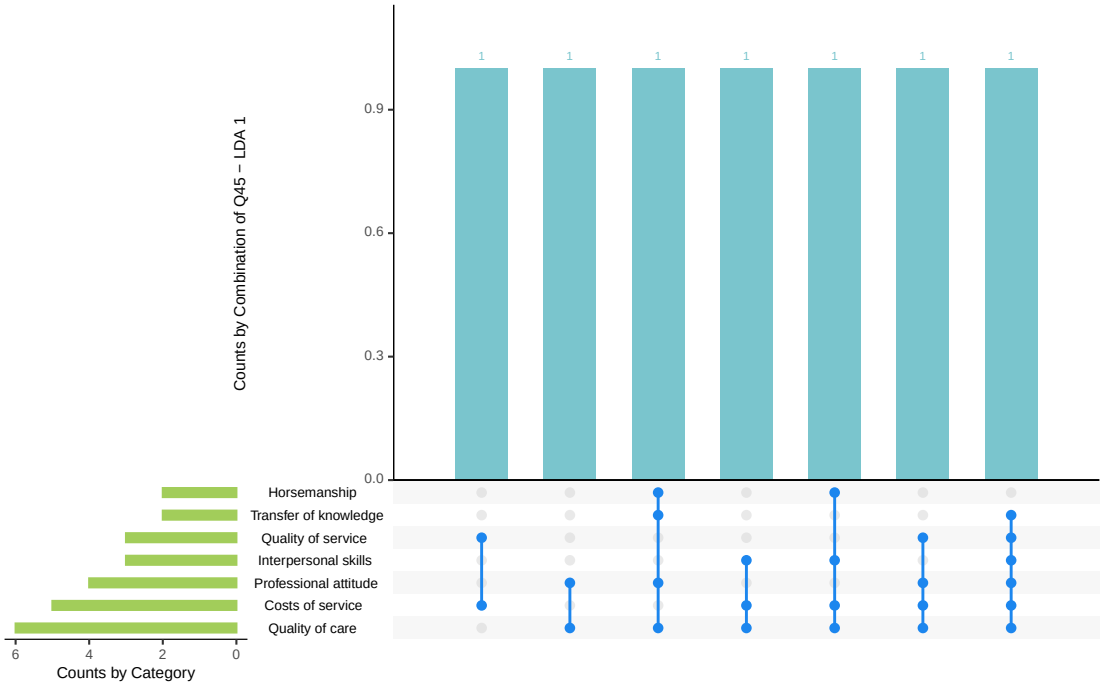

Figure 53: UpSet plot for question 45 “Would you like to explain any of your answers?” for the questionnaire questions concerning pre-purchase exams of the LDA Version 1 results for the bilingual data (Dutch and English).

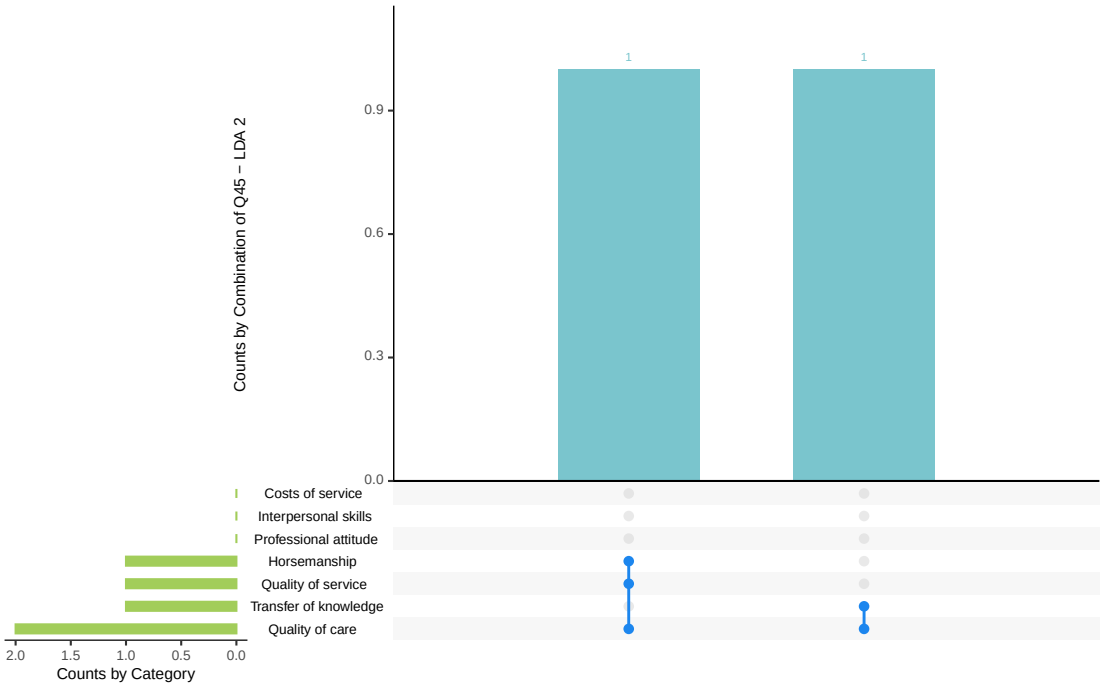

Figure 54: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the LDA Version 2 results for the bilingual data (Dutch and English).

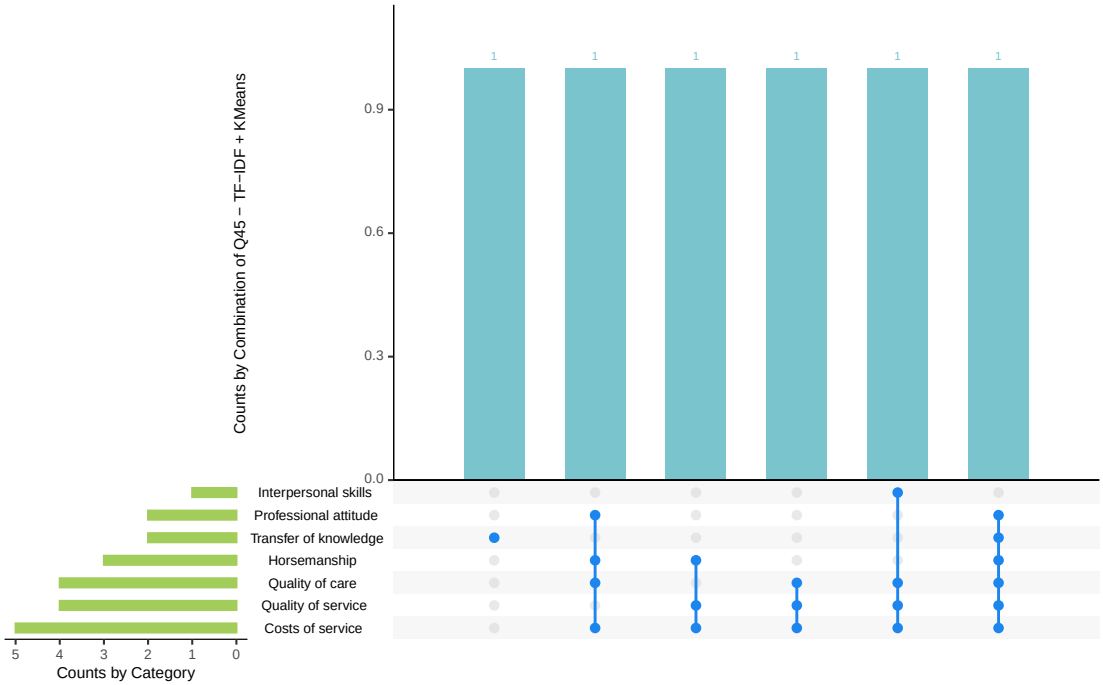

Figure 55: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the bilingual data (Dutch and English).

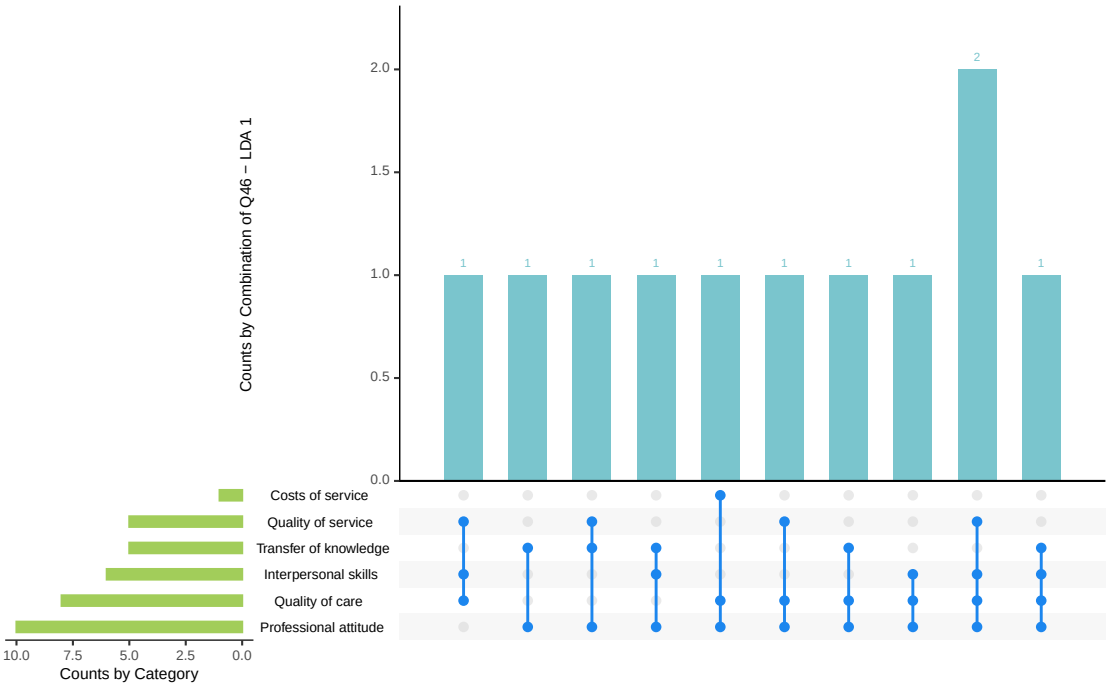

Figure 56: UpSet plot for question 46 "What do you appreciate most in your veterinarian?" of the LDA Version 1 results for the bilingual data (Dutch and English).

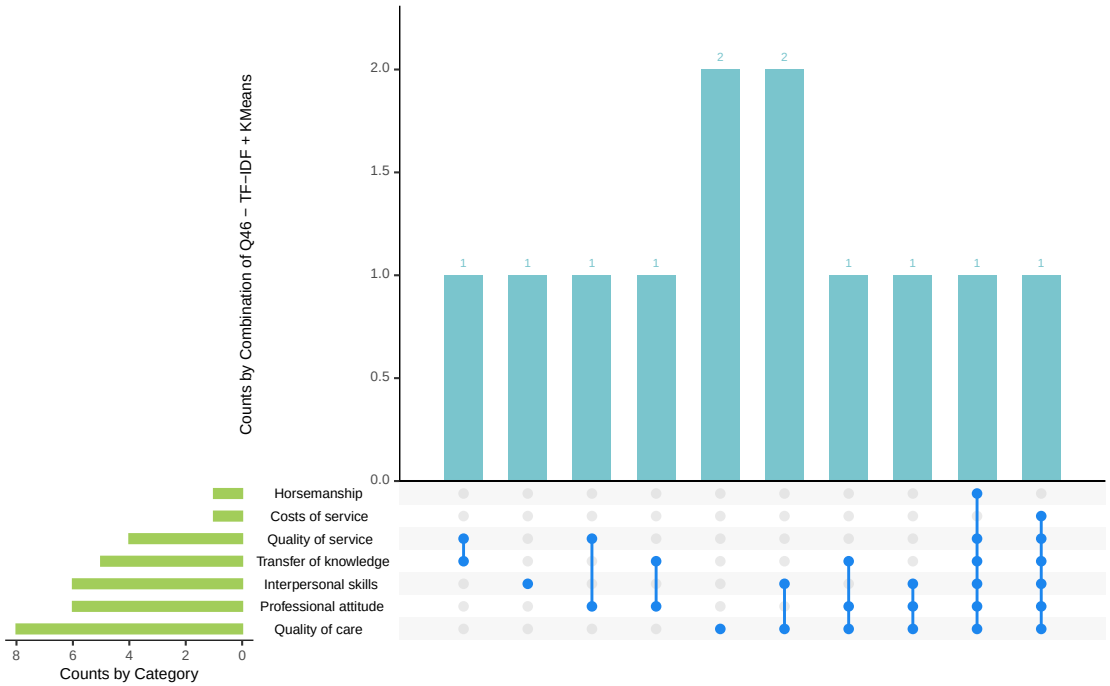

Figure 57: UpSet plot for question 46 "What do you appreciate most in your veterinarian?" of the TF-IDF and k-means clustering results for the bilingual data (Dutch and English).

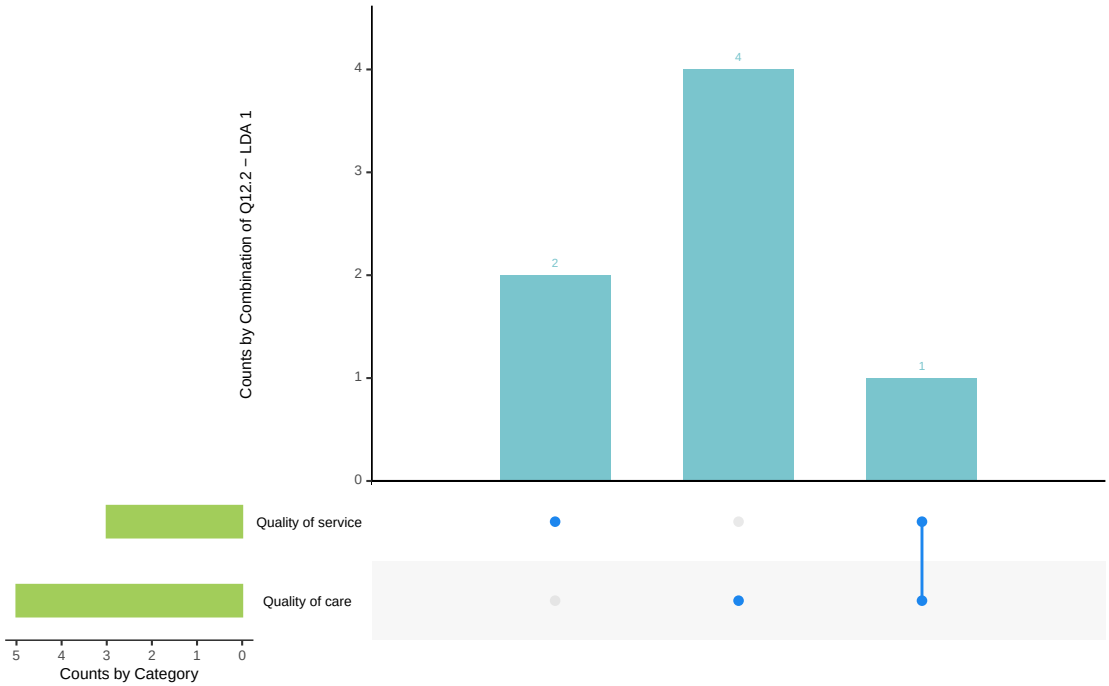

Figure 58: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the LDA Version 1 results for the monolingual English data.

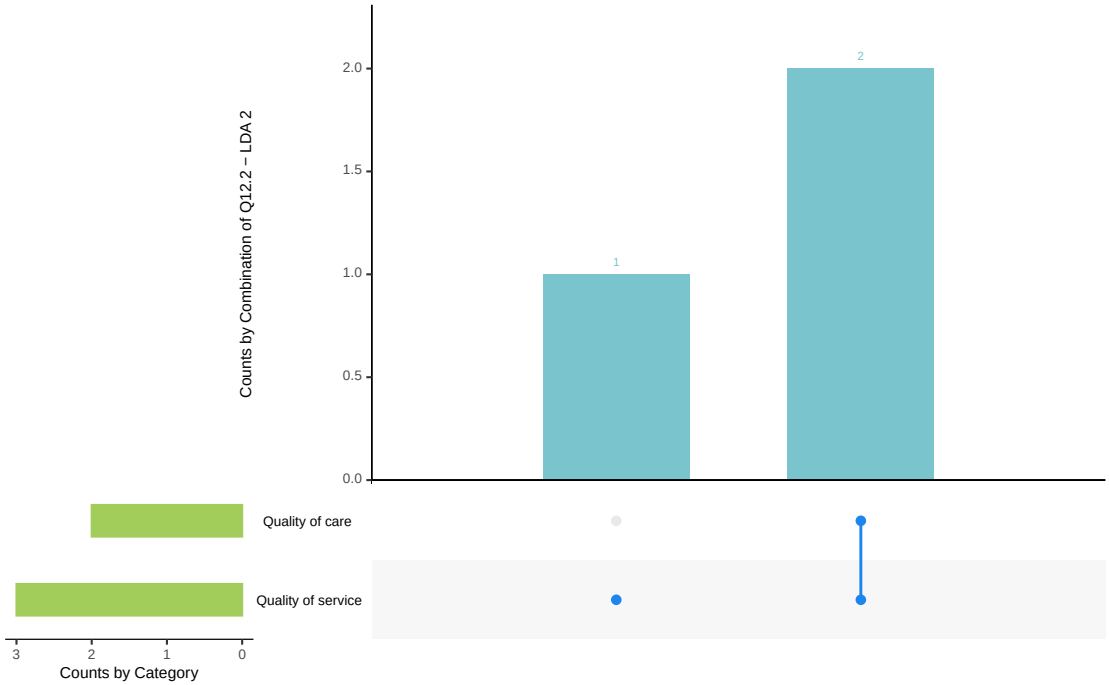

Figure 59: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the LDA Version 2 results for the monolingual English data.

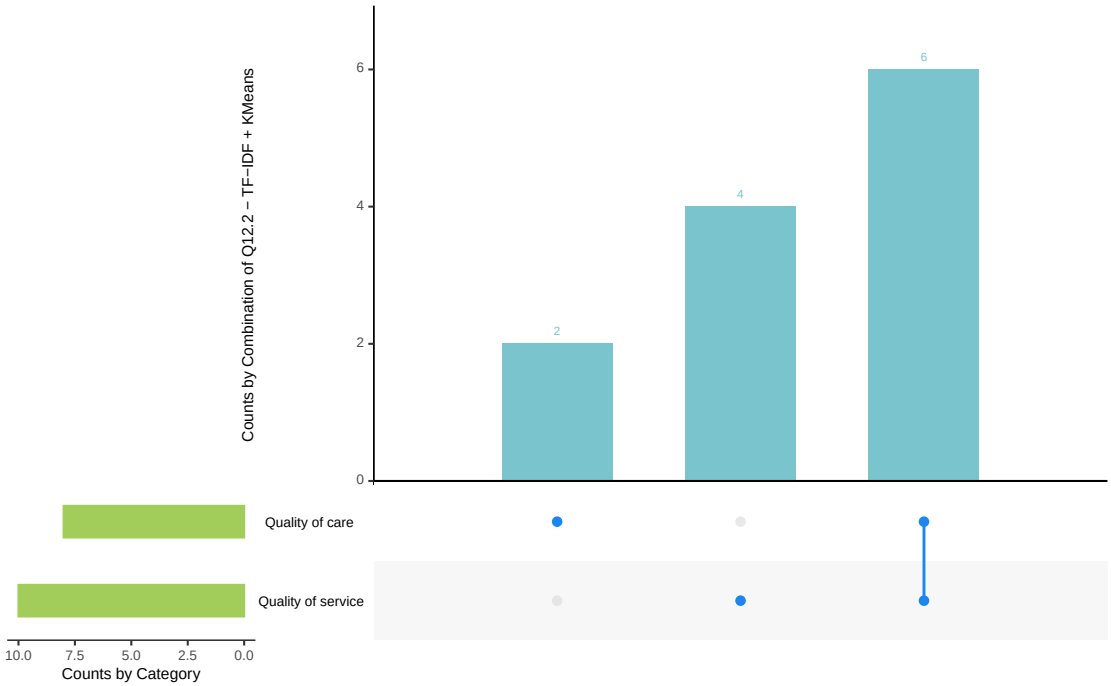

Figure 60: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the TF-IDF and k-means clustering results for the monolingual English data.

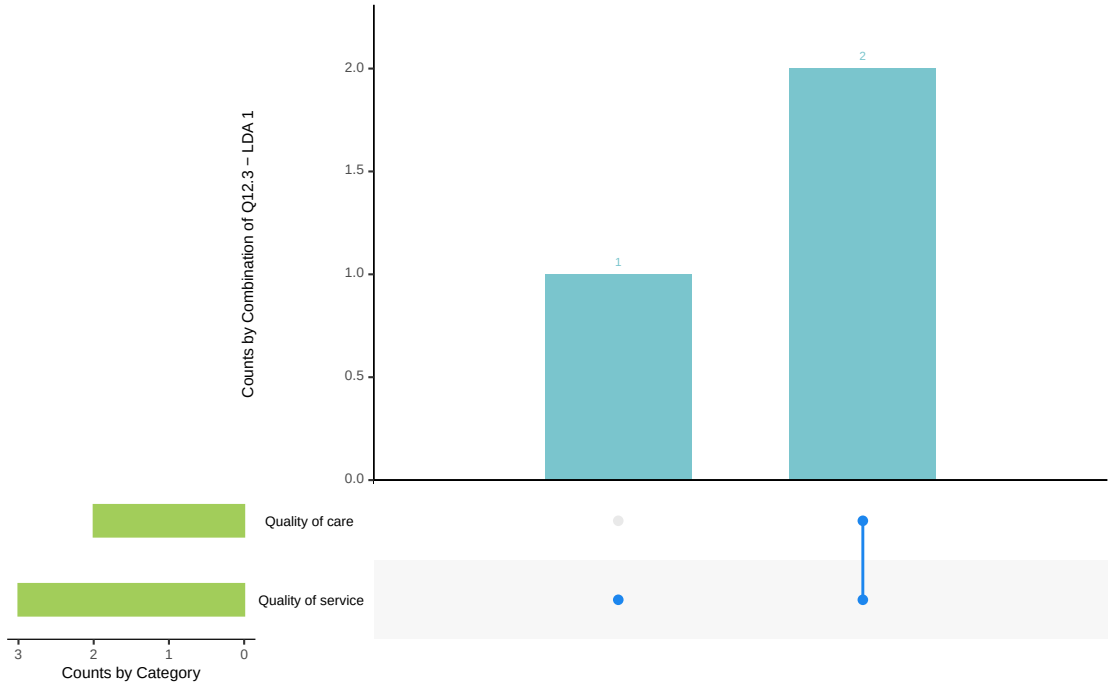

Figure 61: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the LDA Version 1 results for the monolingual English data.

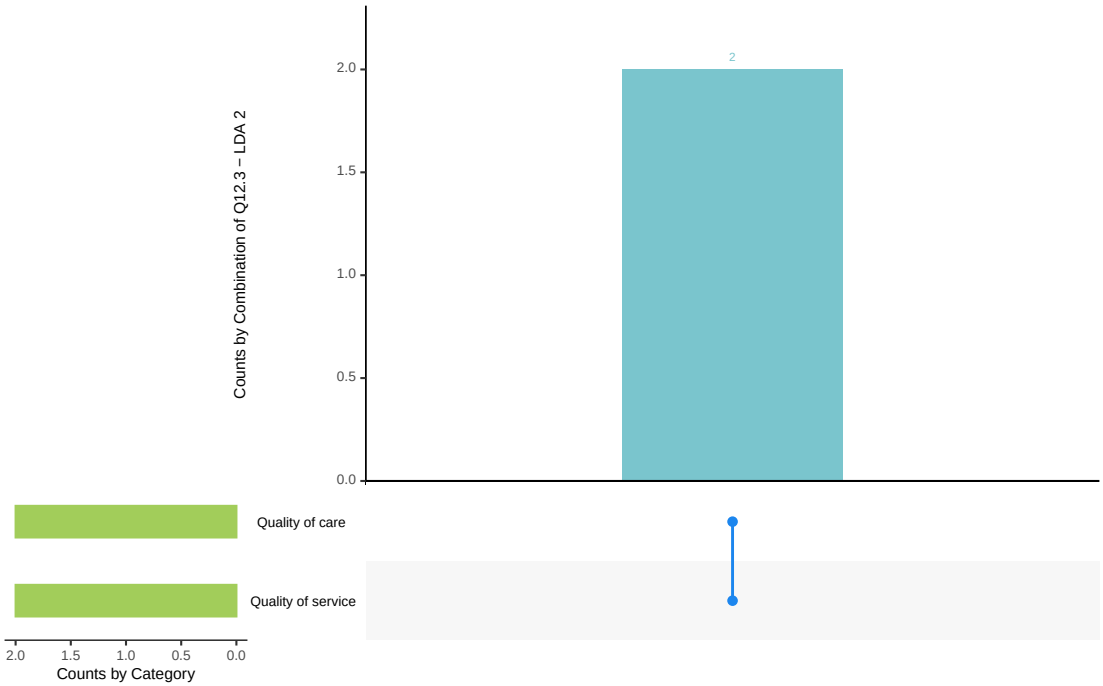

Figure 62: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the LDA Version 2 results for the monolingual (English) data.

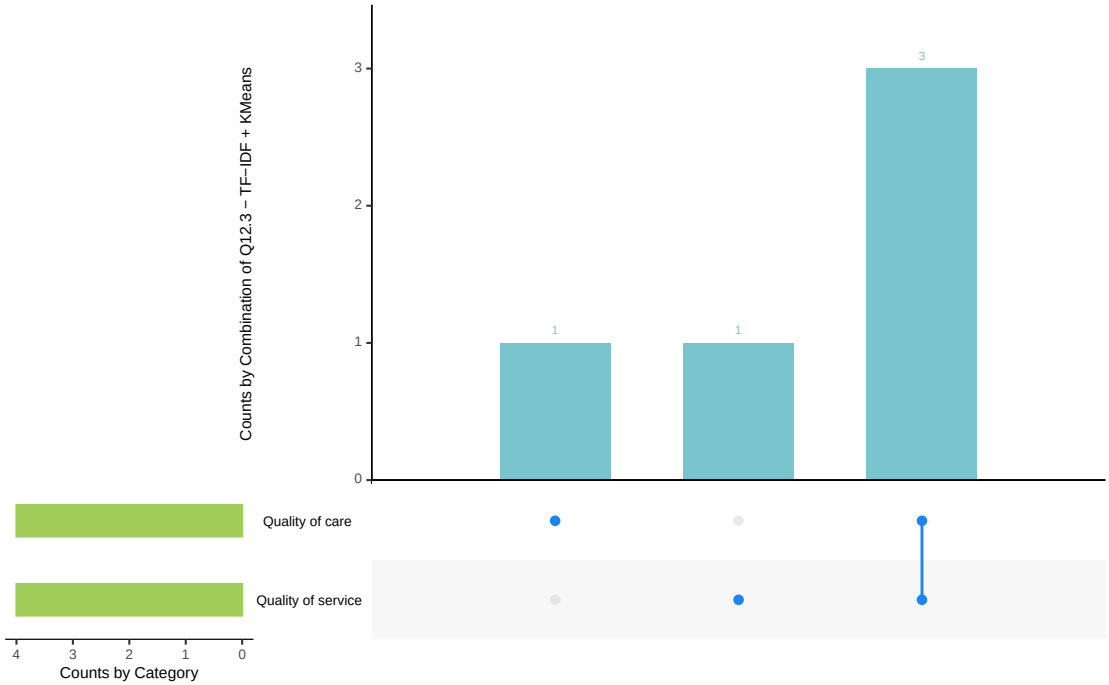

Figure 63: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the TF-IDF and k-means clustering results for the monolingual English data.

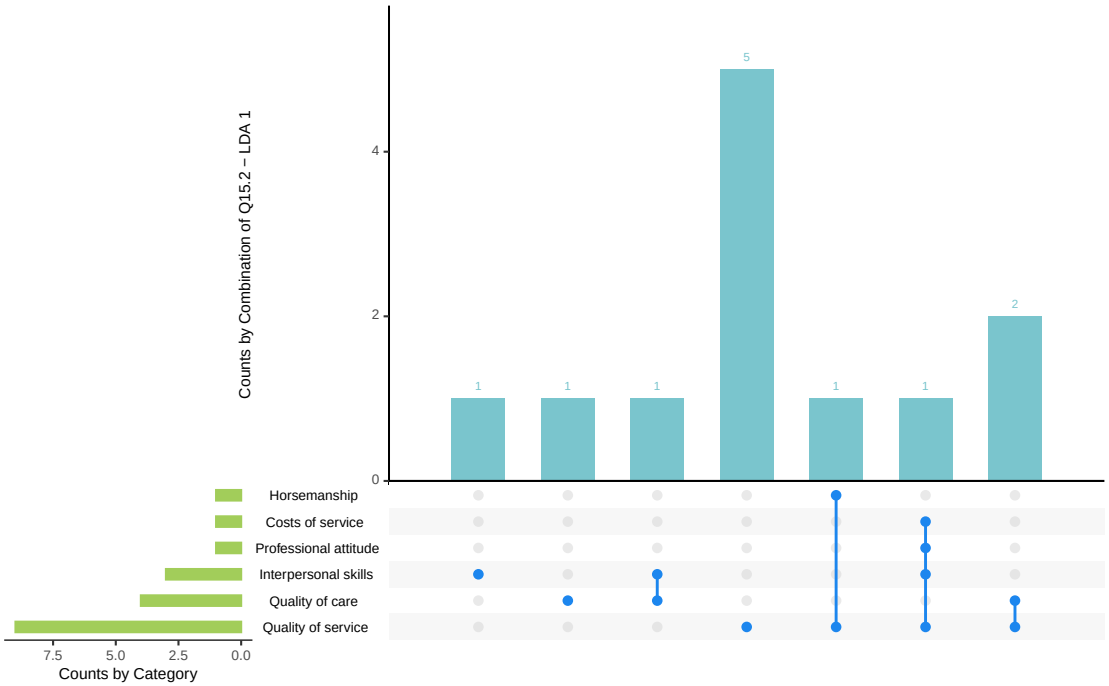

Figure 64: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the LDA Version 1 results for the monolingual English data.

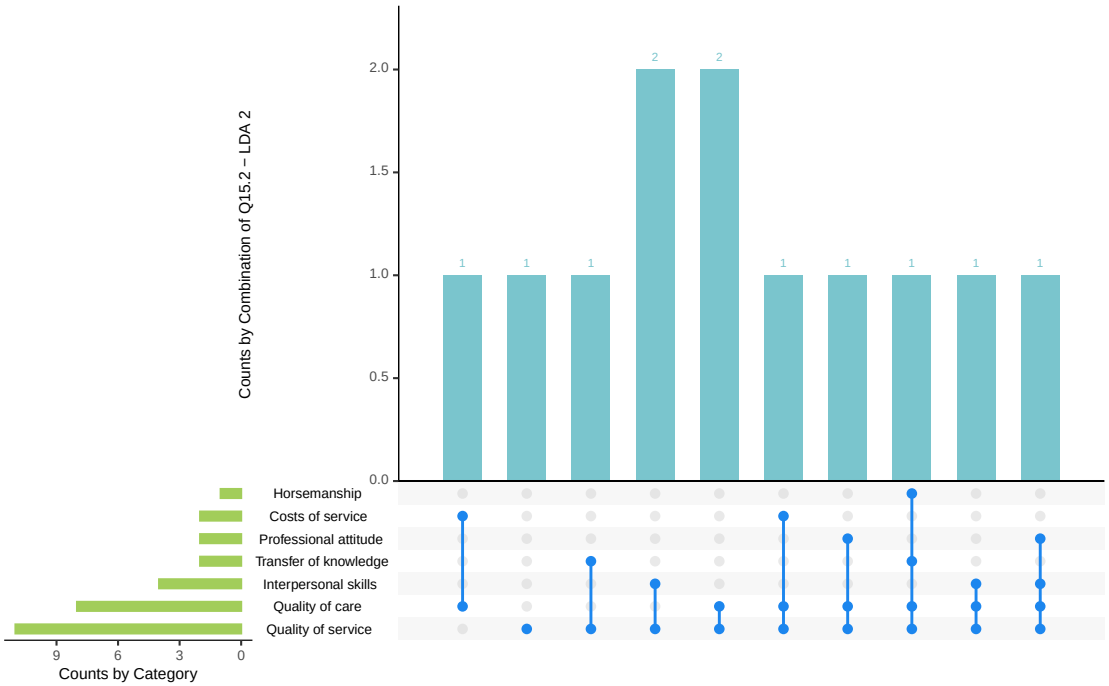

Figure 65: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the LDA Version 2 results for the monolingual English data.

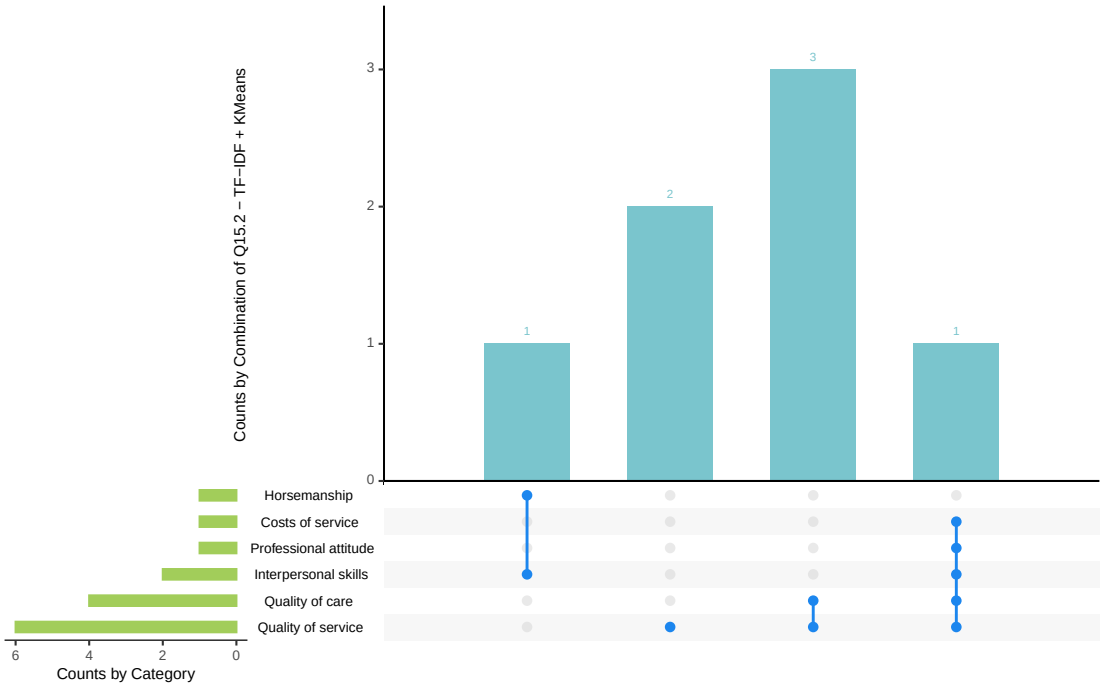

Figure 66: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the TF-IDF and k-means clustering results for the monolingual English data.

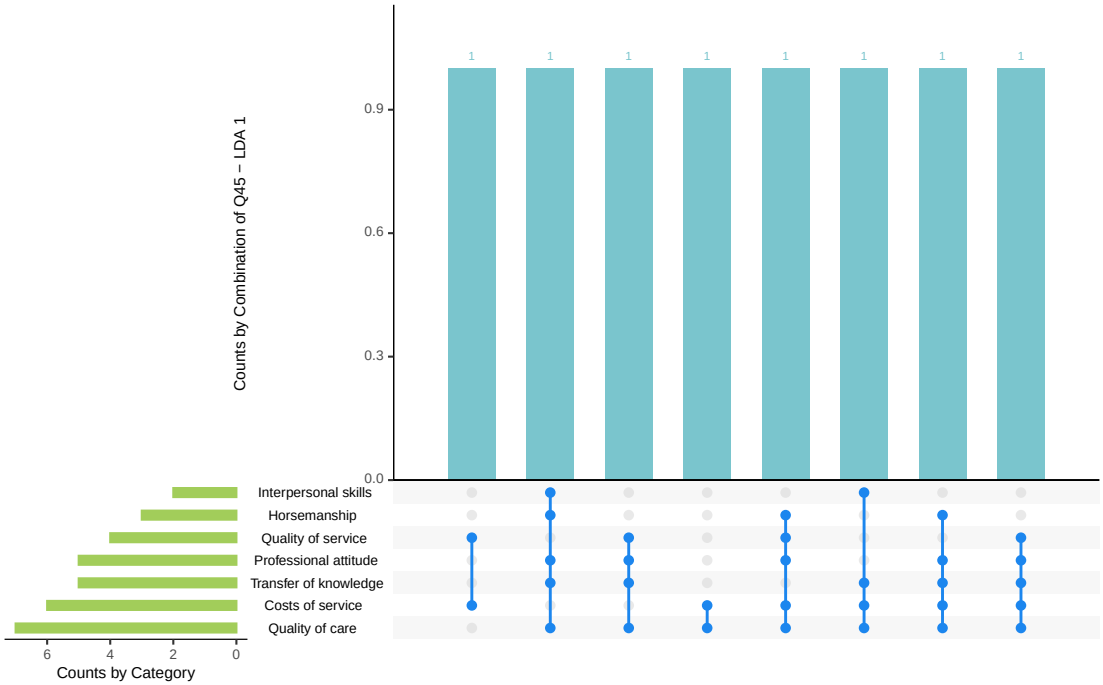

Figure 67: UpSet plot for question 45 “Would you like to explain any of your answers?” for the questionnaire questions concerning pre-purchase exams of the LDA Version 1 results for the monolingual English data.

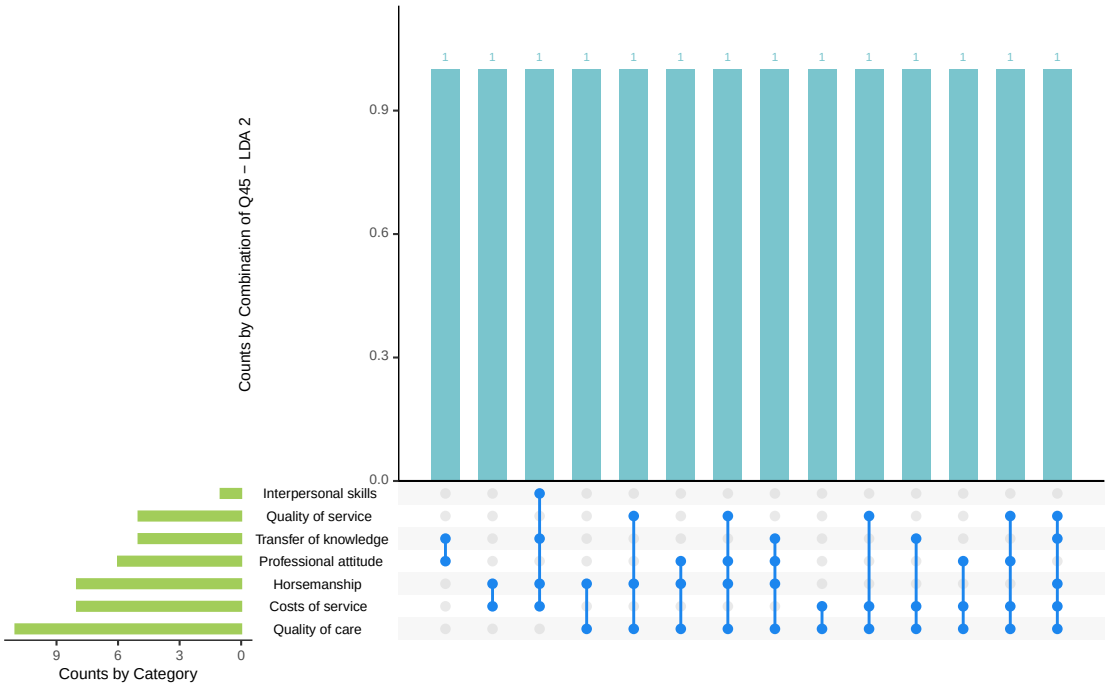

Figure 68: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the LDA Version 2 results for the monolingual English data.

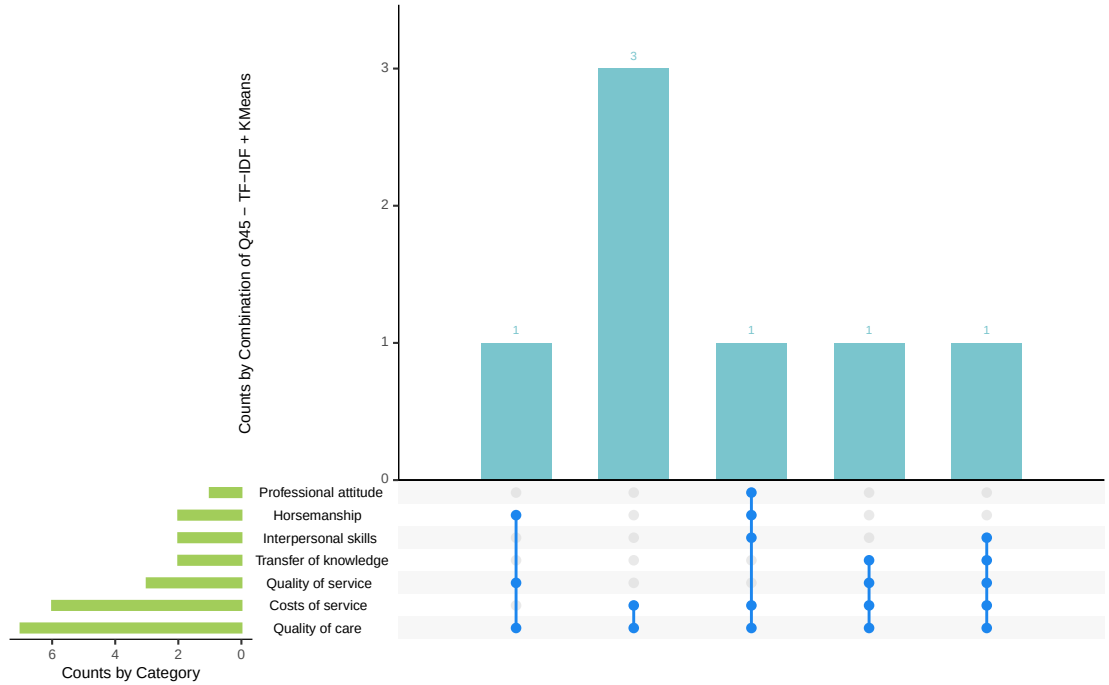

Figure 69: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the monolingual English data.

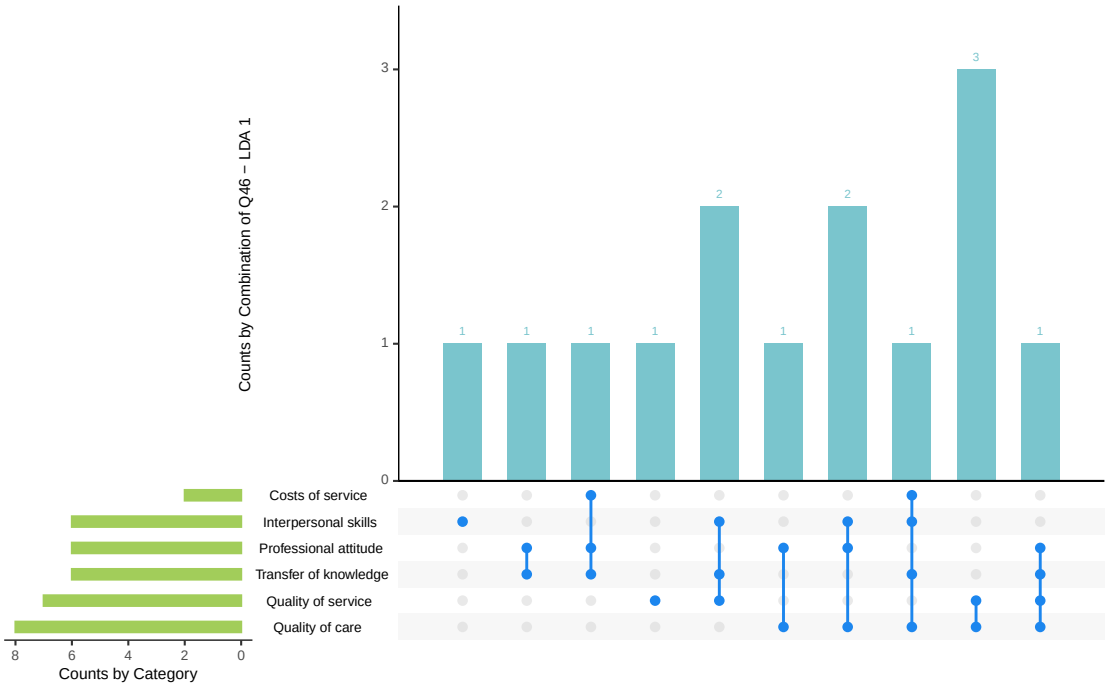

Figure 70: UpSet plot for question 46 "What do you appreciate most in your veterinarian?" of the LDA Version 1 results for the monolingual English data.

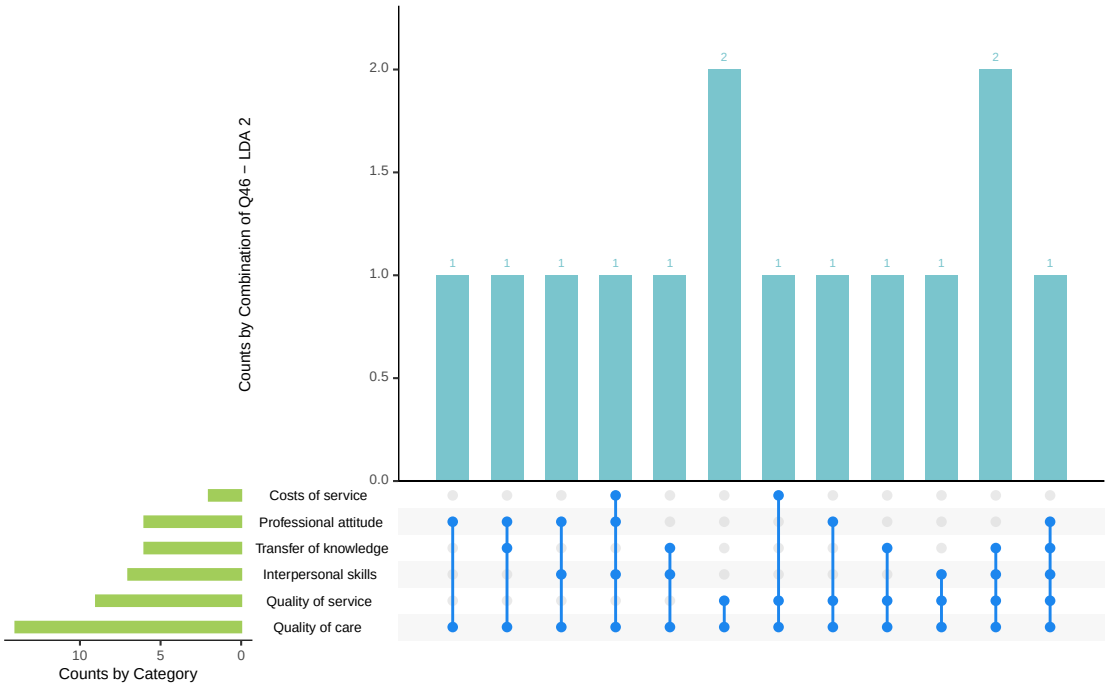

Figure 71: UpSet plot for question 46 "What do you appreciate most in your veterinarian?" of the LDA Version 2 results for the monolingual (English) data.

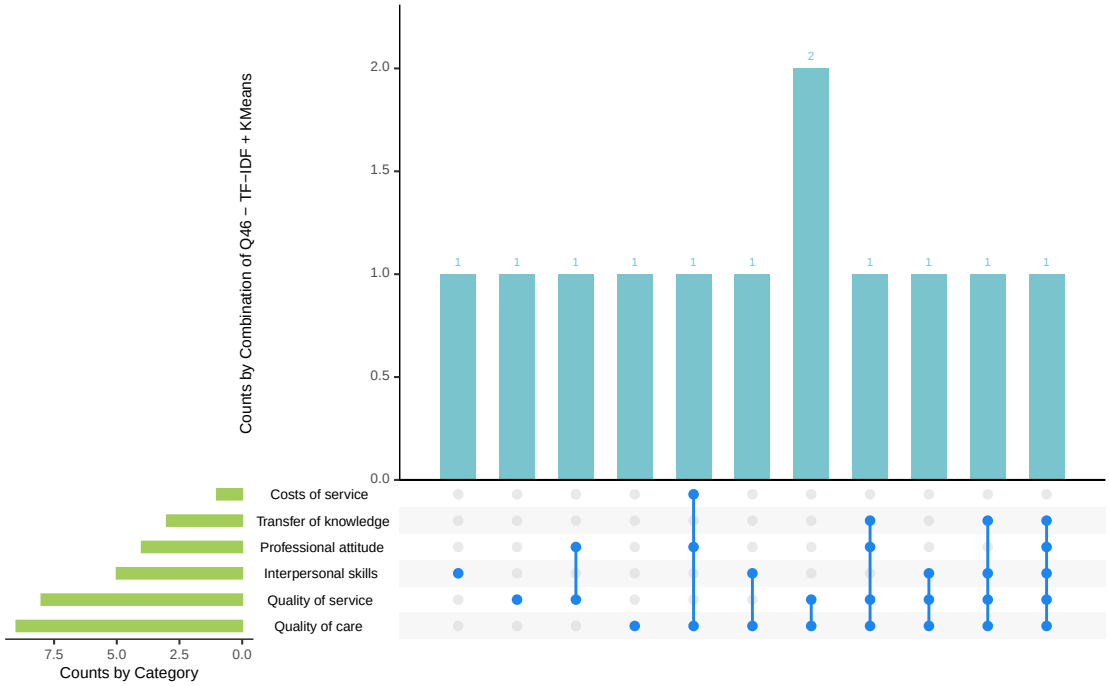

Figure 72: UpSet plot for question 46 “What do you appreciate most in your veterinarian?” of the TF-IDF and k-means clustering results for the monolingual English data.

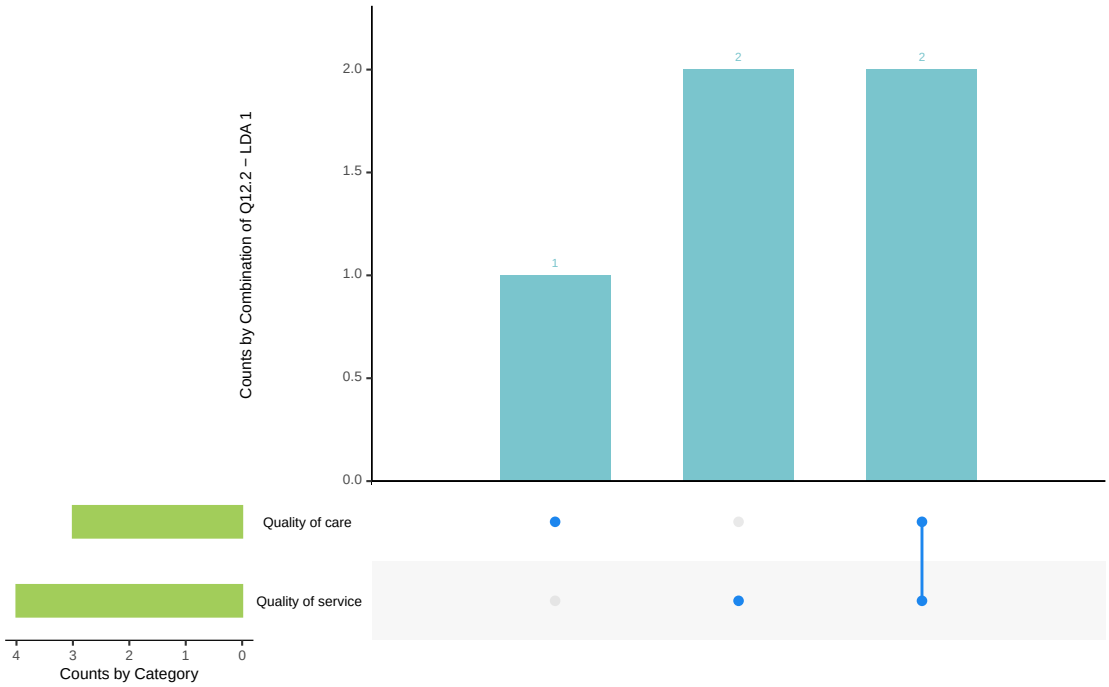

Figure 73: UpSet plot for question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected “I use 2 veterinarians / practices” of the LDA Version 1 results for the monolingual Dutch data.

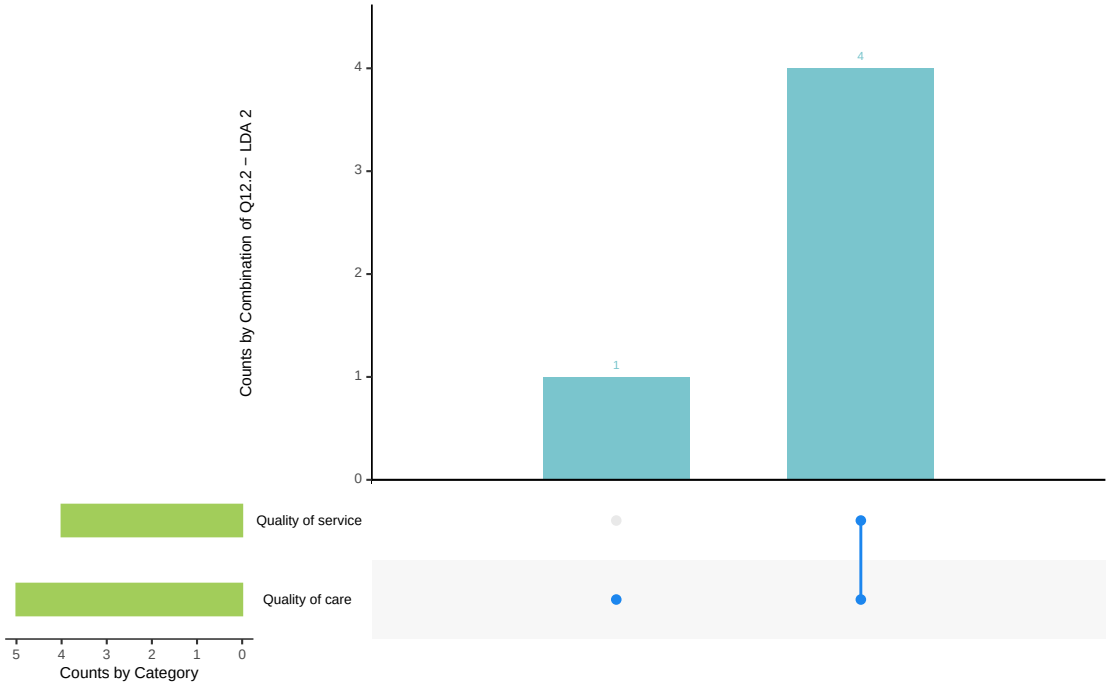

Figure 74: UpSet plot for question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected “I use 2 veterinarians / practices” of the LDA Version 2 results for the monolingual Dutch data.

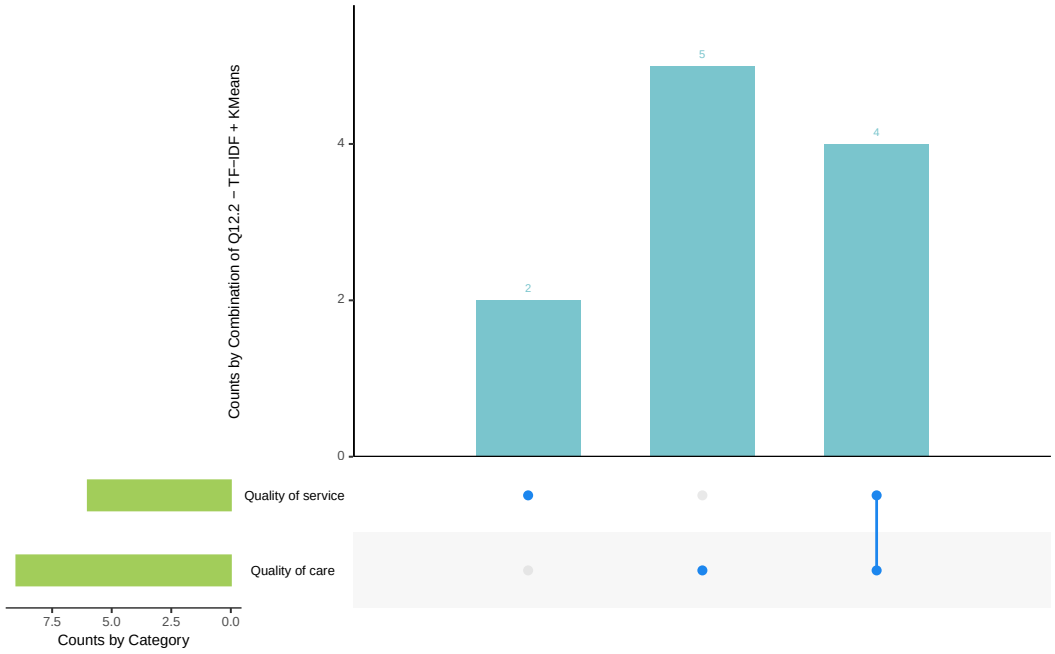

Figure 75: UpSet plot for question 12.2 “How many veterinarians / practices do you use?” where the participant previously selected “I use 2 veterinarians / practices” of the TF-IDF and k-means clustering results for the monolingual Dutch data.

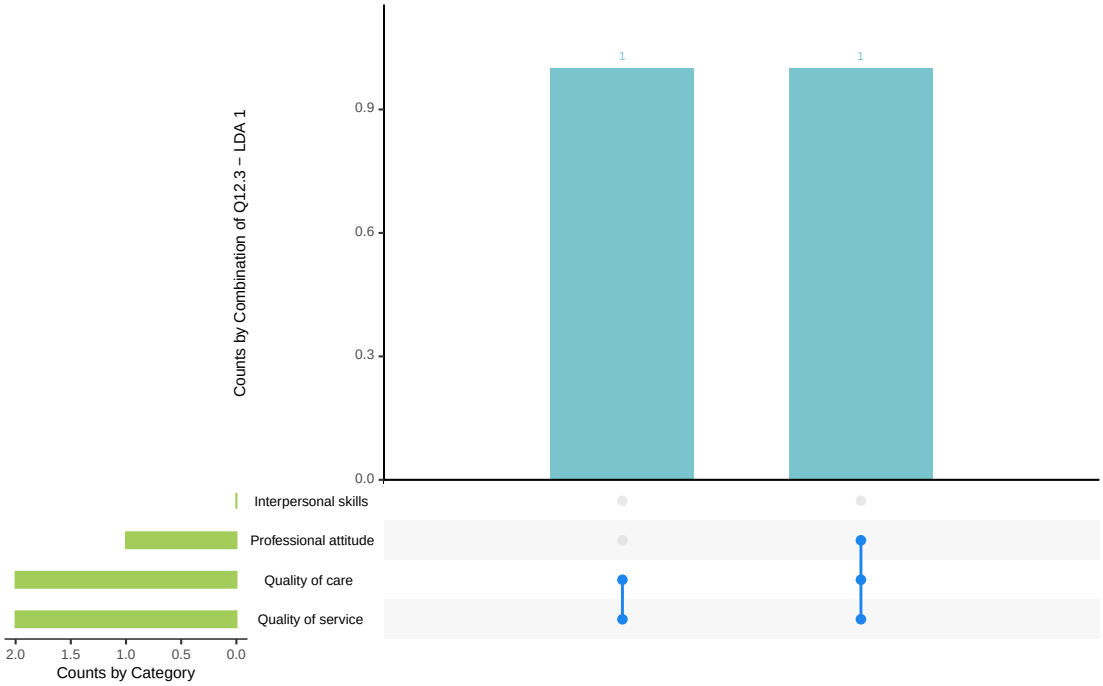

Figure 76: UpSet plot for question 12.2 "How many veterinarians / practices do you use?" where the participant previously selected "I use 2 veterinarians / practices" of the LDA Version 1 results for the monolingual Dutch data.

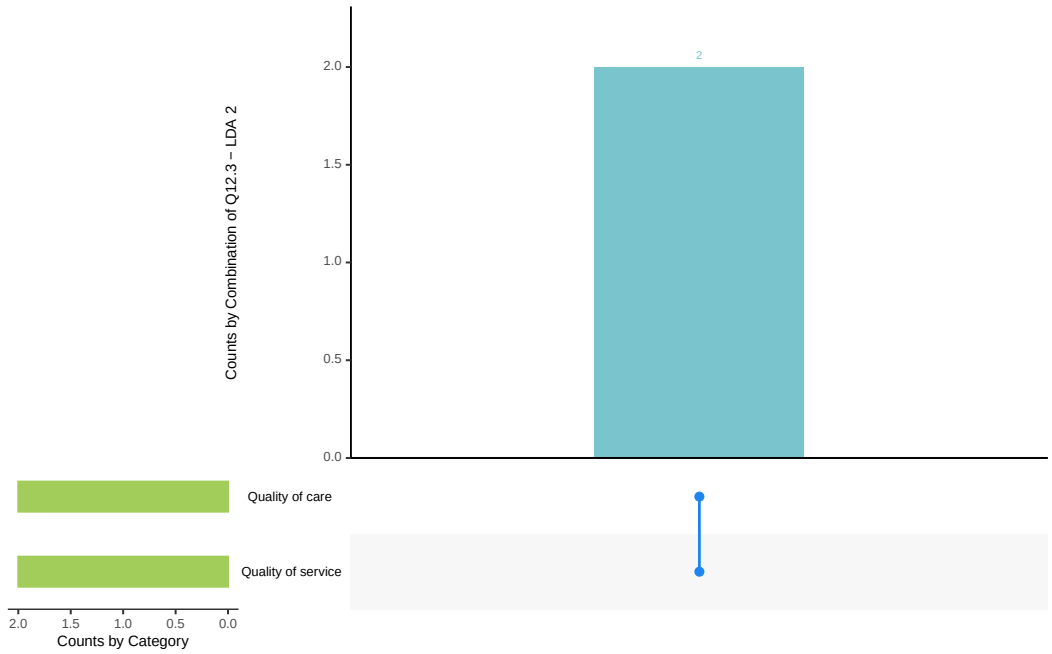

Figure 77: UpSet plot for question 12.3 "How many veterinarians / practices do you use?" where the participant previously selected "I use 3 veterinarians / practices" of the LDA Version 2 results for the monolingual Dutch data.

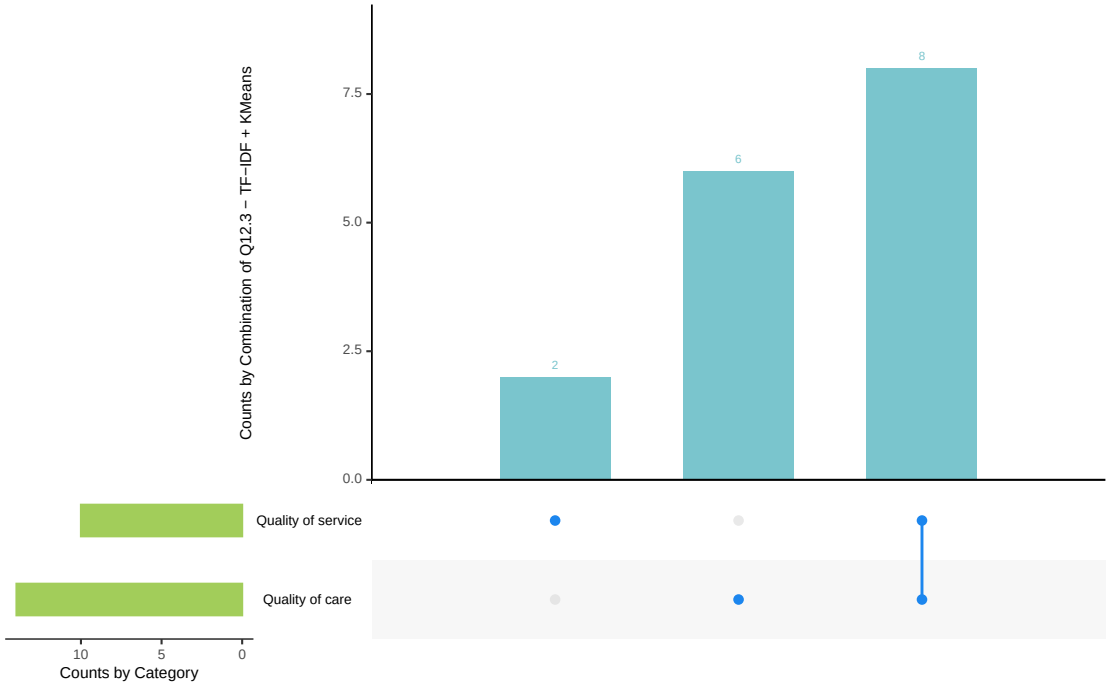

Figure 78: UpSet plot for question 12.3 “How many veterinarians / practices do you use?” where the participant previously selected “I use 3 veterinarians / practices” of the TF-IDF and k-means clustering results for the monolingual Dutch data.

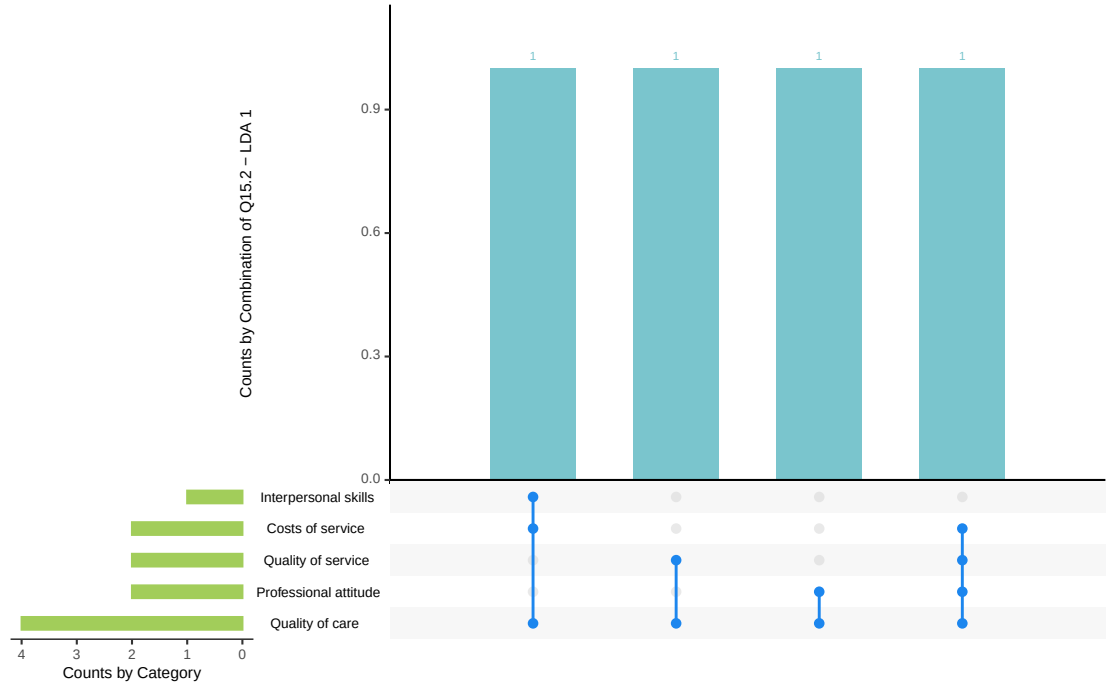

Figure 79: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the LDA Version 1 results for the monolingual Dutch data.

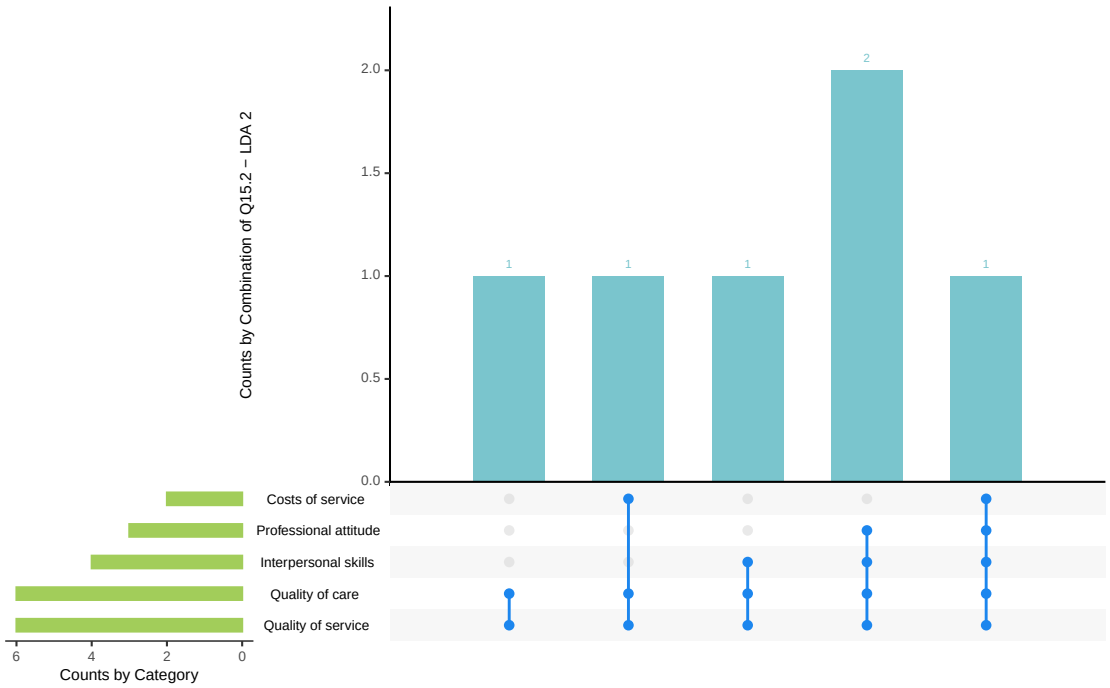

Figure 80: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the LDA Version 2 results for the monolingual Dutch data.

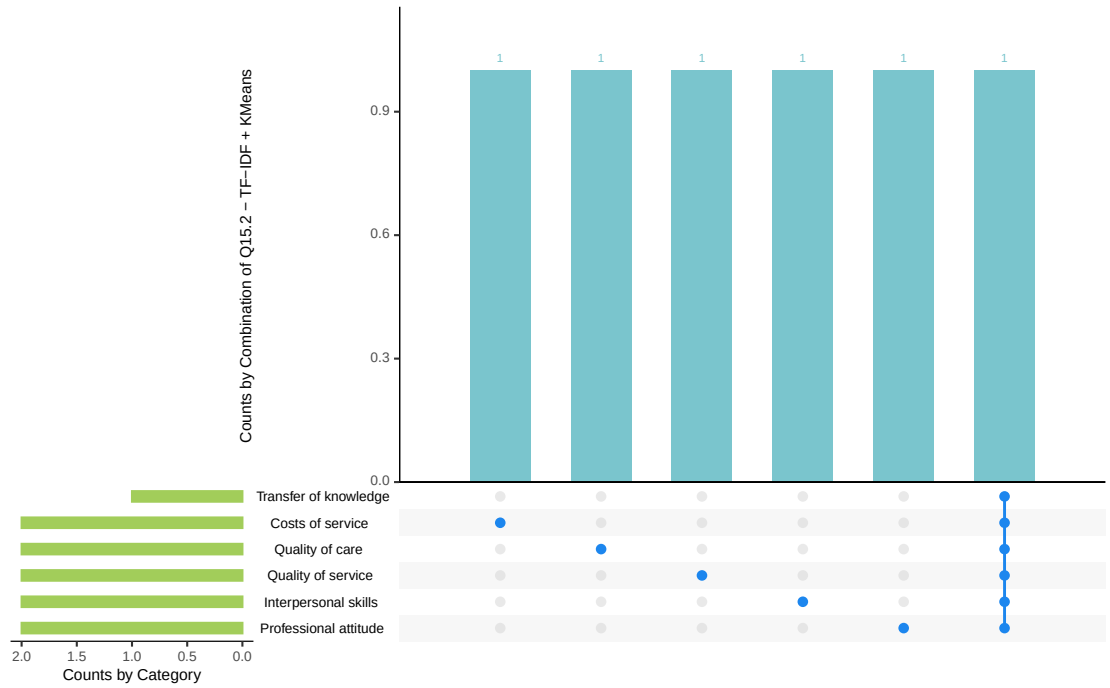

Figure 81: UpSet plot for question 15.2 “Have you ever stopped using a particular vet (practice)?” where the participant previously selected “Yes” of the TF-IDF and k-means clustering results for the monolingual Dutch data.

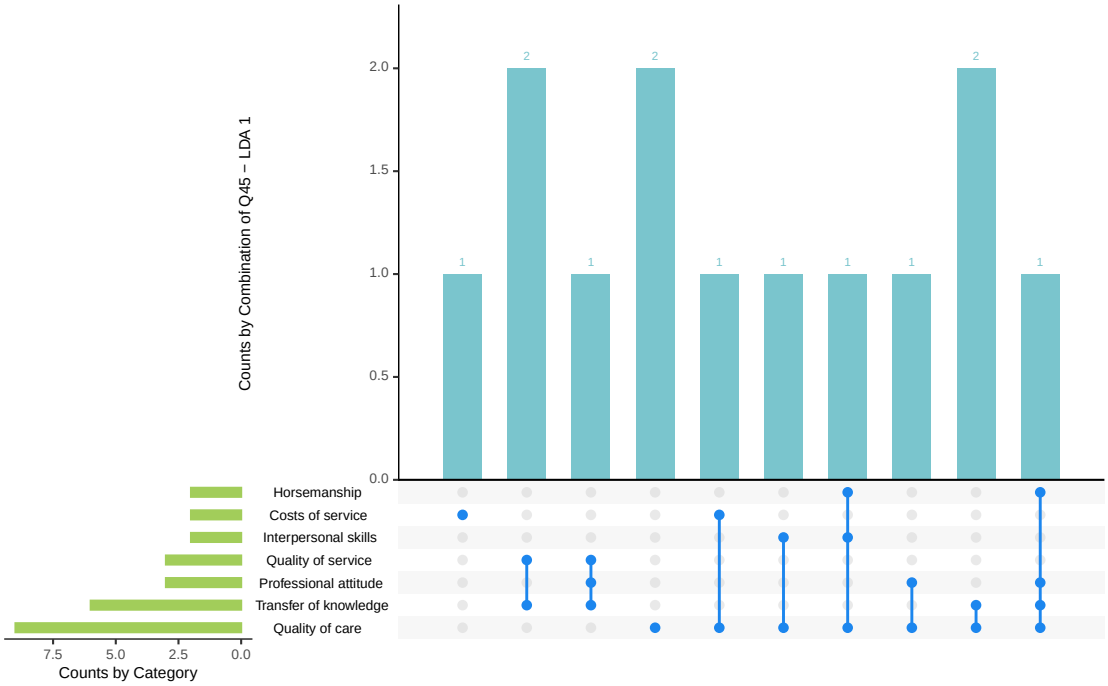

Figure 82: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the LDA Version 1 results for the monolingual Dutch data.

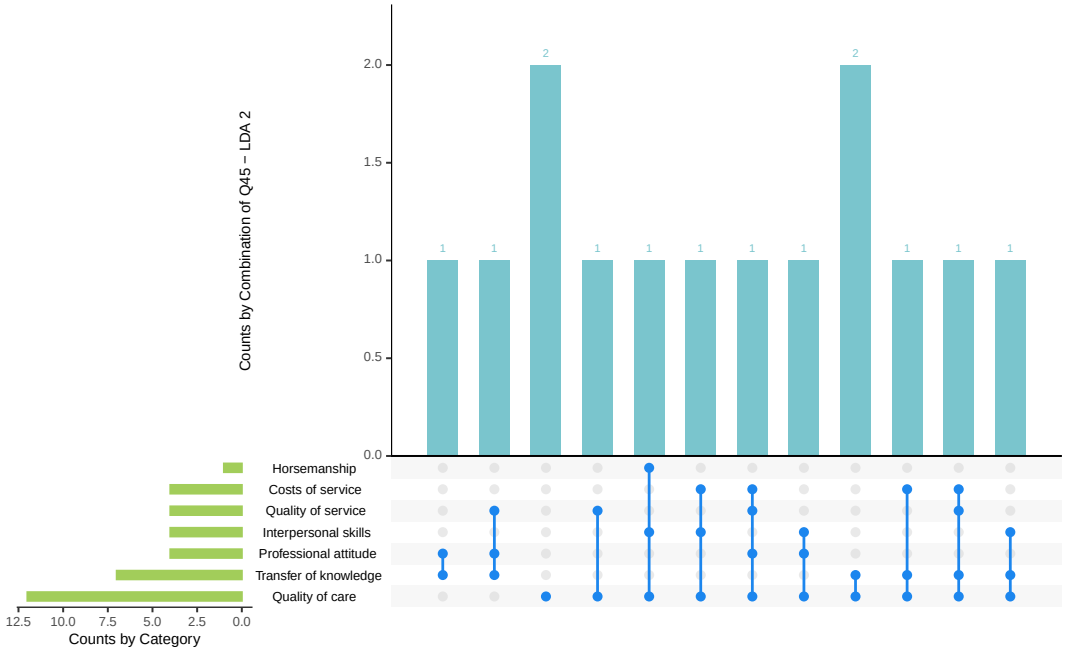

Figure 83: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the LDA Version 2 results for the monolingual Dutch data.

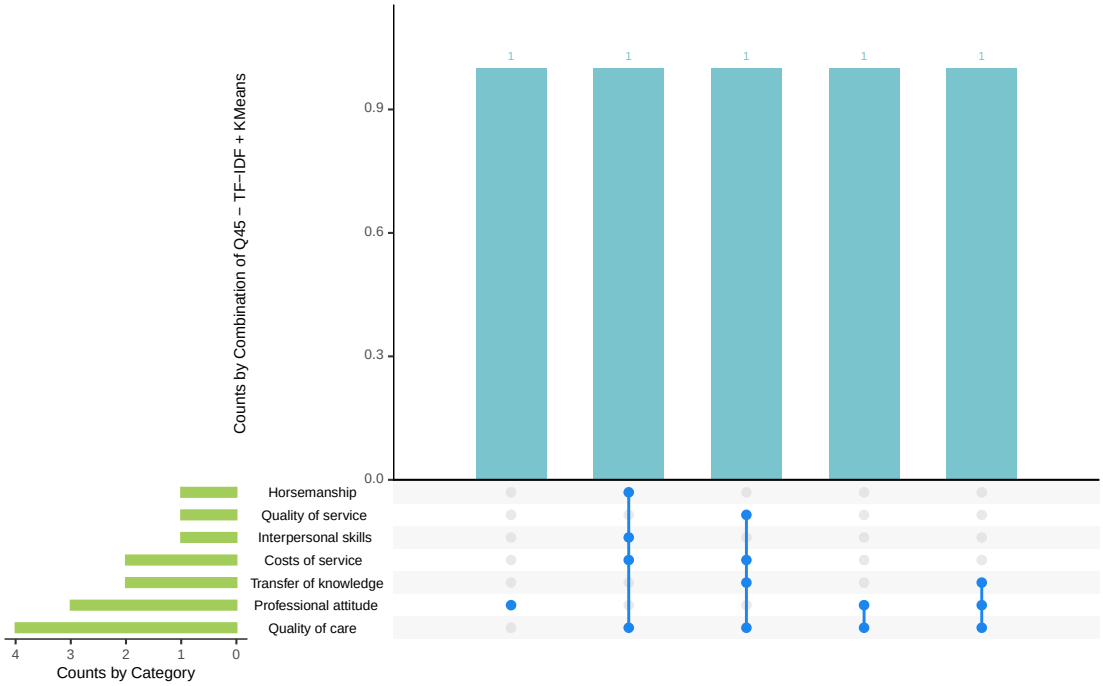

Figure 84: UpSet plot for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the monolingual Dutch data.

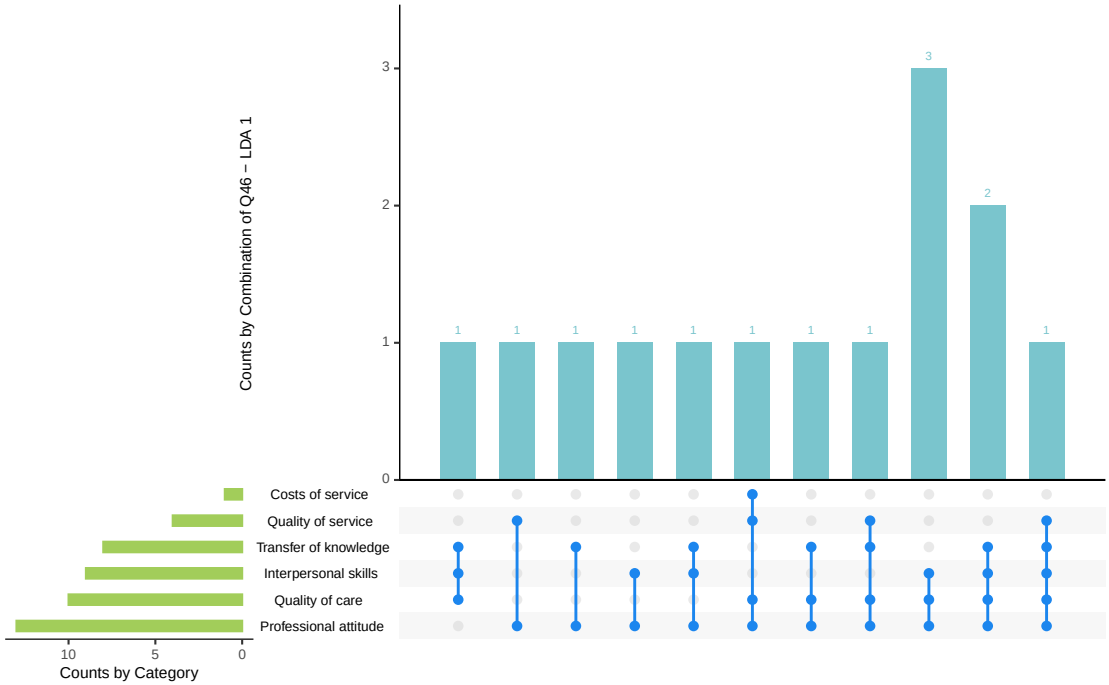

Figure 85: UpSet plot for question 46 "What do you appreciate most in your veterinarian?" of the LDA Version 1 results for the monolingual Dutch data.

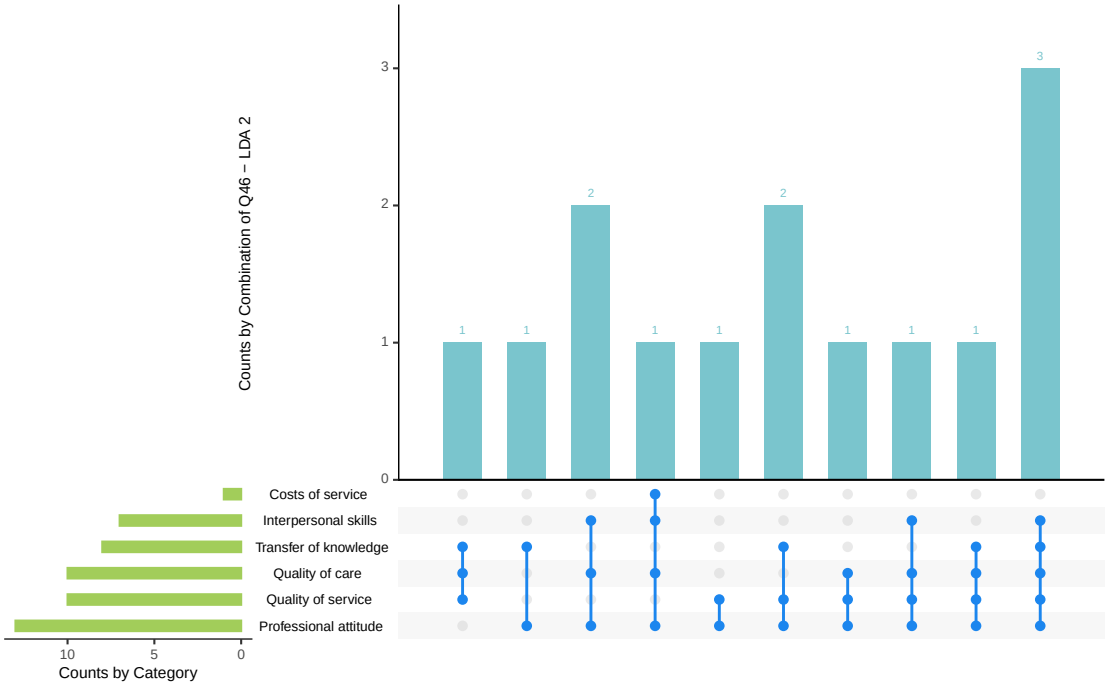

Figure 86: UpSet plot for question 46 “What do you appreciate most in your veterinarian?” of the LDA Version 2 results for the monolingual Dutch data.

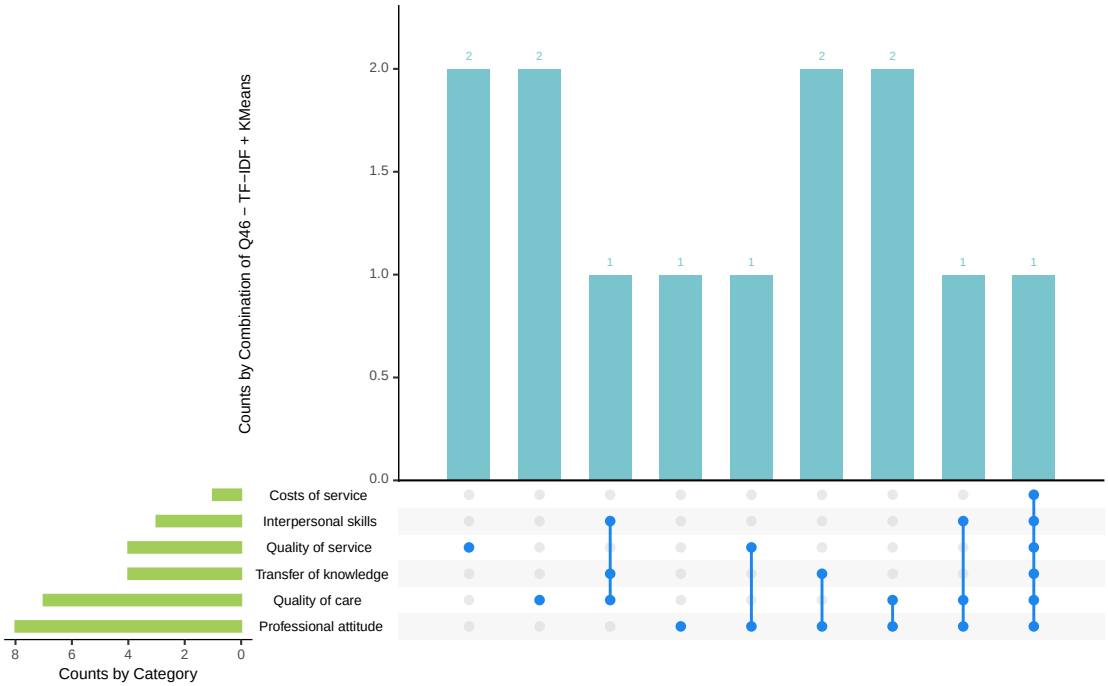

Figure 87: UpSet plot for question 46 “What do you appreciate most in your veterinarian?” of the TF-IDF and k-means clustering results for the monolingual Dutch data.

Appendix K: Word Clouds

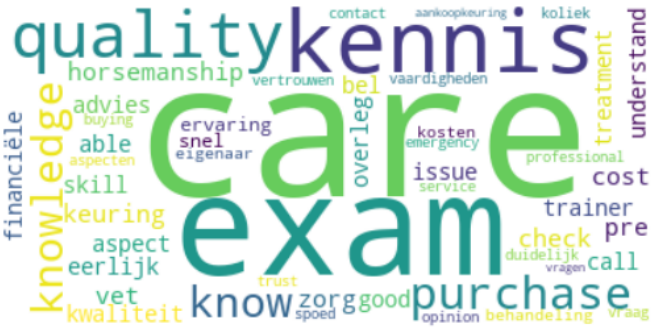

Figure 88: Word cloud for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the bilingual data (Dutch and English).

Figure 89: Word cloud for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the monolingual Dutch data.

Figure 90: Word cloud for question 45 "Would you like to explain any of your answers?" for the questionnaire questions concerning pre-purchase exams of the TF-IDF and k-means clustering results for the monolingual English data.

Appendix L: Coherence Scores for LDA Results

Bilingual Data: LDA Version 1

Q12.2
0.5620761298445898, 0.5762739447484687, 0.5742127712950192, 0.5674379043730493, 0.6203550099262657, 0.6254347655746064, 0.604882237218394, 0.5929482409509103, 0.6107586775688467, 0.6098090831262772, 0.5896505183720806, 0.6106796570386752, 0.6050431745708568

Q12.3
0.5850155124620923, 0.5436339873484525, 0.5750749331646482, 0.5639741446343292, 0.5677416305281965, 0.5573588216231528, 0.5408420389945312, 0.5639750643635741, 0.5110191890413172, 0.5388591232590079, 0.5146408262839429, 0.4921804230274851, 0.5024165520925702

Q15.2
0.6548223730851379, 0.6233848035411406, 0.6494151243295703, 0.6319382224113392, 0.6480597972045571, 0.6445235660195229, 0.6420726370189348, 0.6628860973590628, 0.6371934671558515, 0.6331673765871785, 0.6415566756611585, 0.6510003148538455, 0.6257263977505853

Q45
0.4274625641502847, 0.5039575725190231, 0.46498397661153723, 0.4572294380444163, 0.46814646726181924, 0.5278486509019774, 0.4731014263792336, 0.5001062725279347, 0.46490166553876755, 0.49091817621490813, 0.47258391289663493, 0.48958717697515797, 0.4760048660680418

Q46
0.49693218440269143, 0.5102929768959904, 0.5091666602944571, 0.5040990247443025, 0.4884493328173809, 0.5048610546106256, 0.48898392681354425, 0.5195330941167987, 0.5371268012483577, 0.5375315611886312, 0.5237697976292061, 0.5277471603485598, 0.5348291625779844

Bilingual Data: LDA Version 2

Q12.2
0.5951918738592775, 0.5808496770516464, 0.6112096566272642, 0.6019324956155842, 0.5780262725271627, 0.6006536465840672, 0.6255271238663971, 0.6079020458169857, 0.6014136611517944, 0.6104603904168208, 0.6208324315388091, 0.607247892321074, 0.6128994665714786

Q12.3
0.6049524412313021, 0.5680618156696166, 0.5855687028430925, 0.5768322354862008, 0.5940405147872978, 0.5673314257593826, 0.5757364102392226, 0.5532941155336739, 0.5027267069400837, 0.5217651450452432, 0.4814652886113173, 0.5119295945887804, 0.48789736966405456

Q15.2
0.6349147097392636, 0.6543546960907553, 0.6370288499879555, 0.6632864300822272, 0.6635841465671314, 0.6271657548076269, 0.6479029289391625, 0.6503405343444237, 0.6358006072812346, 0.6168182993968047, 0.6563524952771121, 0.6533515973872379, 0.6510411990304894

Q45
0.5001004593272309, 0.4758656441190113, 0.46632816897247875, 0.4556325568533004, 0.46206126824105676, 0.4860614852902082, 0.45540807376721, 0.4914645481838647, 0.4873716269004035, 0.4914951590363421, 0.4677367478001632, 0.4893999966827275, 0.49316916399371025

Q46
0.5048701577841 39, 0.5240049542151478, 0.5051898215400681, 0.5242005839927112, 0.5277551044264595, 0.504664633457185, 0.5212467875066766, 0.5045042842645331, 0.5292324871431082, 0.5186169833630575, 0.5362804536242514, 0.5113216406706109, 0.5297326587758446

Monolingual Dutch Data: LDA Version 1

Q12.2
0.5301440840086633, 0.4931342553188414, 0.5427737802382213, 0.5700623769712456, 0.5670775539446207, 0.554241446422574, 0.5657672325187313, 0.5366111196196074, 0.5475272986001676, 0.5664432248596108, 0.5630821850680677, 0.5657879437931478, 0.5640982080563547

Q12.3
0.5698037531427542, 0.5844610964526353, 0.5728708532311789, 0.542008110460979, 0.5732537084019014, 0.4846696859305591, 0.5132787799793589, 0.5051722639998946, 0.47160397483423494, 0.4843826390132253, 0.494890551490572, 0.4593788261973287, 0.47861446483752895

Q15.2
0.6630488881141918, 0.6347285043417722, 0.6786086852282702, 0.6419161867698863, 0.6441438556637052, 0.6707288000841568, 0.6469240302065146, 0.6590338924377755, 0.6378075621584967, 0.6603869706303238, 0.6302307059886578, 0.6459277193069882, 0.623277833577312

Q45
0.25510235774845785, 0.2972164305465213, 0.3453441725441629, 0.3381613241882616, 0.3827716297333928, 0.39413881387803235, 0.39792383673534654, 0.4081740431045995, 0.4233435107051841, 0.4120678859182329, 0.42017484349771417, 0.4306803756794876, 0.42550378500895397

Q46
0.3481225557467077, 0.4185214866036515, 0.3871384671209047, 0.3583878014511217, 0.39827564687735245, 0.4337374686155984, 0.44078897661957706, 0.4253652784697277, 0.45337329694159567, 0.45147344311842214, 0.46741521102857014, 0.4546985293985553, 0.48266173615067764

Monolingual Dutch Data: LDA Version 2

Q12.2
0.519415194882481, 0.5474977700654637, 0.5245638609392602, 0.568195457513482, 0.5637942677180023, 0.5633221743211798, 0.5654400109800867, 0.549189653022476, 0.550716449817063, 0.5424634514818233, 0.541616381809324, 0.5493488307099046, 0.5448791552427515

Q12.3
0.598198808921448, 0.586221433810261, 0.55051905330224 27, 0.578430889332016,

0.54252763376329, 0.5085319291658909, 0.4922855435116674, 0.505628036262884, 0.42490679146237403, 0.45866919541069945, 0.466636522258924, 0.4640704909112661, 0.5021606608417887

Q15.2
0.6409206026638733, 0.6541602959321408, 0.6554691863490312, 0.6645401221391258, 0.6689535204434239, 0.6459168906563553, 0.6268799863840665, 0.6312894960197527, 0.6524179331773837, 0.6426108955825971, 0.6443170574565809, 0.6257159154304763, 0.602822896954122

Q45
0.266527072936404, 0.3050495573154517, 0.3748303458405332, 0.38817511636999213, 0.3681509668960397, 0.39085898698523586, 0.3449135680062738, 0.37722528584274506, 0.4060833571444036, 0.42801372142843747, 0.4325385138365431, 0.41963222395495137, 0.4407973948944726

Q46
0.40575072284642544, 0.37899630141707147, 0.4470229715575025, 0.4117194525367392, 0.4300935184638062, 0.41985938423984254, 0.4387260563335209, 0.4235982482696621, 0.4473181892687652, 0.4688827123490901, 0.45071862030735677, 0.46498905416157943, 0.48726583693016606

Monolingual English Data: LDA Version 1

Q12.2
0.526284839535498, 0.5284851260418512, 0.521602924715864, 0.518670662592994, 0.5071153065457028, 0.512740023736877, 0.4798233970059024, 0.5368597295005808, 0.4526935287960585, 0.5092136860392423, 0.5087472948719756, 0.5160566010619108, 0.5535650725634821

Q12.3
0.42288685383415225, 0.42546463992056766, 0.4229771877927452, 0.3953223859281189, 0.37206457053660397, 0.38230774371062287, 0.37759873756316076, 0.3854544293305882, 0.4048450566333699, 0.44870319994146596, 0.41174783200015885, 0.3911357067937135, 0.4795140007321839

Q15.2
0.4683850546520922, 0.5277409009630578, 0.5383145465139745, 0.5407671479879216, 0.5105597850480202, 0.5433905886919526, 0.5389829810162273, 0.5534190313407082, 0.552723228878578, 0.5234309513117821, 0.5555874009659031, 0.5477054021551877, 0.5052339398599522

Q45
0.36735330145345435, 0.34476441375036293, 0.3417946277507352, 0.31845486923363026, 0.3338115010910221, 0.3778853860869561, 0.3835627158376866, 0.362737661653288, 0.3262671711562882, 0.37243473867822935, 0.3452582388512127, 0.3667516944945287, 0.33562558235864737

Q46
0.27909012506616904, 0.2779171326380238, 0.33095969267704395, 0.28121298719442195, 0.30892130349735486, 0.32408705730744636, 0.32875916724133664, 0.3043779162483893, 0.3135895697306837, 0.3270233648032838, 0.31338789256290606, 0.332802957231926, 0.35021465110522504

Monolingual English Data: LDA Version 2

Q12.2
0.5343562420963746, 0.5392524779495705, 0.5363574062322782, 0.5261248221337305, 0.5133555834857723, 0.5330821951045982, 0.47221283380411305, 0.4660613549427491, 0.46657939607235377, 0.4751071778719453, 0.4802635172536454, 0.5196451641019477, 0.4882656422075257

Q12.3
0.47995136073398165, 0.42356338374335206, 0.4393181150069384, 0.36907487711977127, 0.3647779778911813, 0.40734278922039696, 0.42835567450288325, 0.42318307540176897, 0.39881951781793723, 0.4385949332198159, 0.4639223406426775, 0.44130999619455735, 0.4302384537964276

Q15.2
0.5451943816689601, 0.5231593562407068, 0.5279266619594283, 0.5338962383186115, 0.5282502374420195, 0.5293316937629367, 0.5498749482596352, 0.5449361863998184, 0.5159880513604124, 0.5301449956403531, 0.5532517888629674, 0.493456337008005, 0.5326509079399784

Q45
0.3185463223742855, 0.3396223390049758, 0.362416579594747, 0.33387148625418606, 0.35040839191521633, 0.33683134815536026, 0.3280064244469257, 0.3302119722793128, 0.3371558087141867, 0.35497018045467044, 0.35944117213938376, 0.3493366123823557, 0.3701220532996747

Q46
0.2542812111181064, 0.2906105422737059, 0.29219338104601883, 0.2791373901288243, 0.2769155978577503, 0.3060266450578701, 0.2836841888246588, 0.31084978630470755, 0.32007572047110805, 0.31731326273272725, 0.3444713951687848, 0.34489860424695973, 0.35642963515309617