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Investigating Media Influence on Canine Breed Popularity and Increasing Prevalence of Genetic Linked Disorders

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Certificate of Approval

Investigating Media Influence on Canine Breed Popularity and
Increasing Prevalence of Genetic Linked Disorders

Callie Anderson

May/2021

Approved to fulfill the
requirements of HON 437

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Approved to fulfill the Honors
Thesis requirement of the
Murray State Honors Diploma

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Investigating Media Influence on Canine Breed Popularity and
Increasing Prevalence of Genetic Linked Disorders

Submitted in fulfillment of the requirements for
the Murray State University Honor Diploma

Callie P. Anderson

May/2021

Abstract:

This study is focused on influence of social media on dog breed popularity, and if an increase in popularity leads to an increase in the prevalence of genetic-linked disorders observed in specified breeds in a clinical setting. This study was conducted by comparing an in-depth analysis of past research investigating the influence of popular culture on the trends of dog breed popularity as it relates to trends in media and fashion, with the results of a survey of clinical observations by veterinarians practicing in the area surrounding Murray, Kentucky. The results of the literary analysis revealed that humans are greatly influenced by those around them and their social context; and the introduction of social media has led to a dramatic expansion of individuals' social framework. The results from the survey suggest that Poodle Mix(s) are the breed that has been observed in a clinical setting most often during 2016-2021, as well as the breed with the greatest increase in popularity during the same time duration. The survey also provides substantial data showing that social media has a great influence over a prospective owner's breed selection process, and it is the responsibility of both the consumer and veterinary professionals to ensure factual information is taken into greater consideration over social influence when it comes to the breed selection process.

Table of Contents:

Figures/Tables:

1. Introduction:

In 2004, Myspace became the first ever social media site to reach one million monthly active users. This was the beginning of the social media age and what came to be known as influencer culture. When pondering the concept of social media influence, the initial thoughts may be of street fashion, diet trends, or even video challenges. But has social media developed the potential to influence the popularity of consumer decisions beyond clothing brands and coffee drinks? Can this same concept be applied to the trope of "man's best friend" as well? Throughout the growth of human society and cultural advancement, the logic behind owning companion animals such as a dog, has shifted from functional intention to a fashion statement, (Ghirlanda et al., 2013). With the rise of an industrialized society, the need for guard dogs and hunters slowly declined, and the reasoning for selection of dog breeds began to shift. According to the American Kennel Club (AKC), consumer interest of purebred dogs began to rise in the United States following World War II. Furthermore, between the mid-1940's to the early 1970's there was a 20-fold increase in the number of puppy registrations to the AKC, (Herzog, 2006). It is believed that a substantial factor behind this increase is social influence, as it shifted from practicality to fashion. At its center, social influence is the concept of when individuals are faced with choice, and their decision tends to favor that of which reflects their social environment. Humans have a desire to "fit in", so individuals tend to mimic the people around them. Particularly imitating individuals within the same age range, (Ghirlanda et al., 2013, p.5). By this definition, it can be concluded that dog breed selection is not much different than the selection of music or clothing. The presence of social media allows for an even greater access to such information and an expansion of an individual's social context. Where an individual's social environment may have once just included those who physically interact with daily, it has now

been expanded to include everyone who they may "follow" or "subscribe to". No matter where in the world people are geographically, social influence has the potential to reach a global scale. Yet, just as there are advantages to popularity and a large social framework, there are negative consequences as well.

If pet selection is so heavily persuaded by social influence, then important factors such as health or behavior inclinations become less influential in the final decision. It is well known in the scientific community that certain breeds are more susceptible to genetic disorders. Therefore, an increase in that breed's popularity has the potential to expedite the prevalence of the genetic disorder being treated/reported in a clinical setting. Furthermore, this predominance in genetic-linked disorders has the potential to elicit permanent effects on the breed in the future. When selecting a puppy based exclusively on unconscious social contagions, the result may be an insufficient match between owner and pet, in turn, this could have a negative effect on the overall physical and mental health of both the owner and the animal alike. (Herzog, 2006, p.394).

Throughout this study, I will be analyzing previous studies demonstrating the influence of popular media on dog breed selection. The focus of this study will be on evidence of influence of social context on consumer choice; with considerations towards the beginning of the influence of popular media, such as the film industry. As well as analyzing the trends of social culture before, during, and after the introduction of social media. In order to have a more recent analysis of media influence since the rise of social media and Influencer culture, I will be conducting a survey of Small Animal Veterinary Clinics in the area surrounding Murray, Ky. This will investigate if practicing veterinarians have observed any increasing trends in popularity of any particular dog breeds over the past decade, and if this popularity has also correlated with a greater prevalence of genetic-linked disorders in popular breeds.

1. Background:

To have a complete understanding of how the media influences dog breed popularity, one must first understand the process of breed selection, and how social context influences this process. The main factors that prospective owners tend to consider are, physical appearance, behavior, overall health, and financial responsibility, (Holland,2019). Of these four main factors, the one that seemingly has the heaviest influence is physical appearance and characteristics. In fact, many studies have reported that breed appearance may be of greater importance to some owners than the breed's overall health and longevity, (Herzog, 2003). In their study of American dog owners in 2013, Ghirlanda, Acerbi, Herzog, and Serpell, determined that overall health and behavior did not have that much of an influence on breed selection. Congruently, it was revealed that breeds with more inherited disorders and behavioral issues tended to be the most popular breeds. A 2015 study looks further into this concept and suggests that dogs with "human" or "infantile" qualities were the most chosen by prospective owners, (Hecht, Horowitz, 2015). For example, a Golden Retriever that "smiles" or a corgi mix that is advertised to "stay a puppy forever". This selection style is defined as anthropomorphic selection, or 'the selection in favor of physical and behavioral traits that facilitate the attribution of human mental states to nonhumans' (Serpell, 2002). The trend of valuing human-like characteristics and "cuteness" is most observed in brachycephalic breeds (i.e., short-muzzled). Studies have shown that physical attributes, such as a short muzzle and large ears of a French Bulldog, were of greater influence on decision to purchase for owners of brachycephalic breeds, than owners of mesocephalic breeds (i.e., medium-muzzled), (Holland, 2019). In addition, it was observed that owners who favor brachycephalic breeds were commonly younger in age and buying without prior dog

ownership, (Holland, 2019, p. 6). This focus on physical appearance is the perfect factor to connect how dog breed selection is as much of a fashion trend as any other aspect of popular culture.

Fashion and fads can be defined as 'intuitively cultural traits whose popularity undergoes striking fluctuations ...' (Ghirlanda et al., 2014). Herzog analyzed several of these trends of dog breed popularity in his 2006 study. One breed he investigated was the Standard Poodle. The Poodle has remained one of the most popular breeds in the history of the AKC. In 1950, Poodles were ranked 16th among other recognized breeds, with around 3,100 registrations. Then around the 1960's Poodle registrations sky-rocketed, leading them to become the most popular dog in the United States. In 1969, the official number of registered Poodles was approximately 274,154. (Herzog, 2006, p. 389). Even as the number of registrations began to fall over the next few decades, Herzog found in 2003 that poodles still ranked in the top ten most popular breeds. The Poodle is a prime example of dog breed popularity related to fashion fads.

One of the most recognizable fashion staples from the 1950's was the Poodle Skirt. It is suspected that the rise of popularity of the Standard Poodle breed sparked the creation and desire for the famous poodle skirt, (Herzog, 2006). In return, much like a positive feedback loop, the new popularity of the skirt amplified the public's interest in poodles even more. This correlation between the poodle breed and poodle skirt is a strong contender to be a cause for the immense boom of Poodle registrations over the next couple of decades. If something as simple as a skirt can have such an impact on dog breed popularity, it can be hypothesized that popular media could have just as much as, if not more, of an influence on breed popularity trends. One such form of popular media that has been analyzed for its potent influence, is the film industry.

Arguably the most famous film featuring a dog as the main character(s) is Disney's *101 Dalmatians*. This film and the large boom of Dalmatian registrations following its release has been theorized and studied numerous times since its release. When the film was re-released in 1985, the number of Dalmatian registrations to the AKC increased drastically from 8,170 to 42,816 over the course of eight years, (Herzog,2006). This trend reached its peak in 1993, almost 10 years after the release of the film. The impact of films on dog breed popularity in the US have consistently shown to have a persevering influence, sometimes even for a decade or longer, (Ghirlanda et al., 2014). In their 2014 study of film media influence of choice related to dog breed selection, Ghirlanda, Acerbi, and Herzog were able to identify the top ten movies between 1940-2005, that had an impact on their featured breed popularity. Among these top ten movies was *Snow Dogs (*Walt Disney, 2002) which featured both a Siberian Husky and a Border Collie as the main characters. In the two years following the film's initial release, a 40% increase was seen in both breeds. Another notable film is *The Shaggy Dog (*Walt Disney, 1959), rivaling *101 Dalmatians* for the top spot with a 60% increase of Old English Sheep dog registrations over the course of ten years.

As discussed previously, when relating breed selection and popularity to physical appearance, the impact of popularity related to the film industry is also suspected to have a negative impact on breed health. Continuing with the primary focus of *101 Dalmatians,* it has often been suspected that the rise of popularity in the Dalmatian breed after the film, led to the increase of congenital deafness observed in the breed. The deafness disorder is linked to the "lethal white gene" a coat characteristic and lack of pigmentation which causes a lower level of mature melanocytes in the inner ear. Nearly 30% of Dalmatians are born either unilaterally, or bilaterally deaf, (Berbezier, 2011). Though this disorder is linked to their unique coat markings,

it can be easily hypothesized that the increase in popularity following the film release, also led to an increase in irresponsible for desired phenotypes breeding practices, in turn increasing the prevalence of deafness observed in the Dalmatian breed. Another important factor of the impact of the *101 Dalmatians,* is the company that produced the film, Walt Disney Studios.

The Ghirlanda, Acerbi, and Herzog 2014 study showed that some of the topmost influential movies on dog breeds were, *Snow Dogs, The Incredible Journey, 101 Dalmatians, and The Shaggy Dog;* all of which were created by Walt Disney Studios. It is well known that the influence that Disney has on popular culture is very strong and pervasive. Disney has been creating and influencing cultural trends for decades, and evidence indicates one of these fashion trends is undeniably dog breed selection. After all, it can easily be understood how someone who may be interested in purchasing a new pet, could easily be swayed into buying a King Charles Spaniel after watching *Lady and the Tramp*, or even a Golden Retriever after hearing "Dough" from Pixar's 2009 film *Up* say, "I love you". If a media giant such as Disney had such a strong hold over a prospective owners' selection in the 50's through 90's, how much stronger is that influence now during the Social Media Age. Likewise, what about the explosion of new media companies that have developed since the introduction of social media? Media Platforms like Twitter, Instagram, YouTube, and Facebook are places where companies like Disney can reach an even larger global audience than ever before. Furthermore, the individual creators with no association to large scale media production companies, can also gain large followings and influence not only those around them, but those who see them only through a screen. The rise of the Social Media Age developed and is continuing to develop at an unprecedented exponential rate. Through this study I will be analyzing if this rapid rise of popular media consumption has also led to a dramatic increase in dog breed popularity, even more so than what was previously

reported in studies. As well as further investigating the link to breed popularity, and genetic-linked disorders.

2. Methodology:

This study consisted of two main components. First, a literary analysis of past research projects in this area, to get a foundational understanding of how popular media influences individual choice and how this influence could be related to the popularity trends of specific dog breeds. I found published research through scholarly journals using search engines such as EBSO Host and Google Scholar. During my search, I found that most of the research pertaining to this topic, was conducted by the same principal researchers. I was then able to go through their individual and group research studies to find the ones directly related to media influence and dog breed popularity. Once I had found approximately 12 articles, I thoroughly read and annotated them. This helped me to gain an overall better understanding of the topic and narrow down specific data that backed up my overall hypothesis. Analyzing these past research studies also helped me to begin formatting the second component of my study.

To have linear data showing the influence of the media industry before, and after the introduction of social media, I decided to create a survey to be sent to veterinarians practicing in and around the Murray, Ky area. Since this is an online survey, and my subjects are human, I had to first get my IRB (Institutional Review Board) Certification. This training allowed me to have the skills needed to conduct research safely and ethically on human subjects. I found the training program through Murray State University's website and was able to complete it within a couple of days. After completing the certification training, I also was required to submit a thorough application to the IRB representative for Murray State University. I was also able to find the application and detailed instructions.

The Application required a complete copy of the survey questions, recruitment email, and consent form. For my survey questions, I began with basic information such as how long the subject had been practicing. I then created 8 short answer questions that related to the veterinarians' experience and observations relating to dog breed popularity, and if they noticed any new trends of genetic-linked disorders in any specific breeds. I made sure that these questions could have simple answers and asked for a brief explanation on a couple of the questions, to gather more information to ensure a detailed analysis of the results. A recruitment email was administered to clinics asking if they would be willing to participate. I included a brief description of the goals of my study, as well as a quick description of the survey format. I also attached the consent form to the recruitment email, so potential participants could make an informed decision before agreeing to take part in my study. The instructions provided by Murray State contained a sample form that was easy to follow and adjust to ensure that it related to my study. During the drafting of the consent form, I also made sure to narrow down the criteria for participation in this study. The criteria to participate was not extensive and allowed most anyone with a DVM license to participate. To ensure the data had potential to reflect change over a linear time, I asked that any participating Veterinarians had practiced for at least 5 years in the small animal medicine field. This ensured that participants had time to observe changes in popularity and genetic disorder trends as these trends tend to fluctuate over the course of several years.

Once my IRB application had been submitted, I began creating the survey through an online survey website. I chose the website *Qualtrics.com*, because it was accessible, easy to navigate and is programmed with AI analysis technology, to make result analysis easier to understand and present. Qualitrics.com is also available on a mobile device, making it more

accessible to participants. After I had finished and published my survey through *Qualtrics*, I

began creating a list of clinics that I would send the recruitment email too. I found it easiest to

accomplish this task by going into google maps and setting the area as Murray, Kentucky, then

searching for clinics within a 1hour radius. After I created a general list from what I could find

on Google Maps, I began collecting the contact information for each of the clinics, through their

respective websites and Facebook pages. I created a Contact List of 15 clinics that I would send

the recruitment email out to. Each contact contained the clinic name, address, email address, and

phone number.

      After compiling a Contact List, I emailed all 15 clinics a copy of the recruitment email

and attached the Informed Consent Form. I gave the clinics a week to read over the email and the

consent form and reply if they would like to participate. After I received a reply, I sent them the

link to the survey. If I did not receive a reply from a clinic within a week, I called them to ensure

that they were aware of the study. I gave the veterinarians at each clinic 2 weeks to complete the

survey before I began the analysis stage of my study.

      Once I received an adequate number of responses to my survey, I began the data analysis

by first focusing on the data related to dog breed popularity. I did this by first compiling a list of

all the dog breeds that the veterinarians had listed as the most commonly treated/seen in a

clinical setting within the past 5 years (2016-2021). After I compiled a general list of breeds, I

listed the number of "votes" each breed received. This allowed me to see what breeds had been

mentioned by multiple veterinarians. I then compiled a chart for the data based upon percentages,

using the equation:

      (Number of votes received per breed/total number of votes) x 100 = % popularity

In addition to asking the veterinarians to list the top 5 dog breeds they have seen the most often in between 2016-2021, I also asked them to choose which of those breeds they believed had the greatest increase in popularity during the same time. I then used the same equation to determine which breed was deemed to have the greatest increase.

The next section of my data focused on the prevalence of genetic disorders. I analyzed this data in a similar way as the breed popularity section. I compiled a list of breeds reported to have had an increase in popularity over the past 5 years and listed any genetic-linked disorders that veterinarians reported to have observed an increase of within the same period. After doing this, I was able to compare these results to the results of the popularity section, to see if there was any correlation between breed popularity and the listed genetic disorders.

The final section of my data was focused on the impacts of social media on dog breed selection and popularity. The questions in this section asked the veterinarians if they believed that social media had an impact on dog breed selection. I also asked in my survey who the veterinarians felt were responsible for the education of the public about the health criteria related to dog breed selection; the veterinarian/staff, breeders, consumers, and/or those who controlled media platforms. I analyzed this data by tallying the number of votes for each group, then created a graph to have an easy visual comparison of which group veterinarians felt carried the most responsibility.

After I compiled all the data from the breed popularity, genetic disorders, and social media influence sections of my survey, I was able to compare the results to look for related trends. I began by analyzing if the breed(s) that had been seen the most often, were also the ones named to have had the greatest increase over the past 5 years. I then took the breeds with related trends between those two sections and compared them to the data for genetic disorders to see if

this increase in popularity, and lead to an increase in any diseases. The section related to social media influence was less focused on specific breeds, but more provided further information on how much of an impact social media and popular culture has on breed selection as a whole.

3. Results:

Popularity Trends:

When veterinarians were asked to list the top 5 breeds, they saw most often during 2016-2021, the following 10 breeds were listed: Labrador Retriever, Dachshund, Poodle, Chihuahua, Rat Terrier, Shih Tzu, Yorkshire Terrier, German Shepherd, Poodle Mix and English Bulldog. Out of these 10 breeds, the ones that were listed the most often were Labrador Retriever (22%), Poodle (11%), and Poodle Mix (27%). The breed that veterinarians reported to have seen the most in the past 5 years, is Poodle Mixes, such as goldendoodles (Golden Retriever & Poodle) and Bernedoodle (Bernese Mountain Dog & Poodle). Though poodle crosses are not technically a recognized breed by the American Kennel Club (AKC) they were treated as an individual breed in this study because of their continuing increase in popularity. Figure 1.0 provides a visual of the 10 reported breeds in correlation to how often they were listed.
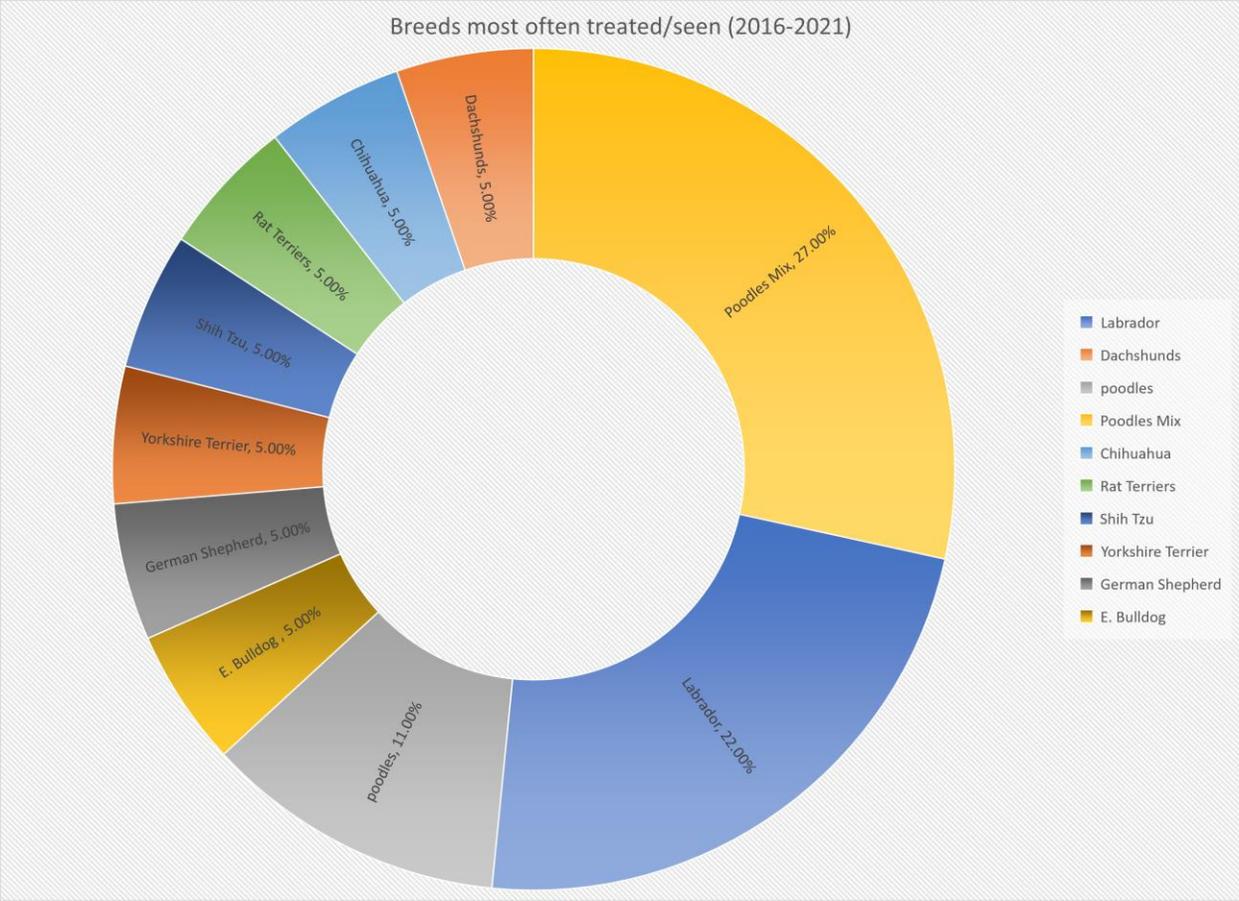
Figure 1.0: *Breeds most often treated/seen in a clinical setting during the 5-year duration (2016-2021)*.

In addition to the results of the breeds most often seen in clinical settings, veterinarians also reported the breed that was observed to have the greatest increase in popularity during the same time. The breeds that were reported to have the highest increase in popularity were Labrador Retriever, Poodle, Poodle Mix, and German Shepherd. Similarly, to the previous data, the Poodle Mix was the most reported.
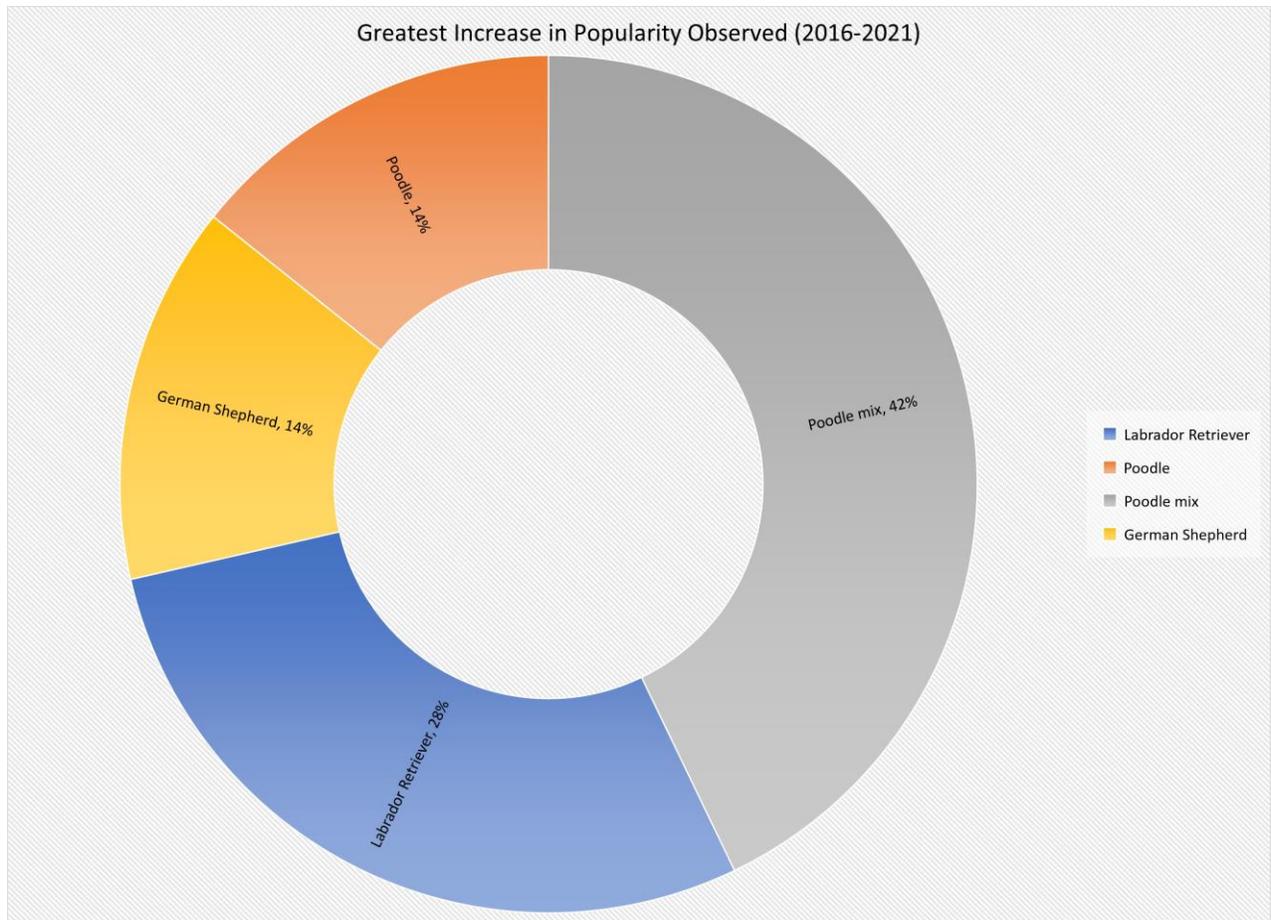
Figure 2.0: *Breeds with greatest increase in popularity observed from a clinical setting with in a 5-year duration (2016-2021).*

Genetic Disorders:

To investigate if an increase in popularity also resulted in an increase in genetic-linked disorders in specific breeds, veterinarians were also asked if they had observed an increase in any genetic disorders in the breeds that they had listed in the previous section. Figure 3.0 shows the breeds and disorders that were reported.

Breed	Genetic-linked Disorder
Golden Retriever	Hemangiosarcoma
(Golden) Poodle Mix	Otitis externa
German Shepard	Hemorrhagic Gastroenteritis

Table 1: Genetic-linked disorders related to reported breeds with population increase.

The results of this section were somewhat inconclusive. Only a couple of veterinarians that participated in the study, reported that they had observed an increase in genetic disorders. Over half of the survey responses reported that they had not seen an increase in any genetic disorders during the past 5 years. When asked to explain if they believe the increase in breed popularity correlates with increase in genetic disorders, the one veterinarian that reported an increase in popularity of poodle breeds stated they believed the mixing of two or more breeds potentially lowered the chance of genetic-linked disorders. This point will be discussed in more detail later. When asked the same question, those who did list genetic disease said that the increase in popularity could have the potential to lead to an increase in genetic disorders, but the data was not completely conclusive.

Social Media Influence Observed from a Clinical Setting:

As could be expected, when asked if they had observed an increase in social media presence during their time practicing small animal medicine, 100% of participating veterinarians answered "yes". With this baseline, participants were then asked if they believed social

media/popular culture had an impact on the popularity of dog breeds, and if they could provide a brief explanation. All veterinarians stated that they did believe that social media had an influence on breed popularity and continued with a variety of explanations and examples. Over 60% of the responses gave examples of clients bringing in new puppies, saying they were inspired to purchase that specific breed by a post they had seen on Instagram and/or Facebook. One response stated, "It seems that when one person starts posting pics of their adorable 'Bernedoodle', now I have 3 clients with Bernedoodles." To continue this thought process, participants were then asked if they believed/had observed social media/popular culture having an influence on a consumer's breed selection. Like the preceding question, all responses suggested that social media did have an impact on a potential owner's decision-making process. One veterinarian wrote in their response, "many owners may only have a familiarity with the breeds they see on social media, and this definitely drives the selection process."

To reach further into this topic of social media influence, I wanted to analyze the concept of "responsibility" when it came to the breed selection process. I asked the participating veterinarians who they believed holds the responsibility of education when it comes to dog breed health and proper care; Veterinary professionals, popular media platforms, breeders, or breed owners/consumers. The responses for this section were varying as well. Both veterinary professionals and owners/consumers received 30% of the votes, with media platforms and breeders tying with 20% of the votes.
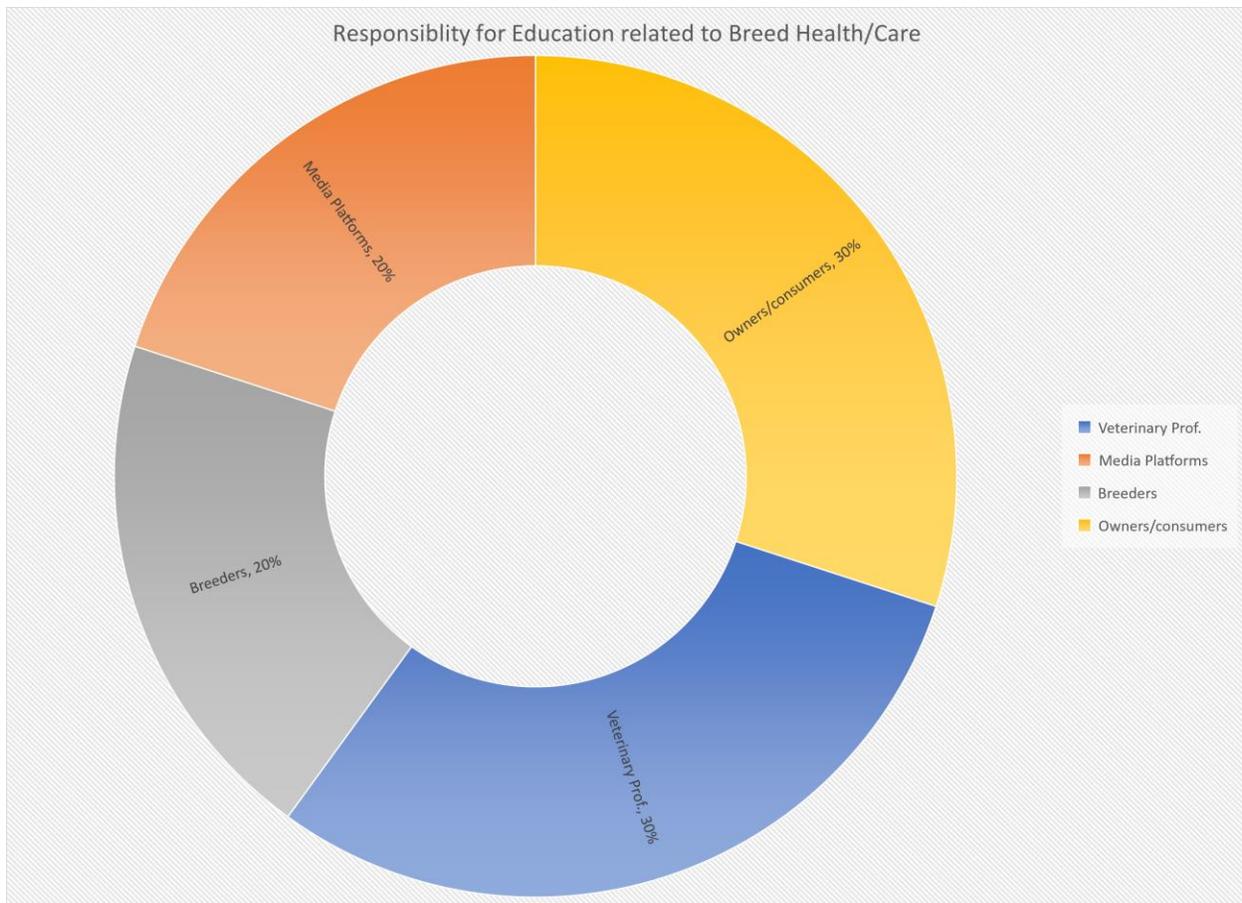
Figure 3.0: who holds the responsibility for education related to breed health and proper care during the breed selection process, according to veterinary professionals.

Furthermore, veterinarians were asked to provide a brief explanation of the reasoning behind their choice. Those that voted for veterinary professionals gave reasoning stating that veterinarians and their staff should encourage clients to search the correct sites and not focus on the "blogs" and "opinions" of influencers on social media platforms, since a majority of those influencers are not professionals in the animal field. Those that chose the final consumer, gave explanations such as, it is the responsibility of the consumer to seek out accurate information, and consult their veterinarian before making any final decisions. One response stated, "There is a wealth of information on the internet (some good, some bad) and I have many clients consult with me regarding the information they have seen on the internet regarding certain breeds."

Those that voted for media platforms and breeders gave less in-depth explanations, usually pertaining more to the statement that there are different people who hold different responsibilities throughout the breed selection process.

4. Discussion

Breed Popularity Related to Social Media Trends:

The data collected from the literary analysis and survey portion of this study does indeed indicate that popularity of dog breeds continues to fluctuate and has the potential to be heavily influenced by social media and popular culture. To begin, the data provided from the survey created a list of the most popular breeds observed in a clinical setting in the area surrounding Murray, Ky during the duration of 2016-2021, the data allowed for a comparison between this list of breeds, and the results of the breed veterinarians believed to have had a greatest increase during the same time. The results from the survey revealed that the Poodle mix was the most seen in a clinical setting, shown in figure 1. In correlation with this, the poodle mixes also received the most nominations for being the breed to have the greatest increase over time, shown in figure 2. Though Poodle mixes are not considered a pure breed by the AKC, they fall under the category of what is now being called "designer breeds". This high popularity of a "designer breeds" is a prime example of the influence of social media culture on owner breed selection. A designer breed is the result of a controlled cross between two registered pure-bred dogs (ex. Golden Retriever and Poodle), essentially a hybrid or mixed breed. The intention behind mixing these breeds is to optimize the best qualities from each parent breed. The reason these breeds are called "designer" and not just simply a "mutt" is because these breeds are often favored by celebrities and/or those that have a large influence on social media scene (Bell, 2012). The

17

Labradoodle was the beginning of the designer dog movement. The creator Wally Conron created the breed in 1989 with the intention of combining the trainable personality of the Labrador Retriever with the hypoallergenic coat of the Poodle. Though this movement began with a defined focus, the presence of social media allowed for world-wide exposure of the practice of cross breeding and the potential profits that could be made. Breeds began to be crossed more for their interesting looks, and less focused on the intention of combining the positive characteristics of the two breeds.

This popularity of a designer breed can be analyzed alongside the conclusions of the Holland, 2019 study, which revealed that consumers during the breed selection process are much more likely to choose a specific breed based upon physical appearance. This study used data related to the rising popularity of the French bulldog breed, because of their physical attributes such as big ears and short muzzles. Using similar logic when looking into the rising popularity of poodle mixes, often these breeds are chosen for their curly coat. What began with the labradoodle, has now spread to new designer breeds such as Goldendoodles, Bernedoodles, Yorkipoos, and even Puggles. The popularity of "doodle" breeds really began to take off in the late 90's and continues to increase today. Social media has allowed photos and videos of these nontypical crosses to reach the screens of millions of viewers. This large-scale exposure has led to another boom in popularity over the last decade and can be hypothesized to contribute to the shift of the purpose behind breeding of poodle mixes to what could be seen as purely cosmetic; focusing more on "cuteness factor" of a curly coat. This dramatic rise in popularity of designer breeds such as poodle mixes, can directly relate to the concept of social influence. Individuals tend to mimic those around them due to humans' innate desire to fit in and be like other individuals who they may see as role models (Ghirlanda et al., 2013). Celebrities and influencers

such as Jennifer Aniston, Tiger Woods, and Harry Styles, have all used various social media platforms to showcase their compassion and approval of the poodle mix. Each of these celebrities have well over 30 million "followers" through Instagram alone; and it can be easily concluded with such a large social framework, their choice of dog breed could have easily influenced the selection of their followers. Furthermore, social media platforms such as Facebook, provide users with the chance to join pages or "groups" centered around an infinite number of topics. When searching "doodles", over two-thousand groups can be found and joined, all centered around various poodle mix breeds. This easy access to information from other poodle mix owners allows for an even greater expansion of an individual's social environment, providing an even greater persuasion during the breed selection process. As the movement of designer breeds such as the "doodle" continues, further research could be conducted to investigate the full spectrum of influence associated with designer breeds and their growing presence in the U.S.

The second most reported breed for both the most often treated/seen in a clinical setting and greatest increase, was the Labrador Retriever. This data is justifiable in the fact that the Labrador Retriever has been ranked the number one most popular breed in the United States by the AKC since 1991. The Labrador Retriever hold on the number one title for 30 years is a good example of a positive correlation between breed popularity and popular social trends. Like the 50's poodle skirt being inspired by the breed's popularity, and thus leading to an even greater increase in popularity (Herzog, 2006), the Labrador Retriever has been stable in popular culture. The AKC registrations show an increase of Labrador Retrievers at a rate of 425 dogs/year during the late 1950's, (Ghirlanda et al., 2014). This popularity trend can be theorized to have inspired the choice by Walt Disney Studios to have a Labrador Retriever as one of the main protagonists

of the 1963 film *An Incredible Journey.* Like that of other films such as *101 Dalmatians*, during

the 10 years following the film's release the rate of registration increased drastically to 2223

dogs/year and continued to increase into the early 1990's (Ghirlanda et al., 2014).

The Labrador's claim and hold over the top spot of the AKC's registry can be believed to

have influenced yet another movie revolving around the breed, the 2008 film *Marley & Me* (20th

Century Studios). Though there is currently no research investigating the influence of this film, if

it follows the same pattern as the previously mention films, it can easily be theorized that the

release *of Marley & Me* created another spike in popularity over the next 10 years, or at least can

be a contributing factor to the Labrador Retriever's ability to maintain the number one title for

another 12 years following the film's release. Furthermore, the film was released around the

beginning of the social media age, allowing for greater advertisement of the film, and the breed

itself. Social Media platforms such as Myspace, Facebook, and Twitter were just hitting their

peak. Facebook had surpassed MySpace as the most visited sight in 2008 with approximately

100 million users; and Twitter had increased its usage from 20,000 "tweets"/day, to 60,000

(Tankovska, 2021). Like with Poodle Mix breeds, this rise in social media culture gave the

Labrador Retriever breed greater publicity and thus having a greater chance of influencing the

individual consumer.

Prevalence of Genetic-Linked Disorders Compared to Breed Popularity:

When investigating the prevalence of genetic-linked disorders in comparison of breed

popularity, the popularity of the Poodle mix can be analyzed along to the 2013 study by

Ghirlanda, Acerbi, Herzog, and Serpell, which investigates the cultural evolution of dog breed

popularity from a functional purpose to a fashionable one. Their study concluded that the

importance of a breed's health and behavior fall secondary to physical appearance during the

selection process. Cross-bred dogs are thought to have the potential to be more genetically healthy than their purebred parents because the crossing of two parent individuals of different breeds can help reduce the chance that the offspring will be homozygous for a specific genetic-linked disease (Beuchat. 2016). Even so, there are many reported cases of hereditary diseases being diagnosed in crossbreed dogs. If a genetic disorder is recognized in both parent breeds, then the offspring is more likely to also display that disorder (Bell, 2012). A 2018 study tested the frequency of 152 genetic disease variants in over 100,000 mixed and purebred dogs. The results found that at least 40.5% of all dogs tested carried at least on of the disease variants in their genome, whether they were crossed or purebred (Donnor, et al., 2018, p. 3). This study analyzed if mixed breeds showed signs of hybrid vigor for recessive disorders, and found that mixed breeds were 1.6 times more likely to carriers of at least one of the tested recessive disease variants (Donnor, et al., 2018, p. 5). In their discussion, researchers said this prevalence of disease variants in mixed breeds may be contributed to the popularity of the breed the disease mutation was originally discovered in, and the tendency of that breed to be seen in the lineage of the studied crossed breed dogs (Donnor, et al., 2018, p. 13).

Relating these results back to this study, a "designer breed" dog has a greater potential to possess a specific disease variant if the one or more of the parent breeds carries that specific variant and is a popular breed. The "doodle" breeds are the perfect example of this, as the Poodle breeds has maintained a large popularity. The previous study found the Miniature Poodle breed possessed variants for at least 3 diseases. One of those being *Osteochondrodysplasia*; an autosomal recessive disease that is characterized by stunted growth and abnormal locomotion (Aiello, 2016, p. 1204). Therefore, a dog a Miniature Poodle with parentage would already have the chance to possess the variant for *Osteochondrodysplasia*. This specific disease is autosomal

recessive, meaning that both parents would have to possess the gene mutation for this disease to be present in the offspring (Aiello, 2016, p. 1204). This does help to lower the prevalence of the disease observed in poodle crosses. However, if a Miniature Poodle carrying the variant was bred to another breed that carries *Osteochondrodysplasia,* then the offspring is guaranteed to exhibit traits of the disease. An example of this is the Shih-Tzu, which is a breed commonly mixed with a poodle to create what has been named the "Shih-Poo". This analysis provides further evidence into the issues with the social media trend of "designer breeds" that focuses more on physical appearance over breed specified health.

In this study, it was reported that a specific disease seen often is *Otitis Externa* in Goldendoodles (Standard Poodle and Golden Retriever mix). This disease causes the ear canal to become inflamed, leading to symptoms such as scratching, head shaking, and discharge (Aiello, 2016, p. 527). Though any breed is susceptible to this disease, certain breeds are more predisposed due to their ear-shape (Aiello, 2016, p. 528). Both the Golden Retriever and the Poodle are predisposed to Otitis Externa. Poodles are known to have excessive hair growth around the pinna (outer ear) and the ear canal. This extra hair can trap moisture inside the canal, leading to the perfect climate for a bacterial and/or yeast infections to thrive. For Golden Retriever's, the shape of the ear is where the issue lies. A dog's ear canal is shaped like an "L", and in Golden Retrievers the angle of the ear canal is sharper than other breeds. This sharper angle makes the ears harder to clean and allows for moisture to get trapped deep within the canal. So as with the poodle, a Golden Retriever's ears are the ideal environment for bacterial and/or yeast infections to take root.

Though they are purebred, the other breeds reported to have been diagnosed with a genetic-linked disorder, Golden Retrievers, can be analyzed for their popularity relating to

disease prevalence in a similar way. Responses to the survey for this study reported Golden

Retrievers to have a high prevalence of *Hemangiosarcoma.* This form of cancer is a highly

malignant tumor that begins in the blood vessels (Aiello, 2016, p. 960). The primary sites for

hemangiosarcoma to form are visceral organs, such as the spleen and liver. A dermal form is also

very common, especially in breeds such as the Golden Retriever that have light hair and/or

nonpigmented skin. (Dobson, 2013). A 2013 study investigating breed pre-deposition to cancers,

analyzed the proportion of cancer-related mortality compared to total breed mortality within a

sampled population, and found that Golden Retrievers had 38.8% cancer-related death. The

results of this study further showed that Goldens comprised 7.16% of the survey population and

had an 8.91% chance of dying of cancer. (Dobson, 2013). Furthermore, hemangiosarcoma has

become a more prevalent problem in Golden Retrievers specifically in North America, with an

estimated life-time risk of 1 in 5 reported by the Golden Retriever Club of America, (Dobson,

2013, p. 9). The researchers in this study suggested that this large risk specifically in Goldens in

the US is related to the large-scale population, with more than 42,000 AKC registrations.

When profiling gene expression of canine hemangiosarcoma, significant differences of

tumors derived from Golden Retrievers, and other breeds have been found. The notable

difference was that the vascular endothelial growth factor (VEGF) receptor was enriched in

tumors taken from Goldens. This enrichment increased the vascular permeability, making the

growth of such tumors that much easier. (Dobson, 2013, p. 10). Since Golden Retrievers carry

the hereditary factor of an enriched VEGF Receptor, an increase in popularity would lead to an

increase in individuals possessing this mutation. Though it is recommended for all breeding

operations to screen their animals for such genetic anomalies, not all breeders choose to follow

this practice. This has potential to create generational lines of offspring possessing this

predisposition to hemangiosarcoma, thus increasing the prevalence of this disease being diagnosed within clinical settings. This illustrates why proper breeding practices and informing consumers about breed specific health concerns should be held to a primary importance within the field canine veterinary medicine.

The results of this study also reported German Shepherds to have a been observed to have a prevalence of Hemorrhagic Gastroenteritis (HGE). This disease is characterized by acute vomiting and hemorrhagic diarrhea (Aiello, 2016, p. 396). HGE is the result of an infection of the *Clostridium perfringes* that line the intestinal tract, with the most serious lesions usually occurring in the large intestine ((Aiello, 2016, p. 397). This result is particularly interesting because this disease is typically reported in small toy breeds. Though large breeds can still be at risk, it is not usually as common. Since the German Shepherd breed does not fall into the typical parameters, these results could be considered an isolated occurrence. To make an accurate conclusion, a larger data pool from a greater geographical area would need to be analyzed to conclude if these particular findings are related to an isolated event, or an overall increase in popularity of the German Shepherd breed.

Overall, this study does show the potential that popularity of dog breeds to have a correlation to genetic-linked disorders. Even though there is substantial results to be analyzed in this study, the geographical area and thus the data pool, was limited to the area surrounding Murray, Kentucky, because of this limitation, further research of a larger data pool will need to be conducted to make a more accurate conclusion.

Social Media's Influence of Owner Education and Overall Breed Selection:

The primary focus of this study is to understand just how much of an influence social media and popular culture has when it comes to dog breed popularity and owners' breed selection and favoritism. This study allowed for greater insight into this culture shift from the perspective of practicing veterinarians. To begin this thought process, veterinarians were asked if they believed that social media/popular culture has impacted the popularity of specific dog breeds. The results for showed a strong belief from all participants - that social media has an influence. This was to be expected, as the influence of social media culture has grown exponentially since it was first established in 2004. As discussed previously, social media widens individuals' social environment and field of influence from just those who they may interact with physically, to people they may never have met other than through the internet. To further the discussion, veterinarians were asked to explain why, or what led them to make this conclusion. Many discussed how social media platforms such as Instagram allow people with a large following to post pictures of their own dog, thus inspiring their "followers" to consider owning a dog of the same breed. A couple of responses specifically mentioned "doodle" breeds. One response said, "with the rise of social media in the past decade, there has been a noticeable increase in 'trendy' breeds such as goldendoodles." Similarly, another veterinarian discussed how they had one client post pictures of their new Berendoodle puppy, and not long after had three other clients purchase the same breed. Though this new exposure has potential to have some positive effects, such as breed advocacy and education, the lack of factual monitoring of social media can also have some negative consequences.

Participating veterinarians discussed negative occurrences such as a new dog owner purchasing a breed that may not adequately fit their lifestyle. To continue the discussion of the

poodle mix, because they were originally bred with the intention of being hypoallergenic, someone who may not have previously had a dog due to allergens, may be interested in purchasing a doodle. Many doodle owners and breeders have stated that these breeds are hypoallergenic, but there has not been much scientific research done to factually prove this statement. Therefore, an unexperienced owner may purchase a dog that has the potential to not only bother their allergies, but some poodle crosses, specifically labradoodles and goldendoodles, tend to exhibit very hyperactive personalities and their curly coat requires a lot more upkeep than their short-coated parents. Continuing this point, one response said that many owners may only have a familiarity with the breeds they see on social media. If a prospective owner has had little physical interaction with the specific breed and does not have a true understanding of the behavior and health specifics of the breed. Then a similar situation as above could occur, where an unexperienced and uneducated owner has a dog that does not fit their lifestyle and they may not have a strong enough understanding of how to properly care for the specific breed. These situations are great examples of why of breed specific health and care are so important.

The overarching theme of this study is the role that social media and influencer culture plays in the expansion of an individual's social environment. With the "internet age" and the continual growth of social media culture, a wealth of information has become available to anyone almost instantaneously. Unfortunately, though, not all this information is accurate. With so much information on the internet, whether it be certified websites, or Facebook posts, education of the public has become so much more important when it comes to not only specified dog breed health, but the world of veterinary medicine as a whole. This dilemma is what inspired the final question of the survey for this study, and truly the overall study itself. The final question

asked participants who they believe holds the responsibility for education when it comes to dog breed health and proper care. They were asked to choose either veterinary professionals, popular media platforms, breeders, or breed owners/consumers. Consumers and veterinary professional tied with 30% of the overall vote. Those who voted for consumers provided explanations generally stating that it is the consumers job to seek out factual information and consult their veterinarian before making a decision. Responses that voted for veterinary professional gave a similar response, but from the standpoint of who overall has a greater education on the topic of canine health. One response said, "you have to encourage clients to web surf the correct sites and not listen to some blogs…when those people are pet owners not professionals".

It can be concluded that these responses and the fact that consumers and veterinary professionals received the same number of votes, that for a truly educated decision to be made, these parties must work together. One response suggested a similar conclusion, stating, "for different stages of the selection process, different classes have a major responsibility". There is an abundance of information available at the tap of a finger, which has been shown to directly correlate with the fact that it is human nature to be unconsciously influenced by social contagions (Herzog, 2006). To combat this, it is important for those in the field of veterinary medicine to provide consumers with factual information concerning the breed(s) they are interested in, and it is equally as important for those consumers to take that information into account before making a final selection. Many veterinarians who participated in this study made remarks about their experience of providing information to clients and advising them during the breed selection process, but clients still frequently choose a breed that is inappropriate for them and their lifestyle. This further shows why studies pertaining to this topic are helpful for

understanding how people are influenced and provides veterinary professionals with knowledge that will aid them in providing their own positive influence on consumers' final decision.

5. Conclusion:

In conclusion, since the beginning of social media in 2004, the continual growth of the Internet age and "Influencer Culture" has vastly changed individuals' social environment and how one is influenced. This change in social influence can be directly observed in the shift of dog breed selection from a functional focus, to a fashionable one. Previous studies have analyzed how an individual's choice of breed can directly be affected by what popular culture exposes them to. Previous studies have investigated the impact of the film industry and the increase of dog breed popularity, concluding that highly popular films lead to an increase in registrations to the American Kennel Club for at least 10 years following the film's release. These studies have also shown a positive correlation between dog breed popularity and popular culture trends, such as the infamous 50's poodle skirt. Furthermore, it was studied how individuals tend to favor and select breeds more for their physical appearance and focus less on the health criteria that each breed may possess. This focus on physical attributes over health, has been proven to lead to an increase of popularity in breeds that have greater health requirements, such as brachycephalic breeds. Congruently, this increase in popularity of breeds, has the potential to increase the prevalence of genetic-linked disease observed in a clinical setting. This study focused on the growth of social media and how this development has potential to affect dog breed popularity, and if this increase in popularity also increased the prevalence of genetic-linked diseases/disorders observed.

A survey sent to veterinarians in the area surrounding Murray, Kentucky produced results suggesting that the Poodle Mix had been seen/treated at clinics the most often in the time span of 2016-2021 (5 years) and had the greatest increase in popularity during the same time. This growth of popularity of Poodle Mix(s) can be concluded to be directly related to the growing trend of "designer breeds". A trend that indeed began in social media culture. This increasing trend of designer breeds provides additional evidence that individuals tend to consider physical appearance when selecting a breed, with greater importance than behavior and health criteria. Following the poodle mix in both categories, is the Labrador Retriever. The Labrador Retriever has maintained a constant popularity since 1991, when it was voted the number one breed in America by the AKC and has maintained that title for 30 years since. The continual popularity of the Labrador Retriever can easily be analyzed as an example of positive correlation between dog breed popularity and popular media trends. Using the example of films such as the *Incredible Journey*, sparking the increase in registrations of Labrador Retriever, and it can be theorized that this rise in popularity could have influenced the selection of the breed to star in the 2005 film *Marley & Me*.

The results from this study also suggested that the increase of the Poodle Mix directly related to the increase of *Otitis Externa* being diagnosed in the breed, because of the breeding for a curly coat, also leads to a nontypical amount of hair in the ear canal, causing infection. The results also stated an increase in *Hemangiosarcoma* observed in the Golden Retriever breed. This cancer is related to breeds with a light coat color, and a low skin pigmentation. It can be concluded this increase in diagnosis, could be due to the high popularity of the Golden Retriever in the United States, and not following the proper breed standards. Thought this study does

suggest that popularity can be a factor of influence in the prevalence of the hereditary diseases, further research of a larger data pool needs to be conducted to make a more accurate conclusion.

To gain more insight into the influence of social media on breed popularity, veterinarians were asked if they believed social media/popular culture and to explain why they believed the way they did. Overwhelmingly participants agreed that social media has a large influence and provided explanations such as clients purchasing a certain breed after seeing posts on social media. As well as observing an increase in designer breeds, like the Poodle Mix.

Finally, this study asked participating veterinarians to choose who they believe is responsible for education when it comes to dog breed selection. The results showed a tie between the consumer themselves and veterinary professionals. These results suggest that both consumers and veterinary professionals need to work cohesively to ensure that the breed selection process is led by information and not to heavily influenced by the large amounts of information that can come from less scholarly sources on social media, such as blogs and Facebook groups. Future studies in the topic of social media influence on dog breed popularity and genetic disorder prevalence would provide an even greater understanding of just how much of an influence that social media has over the consumer's selection process. By having a greater understanding of how social media and popular culture affects breed popularity, those in the veterinary profession can aim to work with clients and those involved in social media platforms to ensure that accurate information is given readily available to consumers. Having this greater understanding and working cohesively with all parties involved in the breed selection process of "man's best friend", would aid veterinary professionals to continue the foundational purpose of the field, to ensure the happiness and longevity of both parties of animal and human relationships.

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