# The existence of an association between dog-directed parenting styles and overweight in dogs

**Maxime Jochems**
**Student no. 5513790**
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**Supervisors:**
**Ineke van Herwijnen – Wageningen University**
**Joanne van der Borg – Utrecht University**

**Abstract**

Recently identified dog-directed parenting styles with a Dog-Directed Parenting Styles and Dimensions Questionnaire gave an opportunity to investigate the possible factor in the owner-dog relationship for it is influencing on the growing problem of dog obesity. Body condition scoring with a nine-point scoring system was used to determine overweight. Two databases were used for statistical analysis, an expert judgement database (99) with body condition scores given by an expert and a total database (2183) with mostly owner given body condition scores. Significant associations between parenting styles and overweight in dogs were found in both databases. In both databases, the authoritative parenting style showed the highest percentage of overweight and the authoritarian parenting style showed the lowest percentage of overweight. Next to the possible association between the variables parenting styles and overweight, possible associations between all other variables noted in data collection were investigated as well. Interesting associations were found between variables such as, parenting style and breed, parenting style and gender and parenting style and survey.

# Table of contents

# 1. Introduction

Overweight is a growing problem in the animal world. Overweight can lead to obesity, therefore the growing problem of overweight should be taken seriously and factors influencing a dog's weight status, for instance owner factors, are of interest (1). Obesity in dogs is defined as a dog being 15-20% above ideal weight (2). On average, 30% of dogs visiting veterinary practices is obese (1). In dogs, obesity is the most common nutritional disorder leading to morbidity. Other health issues caused by obesity are metabolic derangements such as: hypoadiponectinemia, dyslipidemia, a pro-inflammatory state and insulin resistance. Furthermore, obese dogs show structural and functional cardiac changes (3).

There are many factors that contribute to obesity of the dog, which can be divided into three categories: reproductive management, genetic pre-disposition and diet/exercise. This last category is affected by the owner of the dog, as he/she controls food type, composition, feeding management and exercise regime. Studies on child-directed parenting styles, which refers to the way the child is being parented, indicate their influence on the child's body condition (4–6). Based on child-directed studies, German (2015) suggested that studying these styles as potential predisposing conditions to overweight in a dog's life may be a first step towards more effectiveness of weight interventions for dogs or other companion animals (7). However, the association between the factor 'parenting style', and the body condition in dogs has never been researched before. Recently identified dog-directed parenting styles give an opportunity to investigate this possible factor in the owner-dog relationship for it is influencing on the growing problem of dog obesity (8).

The overall aim of this research is to study the association between dog-directed parenting styles and overweight in dogs with the long-term objective to increase knowledge on factors that predispose a dog for overweight, optimizing weight intervention programs for dogs and thus reducing the prevalence of obesity in dogs. Previous research suggested an association between child-directed parenting styles and overweight (4–6). Therefore, it is hypothesized that the association between dog-directed parenting styles and overweight in dogs exists. Rhee et al (2006) showed an increased risk of being overweight for children with authoritarian mothers, compared to children with authoritative mothers. Furthermore, permissive and uninvolved mothers were twice as likely to have overweight children, compared to authoritative mothers (5). The authoritarian, permissive and uninvolved parenting style were also associated with higher child BMI in the research of Shloim et al (2015). For this reason, it is hypothesized that the authoritarian, permissive and uninvolved dog-directed parenting styles associate more strongly to overweight in dogs than the authoritative dog-directed parenting style. Next to the possible association between the variables parenting styles and overweight, possible associations between all other variables noted in data collection were investigated as well. These are treated as sub questions.

## 2. Theoretical framework

### 2.1 Parenting Styles

Previous studies have shown that human personality can affect the interactions and thereby the relationship between human and dog (9–12). For most of the owners, their pet is a very important family member and more than 70% even see their pet as child (13). Human infant-caregiver relationships involve similar attachment bonds as human-dog relationships (14). Further research shows that, just like with children, dog owners adopt consistent interaction styles known as parenting styles. These styles reflect the goals an owner has with parenting the dog and relatively stable patterns in the behaviour shown towards the dog (8).

The four main parenting styles constructed by Baumrind and known in child-directed parenting, are based on the dimensions of responsiveness and demandingness. Responsiveness refers to the owner's emotional warmth, by being supportive and attuned, and support of dog's individual needs and demands. Demandingness refers to monitoring and confrontive control. Monitoring stands for the claims the owner makes on their dog to become integrated into and contribute to the family. Confrontive control shapes the dog's behaviour by supervision, disciplinary efforts and willingness to confront the dog who disobeys (15,16). The authoritative style manifests as being demanding and responsive. The authoritarian style involves low levels of responsiveness, but strong demandingness. The permissive style scores low on demandingness but high on responsiveness. Finally, the uninvolved style, also known as least-effort parenting, reflects low levels of responsiveness and demandingness (15).

Three of the four main parenting styles were used in the survey. Before the statistical analysis, it was hypothesized that the authoritarian, permissive and uninvolved dog-directed parenting styles associate more strongly to overweight in dogs than the authoritative dog-directed parenting style. The uninvolved parenting style, however, was not used in this research, due to the limited amount of research done with human parenting and therefore the lack of knowledge. Another reason was the expectation of a very low outcome of owners that maintain the uninvolved parenting style, because owners who are less involved with their dog, are expected to visit the veterinary practice less often. Furthermore, they are also expected to show less willingness to participate with the research. This was also hypothesized as a cause to not finding this uninvolved style in a previous study on dog owners (8). The overall reasons to leave the uninvolved parenting style out were the lack of previous research and the expectation of a low outcome.

*Table 1. Parenting Styles*

|  | Authoritative parenting style | Authoritarian parenting style | Permissive parenting style | Uninvolved parenting style |
|---|---|---|---|---|
| Demandingness | High | High | Low | Low |
| Responsiveness | High | Low | High | Low |

### 2.1.1 Permissive Parenting Style

The approach of the permissive parenting method is approving and accepting behaviour for the dog's wishes, without searching their roots or origins (17). This parenting method is characterized by acceptance, psychological autonomy and lax behavioural control (17). Even if the environment is harmed by the behaviours of the dog, those behaviours are accepted (18). They have lower expectations of their dog, therefore the dog is given excessive freedom and less discipline (19). Parental control is treated as a negative counteractive force to dog's motive to act autonomously (15). The owners can not persuade the dog to obey the rules (18).

### 2.1.2 Authoritative Parenting Style

Authoritative parenting is seen as the most ideal parenting style. The rules of the authoritative owner are clear and open and can be adapted according to the dogs needs and interests (19). An authoritative owner is demanding and responsive, autonomy supportive and confrontive, power assertive and affectionate and confrontive without being coercive (15). Therefore, authoritative owners are characterized by the optimal combination of psychological autonomy, firm behavioural control and acceptance (17). Hulbert (2003) described it as an approach that struck a balance between love and control (20).

### 2.1.3 Authoritarian Parenting Style

Authoritarian owners have rigid limitations and rules (21). They view owners' responsibility and right to enforce firm limits and strict control as primary and dog's autonomy as secondary (15). This parenting method is characterized by psychological control, rejection and behavioural control (17). The owners expect their dog to act beyond their real capacities and do not support their dog (15). Good behaviour will not be praised, but unwanted behaviour will be punished both physical and verbal. When they make decisions about their dog, they do not think about the consequences for the dog (21).

## 3. Material and methods

### 3.1 Parenting Styles Survey

Dog owners visiting different veterinary clinics with their dogs, participated in a Dutch language survey. In as many owner-dog combinations as could be reached during the research period, owners were asked to fill in a survey about parenting styles (appendix 2). The surveys were taken in the waiting room at the veterinary clinic. When approaching the owners, the aim of the research was explained clearly, and the owner was asked properly if they wanted to participate in the research. Only the owners who wanted to participate, which includes almost every owner approached, received the survey. The owners that were not willing to participate will most likely maintain the uninvolved parenting style as discussed in the introduction.

The questionnaire used was the Dog-Directed Parenting Styles and Dimensions Questionnaire (DD-PSDQ) as defined by Van Herwijnen et al (2018).The PSDQ was originally developed by Robinson et al (1995) to identify specific parenting practices that occur within the context of typologies (22). The typologies used were described by Baumrind in 1971 (23). The PSDQ contains Baumrind's authoritative, authoritarian and permissive parenting style along dimensions of demandingness and responsiveness. The retained PSDQ contains 62 questionnaire items with a 5-point Likert scale, rating the likelihood of scenarios occurring as never, nearly never, neutral (defined as half of the time), nearly always and always (22). The 62-item PSDQ was also analyzed as the shorter 32-item PSDQ. In this 32-item PSDQ, fifteen items measure the authoritative, twelve the authoritarian and five the permissive. Herwijnen et al (2018) reconstructed the 32-item and 62-item PSDQ to the 34-item DD-PSDQ thereby making it applicable for the owner-dog relationship instead of the parent-child relationship. They calculated the uninvolved style by following Blakely Kible and Baumrind's ideas on the uninvolved style representing weak behavioural control and strong rejection, and adapted existing items to situations dog owners encounter when raising their dog. The 5-point Liker scale was not adjusted.

The survey was tested beforehand on dog owners with different education levels. They were all able to fill in and complete the survey in an average time of five minutes. Side information asked regarded: postal code, name of the dog, breed of the dog, age of the dog and reason of the visit to the veterinary clinic. The survey results where sorted by postal code and name of the dog, as to identify the dog in the research set later on, and at the same time allowing for anonymous handling of the data.

## 3.2 Body Condition Scoring

The possibility of overweight or obesity can be determined by body condition scoring the dog. The body composition of a dog exists of various biological components, which contains bone, body fat and lean tissue. To determine the body composition of a dog, several methods can be used (24). Body condition scoring is one of the most commonly used methods in veterinary practice (25). Body condition scoring involves a combination between visual and palpable characteristics of body fat and muscle mass at multiple locations on the body (25). For dogs, these locations include the rib cage, lumbar area, abdomen, pelvic bones and waist (26). The most important subjects while observing are the attendance of a waist when looking at the dog from above, the attendance of an abdominal tuck when looking at the dog from aside, the attendance of the last ribs and the attendance of fat at the base of the tail (27).

Three different scale systems can be used for body condition scoring the dog. The 5 points system offers 5 integer categories within the scoring system, the 6 points offers 6 categories and the 9 points offers 9 categories (28). In this research, the decision was made to study body condition scores with the nine-point scoring system. This scoring system was validated by the strong correlation with DEXA for measurement in body fat in both dogs and cats (26,29) DEXA or DXA stands for the non-invasive technique of dual energy X-ray absorptiometry (30). This implies two low-dose X-rays of different energy levels that scan the subject. The absorption of energy by the tissues is used to differentiate between soft tissue, including fat and lean tissue composition. (31). It is considered the reference (golden) standard for estimating body composition (32). In the nine-point scoring system, with each decrease in category the body weight increases with approximately 10% and the body fat percentage with approximately 5% (33).

The body condition score system has many advantages including repeatability, ease of use and availability of a visual image of the appearance of normal, overweight and underweight dogs (26,29). However, this method also has its limitations, including subjectivity and interobserver variation. When veterinarians and trained individuals use body condition scoring systems, the results will correlate well with DEXA (34–36). This research is based on the WSAVA (Global Veterinary Community) chart of body condition score by the dog (appendix 1).

Every dog used in this research was body condition scored by both the vet and the researcher. The researcher performing this assessment followed a training beforehand at the University of Utrecht, provided by Dr. Ronald Jan Corbee (European specialist Nutrition) to learn to reliably assess body condition scores in practice. During data collection, when the owner filled in the survey, the dog was being held by the researcher. This gave the owner the chance to calmly fill in the survey and gave the researcher the chance to body condition score the dog. After receiving the completed survey, the body condition score was noted on top of the survey by the researcher. During the consult, the veterinarian body condition scored the dog. This score was noted after the owner (and dog) left the clinic. Thus, influencing scoring of vet and researcher were limited maximally.

### 3.3 Data collection

For this research, convenience sampling was used to collect data. Three different veterinary practices were used as location for recruiting dog-owners to participate in the research. Aside from being a dog owner/caregiver, no inclusion criteria were identified prior to the selection of subjects. The data was collected by paper survey given to the owner/caretaker. During this research, 74 participants were collected. Next to the collected data, existing third-party data, containing 2227 participants, was used for this research. The third-party survey was communicated to general public via a press release by Wageningen University & Research and posted on the WUR news site. Also, several online channels, such as dog information sites as well as local, regional and national newspapers posted information on the research and the survey. Respondents filled out the survey via a digital survey tool that could be accessed on a WUR-based platform. The body condition scores of this data were scored by the owners, with the exception of 27 dogs, which were scored by the veterinarian.

### 3.4 Data analysis

Third party data included, the total data came down to 2183 dogs. The third-party data (2227) contained 110 dogs in the age of 0-6 months. These dogs were excluded from data, while their weight and body condition fluctuate and therefore is unreliable. Six more dogs were excluded because the age was unknown. The number of third-party data used, is therefore 2111. The collected data contained 74 dogs. Two dogs were incidentally excluded from data, which will be further explained at the discussion. Therefore, the total data contained 72 dogs. From the total of 74 dogs, there were only six differences in body condition score between the vet and researcher. In these cases, the body condition score of the vet was assumed to be the most valid one and used in analysis.

The two databases were put together to form a total database of 2183. This total database was used for statistical analyses and will be referred to as 'total database'. The body condition scoring of this database was done by owner or expert. As proven in former research of Singh et al (2002), misinterpretation of the body condition score by the owner of the dog occurs (37). Therefore, another database was put together containing the 99 dogs of the 'total database' that were body condition scored by a veterinarian. This database contained 27 dogs from the third-party data and the 72 dogs of the collected database. This database was also used for statistical analyses and will be referred to as 'expert judgement database'.

*Table 2. The two databases*
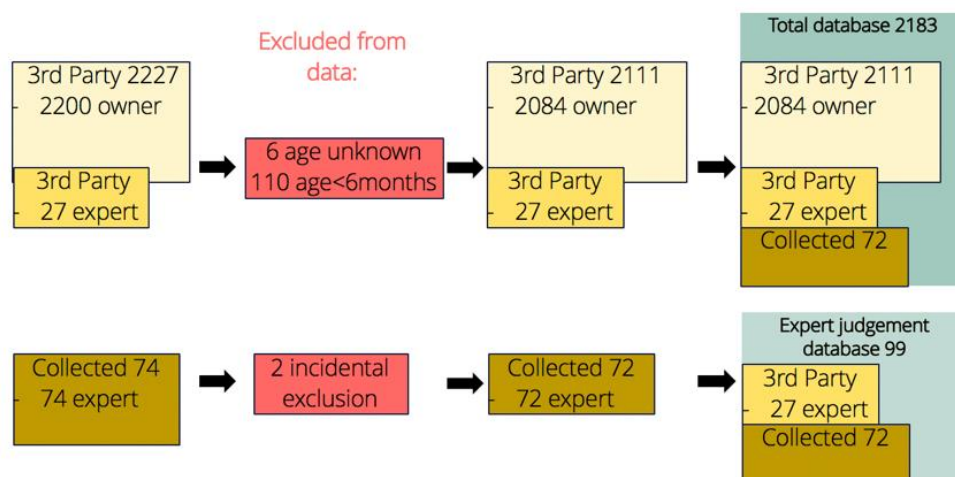


## 3.5 Definition of variables

Multiple variables were noted during the research and all used in statistical analysis.
The body condition score variable was converted into the variable overweight, with the options 'yes' or 'no'. The option 'yes' refers to a body condition score of 6-9 and the option 'no' refers to a body condition score of 1-5; Parenting style was classified in 3 different classes, with 1 representing 'permissive', 2 representing 'authoritative' and 3 representing 'authoritarian'; The variable age was categorized into 4 categories, with 'young(1)' representing '6 months-3 years', 'middle aged(2)' representing '3-8 years', 'senior(3)' representing '8-12 years' and 'old(4)' representing '12 years and older'; Breed was classified in 2 different classes, with 0 representing 'no labrador' and 1 representing 'labrador'; Gender was classified in 2 different classes, with 0 representing 'female' and 1 representing 'male'; Intact was classified in 2 different classes, with 0 representing 'not intact' and 1 representing 'intact'; Survey was classified in 2 different classes, with 0 representing 'third party data' and 1 representing 'collected data; Judgement was classified in 2 different classes with 0 representing 'owner' and 1 representing 'expert'.

## 3.6 Statistical analysis

Statistical analysis was performed with SPSS Statistics. No outliers where removed previous to the data analysis. All perceptions where validated and put in categories, which all are realistic. Tests of Independence when using a bivariate table (crosstabulation) were used to determine whether there was an association between all the categorical variables.

The Pearson's Chi-square test was used to evaluate the Tests of Independence, this way a selection of explanatory variables for the multivariable logistic regression model with p-value<0.25 was made for dog overweight against the other categorical variables. Stepwise backward elimination with P>0.05 at each step, studying parameter estimates for confounding, was used to delete risk factors. The appendix contains the univariable and multivariable results of the association between dog overweight and the other categorical variables in cross tables given the Odds Ratio (OR), 95% Confidence Interval (95%CI) and p-value and the cross tables of other categorical variables with p-values.

## 4. Results

Appendix 7.3 shows the results of univariable analysis in the "expert judgement database" that provides information about the possibility of an association between overweight in dogs and other categorical variables. As shown in the table, significant associations (P<0.05) between overweight in dogs and parenting style, age and survey were found. The parenting style with the highest percentage of overweight was the authoritative parenting style (55.6% overweight) and the lowest the authoritarian parenting style (19.6% overweight). The senior and old age-classes showed the highest percentage overweight (53.8). The face to face survey showed a higher percentage of overweight dogs (48.6%) than the online survey (7.4%). The variables gender of the dog, intact and breed showed no significant association.

Appendix 7.4 shows the same results for the 'total database'. In this database significant associations (all with P-value=0.000) between overweight and parenting style, age, intact, breed, survey and judgement were found. Only the variable gender of the dog showed no significant association with overweight in dogs. In this database, the authoritative parenting style again showed the highest percentage of overweight in dogs (23.8% in contrary to 8.2% and 6.5% of the other parenting styles). The age-classes senior and old also showed the highest percentage of overweight in dogs again. Intact dogs showed a lower percentage of overweight in dogs that neutered dogs. Further, the breed Labrador is more likely to be overweight compared to other breeds. The face to face survey again showed a higher percentage of overweight dogs in comparison to the online survey.

The results of the multivariable analysis of the 'expert judgement database' are shown in Appendix 7.5. In this database, the odds of overweight in Labradors is 3.4 times as likely as in other breeds. The online survey is less likely to have overweight results compared to the face to face survey.
In Appendix 7.6 the results of the multivariable analysis of the 'total database' are shown. Compared to the authoritarian parenting style, dogs parented with the authoritative parenting style are two times as likely to be overweight (OR=2.0, 95%CI=1.1-3.6). Dogs parented with the permissive parenting style also have more odds compared to the authoritarian parenting style (OR=1.3, 95%CI=0.8-2.2). For the variable age, the class 'senior' showed the highest odd for overweight in dogs, young dogs showed the lowest odd. Middle-aged and old dogs are almost as likely to be overweight. Intact dogs are less likely to be overweight compared to neutered dogs. Compared to other breeds, Labrador dogs have a higher odd to be overweight, with an odds ratio of 3.7. The outcomes of face to face surveys are more likely to be overweight than the outcomes of online surveys.

Appendix 7 shows an overview of all possible associations between all variables using P-value tables. The possible associations between variables are further amplified in crosstabs, shown in appendix 8 (expert judgement database) and 9 (expert judgement database). Significant relations (P<0.05) for variables other than overweight in the 'expert judgement database' were found between; Intact and parenting style, with neutered dogs being less often parented with the permissive parenting style compared to the intact dogs that are mostly parented with the permissive parenting style. Age and intact, with the percentage of intact dogs decreasing while the age increases. Gender and intact, with females being more often neutered than males. Parenting style and survey, with the face to face survey showing mostly authoritative scores and the online survey showing mostly authoritarian scores. And at last, age and survey, which is not treated as interesting.

Significant relations (P<0.05) for variables other than overweight in the 'total database' were found between; Parenting style and age, with the permissive parenting being mostly used for young dogs, the authoritative parenting style for adult dogs and authoritarian for old dogs. Parenting style and intact, with the permissive parenting style mostly seen for intact dogs and the authoritative and authoritarian for neutered dogs. Intact and age, with again a decrease in percentage for intact dogs when the age increases. Gender and intact, with again females being more often neutered than males. Parenting style and breed, with Labradors being less often parented with the permissive parenting style than other breeds. Parenting style and survey, with again the face to face survey showing mostly authoritative scores and the online survey showing mostly authoritarian scores. Relations between breed and gender, age and survey, intact and survey and at last breed and survey, which are all not treated as interesting.

## 5. Discussion

### 5.1 The association between overweight and parenting styles

Surprisingly, the outcome of this research was partly in contradiction with the hypothesis. The authoritative parenting style, which was expected to have the least association with overweight, showed the highest percentage of overweight and obese dogs. The authoritarian parenting style was hypothesized to have a high association with overweight but showed the lowest percentage of overweight dogs. When looking at literature about the association of child-directed parenting styles and overweight, the explanations for the outcomes are mostly explained with levels of pressure to eat. For the association between dog-directed parenting styles and overweight, these explanations cannot be used, because the owner cannot pressure the dog to empty its bowl. Other explanations used in child-directed studies are encouragement to eat and emotional eating, which can be used for dog-directed studies; (4,38)

Responsive owners are assumed to pay more attention to the food preferences of the dog and thereby encourage their dog to eat. This can be an explanation for the outcome of the authoritarian parenting style as the most preferable one to prevent overweight. Permissive owners have low expectations for their dog and therefore are assumed to practice less tricks with their dog, which leads to less feeding rewards. Authoritative owners on the other hand, have higher expectations for their dog and therefore are assumed to use more feeding rewards. The authoritarian owners, who are not responsive, are assumed to use little rewarding towards their dog. They are also assumed to ignore signs of hunger from their dog and feed the dog when it suits themselves. This leads to the hypothesis that the dog learns to ignore hunger

cues, which can lead to a lower body weight (39,40). As noted in 3.2.1, the authoritarian owners are characterized by psychological control, rejection, behavioural control and expectations beyond the dog's real capacities (15). Child-directed research found that non-reasoning punishment is related to increased emotional eating (38). Therefore, it is assumed that dogs parented by an authoritarian owner have the highest emotional distress and increased emotional eating. Nevertheless, the authoritarian parenting style had the lowest percentage of overweight. Possible explanations for this outcome are a wrong assumption or more reverse arguments.

The parenting style and thereby the behaviour of the dog has an impact on the possibility of overweight, but recent research also showed that overweight influences the behaviour. This research found an association between overweight and undesirable behaviour in dogs, including displays of aggression to strangers or other dogs, being fearful of walking, guarding and stealing food and not returning when called (41). For the future it would be interesting to combine these two researches and look into the consequences of overweight for the parenting style.

*Future work*
The dataset used in this part of the research (dataset 'expert judgement data'), consists of only 99 participants. For the future, it would be interesting to repeat this research with more 'expert given' body condition scores and parenting style scores. Taking the association between the type of survey and the parenting style outcome into account, the preference would be to use an online survey, which the owner can fill in in private, so the influence of social desirability will be limited maximally

The two dogs from the collected database were excluded since no dominant parenting style was found for their owners. They could not be used for the main research question so were excluded from data. At a later stage of the study it was decided to investigate the possible associations between all variables. When the third-party data arrived, the 71 dogs of this database with owners that showed no dominant parenting style, were used in statistical analysis for the other associations. For the future it would be better to treat both databases the same.

The intention of the research was to use at least five practices spread throughout the country, when taking the social-economic statuses of the area's into account, in order to have a reliable database. In practice, it turned out hard to find veterinary practices that wanted to cooperate with the research, therefore only three veterinary practices, all in the middle of the Netherlands, were used for this research. For future research, it would be better to use more practices from different area's with different social-economic statuses.

## 5.2 The association between overweight and survey

The outcome of a lower percentage of overweight body condition scores in online survey (where the veterinarian emailed his/her body condition score), compared to face to face survey (where the veterinarian told his/her body condition score in person), leads to the assumption that veterinarians trivialize the body condition score when they are not confronted in person. Recent research shows that veterinarians and medical doctors experience barriers (and facilitators) when discussing obesity. Some factors that contribute to the barrier are; preventing the customer from feeling unease (especially with unmotivated or resistant

caretakers), fear of customer loss, an overweight care taker, lack of time and being uncertain about performing diagnostics or setting up a treatment plan for overweight, negative effects on the self-esteem of the patients and negative experiences (42).

## 5.3 The association between overweight and judgement

The results confirm the outcome of Singh et al (2002), who found a difference in perception of the body condition score between pet expert and owner. The mean body condition score determined by trained pet experts in the study was 6.3 compared to 5.3 by owners (using the 9-point score system). It was also found that almost 27% of owners underrated their dog's body condition score by two units (37). Courcier et al (2011) showed the existence of an owner misperception in 44,1% with underestimation being the most common form of misperception. After proving it in human studies, research has proven that the odds of underestimation decrease significantly when the dog's BCS increases (43).
The misinterpretation of the dog's body condition is not always the consequence of ignorance. White et al (2011), showed that, in some cases of misinterpretation, owners were previously informed by a veterinarian about the overweight of their dog. These owners were either reluctant to accept this information or view it as important (44). The unrealistic perceptions or ignorance can be problematic as owners were seen to influence obesity in 97% of obese dogs (1).

## 5.4 The association between overweight and breed

The expert judgement database only contains 14 Labradors. This amount is too low to draw a valid conclusion from the analysis. No correlation was found between breed and body condition score in this database, but this is not seen as a valid outcome. It would be interesting to repeat this part of the research with more Labradors that were body condition scored by an expert. The finding of a higher mean body condition score in labradors compared to other breeds, confirms the finding of Raffan et al (2016) about the genetic predisposition of labradors towards overweight. One of the genetic factors that predispose to obesity is the leptin melanocortin signaling pathway. The pro-opiomelanocortin (POMC) gene produces neuroactive peptides, which are appetite regulators. Raffan et al (2016) found a deletion polymorphism in this POMC gene in Labrador retrievers. This deletion disrupts the production of the neuroactive peptides, this associates strongly to an increase of weight and adiposity, and greater food motivation (45).

## 5.5 The association between overweight and intact

The finding of the total database that neutered dogs showed an overall higher body condition score than intact dogs, corresponds with the research of Jeusette et al (2004), who found that ovariectomy in dogs induces a significant decrease of daily energy requirement, but also a significant increase in food consumption (46). The increased food intake as a result of neutering was also proved in female kittens by Alexander et al (2011) (47). One of the main suggested explanations is the influence of oestradiol at feeding by advancing the onset of satiety (48). The advice for owners of neutered dogs would therefore include attention for the dogs weight and body condition, while the dog can gain weight more easily after the operation.

## 5.6 The association between overweight and age

The findings of this research support earlier research that showed a correlation between age and the prevalence of excess body weight in dogs (49). A possible explanation is the non-persistence of a decrease of energy intake unless the decrease in caloric requirement due to loss of lean body tissue (50). For this research the assumption is made that this is the explanation for the high percentages of overweight in senior and old dogs. However, when dogs get really old, they become thinner and show a less than optimal body condition. On the other side it is hypothesized that overweight dogs and cats do not reach ages attained by thinner animals because excess weight is harmful to the overall health (49).

## 5.7 The association between parenting style and survey

In both databases a significant outcome was found for the association between parenting style and survey. Joinsen (1999) found that participants using the internet to anonymously fill in a survey, showed lower levels of social desirability than participants answering with pen and paper (51). Based on this research, the explanation for the differences in parenting style-outcome between the online survey and the face to face survey is linked to social desirability. Apparently, the authoritative parenting style is seen as more desirable than the authoritarian parenting style.
Another possible explanation could be that the collected data found a different group of dog owners than the third-party data collection. The participants of the third-party data were collected through advertisement in newspapers, online channels and the university site. Therefore, the participants made an effort of their own, to look up the survey. The participants of the collected data were personally approached and asked to take the time to fill in the survey. The third-party data likely found more motivated participants that the collected data. The amount of data that was collected through surveys with the presence of the researcher, was low in this research and it may be that the number of study subjects was too low to establish valid conclusions and therefore it is recommend repeating this part of the research with a larger group of participants. It could be interesting to use the same people for both the data collection methods. First, use an interviewer to ask the questions in person and a few months later send the same questions through mail. This way it is possible to see the differences between the data collection methods.

## 5.8 The association between parenting style and age

Young dogs showed the highest percentage of permissive owners, compared to other age classes, this can be explained by low expectations of the owner towards their dog. Research found that young dogs react more strongly to new stimuli, show higher physical activity and are more socially responsive compared to older dogs (52). These are assumed to be well-known properties of young dogs that can lead to low expectations. If an older dog is being overactive it will be less tolerated compared to a puppy, because of other expectations. Another explanation could be the cuteness of the young dog, which makes it harder to discipline the dog.

Old dogs, as the age group that is most often parented with the authoritarian parenting style, compared to other age classes, are expected to know the rules and behave accordingly to them. Other expectations are low physical activity and reaction to new stimuli (52). Because of the high expectations, the conclusion was made that older dogs need more demandingness. Another interesting factor is the described hyperactivity in dementia in human literature (53). Siwak et al (2001) also found a link between cognitive impairment and behavioural activity in older dogs (52). For the future it would be interesting to note the possible cognitive impairment, since it is expected that this influences the parenting style. The authoritative parenting style was mostly used for senior dogs.

### 5.9 The association between parenting style and breed

The association between parenting style and breed, with the permissive parenting style as being less popular with Labrador owners, can be explained by different possible explanations. These explanations can be a certain type of human chooses the breed Labrador, dogs of the breed Labrador need more demandingness from their owner to control their behaviour or the total amount of 125 Labrador's was not enough to draw a valid conclusion. Duffy et al (2008) studied aggression in a large number of breeds, showing a below-average level of aggression towards owners, strangers and dogs in Labrador Retrievers (54). This may have a connection with the argument that a certain type of human chooses the breed Labrador. The permissive parenting style is characterized by excessive freedom for the dog due to low expectations of the owner towards their dog (19). Authoritative and authoritarian dog owners have more expectations towards their dog. The below-average level of aggression is normally seen as a good character trait in dogs. Therefore, dog owners with expectations of a good dog, will be more likely to buy a Labrador than dog owners that have less expectations.
More research about this subject would be interesting. For this research it would be preferable to use more Labrador dogs in the research. Alongside the information collected from the participants in this research, it can also be interesting to extend the research with information about the presence of a pedigree, the color of the Labrador (to see if the color influences character) and the presence of the well-known Labrador-predispositions such as hip dysplasia and elbow dysplasia. These disorders can cause pain in daily life, which may affect the parenting method of the owner towards the dog.

### 5.10 The association between parenting style and intact

The association can be explained from two different perspectives. Hormones, affected by the dog being intact or not, influence the parenting style of the owner or the parenting style influences the choice of the owner to may or may not neuter their dog.
Castration of male dogs shows an improvement in behaviour in 50-60% of the male dogs, thereby reducing roaming, dominance aggression, sexual mounting and urine marking (55). Hormones affect the sensitivity of the neural pathways involved in different behaviours, so they do not cause or inhibit behaviour by themselves. Testosterone sensitizes the responsiveness for aggression and sexual stimuli and strengthens the motor output, so the behaviour is performed at a higher intensity. In females, the reverse of the pattern seen in males is indicated. Data for unspecified aggression in intact female dogs indicate that they are less frequently implicated in aggression than are neutered females (56). However, pseudopregnancy can produce distinctive, unwanted behavioural changes in some female dogs. It is recommended to neuter the dog 2-3 months after the pseudopregnancy signs, since

neutering during pseudopregnancy can cause the unwanted behavioural signs to persist (57). In conclusion, neutering dogs has impact on the behaviour of the dog. The permissive parenting style was more often seen with intact dogs than neutered dogs, while the authoritative and authoritarian were more seen in neutered dogs. Based on these outcomes, the assumption can be made that neutered dogs need more demandingness than intact dogs. This is in contradiction with earlier research that showed behaviour improvement after castration of male dogs.

The other view indicates that the parenting style influences the choice of the owner to may or may not neuter the dog. Based on the fact that permissive dog owners have less expectations towards their dog, it is assumed that permissive owners will be less likely to neuter their male dog because of dissatisfaction of the behaviour (19). This corresponds to the outcome of permissive owners having the highest percentage of intact dogs.

### 5.11      The association between intact and age and intact and gender

The outcome of more neutered dogs at an older age was expected, since neutering can only happen after a minimum age. Owners of female dogs have multiple reasons to neuter their dog. Next to the blood spilling in heat, the chance of mammary gland tumor development is an unwanted phenomenon for the owners of intact female dogs. Ovariohysterectomizing dogs decreases mammary gland tumor prevalence (58). Therefore, many owners choose to neuter their female dog after the first heat or when no more litters are desired. The reason to neuter male dogs often has to do with behavioural problems. The sexually dimorphic behavioural patterns are reduced or eliminated in males by castration, but not all males undergo a change in behaviour following castration (59). This is often done at a later age, while educating the young dog is tried first. This also explains the outcome that female dogs are more often neutered in comparison to male dogs.

## 6. Conclusion

Between overweight and parenting style, a significant association was found. The outcome of this study indicates that the authoritarian parenting style is the most favorable parenting style for preventing overweight in dogs. Other interesting associations were found between variables such as, parenting style and breed, parenting style and gender and parenting style and survey. It would be interesting to repeat this research with a larger group of reliable body condition scores to increase the validation of conclusion.

## 7. Acknowledgment

# 8. References

1.    Bland IM, Guthrie-Jones A, Taylor RD, Hill J. Dog obesity: veterinary practices' and owners' opinions on cause and management. Prev Vet Med. 1 mei 2010;94(3–4):310–5.

2.    Bland IM, Guthrie-Jones A, Taylor RD, Hill J. Dog obesity: owner attitudes and behaviour. Prev Vet Med. 1 december 2009;92(4):333–40.

3.    Tropf M, Nelson OL, Lee PM, Weng HY. Cardiac and Metabolic Variables in Obese Dogs. J Vet Intern Med. 2017;31(4):1000–7.

4.    Shloim N, Edelson LR, Martin N, Hetherington MM. Parenting Styles, Feeding Styles, Feeding Practices, and Weight Status in 4–12 Year-Old Children: A Systematic Review of the Literature. Front Psychol [Internet]. 2015 [geciteerd 3 september 2018];6. Beschikbaar op: https://www.frontiersin.org/articles/10.3389/fpsyg.2015.01849/full

5.    Rhee KE, Lumeng JC, Appugliese DP, Kaciroti N, Bradley RH. Parenting Styles and Overweight Status in First Grade. Pediatrics. 1 juni 2006;117(6):2047.

6.    Olvera N, Power TG. Brief Report: Parenting Styles and Obesity in Mexican American Children: A Longitudinal Study. Journal of Pediatric Psychology. 1 april 2010;

7.    German AJ. Style over substance: What can parenting styles tell us about ownership styles and obesity in companion animals? Br J Nutr. januari 2015;113 Suppl:S72-77.

8.    Herwijnen IR van, Borg JAM van der, Naguib M, Beerda B. The existence of parenting styles in the owner-dog relationship. PLOS ONE. 23 februari 2018;13(2):e0193471.

9.    Asendorpf JB, Wilpers S. Personality effects on social relationships. 1998;(74):1531–44.

10.   Kotrschal K, Schöberl I, Bauer B, Thibeaut A-M, Wedl M. Dyadic relationships and operational performance of male and female owners and their male dogs. Behavioural Processes. juli 2009;81(3):383–91.

11.   Wedl M, Schöberl I, Bauer B, Day J, Kotrschal K. Relational factors affecting dog social attraction to human partners. Interaction Studies, Social Behaviour and Communication in Biological and Artificial Systems. 2010;(11):482–503.

12.   Kiss A, Turcsán B, Miklósi Á, Gácsi M. The effect of the owner's personality on the behaviour of owner-dog dyads. 2012;

13.   Bartges J, Kushner RF, Michel KE, Sallis R, Day MJ. One Health Solutions to Obesity in People and Their Pets. Journal of Comparative Pathology. mei 2017;156(4):326–33.

14.   Serpell J. Evidence for an association between pet behavior and owner attachment levels. In: Applied Animal Behaviour Sciende. Elsevier; 1996.

15.   Baumrind D. Authoritative parenting revisited: History and current status. Authoritative parenting: Synthesizing nurturance and discipline for optimal child development. 1 januari 2013;11–34.

16.   Baumrind D. The Influence of Parenting Style on Adolescent Competence and Substance Use. The Journal of Early Adolescence. 1 februari 1991;11(1):56–95.

17.   Baumrind D. A Blanket Injunction Against Disciplinary Use of Spanking Is Not Warranted by the Data. Pediatrics. 1 oktober 1996;98(4):828–31.

18.   G.J. Craig, Kermis DM. Children Today. New Yersey: Perentice Hall; 1995.

19.   Cunningham B. Child Development. New York: Harper Collins; 1993.

20.   Hulbert A. Raising America : experts, parents, and a century of advice about children [Internet]. New York : Alfred A. Knopf; 2003 [geciteerd 11 juni 2018]. 476 p. Beschikbaar op: http://archive.org/details/raisingamericaex00hulb

21.   Önder A, Gülay H. Reliability and validity of parenting styles & dimensions questionnaire. Procedia - Social and Behavioral Sciences. 1 januari 2009;1(1):508–14.

22.   Robinson CC, Mandleco B, Olsen SF, Hart CH. Authoritative, Authoritarian, and

Permissive Parenting Practices: Development of a New Measure. Psychological Reports. december 1995;77(3):819–30.

23.     Baumrind D. Current patterns of parenta authority. In: Developmental Psychology Monographs. 1971. p. 1–103.

24.     Borges NC, Vasconcellos RS, Carciofi AC, Gonçalves KNV, Paula FJA, Filho DEF, e.a. DXA, bioelectrical impedance, ultrasonography and biometry for the estimation of fat and lean mass in cats during weight loss. BMC Vet Res. 10 juli 2012;8:111.

25.     Santarossa A, Parr JM, Verbrugghe A. The importance of assessing body composition of dogs and cats and methods available for use in clinical practice. J Am Vet Med Assoc. 01 2017;251(5):521–9.

26.     Laflamme D (Ralston PC. Development and validation of a body condition score system for dogs. Canine practice (Santa Barbara, Calif : 1990) (USA) [Internet]. 1997 [geciteerd 30 april 2018]; Beschikbaar op: http://agris.fao.org/agris-search/search.do?recordID=US9742264

27.     Lisa  and F, Iveta B, Nick C, Clayton M, Patrick N, Betina R, e.a. WSAVA Nutritional Assessment Guidelines. Journal of Small Animal Practice. 1 juli 2011;52(7):385–96.

28.     German AJ, Holden SL, Moxham GL, Holmes KL, Hackett RM, Rawlings JM. A simple, reliable tool for owners to assess the body condition of their dog or cat. J Nutr. juli 2006;136(7 Suppl):2031S-2033S.

29.     PMC E. Development and validation of a body condition score system for cats: a clinical tool. - Abstract - Europe PMC [Internet]. [geciteerd 3 mei 2018]. Beschikbaar op: http://europepmc.org/abstract/AGR/IND20615063

30.     Munday HS, Booles D, Anderson P, Poore DW, Earle KE. The repeatability of body composition measurements in dogs and cats using dual energy X-ray absorptiometry. J Nutr. december 1994;124(12 Suppl):2619S-2621S.

31.     Johnson MS, Watts RJ, Hammer HS, Nagy TR, Watts SA. Validation of Dual-energy X-ray Absorptiometry to Predict Body Composition of Channel Catfish, Ictalurus punctatus. Journal of the World Aquaculture Society. 1 februari 2017;48(1):122–31.

32.     Bjornvad CR, Nielsen DH, Armstrong PJ, McEvoy F, Hoelmkjaer KM, Jensen KS, e.a. Evaluation of a nine-point body condition scoring system in physically inactive pet cats. Am J Vet Res. april 2011;72(4):433–7.

33.     German AJ, Holden SL, Bissot T, Morris PJ, Biourge V. Use of starting condition score to estimate changes in body weight and composition during weight loss in obese dogs. Res Vet Sci. oktober 2009;87(2):249–54.

34.     Shoveller AK, DiGennaro J, Lanman C, Spangler D. Trained vs untrained evaluator assessment of body condition score as a predictor of percent body fat in adult cats. J Feline Med Surg. december 2014;16(12):957–65.

35.     German AJ, Holden SL, Morris PJ, Biourge V. Comparison of a bioimpedance monitor with dual-energy x-ray absorptiometry for noninvasive estimation of percentage body fat in dogs. American Journal of Veterinary Research. 1 april 2010;71(4):393–8.

36.     German AJ, Martin L. Feline obesity: epidemiology, pathophysiology and management. In: The encyclopedia of feline clinical nutrition. France: Royal Canine; 2008. p. 14–20.

37.     Singh R, Laflamme D, Sidebottom-Nielsen M. Owner perception of canine body condition score. Journal of Veterinary Internal Medicine. januari 2002;(16).

38.     Topham GL, Hubbs-Tait L, Rutledge JM, Page MC, Kennedy TS, Shriver LH, e.a. Parenting styles, parental response to child emotion, and family emotional responsiveness are related to child emotional eating. Appetite. 1 april 2011;56(2):261–4.

39.     Vollmer RL, Mobley AR. Parenting styles, feeding styles, and their influence on child

obesogenic behaviors and body weight. A review. Appetite. 1 december 2013;71:232–41.

40.    Fuemmeler BF, Yang C, Costanzo P, Hoyle RH, Siegler IC, Williams RB, e.a. Parenting styles and body mass index trajectories from adolescence to adulthood. Health Psychol. juli 2012;31(4):441–9.

41.    German AJ, Blackwell E, Evans M, Westgarth C. Overweight dogs are more likely to display undesirable behaviours: results of a large online survey of dog owners in the UK. Journal of Nutritional Science. ed 2017;6.

42.    Aldewereld CM, van der Maas JC, Monninkhof EM, Corbee RJ. Barriers of companion animal veterinarians and medical doctors to discuss overweight. 2018;

43.    Courcier EA, Mellor DJ, Thomson RM, Yam PS. A cross sectional study of the prevalence and risk factors for owner misperception of canine body shape in first opinion practice in Glasgow. Prev Vet Med. 1 oktober 2011;102(1):66–74.

44.    White GA, Hobson-West P, Cobb K, Craigon J, Hammond R, Millar KM. Canine obesity: Is there a difference between veterinarian and owner perception? Journal of Small Animal Practice. 2011;52(12):622–6.

45.    Raffan E, Dennis RJ, O'Donovan CJ, Becker JM, Scott RA, Smith SP, e.a. A Deletion in the Canine POMC Gene Is Associated with Weight and Appetite in Obesity-Prone Labrador Retriever Dogs. Cell Metab. 10 2016;23(5):893–900.

46.    Jeusette I, Detilleux J, Cuvelier C, Istasse L, Diez M. Ad libitum feeding following ovariectomy in female Beagle dogs: effect on maintenance energy requirement and on blood metabolites. Journal of Animal Physiology and Animal Nutrition. 1 april 2004;88(3-4):117–21.

47.    Alexander LG, Salt C, Thomas G, Butterwick R. Effects of neutering on food intake, body weight and body composition in growing female kittens. Br J Nutr. oktober 2011;106 Suppl 1:S19-23.

48.    Butera PC. Estradiol and the control of food intake. Physiology & Behavior. 9 februari 2010;99(2):175–80.

49.    P.J. Armstrong, Lund EM. Changes in body composition and energy balance with aging. Veterinary Clinical Nutrition. 1996;83–7.

50.    Mason E. Obesity to pet dogs. Veterinary Record. 1970;(86):612–6.

51.    Joinson A. Social desirability, anonymity, and internet-based questionnaires. Behavior Research Methods, Instruments, & Computers. 1 september 1999;31(3):433–8.

52.    Siwak CT, Tapp PD, Milgram NW. Effect of age and level of cognitive function on spontaneous and exploratory behaviors in the beagle dog. Learn Mem. december 2001;8(6):317–25.

53.    Neary D, Snowden J, Mann D. Frontotemporal dementia. Lancet Neurol. november 2005;4(11):771–80.

54.    Duffy DL, Serpell JA. Predictive validity of a method for evaluating temperament in young guide and service dogs. Applied Animal Behaviour Science. 1 april 2012;138(1):99–109.

55.    Hopkins SG, Schubert TA, Hart BL. Castration of adult male dogs: effects on roaming, aggression, urine marking, and mounting. J Am Vet Med Assoc. 15 juni 1976;168(12):1108–10.

56.    Overall. Clinical Behavioral Medicine For Small Animals, 1e. St. Louis: Mosby; 1997. 560 p.

57.    Jensen P. The Behavioural Biology of Dogs. Wallingford, Oxfordshire: CABI Publishing; 2007. 288 p.

58.    Munson L, Moresco A. Comparative pathology of mammary gland cancers in domestic and wild animals. Breast Dis. 2007;28:7–21.

59.    Hart BL, Eckstein RA. The role of gonadal hormones in the occurrence of

objectionable behaviours in dogs and cats. Applied Animal Behaviour Science. 1 april 1997;52(3):331–44.

# 9. Appendix

## 9.1 Appendix 1: Body Condition Score (WSAVA Global Nutrition Committee)

| 1 | Ribs, lumbar vertebrae, pelvic bones and all bony prominences evident from a distance. No discernible body fat. Obvious loss of muscle mass. | Under ideal |
|---|---|---|
| 2 | Ribs, lumbar vertebrae, pelvic bones easily visible. Some evidence of other bony prominences. No palpable fat Minimal loss of muscle mass. | Under ideal |
| 3 | Ribs easily palpated and may be visible with no palpable fat. Tops of lumbar vertebrae visible. Pelvic bones becoming prominent. Obvious waist and abdominal tuck. | Under ideal |
| 4 | Ribs easily palpable, with minimal fat covering. Waist easily noted, viewed from above. Abdominal tuck evident | Ideal |
| 5 | Ribs palpable without excess fat covering. Waist observed behind ribs when viewed from above. Abdomen tucked up when viewed from side | Ideal |
| 6 | Ribs palpable with slight excess fat covering. Waist is discernible viewed from above but is not prominent. Abdominal tuck apparent | Over ideal |
| 7 | Ribs palpable with difficulty; heavy fat cover. Noticeable fat deposits over lumbar area and base of tail. Waist absent or barely visible. Abdominal tuck may be present | Over ideal |
| 8 | Ribs not palpable under very heavy fat cover, or palpable only with significant pressure Heavy fat deposits over lumbar area and base of tail. Waist absent and no abdominal tuck. Obvious abdominal distention may be present. | Over ideal |
| 9 | Massive fat deposits over thorax, spine and base of tail. Waist and abdominal tuck absent. Fat deposits on neck and limps Obvious abdominal distention. | Over ideal |

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Kruis het antwoord aan wat volgens u het meest van toepassing is.
Denk niet te lang na, ga op uw eerste gevoel af.  Er zijn geen goede of foute antwoorden.

| vragenlijst opvoedingsstijlen | nooit | bijna nooit | de helft van de tijd | bijna altijd | altijd |
|---|---|---|---|---|---|
| 1. Ik sta toe dat mijn hond mijn besluiten beïnvloedt, bijvoorbeeld wat betreft de route tijdens de wandeling. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Ik houd rekening met de gevoelens en behoeften van mijn hond | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Ik kan in woede uitbarsten richting mijn hond als hij iets doet waarvan hij weet dat ik dat niet wil. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Ik buig ongewenst gedrag van mijn hond om naar meer gewenst gedrag. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Ik moedig mijn hond aan zijn gemoedstoestand te tonen, zo mag hij grommen bij ongemak. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. Ik troost mijn hond als hij overstuur is. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. Ik prijs mijn hond als hij iets goed doet. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. Ik pak mijn hond beet als hij ongehoorzaam is. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. Ik oefen gedrag stap voor stap met mijn hond, zodat ik zeker weet dat hij begrijpt wat ik van hem vraag. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. Ik oefen bepaald gedrag met mijn hond, voordat ik dat gedrag vraag in een voor de hond moeilijke situatie. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. Ik verhef mijn stem als mijn hond zijn gedrag moet verbeteren. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. Ik scheld en heb kritiek als het gedrag van mijn hond niet voldoet aan mijn verwachtingen. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. Ik houd voorkeuren van mijn hond in gedachten als ik plannen maak. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. Ik houd de wensen van mijn hond in gedachten voor-dat ik hem vraag iets te doen. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. Ik denk na over regels die ik mijn hond opleg. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. Ik gebruik een corrigerende tik als mijn hond zich misdraagt. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. Ik prik met mijn vinger, of geef een kort schopje als mijn hond zich misdraagt. Zo haal ik hem uit het gedrag. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. Ik zet een beloning in (voer/speeltje) als mijn hond echt iets moet doen. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. Ik gebruik fysieke (lichamelijke) correcties (bijvoorbeeld een tik of een slipketting) als een manier om het gedrag van mijn hond te verbeteren. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. Ik roep of schreeuw als mijn hond zich misdraagt. | ☐ | ☐ | ☐ | ☐ | ☐ |

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| vragenlijst opvoedingsstijlen | nooit | bijna nooit | de helft van de tijd | bijna altijd | altijd |
|---|---|---|---|---|---|
| 21. Als ik mijn hond iets vraag, moet hij dat doen, omdat ik het zeg en ik de baas ben. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. Ik ben toegeeflijk richting mijn hond als hij scène maakt (blaft / uitvalt), of iets niet doet wat ik wil. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. Ik corrigeer mijn hond middels 'time out' en door weg te lopen als hij zich misdraagt, ook als hij de situatie waarin hij zich bevindt, ongemakkelijk vindt. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. Ik dreig met straf richting mijn hond, maar voer het niet daadwerkelijk uit. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. Ik dreig vaker naar mijn hond dan dat ik echt een correctie geef. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. Ik heb het leuk met mijn hond. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. Ik help mijn hond inzien wat het gevolg is van zijn gedrag, door hem keuzes te geven in situaties. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. Ik laat mijn hond weten hoe ik denk over goed en slecht gedrag van hem. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. Ik moedig mijn hond aan 'hond' te zijn, ook als het leidt tot een vieze of natte hond. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30. Ik straf door speeltjes van mijn hond af te pakken. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. Ik toon respect voor de behoeften van mijn hond door hem aan te moedigen 'hond' te zijn. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. Ik verwen mijn hond. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. Ik vind het moeilijk om mijn hond te corrigeren. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. Ik zet dreigen in als straf, zonder noodzaak te voelen tot rechtvaardiging richting mijn hond. | ☐ | ☐ | ☐ | ☐ | ☐ |

Vul onderstaande gegevens in

Naam van uw hond ...........................................................

Ras van uw hond ..............................................................

Leeftijd van uw hond ........................................................

Reden van het bezoek aan de dierenarts ............................................

..........................................................................

**Hartelijk bedankt voor het invullen van deze vragenlijst.**

## 9.3 Appendix 3: Univariable analysis of the 'expert judgement database'

| Variables | Categories | Total 99 | Overweight | | OR | 95% CI | P-value |
|---|---|---|---|---|---|---|---|
| | | | No N=62 (62.6%) | Yes N=37 (37.4%) | | | |
| | | N (%) | N (%) | N (%) | | | |
| **Parenting style** | Permissive | 17(17.2) | 9 (52.9) | 8 (47.1) | 3.7 | 1.1-12.1 | 0.002 |
| | Authoritative | 36(36.4) | 16(44.4) | 20(55.6) | 5.1 | 1.9-13.7 | |
| | Authoritarian | 46(46.5) | 37(80.4) | 9 (19.6) | 1.0 | Ref | |
| **Age** | Young | 29(29.3) | 18(62.1) | 11(37.9) | 3.2 | 0.9-10.7 | 0.015 |
| | Middle-aged | 31(31.3) | 26(83.9) | 5 (16.1) | 1.0 | Ref | |
| | Senior | 26(26.3) | 12(46.2) | 14(53.8) | 6.1 | 1.8-20.7 | |
| | Old | 13(13.1) | 6 (46.2) | 7 (53.8) | 6.1 | 1.4-25.9 | |
| **Gender of the dog** | Female | 46(46.5) | 31(67.4) | 15(32.6) | 0.7 | 0.3-1.6 | 0.4 |
| | Male | 53(53.5) | 31(58.5) | 22(41.5) | 1.0 | Ref | |
| **Intact** | No | 61(61.6) | 35(57.4) | 26(42.6) | 1.0 | Ref | 0.2 |
| | Yes | 38(38.4) | 27(71.1) | 11(28.9) | 0.5 | 0.2-1.3 | |
| **Breed** | No Labrador | 85(85.9) | 56(65.9) | 29(34.1) | 1.0 | Ref | 0.099 |
| | Labrador | 14(14.1) | 6 (42.9) | 8 (57.1) | 2.6 | 0.8-8.1 | |
| **Survey** | Online survey | 27(27.3) | 25(92.6) | 2 (7.4) | 1.0 | Ref | 0.000 |
| | Face to face | 72 (72.7) | 37(51.4) | 35(48.6) | 0.09 | 0.02-0.4 | |

## 9.4 Appendix 4: Univariable analysis of the 'total database'

| Variables | Categories | Total 2181 | Overweight | | OR | 95% CI | P-value |
|---|---|---|---|---|---|---|---|
| | | | No N=2010 (92.2%) | Yes N=171 (7.8%) | | | |
| | | N (%) | N (%) | N (%) | | | |
| **Parenting style** | Permissive | 316 (15.0) | 290 (91.8) | 26 (8.2) | 1.3 | 0.8-2.01 | 0.000 |
| | Authoritative | 122 (5.8) | 93 (76.2) | 29 (23.8) | 4.5 | 2.8-7.1 | |
| | Authoritarian | 1674(79.3) | 1565(93.5) | 109(6.5) | 1.0 | Ref | |
| **Age** | Young | 863(39.6) | 828(95.9) | 35(4.1) | 0.5 | 0.3-0.7 | 0.000 |
| | Middle-aged | 882(40.4) | 812(92.1) | 70(7.9) | 1.0 | Ref | |
| | Senior | 326(14.9) | 277(85.0) | 49(15.0) | 2.1 | 1.4-3.0 | |
| | Old | 110(5.0) | 93 (84.5) | 17(15.5) | 2.1 | 1.2-3.8 | |
| **Gender of the dog** | Female | 984 (47.2) | 899 (91.4) | 85(8.6) | 1.3. | 0.9-1.7 | 0.165 |
| | Male | 1099(52.8) | 1022(93.0) | 77(7.0) | 1.0 | Ref | |
| **Intact** | No | 1083(52.0) | 972(89.8) | 111(10.2) | 1.0 | Ref | 0.000 |
| | Yes | 1000(48.0) | 949(94.9) | 51 (5.1) | 0.5 | 0.3-0.7 | |
| **Breed** | No Labrador | 2056(94.3) | 1911(92.9) | 145(7.1) | 1.0 | Ref | 0.000 |
| | Labrador | 125 (5.7) | 99 (79.2) | 26 (20.8) | 3.5 | 2.2-5.5 | |
| **Survey** | Online survey | 2109(96.7) | 1973(93.6) | 136(6.4) | 1.0 | Ref | 0.000 |
| | Face to face | 72 (3.3) | 37 (51.4) | 35 (48.6) | 13.7 | 8.4-22.5 | |
| **Judgement** | Owner | 2082(95.5) | 1948(93.6) | 134(6.4) | 1.0 | Ref | 0.000 |
| | Expert | 99 (4.5) | 62 (62.6) | 37 (37.4) | 8.7 | 5.6-13.5 | |

## 9.5 Appendix 5: Multivariable analysis of the 'expert judgement database'

| Variable | Category | OR | 95%CI |
|----------|----------|-----|-------|
| **Breed** | No Labrador | 1.0 | Ref |
| | Labrador | 3.4 | 0.9-13.0 |
| **Survey** | Online | 1.0 | Ref |
| | Face to face | 13.3 | 2.8-62.8* |

*The category of the variable is significant compare to the reference group

## 9.6 Appendix 6: Multivariable analysis of the 'total database'

| Variable | Category | OR | 95%CI |
|---|---|---|---|
| **Parenting Style** | Permissive | 1.3 | 0.8-2.2 |
| | Authoritative | 2.0 | 1.1-3.6* |
| | Authoritarian | 1.0 | Ref |
| **Age** | Young | 0.5 | 0.3-0.7* |
| | Middle-aged | 1.0 | Ref |
| | Senior | 1.6 | 1.0-2.5 |
| | Old | 1.1 | 0.5-2.2 |
| **Intact** | No | 1.0 | Ref |
| | Yes | 0.6 | 0.4-0.9* |
| **Breed** | No Labrador | 1.0 | Ref |
| | Labrador | 3.7 | 2.2-6.2* |
| **Survey** | Online | 1.0 | Ref |
| | Face to face | 9.2 | 5.1-16.5* |

*The category of the variable is significant compare to the reference group

## 9.7 Appendix 7: P-value tables of both databases

P-value table - expert judgement only

| Variables | Overweight | Parenting Style | Age | Gender | Intact | Breed | Survey |
|---|---|---|---|---|---|---|---|
| Overweight | X | X | X | X | X | X | X |
| Parenting Style | 0.002 | X | X | X | X | X | X |
| Age | 0.015 | 0.110 | X | X | X | X | X |
| Gender | 0.361 | 0.075 | 0.864 | X | X | X | X |
| Intact | 0.171 | 0.043 | 0.013 | 0.019 | X | X | X |
| Breed | 0.099 | 0.855 | 0.638 | 0.770 | 0.825 | X | X |
| Survey | 0.000 | 0.000 | 0.005 | 0.484 | 0.092 | 0.906 | X |

P-value table - total data

| Variables | Overweight | Parenting Style | Age | Gender | Intact | Breed | Survey |
|---|---|---|---|---|---|---|---|
| Overweight | X | X | X | X | X | X | X |
| Parenting Style | 0.000 | X | X | X | X | X | X |
| Age | 0.000 | 0.031 | X | X | X | X | X |
| Gender | 0.165 | 0.052 | 0.256 | X | X | X | X |
| Intact | 0.000 | 0.015 | 0.000 | 0.000 | X | X | X |
| Breed | 0.000 | 0.006 | 0.594 | 0.026 | 0.846 | X | X |
| Survey | 0.000 | 0.000 | 0.000 | 0.813 | 0.011 | 0.002 | X |

## 9.8 Appendix 8: Crosstabs of the 'expert judgement database'

| Variables | Categories | Total 99 | Parenting Styles | | | P-value |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Permissive N=17 (17.2%) | Authoritative N=36 (36.4%) | Authoritarian N=46 (46.5%) | |
| Overweight | No | 62(62.6) | 9(14.5) | 16(25.8) | 37(59.7) | 0.002 |
| | Yes | 37(37.4) | 8(21.6) | 20(54.1) | 9(24.3) | |
| Age | Young | 29(29.3) | 4(13.8) | 13(44.8) | 12(41.4) | 0.110 |
| | Middle-aged | 31(31.3) | 4(12.9) | 6(19.4) | 21(67.7) | |
| | Senior | 26(26.3) | 7(26.9) | 11(42.3) | 8(30.8) | |
| | Old | 13(13.1) | 2(15.4) | 6(46.2) | 5(38.5) | |
| Gender | Female | 46(46.5) | 6(13.0) | 13(28.3) | 27(58.7) | 0.075 |
| | Male | 53(53.5) | 11(20.8) | 23(43.4) | 19(35.8) | |
| Intact | No | 61(61.6) | 6(9.8) | 23(37.7) | 32(52.5) | 0.043 |
| | Yes | 38(38.4) | 11(28.9) | 13(34.2) | 14(36.8) | |
| Breed | No Labrador | 85(85.9) | 15(17.6) | 30(35.3) | 40(47.1) | 0.855 |
| | Labrador | 14(14.1) | 2(14.3) | 6(42.9) | 6(42.9) | |
| Survey | Online | 27(27.3) | 3(11.1) | 2(7.4) | 22(81.5) | 0.000 |
| | Face to face | 72(72.7) | 14(19.4) | 34(47.2) | 24(33.3) | |

| Variables | Categories | Total 99 | Age | | | | P-value |
|---|---|---|---|---|---|---|---|
| | | | Young N=29 (29.3%) | Middle-aged N=31 (31.3%) | Senior N=26 (26.3%) | Old N=13 (13.1) | |
| **Overweight** | No | 62(62.6) | 18(29.0) | 26(41.9) | 12(19.4) | 6(9.7) | 0.015 |
| | Yes | 37(37.4) | 11(29.7) | 5(13.5) | 14(37.8) | 7(18.9) | |
| **Parenting Style** | Permissive | 17(17.2) | 4(23.5) | 4(23.5) | 7(41.2) | 2(11.8) | 0.110 |
| | Authoritative | 36(36.4) | 13(36.1) | 6(16.7) | 11(30.6) | 6(16.7) | |
| | Authoritarian | 46(46.5) | 12(26.1) | 21(45.7) | 8(17.4) | 5(10.9) | |
| **Gender** | Female | 46(46.5) | 12(26.1) | 14(30.4) | 13(28.3) | 7(15.2) | 0.864 |
| | Male | 53(53.5) | 17(32.1) | 17(32.1) | 13(24.5) | 6(11.3) | |
| **Intact** | No | 61(61.6) | 12(19.7) | 19(31.1) | 18(29.5) | 12(19.7) | 0.013 |
| | Yes | 38(38.4) | 17(44.7) | 12(31.6) | 8(21.1) | 1(2.6) | |
| **Breed** | No Labrador | 85(85.9) | 23(27.1) | 28(32.9) | 23(27.1) | 11(12.9) | 0.638 |
| | Labrador | 14(14.1) | 6(42.9) | 3(21.4) | 3(21.4) | 2(14.3) | |
| **Survey** | Online | 27(27.3) | 7(25.9) | 15(55.6) | 5(18.5) | 0(00.0) | 0.005 |
| | Face to face | 72(72.7) | 22(30.6) | 16(22.2) | 21(29.2) | 13(18.1) | |

| Variables | Categories | Total 99 | Gender Female N=46 (46.5%) | Male N=53 (53.5%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| Overweight | No | 62(62.6) | 31(50.0) | 31(50.0) | 0.361 |
| | Yes | 37(37.4) | 15(40.5) | 22(59.5) | |
| Parenting style | Permissive | 17(17.2) | 6(35.3) | 11(64.7) | 0.075 |
| | Authoratitive | 36(36.4) | 13(36.1) | 23(63.9) | |
| | Authoritarian | 46(46.5) | 27(58.7) | 19(41.3) | |
| Age | Young | 29(29.3) | 12(41.4) | 17(58.6) | 0.864 |
| | Middle-aged | 31(31.3) | 14(45.2) | 17(54.8) | |
| | Senior | 26(26.3) | 13(50.0) | 13(50.0) | |
| | Old | 13(13.1) | 7(53.8) | 6(46.2) | |
| Intact | No | 61(61.6) | 34(55.7) | 27(44.3) | 0.019 |
| | Yes | 38(38.4) | 12(31.6) | 26(68.4) | |
| Breed | No Labrador | 85(85.9) | 40(47.1) | 45(52.9) | 0.770 |
| | Labrador | 14(14.1) | 6(42.9) | 8(57.1) | |
| Survey | Online | 27(27.3) | 11(40.7) | 16(59.3) | 0.484 |
| | Face to face | 72(72.7) | 35(48.6) | 37(51.4) | |

| Variables | Categories | Total 99 | Intact No N=61 (61.6%) | Yes N=38 (38.4%) | P-value |
|---|---|---|---|---|---|
|  |  | N (%) | N (%) | N (%) |  |
| **Overweight** | No | 62(62.6) | 35(56.5) | 27(43.5) | 0.171 |
|  | Yes | 37(37.4) | 26(70.3) | 11(29.7) |  |
| **Parenting style** | Permissive | 17(17.2) | 6(35.3) | 11(64.7) | 0.043 |
|  | Authoratitive | 36(36.4) | 23(63.9) | 13(36.1) |  |
|  | Authoritarian | 46(46.5) | 32(69.6) | 14(30.4) |  |
| **Age** | Young | 29(29.3) | 12(41.4) | 17(58.6) | 0.013 |
|  | Middle-aged | 31(31.3) | 19(61.3) | 12(38.7) |  |
|  | Senior | 26(26.3) | 18(69.2) | 8(30.8) |  |
|  | Old | 13(13.1) | 12(92.3) | 1(7.7) |  |
| **Gender of the dog** | Female | 46(46.5) | 34(73.9) | 12(26.1) | 0.019 |
|  | Male | 53(53.5) | 27(50.9) | 26(49.1) |  |
| **Breed** | No Labrador | 85(85.9) | 52(61.2) | 33(38.8) | 0.825 |
|  | Labrador | 14(14.1) | 9(64.3) | 5(35.7) |  |
| **Survey** | Online | 27(27.3) | 13(48.1) | 14(51.9) | 0.092 |
|  | Face to face | 72(72.7) | 48(66.7) | 24(33.3) |  |

| Variables | Categories | Total 99 | Breed | | P-value |
|---|---|---|---|---|---|
| | | | No Labrador N=85 (85.9%) | Labrador N=14 (14.1%) | |
| | | N (%) | N (%) | N (%) | |
| **Overweight** | No | 62(62.6) | 56(90.3) | 6(9.7) | 0.099 |
| | Yes | 37(37.4) | 29(78.4) | 8(21.6) | |
| **Parenting style** | Permissive | 17(17.2) | 15(88.2) | 2(11.8) | 0.855 |
| | Authoratitive | 36(36.4) | 30(83.3) | 6(16.7) | |
| | Authoritarian | 46(46.5) | 40(87.0) | 6(13.0) | |
| **Age** | Young | 29(29.3) | 23(79.3) | 6(20.7) | 0.638 |
| | Middle-aged | 31(31.3) | 28(90.3) | 3(9.7) | |
| | Senior | 26(26.3) | 23(88.5) | 3(11.5) | |
| | Old | 13(13.1) | 11(84.6) | 2(15.4) | |
| **Gender of the dog** | Female | 46(46.5) | 40(87.0) | 6(13.0) | 0.770 |
| | Male | 53(53.5) | 45(84.9) | 8(15.1) | |
| **Intact** | No | 61(61.6) | 52(85.2) | 9(14.8) | 0.825 |
| | Yes | 38(38.4) | 33(86.8) | 5(13.2) | |
| **Survey** | Online | 27(27.3) | 23(85.2) | 4(14.8) | 0.906 |
| | Face to face | 72(72.7) | 62(86.1) | 10(13.9) | |

| Variables | Categories | Total 99 | Survey Online N=27 (27.3%) | Face to face N=72 (72.7%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| **Overweight** | No | 62(62.6) | 25(40.3) | 37(59.7) | 0.000 |
| | Yes | 37(37.4) | 2(5.4) | 35(94.6) | |
| **Parenting style** | Permissive | 17(17.2) | 3(17.6) | 14(82.4) | 0.000 |
| | Authoratitive | 36(36.4) | 2(5.6) | 34(94.4) | |
| | Authoritarian | 46(46.5) | 22(47.8) | 24(52.2) | |
| **Age** | Young | 29(29.3) | 7(24.1) | 22(75.9) | 0.005 |
| | Middle-aged | 31(31.3) | 15(48.4) | 16(51.6) | |
| | Senior | 26(26.3) | 5(19.2) | 21(80.8) | |
| | Old | 13(13.1) | 0(00.0) | 13(100.0) | |
| **Gender of the dog** | Female | 46(46.5) | 11(23.9) | 35(76.1) | 0.484 |
| | Male | 53(53.5) | 16(30.2) | 37(69.8) | |
| **Intact** | No | 61(61.6) | 13(21.3) | 48(78.7) | 0.092 |
| | Yes | 38(38.4) | 14(36.8) | 24(63.2) | |
| **Breed** | No Labrador | 85(85.9) | 23(27.1) | 62(72.9) | 0.906 |
| | Labrador | 14(14.1) | 4(28.6) | 10(71.4) | |

## 9.9 Appendix 9: Crosstabs 'total database'

| Variables | Categories | Total 2183 | Parenting Styles | | | P-value |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Permissive N=316 (14.9%) | Authoritative N=122 (5.8%) | Authoritarian N=1676 (79.3%) | |
| **Overweight** | No | 1948(92.2) | 290(14.9) | 93(4.8) | 1565(80.3) | 0.000 |
| | Yes | 164(7.8) | 26(15.9) | 29(17.7) | 109(66.5) | |
| **Age** | Young | 833(39.4) | 131(15.7) | 45(5.4) | 657(78.9) | 0.031 |
| | Middle-aged | 853(40.4) | 128(15.0) | 39(4.6) | 686(80.4) | |
| | Senior | 320(15.1) | 48(15.0) | 29(9.1) | 243(75.9) | |
| | Old | 108(5.1) | 9(8.3) | 9(8.3) | 90(83.3) | |
| **Gender** | Female | 942(46.7) | 121(12.8) | 57(6.1) | 764(81.1) | 0.052 |
| | Male | 1077(53.3 | 180(16.7) | 63(5.8) | 834(77.4) | |
| **Intact** | No | 1049(52.0) | 138(13.2) | 73(7.7) | 838(79.9) | 0.015 |
| | Yes | 970(48.0) | 163(16.8) | 47(4.8) | 760(78.4) | |
| **Breed** | No Labrador | 1992(94.2) | 308(17.6) | 110(5.5) | 1574(79.0) | 0.006 |
| | Labrador | 122(57.8) | 8(14.3) | 12(9.8) | 102(83.6) | |
| **Survey** | Online | 2042(27.3) | 302(14.8) | 88(4.3) | 1652(80.9) | 0.000 |
| | Face to face | 72(72.7) | 14(19.4) | 34(47.2) | 24(33.3) | |

| Variables | Categories | Total 2183 | Age Young N=864 (39.6%) | Middle-aged N=882 (40.4%) | Senior N=327 (15.0%) | Old N=110 (5.0%) | P-value |
|---|---|---|---|---|---|---|---|
| **Overweight** | No | 2010(92.2) | 828(41.2) | 812(40.4) | 277(13.8) | 93(4.6) | 0.000 |
| | Yes | 171(7.8) | 35(20.5) | 70(40.9) | 49(28.7) | 17(9.9) | |
| **Parenting Style** | Permissive | 316(14.9) | 131(41.5) | 128(40.5) | 48(15.2) | 9(2.8) | 0.031 |
| | Authoritative | 122(5.8) | 45(36.9) | 39(32.0) | 29(23.8) | 9(7.4) | |
| | Authoritarian | 1676(79.3) | 657(39.2) | 686(40.9) | 243(14.5) | 90(5.4) | |
| **Gender** | Female | 985(47.2) | 369(37.5) | 409(41.5) | 154(15.6) | 53(5.4) | 0.256 |
| | Male | 1100(52.8) | 459(41.7) | 429(39.0) | 160(14.5) | 52(4.7) | |
| **Intact** | No | 1085(52.0) | 285(26.3) | 512(47.2) | 213(19.6) | 75(6.9) | 0.000 |
| | Yes | 1000(48.0) | 543(54.3) | 326(32.6) | 101(10.1) | 30(3.0) | |
| **Breed** | No Labrador | 2058(94.3) | 818(39.7) | 833(40.5) | 303(14.7) | 104(5.1) | 0.594 |
| | Labrador | 125(5.7) | 46(36.8) | 49(39.2) | 24(19.2) | 6(4.8) | |
| **Survey** | Online | 2111(96.7) | 842(39.9) | 866(41.0) | 306(14.5) | 97(4.6) | 0.000 |
| | Face to face | 72(3.3) | 22(30.6) | 16(22.2) | 21(29.2) | 13(18.1) | |

| Variables | Categories | Total 2183 | Gender Female N=985 (47.2%) | Male N=1100 (52.8%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| **Overweight** | No | 1921(92.2) | 899(46.8) | 1022(53.2) | 0.165 |
| | Yes | 162 (7.8) | 85(52.5) | 77(47.5) | |
| **Parenting style** | Permissive | 301(14.9) | 121(40.2) | 180(59.8) | 0.052 |
| | Authoritative | 120(5.9) | 57(47.5) | 63(52.5) | |
| | Authoritarian | 1598(79.1) | 764(47.8) | 834(52.2) | |
| **Age** | Young | 828(39.6) | 369(44.6) | 459(55.4) | 0.256 |
| | Middle-aged | 838(40.4) | 409(48.8) | 429(51.2) | |
| | Senior | 314(15.0) | 154(49.0) | 52(49.5) | |
| | Old | 105(5.0) | 53(50.5) | 160(51.0) | |
| **Intact** | No | 1085(52.0) | 613(56.5) | 472(43.5) | 0.000 |
| | Yes | 1000(48.0) | 372(37.2) | 628(62.8) | |
| **Breed** | No Labrador | 1964(94.2) | 916(46.6) | 1048(53.4) | 0.026 |
| | Labrador | 121(5.8) | 69(95.3) | 52(43.0) | |
| **Survey** | Online survey | 2013(96.7) | 950(47.2) | 1063(52.8) | 0.813 |
| | Face to face | 72(3.3) | 35(48.6) | 37(51.4) | |

| Variables | Categories | Total 2085 | Intact No N=1085 (52.0%) | Yes N=1000 (48.0%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| **Overweight** | No | 1921(92.2) | 972(50.6) | 949(49.4) | 0.000 |
| | Yes | 162 (7.7) | 111(68.5) | 51(31.5) | |
| **Parenting style** | Permissive | 301 (14.9) | 138(45.8) | 163(54.2) | 0.015 |
| | Authoritative | 120 (5.9) | 73(60.8) | 47(39.2) | |
| | Authoritarian | 1598(79.1) | 838(52.4) | 760(47.6) | |
| **Age** | Young | 828(39.7) | 285(34.4) | 543(65.6) | 0.000 |
| | Middle-aged | 838(40.2) | 512(61.1) | 326(38.9) | |
| | Senior | 314(15.1) | 213(67.8) | 101(32.3) | |
| | Old | 105(5.0) | 75(71.4) | 30(28.6) | |
| **Gender of the dog** | Female | 985(47.2) | 613(62.2) | 372(37.8) | 0.000 |
| | Male | 1100(52.8) | 472(42.9) | 628(57.1) | |
| **Breed** | No Labrador | 1964(94.2) | 1021(52.0) | 943(48.0) | 0.846 |
| | Labrador | 121(5.8) | 64(52.9) | 57(47.1) | |
| **Survey** | Online survey | 2013(96.5) | 1037(51.5) | 976(48.5) | 0.011 |
| | Face to face | 72(3.5) | 48(66.7) | 24(33.3) | |

| Variables | Categories | Total 2183 | Breed No Labrador N=2058 (94.3%) | Labrador N=125 (5.7%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| **Overweight** | No | 2010(92.2) | 1911(95.1) | 99(4.9) | 0.000 |
| | Yes | 171(7.8) | 145(84.8) | 26(15.2) | |
| **Parenting style** | Permissive | 316(14.9) | 308(97.5) | 8(2.5) | 0.006 |
| | Authoratitive | 122(5.8) | 110(90.2) | 12(9.8) | |
| | Authoritarian | 1676(79.3) | 1574 (93.9) | 102(6.1) | |
| **Age** | Young | 864(39.6) | 818(94.7) | 46(5.3) | 0.594 |
| | Middle-aged | 882(40.4) | 833(94.4) | 49(5.6) | |
| | Senior | 327(15.0) | 303(92.7) | 24(7.3) | |
| | Old | 110(5.0) | 104(94.5) | 6(5.5) | |
| **Gender of the dog** | Female | 985(47.2) | 916(93.0) | 69(7.0) | 0.026 |
| | Male | 1100(52.8) | 1048(95.3) | 52(4.7) | |
| **Intact** | No | 1085(52.0) | 1021(94.1) | 64(5.9) | 0.846 |
| | Yes | 1000(48.0) | 943(94.3) | 57(5.7) | |
| **Survey** | Online survey | 2111(96.7) | 1996(94.6) | 115(5.4) | 0.002 |
| | Face to face | 72(3.3) | 62(86.1) | 10(13.9) | |

| Variables | Categories | Total 2183 | Survey Online survey N=2111 (96.7%) | Face to face N=72 (3.3%) | P-value |
|---|---|---|---|---|---|
| | | N (%) | N (%) | N (%) | |
| Overweight | No | 2010(92.2) | 1973(98.2) | 37(1.8) | 0.000 |
| | Yes | 171(7.8) | 136(79.5) | 35(20.5) | |
| Parenting style | Permissive | 316(14.9) | 302(95.6) | 14(4.4) | 0.000 |
| | Authoratitive | 122(5.8) | 88(72.1) | 34(27.9) | |
| | Authoritarian | 1676(79.3) | 1652(98.6) | 24(1.4) | |
| Age | Young | 864(39.6) | 842(97.5) | 22(2.5) | 0.000 |
| | Middle-aged | 882(40.4) | 866(98.2) | 16(1.8) | |
| | Senior | 327(15.0) | 306(93.6) | 21(6.4) | |
| | Old | 110(5.0) | 97(88.2) | 13(11.8) | |
| Gender of the dog | Female | 985(47.2) | 950(96.4) | 35(3.6) | 0.813 |
| | Male | 1100(52.8) | 1063(96.6) | 37(3.4) | |
| Intact | No | 1085(52.0) | 1037(95.6) | 48(4.4) | 0.011 |
| | Yes | 1000(48.0) | 976(97.6) | 24(2.4) | |
| Breed | No Labrador | 2058(94.3) | 1996(97.0) | 62(3.0) | 0.002 |
| | Labrador | 125(5.7) | 115(92.0) | 10(8.0) | |