

Is it nutritional? Factors impacting purchase intention of sustainable dog food

A quantitative study

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Master's Thesis

June 2020

ABSTRACT

Since the domestication of dogs, there has been a long history of pet dogs living with human beings. With the increasing dog ownership and growing expenditure on pet dogs, recent years witness great market growth of the pet food industry. As global warming and climate change become increasingly urgent global issues, the burgeoning industry of pet food is put under the spotlight for its environmental impacts. Since the large amount of livestock meat used during pet food production is a great contributor towards climbing greenhouse gas emissions, sustainable pet food with no livestock meat is produced as a response by pet food companies to take their environmental-related corporate social responsibilities. Sustainable dog food products are green innovative products. As they serve as environmental-friendly alternative options that are new to the market, whether they would be accepted and welcomed by the market is unknown. Effective promotion and marketing rely on the understanding of consumer decision making and psychology. Within the context of sustainable dog food products, this study applied a quantitative approach to examine factors that would influence consumer's purchase intention towards sustainable dog food products. A survey was conducted online to collect data from Western European (potential) dog owners ($N=230$). The results of this study show that perceived nutritional value of sustainable dog food directly and positively influenced consumer's purchase intention, but this association could not be enhanced by integrating anthropomorphic tendency as the moderator. Though sustainable dog food contains no livestock meat as ingredients, consumer's environmental concerns had no direct influence on purchase intention. The association between these two variables could not be moderated by perceived nutritional value. Besides, the tendency to attribute supportive humanlike traits on dogs had marginally significant influence on purchase intention. Furthermore, this research also found that consumer's level of loneliness was not associated with their anthropomorphic tendency.

KEYWORDS: *Sustainable dog food, perceived nutritional value, environmental concerns, purchase intention, consumer psychology*

Preface

With the finish of this thesis, my student life is coming to an end. Looking back to my (almost) one year at EUR and in the Netherlands, I would say it is indeed a wise choice to get out of my comfort zone and pursue my master's degree in a foreign country. I gained a lot of new insights from lecturers and my fellow classmates through courses, group discussion and assignments. They helped a lot with my thesis writing as well as my future career.

Months of hard work has been dedicated to this thesis. The process was of course accompanied by stresses. I do appreciate my supervisor dr. A.M. van Prooijen who guided and kept encouraging me through the whole process. When I was unsure with my research, she gave me useful suggestions as well as patient comforts. A lot of thanks are also given to my aunt's family. Their companionship and delicious homecooked meals during the past few months warmly supported me to finish my thesis. I also want to thank the unconditional supports from my parents and my grandparents. They relieved my pressures when I was nervous. Also, I would like to thank Ellis for giving me advices. Chrystel, Fabian and Ziqing lent me an ear and gave me emotional supports. Finally, I would like to thank my respondents and those who helped with questionnaire distribution. My thesis could not be finished without their help. It was indeed a beneficial learning process to write this thesis. Though my master study life is approaching to the end, the exploration just started.

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1. Introduction

1.1. Research topic and research question

Under today's lens, there is a growing trend of pet ownership around the globe. According to a research conducted by GfK (2016), over half (43%) of respondents internationally have at least one pet. In general, dogs (33%) and cats (23%) are the most common companion animals. The trend of growing number of pets goes hand in hand with the prosperity of the commercial pet food industry. Industry leaders, such as Blue Buffalo, have achieved sales growth (Semple, 2019). Data from Statista (2019) shows an anticipated revenue of Central and Western European pet food industry to reach over 15 billion euros in 2020, indicating the great market potential in the region. Besides mass manufactures, internet retailers and private online brands are taking advantages of the development of omni shopping channels (Semple, 2019) to thrive. To drive growth and respond to consumer's needs, various premium commercial pet food products and innovative product formats, such as freeze-dried food, are becoming available (Semple, 2019).

The prosperity and growth in the pet food market come along with criticisms, among which sustainability is a primary issue. Sustainability is a widely used concept. A common definition is to maintain and meet the current needs without compromising needs of future generations (Marshall & Toffel, 2005). In the context of commercial pet food, the topic of sustainability has a main focus on the environmental aspect. Commercial pet food serves as a key nutritional source for pets (Tobie, Péron, & Larose, 2015). In Northern Europe, it accounts for 90% of calorie intakes of pets (Zicker, 2008). Growing pet ownership as well as pet food expenses are accompanied by the trend of demands for higher quality and content of meats (Okin, 2017). The primary and high reliance on animal meats (Wrye, 2012) leads to increasing environmental impacts that could not be underestimated. Environmental paw print of pets takes the form of land usage, greenhouse gas (GHG) emission, and production waste (Broom, 2019). Compared to plants and cereals, meat consumption has higher environmental impacts (Swanson, Carter, Yount, Aretz, & Buff, 2013) due to production processes and wastes. It is calculated that the animal products consumed by cats and dogs contribute to 64

million tons of GHG emission (Okin, 2017). As these negative environmental consequences are increasingly recognized by the public (Fleming, 2018; McMahon, 2017), pet food brands are put under the spotlight of sustainability.

Sustainability is not a new word for companies. It is increasingly being viewed as relevant to companies and their corporate activities. To demonstrate their involvements and contributions to sustainability, some corporations include indicators such as energy consumption and wastes into their corporate sustainable reports (Marshall & Toffel, 2005). While this approach to respond to concerns on environmental issues is relatively passive, being sustainable also suggests the potential opportunities for companies to proactively spot and to exploit. From a corporate perspective, sustainability could refer to opportunity exploitation based on the evaluation of economic, environmental, and social circumstances to generate values for stakeholders (Marshall & Toffel, 2005). As environmental issues are attracting growing attentions, some pet food companies are proactively responding to the situation and attempting to seize opportunities. Facing the issue pertaining environmental impacts of meat consumption by pets, providing alternative products is one of the directions that they have been endeavoring to explore. As dogs have evolved into omnivores that are adaptive to vegan diets with properly formulated nutrients (Knight & Leitsberger, 2016), some dog food options without livestock meats have been introduced into the market, being rather vegan, vegetarian or with insects to replace traditional meat ingredients (Koutsos, McComb, & Finke, 2019).

Green pet food products for dogs are relatively new in the market. With limited knowledge towards to this kind of products and brands, there might be no clear and obvious preference for them among consumers (Pauliuc & Fu, 2018). The marketing of such green product innovations is the process of awareness raising and persuasion. It greatly relies on strategical communication with consumers, suggesting a research direction towards the consumer's psychology and purchase decision making. The understanding of consumers' perceptions of sustainable dog food could facilitate marketing strategy designs to be more effective and fruitful. While pet dogs are the ultimate consumer of dog food products, pet owners are the direct purchasers. Choosing pet food is an easily achievable way to manage

pet's diets and take care of a pet's health. As nutrition is being constructed to be the representation of pet food quality (Wrye, 2012), how consumers perceive the nutritional value of certain products could influence their motivation to consider future purchases. While there are doubts on pet food failing to provide industry recommended nutrients (Gosper, Raubenheimer, Machovsky-Capuska, & Chaves, 2016), meat continues to be used as a concentrated nutrient source in both human diets and pet diets. Therefore, whether sustainable dog food is nutritional balanced could be the most common concern among consumers (Dodd, Cave, Adolphe, Schoveller, & Verbrugghe, 2019) that might influence their purchase intention. Besides, consumer's awareness and concerns toward environmental issues could also be related to their purchase intention towards green products (Aman, Harun, & Hussein, 2012). For example, green consumers purposefully avoid products containing materials that could possibly damage environments through production (Ali & Ahmad, 2012). Compared to traditional meat-based products, sustainable dog food contributes to less environmental consequences, and thus, could be attractive for dog food purchasers who are concerned about the environment.

Besides practical considerations of nutritional values and individual values, owner-dog relationship could also play a role in the pet feeding practices. Among owners, it is common to name pets and call a pet as he or she instead of it. This suggests an anthropomorphic tendency, which means the extent that one is likely to attribute unique humanlike features to a non-human animal or object (Portal, Abratt, & Bendixen, 2018). By anthropomorphism, owners could build a close human-pet emotional bond with pets, and therefore be more concerned about pet's welfare, which could translate into the tendency of optimal pet-feeding (Linder & Mueller, 2014). Choosing the right pet food is an easily achievable way to reduce concerns about pet's welfare (Chandler, Hamper, & Weeth, 2013). Therefore, anthropomorphic tendency could also play a role in consumers' purchase decision making and how they consider purchasing sustainable dog food in particular. Such anthropomorphic tendency is not universal (Waytz, Cacioppo, & Epley, 2010a) but could vary among individuals. Scholarly experiments showed that the loneliness feeling is positively associated with anthropomorphic tendency (Epley, Waytz, Akalis, & Cacioppo, 2008). As a result of the

dissatisfaction towards family and social life (Bialik, 2018), growing level of reported loneliness has been a key reason for pet ownership (Stanley, Conwell, Bowen, & Van Orden, 2014). Loneliness might play a role in the dog-owner relationship, and possibly indirectly influence the feeding practices by dog owners. Therefore, by incorporating loneliness into the current research, it offers an additional perspective to understand both current and potential consumers.

In order to examine what has been discussed above, the following research question was formed: *“To what extent is Western European adults’ purchase intention toward sustainable dog food associated with their perceived nutritional value of products, environmental concerns, as well as anthropomorphic tendency?”*

1.2. Scientific relevance

The perceived value refers to consumers’ evaluation of a merchandise in terms of the tradeoff between benefits they could receive and sacrifices they have to make (Zeithaml, 1988). Multi-dimensional approaches have been applied in previous research, categorizing perceived values into different aspects such as functional (i.e. utilities of products), monetary (i.e. whether benefits worth monetary costs) and conditional (i.e. under certain circumstances) values (Kuo, Wu, & Deng, 2009; Wang, 2010). By further integrating perceived value into research on purchase intention, researchers dive into the purchasing decision making process of consumers. As for the food industry, the association between value perception and purchase intention has been examined. For example, perceived value has been found to be influencing consumer’s purchase intention towards organic food (Shaharudin, Pani, Mansor, & Elias, 2010). Yet, the discussion is relatively general and does not specify different dimensions of perceived values. Some research only pertains the monetary aspect of the perceived value (Konuk, 2018).

Though belong to the food industry, the dog food industry is unique for the fact that dog owners, who are the direct purchasers, are not the final consumers of products. Values are subjective evaluations (Chu & Lu, 2007). Since dog owners do not directly consume dog

food products, their perceived values of sustainable dog food might be different from value perception on food products which are made for humans. The dog-owner relationship might exert influence on the type of values perceived by dog owners, and some types of values might play a relatively more important role that impacts dog owner's willingness to purchase sustainable dog food. Yet, to the knowledge of the researcher, no previous research has been conducted on perceived values of sustainable dog food. Little is known about the types of values perceived by sustainable dog food purchasers. As such, the current research could provide some insights on the value perception of human purchasers on sustainable dog food and their association with purchase intention.

Corporate social responsibility (CSR) is the commitment of business to proactively contribute to both economic success and the wellbeing of the society (Cho, Furey, & Mohr, 2017). Being relevant to this, the triple-bottom line theory has been commonly applied to evaluate company's performances. It integrates economic, social and environmental aspects (Marshall & Toffel, 2005). Having recognized the significance of different pillars of corporate performances, companies are attempting to emphasize their commitments via CSR-related initiatives and marketing activities (Olsen, Slotegraaf, & Chandukala, 2014). By addressing CSR and stakeholders' concerns in marketing activities, firms could enhance their reputation of being trustworthy and reliable (McWilliams & Siegel, 2001), thus gain legitimacy and differentiate themselves from competitors (Carroll & Shabana, 2010).

There has been industry-specific research regarding CSR communication. For the luxury industry, its image of social distinction and hedonism could be conflicting with the values of CSR, such as equality and altruism (Wong & Dhanesh, 2017). Previous research has focused on industrial practices to alleviate such paradoxes by creating value coexistences or rebuilding brand image to be in line with the desired values (Wong & Dhanesh, 2017). While such research has taken a corporate perspective, other research has examined consumer's responses. For example, the energy industry has been especially stigmatized for the well-recognized environmental impacts associated with it. A main focus of research specific to the energy industry has been on the usage of CSR communication to reduce skepticism and regain reputation for the energy industry (Austin & Gaither, 2017). A lower fit between the

company and the addressed cause was found to lead respondents evaluating the CSR initiative as sincere and driven by public interests (Austin & Gaither, 2017).

The pet food industry also faces criticisms regarding its environmental impacts. However, compared to the energy industry, the social scrutiny is less severe, and the industry has not been stigmatized. Since the environmental-related criticisms have not become the crisis of the industry, there could be a research gap on the usage of CSR communication to reduce the chance of the stigmatized stereotypes to form. Sustainable dog food products are a proactive attempt by the industry to face environmental criticisms. By examining consumer variables that influencing purchase intention towards such products, the current research could offer insights for directions of future research on utilizing CSR communication to reduce criticisms and the chance of the industry to be stigmatized.

1.3.Social relevance

Climate change is still viewed as the greatest threat around the globe (Poushter & Huang, 2019). In spite of climate-focused commitments under Paris agreement, GHG concentration is still rising (Carrington, 2019). GHG emissions are a key contributor to global heating that could lead to severe consequences such as droughts, floods, and heatwaves. To tackle the issue and avoid global warming crisis, the United Nation is appealing for annual reduction of global emission by 7.6% for the next decade (Harvey, 2019), emphasizing the urgency to reduce GHG emissions. The ecological pawprint of dogs and cats is being criticized, mainly due to the unneglectable amount of GHG emissions caused by animal agriculture. Pet food is formulated in a fashion with high-meat and high-fat (Semple, 2019). The increasing demands for processed animal meats in pet food further contribute to the environmental impacts during pet food production (McMahon, 2017). In 2018, the European Commission has established the methodology to calculate the carbon footprint of pet food products, which further put the pet food industry under the spotlight.

For pet food producers, they are confronted with a trend of the growing importance of environmental-friendly business operations and claims. Confronted with such a trend and circumstances, the pet food industry is attempting to reduce wastes, improve packaging

designs, and find alternative nutrition providers (Okin, 2017). While novel proteins from fungi, yeast, insects et cetera are being explored (Semple, 2019), companies are establishing their brand images to be planet-friendly and sustainable. The approach of “enviropreneurial marketing” refers to the proactive attempts by companies to address their environmental responsibilities and to become market pioneers (Varadarajan, 1992, p.342). It could help them win legitimacy and advantages as the first mover. This approach has an underlying perception of being green as an opportunity rather than a challenge (Varadarajan, 1992). With proactive innovation based on opportunity spotting, companies could seize the opportunity and distinguish themselves from competitors within their initial industry as well as other unexpected market player.

Green innovation of products and services is one of the green strategies (Cronin et al., 2011). Within the pet food market, there are already entrepreneurs building identity around the concept of sustainability (Vallaster, Lindgreen, & Main, 2012). Green Pet Food (green-petfood.com), for example, has been leveraging the environmental cause to help with its corporate branding (Vallaster et al., 2012). Since such companies tend to be small and young, insights into positioning and marketing strategies are needed to create competitive advantages and to persuade consumers. Whether their innovative products could achieve positive consumer responsiveness and receptivity remains to be the question.

Hult (2011) argued that interests of multiple stakeholders should be integrated into market-oriented products. For sustainable dog food producers, on one hand, they are urged to reduce GHG emissions and operate environmental-friendly; on the other hand, consumers who establish strong emotional bonds with pet dogs demand healthy dog food. Being in an environment where nutritional value is prioritized, consumers demand for high-quality dog food options with balanced and completed nutrition. The reliance on meat as the main protein source somehow implies the trend of high meat content in pet food. While environmentally friendly dog food might address concerns and meet needs of some stakeholders, whether it would also be perceived as an acceptable option by other stakeholders, for example consumers, needs further examination. Being able to achieve successful persuasion and retention of consumers, companies can then gain legitimacy, retain consumers, and drive

growth in the long term.

Different green marketing strategies have been introduced and discussed by scholars (Ginsberg & Bloom, 2004). However, the application of theories in commercial practices greatly relies on the context. Though belonging to the general food industry, the pet food industry is unique because it specifically targets on pets as the ultimate consumer and pet owners as the direct purchaser. As no previous research has been done to examine human consumers' perception and respond to sustainable dog food products, variables that could have an impact on consumer's willingness to consider such non-meat alternatives worth further examination. By examining variables from a consumer angle, the current research could help with persuading dog owners to consider more sustainable pet food products and thereby, lower carbon footprints related to pet food production and consumption.

1.4. Chapter outline

To make the layout and structure clear, the current thesis is divided into chapters. The topic of sustainable dog food and the perspective of consumer variables are introduced in this chapter of introduction. Following this, the second chapter of theoretical framework discusses previous academic findings relevant to sustainable dog food. To be more specific, pet dog feeding practices and the construction of the importance of nutritional value are introduced. Clear definition and examples of sustainable dog food in the context of the current research are given. After this, the association between environmental concerns and purchase intention is critically discussed. The concept of anthropomorphism and anthropomorphic tendency towards pet dogs are demonstrated afterwards, followed by the discussion on loneliness. Based on these concepts and previous literature, the second chapter gives a closer look at the possible directional association between 1) perceived nutritional values of sustainable dog food and purchase intention, 2) environmental concerns and purchase intention with perceived nutritional value serving as the moderator, 3) perceived nutritional value of sustainable dog food and purchase intention with anthropomorphic tendency being the moderator, and 4) anthropomorphic tendency and loneliness. After the discussion of each

association, a hypothesis is introduced.

The third chapter deals with the methodology of the current research. A general overview of online survey research design is given, followed by detailed explanations including procedure, sampling approach and samples, measurements for variables as well as analysis plans. Specifically, how questionnaires were distributed online with the help of social media and convenient snowballing is introduced. Content of the survey and the order of items are explained. Scales that were used and adapted to measure each variable, namely perceived nutritional value of sustainable dog food, purchase intention, environmental concerns, anthropomorphic tendency, loneliness, and control variables of consumer's meat consumption frequency, length of pet ownership and age, are also discussed in that chapter. Results of the analyses and hypotheses testing are interpreted in the fourth chapter. The final chapter gives conclusions to answer the research question. Theoretical and practical implications are discussed, and limitations of the current research are reflected, followed by suggestions for future research.

2. Theoretical framework

This chapter reviews previous scholarly research relevant to the topic of sustainable dog food. Concepts of perceived nutritional value, environmental concerns, purchase intention, anthropomorphic tendency, and loneliness are illustrated. After the discussion of their associations, four hypotheses are introduced to be tested.

2.1. Perceived nutritional value of sustainable dog food

2.1.1. Pet dog feeding practices

Since the domestication of canines, dogs have been incorporated into human cultures (Power, 2012). They are trained to live together with human beings in their shared home (Power, 2012). With such a cohabiting relationship, dog owners have been positioned and also positioning themselves as pet guardians (Wrye, 2012). Being responsible for pet dog's diets, they are greatly involved in the diet management of pet dogs (Kienzle, Bergler & Mandernach, 1998) and exert substantial influences on dogs with regard to various diet-related scenarios, such as where, when, and what dogs are fed (Kienzle et al., 1998).

The way in which dog owners feed their dogs could vary. While veterinarians play the role as the authentic information sources and guiders to some extent (Downes, Devitt, Downes, & More, 2017; Kienzle et al., 1998), pet owners are the ultimate decision makers themselves. Their attitudes toward the outcome of feeding as well as beliefs on what is the proper feeding could influence their decisions on feeding routines. When certain feeding is viewed as proper and contributing to beneficial outcomes, such as changing diets as a form of weight management, some dog owners might tend to have positive attitudes towards it and see it as necessary (Downes et al., 2017). Such perceptions about proper diets as well as the desirable outcome will then play an important role in the type of food chosen by them.

2.1.2. Perceived nutritional value

Downes et al., (2017) found that concerns for pet's health and well-beings are the major factor predicting feeding practices. When deciding what and how to feed their dogs, owners care about impacts on the health of their dogs and value beneficial outcomes for maintaining dogs' health. With regard to the type of food chosen by owners, they would consider what are proper and necessary for their dogs and use them as criteria to evaluate dog food products. An important aspect to evaluate dog food products is nutrition. Wrye (2012, p.5) put forward the concept of "nutritionism" in pet food. She argued that nutrition has been constructed as a desirable value that represents the quality of pet food (Wrye, 2012). If being nutritious, certain pet food will then be able to contribute to the well-being of pets, maintain their health and not make them sick. The construction process of nutritionism is a collective play involving scientific research, pet food companies, industry standards and consumers.

Nutrients are chemicals that support the operation of bodies (Wrye, 2012). Contributing to maintaining the tissue and health of dogs, nutrients needed by dogs were categorized into proteins, carbohydrates, fats, minerals, and vitamins (Case, 2013). Previous scholarly research (Connolly, Heinze, & Freeman, 2014) has found that nutritionally insufficient and incomplete feeding could result in abnormalities, diseases and even death of puppy dogs. When evaluating contributors and maintainers for pet's health, nutritional adequacy then becomes a key factor for designing a proper and rational feeding strategy (Connolly et al., 2014).

With the emergence of pet-related non-profit organizations and associations, nutritional requirements and standards supported by scientific research have been set. In Europe, for instance, recommended minimum proportions of proteins, fats, minerals, and vitamins et cetera in dog food are specified in the nutritional guidance by the European Pet Food Industry (FEDIAF, 2019). Regardless of the source being plants or animals, 18% is the proportion of protein recommended by American Feed Control Official (AAFCO, 2014). For pet food companies, these standards mean that pet food products ought to be purposively formulated to meet the nutritional needs of pets (Wrye, 2012). As commercial pet food is increasingly advertised and marketed as being nutritionally complete and balanced (Connolly et al., 2014),

nutritional profiles and nutritional-related claims are also required to be shown on the label of pet food products (FEDIAF, 2011). Being in such an environment where the importance of nutritional balance and adequacy in pet diets are emphasized, it makes sense that nutritional values could be a primary factor that pet owners would consider in their feeding practices.

Michel et al. (2008) have found that perceptions on nutritional value could influence the nutritional choices of pet owners. As pet owners are not the ultimate consumer of pet food and could not experience its values themselves, how they perceive the nutritional value of certain pet food matters for their feeding practices and food choices. Here, perceived nutritional value refers to dog owner's belief in the quality and healthiness of dog food products in terms of the sufficiency of nutrients and the contribution to dog's health. It measures the extent to which dog owners view certain dog food as being nutritious, supplying enough nutrients, and beneficial to the health of pet dogs.

2.1.3. Perceived nutritional value of sustainable dog food

2.1.3.1. Sustainable dog food

Traditional dog food production is criticized for it being environmentally unfriendly regarding the great amount of GHG emission and inefficient resource usage (Okin, 2017). To address calls for sustainability, some innovative dog food products emerge in the pet food market as sustainable choices for their less GHG emission and efficient resource consumption. Sustainable dog food goes beyond environmental sustainability but also pertains the concept of nutritional sustainability discussed by Swanson et al. (2013). Nutritional sustainability denotes the ability to meet both current and future generations' nutritional needs to maintain health (Swanson et al., 2013). While trying to minimize the environmental impact, sustainable pet food also aims to sufficiently provide essential nutrients for pets.

In the context of the current research, sustainable pet food could be defined as commercial pet food products with no livestock meat but instead, using non-meat ingredients,

such as plants as nutrient providers. This is because that animals are not the only source of essential nutrients (Dodd, Adolphe, & Verbrugghe, 2018). Some plant ingredients are also capable of providing nutrients such as proteins, amino acids and minerals (Dodd, et al., 2018). For example, soy, rice and potatoes could all function as plant protein providers for dogs (Dodd et al., 2018). As for the environmental benefits, plant-based diets tend to be more environmentally friendly for the fewer natural resources needed during production. Soy protein, for instance, requires far less water, fossil fuel and land compared to that of the same amount of animal proteins (Sabate & Soret, 2014).

2.1.3.2. Perceived nutritional values of sustainable dog food

Using ingredients such as insects and plants, sustainable dog food claims to provide dogs with sufficient nutrients while being environmentally friendly. However, it still faces some doubts regarding the nutritional value of its nonanimal-derived ingredients. In a survey research conducted by Dodd, Cave, Adolphe, Shoveller, and Verbrugghe (2019), nutritional adequacy was the mostly reported concern for strict vegan pet food. As discussed below, there could be mainly four reasons to explain such concerns.

First, dogs have relatively higher needs for both the quantity and quality of proteins (Dodd, 2018). Quality means the digestibility of proteins and the essential amino acids that they contain. Some amino acids are essential for synthesizing proteins in the body but could only be obtained from diets (Dodd, 2018). The quality of proteins could be influenced by their sources. Containing all ten essential amino acids needed by dogs, animal tissues are believed to be able to provide high-quality proteins (Dodd, 2018). By contrast, protein concentration in plants varies greatly (Kanakubo, Fascetti, & Larsen, 2015). For example, soybeans only produce limited digestible proteins (Brown, 2010; Yamka, Jamikorn, True, & Harmon, 2003). Therefore, when not properly formulated, non-meat-based dog food might be questioned about its nutritional completeness.

Secondly, livestock meat has been perceived and used as the nutrient provider in human diets for a long time (Pereira & Vicente, 2013; Piazza, 2015). For some people, meats might be a symbol of privilege (Wrye, 2012). Due to the fact that pets are taken care by human

owners, pet diets might be viewed as comparable and similar to meat-included diets for some people (Dodd, 2018). Based on such perceptions and practices, it makes sense that red meats are commonly used as digestible ingredients to provide adequate nutrients for the health of companion animals. Therefore, without livestock meats as ingredients, sustainable dog food products might be perceived as being incapable of providing sufficient nutrients to dogs.

Thirdly, “bio-carnism” has been introduced to explain why a former vegetarian might switch back to meat consumption. It argues that vegan diets are unhealthy for humans. In order to survive and maintain one’s health, meat consumption is essential for human beings. Because of the great significance of meat consumption, veganism is therefore unfeasible (Joy, 2012). By placing the bio-carnism belief into a dog feeding context, meats could be viewed as a necessity for dog’s survival while plant-based diets might be perceived as unnatural and unhealthy for dogs. Thus, sustainable dog food products might be viewed as not applicable to maintain dog’s health at the very beginning.

Fourthly, there are cases of commercial pet food failing to be aligned with guaranteed nutritional profiles on packages (Dodd et al., 2019). Though not exclusively being an issue in sustainable dog food products, such cases might lead to the distrust in the authenticity of label claims, and therefore, contribute to doubts on the nutritional adequacy in sustainable dog food products.

2.2. Purchase intention

In order to play the role of the caretaker, pet owners are direct purchasers of commercial dog food products and greatly involve in dog’s diets management. For companies, this implies the importance to understand and analyze consumer behaviors, that is, pet owner’s purchasing behaviors. According to the integrated behavioral model, behavioral intention is the most significant determinant of behaviors (Montano & Kasprzyk, 2015). This suggests that purchasing behavior could be predicted by people’s motivation of buying. The positive association between purchase intention and purchasing behavior has been supported by previous research (Haque et al., 2015; Wee, et al., 2014). Purchase intention is therefore,

widely applied in both academic research and marketing practices as a measurable tool and predictor of consumer's purchasing behaviors (Morwitz, 2014). From a marketing perspective, whether pet owners would try or consider buying certain products if they are available is of great importance.

Purchase intention refers to consumer's desires and conscious plans of paying for certain services and products in the future (Kim & Ko, 2012; Spears & Singh, 2004). In the context of sustainable dog food products, purchase intention means the willingness of considering purchasing non-meat food products for pet dogs to consume.

2.3. Perceived nutritional value and purchase intention

Perceived values are the benefits that consumers believe to receive by purchasing a product or a service (Salehzadeh & Pool, 2017). Being beneficial and in line with consumer's expectations, products would then lead to positive results of consumer satisfaction and retention (Gallarza, Gil Saura, & Holbrook, 2011). Previous research has found that perceived values have direct influences on purchase intentions (Salehzadeh & Pool, 2017). Perceived values could pertain functional value which refers to the quality of products and its utility (Wang, 2010). Being able to offer beneficial utilities to consumers, products are more likely to be viewed as of high quality and considered to be chosen.

For dog food products, nutritional values serve as their function and utility to maintain the health of dogs. When nutritional value is perceived as high, the functionality of the corresponding product would be satisfactory for consumers. Therefore, how consumers perceive the nutritional value of sustainable dog food would influence their motivational behavior of considering the purchase of such products. Researchers have found that the efficacy of nutrients and the corresponding health effects are dog owner's major concerns toward non-meat-based dog food (Dodd et al., 2019). Four reasons have been discussed previously to explain why the nutritional value of sustainable dog food products might be questioned. Such worries could therefore, hinder pet owners to view sustainable dog food as being of nutritional value and discourage them to view purchasing sustainable dog food as beneficial.

On the contrary, having no doubts on nutritional values of sustainable dog food, dog owners would be more likely to have positive perception on it. Thus, owners would tend to believe that sustainable dog food is a beneficial option or at least not a harmful option to maintain the health of their dogs. Therefore, they would be more likely to view providing such products to dogs positively and be more willing to provide sustainable dog food products to their dogs. In the research by Dodd et al. (2019), pet owners who has not fed dogs with plant-based food reported interests in considering such options if more information is available regarding the product's nutritional completeness. That is to say, when sustainable dog food products are perceived positively, especially regarding their nutritional values, dog owners would be more likely to consider such product choices. The following hypothesis could then be introduced:

H1: Higher levels of perceived nutritional value in sustainable dog food products are associated with higher levels of purchase intention toward such products.

2.4. Environmental concerns and purchase intention

Environmental concerns are the awareness of environmental-related problems and the willingness to help with solving such issues (Alibeli & Johnson, 2009). With the increasing media coverage on environmental problems and pro-environment appeals from activist groups and organizations, environmental concerns remain to be a socially relevant concept that attracts academic attentions, especially related to consumer research about green products and green marketing (Albayrak, Aksoy, & Caber, 2013; Ali & Ahmad, 2016). However, whether environmental concerns have a direct impact on purchasing intention of sustainable products is still in academic debates.

Some researchers argue that environmental concerns could directly and positively influence consumers' purchase intention of green products. This is because green products reflect and address their concerns towards environmental-related issues (Kim & Choi, 2005). When consumers are concerned about the environment, they tend to show positive attitudes toward environmentally-sound activities and to participate in such activities (Trudel & Cotte,

2008). The more they care about environmental issues and causes, the more likely that they value the beneficial outcome of consuming products that are less damaging to the environment (Barbarossa & Pelsmacker, 2014). In a research, respondents reported their willingness to pay more for energy that is relatively environmentally friendly (Hartmann & Apaolaza-Ibáñez, 2011). Green consumers, in particular, are those who engage in pro-environmental behaviors and prefer environmentally friendly products out of the care for the environment (Matthes & Wonneberger, 2014). Already being engaged in environmentally friendly activities, they tend to participate in other green actions such as purchasing green products.

Others argued that perceived environmental consequences do not necessarily directly translate into environmentally-sound purchase intention. Ramayah et al. (2010) offered a possible explanation. Though being aware of environmental issues, it is unnecessary that people always feel the moral obligation to behave environmentally-responsibly. It suggests that other considerations might hinder environmental concerns to be given the top priority in purchases (Ramayah et al., 2010). To further explore the impacts of environmental concerns on certain behaviors, other contextual beliefs and attitudes were also discussed. Barbarossa and Pelsmacker (2014) discussed the role of perceived personal inconvenience in purchase intention. When the purchase of green products is evaluated as leading to adverse or disadvantageous consequences for oneself, such as being time-consuming or costly (Barbarossa & Pelsmacker, 2014), consumers might be discouraged and less willing to consider such products.

Considering the above discussed academic debates, the directional association between environmental concerns and purchase intention of environmental-friendly products is not obviously clear. In the context of sustainable dog food purchases, environmental concerns alone might not be enough for predicting the purchase intention of sustainable dog food products. Other factors, therefore, might play significant roles, which means that other variables could be integrated into the interaction between environmental concerns and purchase intention of sustainable dog food.

As previously introduced, nutritional value is an important indicator of the quality of dog

food products. When choosing dog food products, nutritional value could be viewed as a key criterion of high priority. Dog owners' perception of nutritional value could then serve as an important factor influencing the food choosing intention and practice. Containing non-meat ingredients, sustainable dog food products are different from traditional commercial dog food that uses meats as important nutrition providers. If the nutritional value of sustainable dog food is doubted, consumers might distrust the quality of such products. Therefore, even they are concerned about environment issues, they might still not consider providing sustainable dog food products to their dogs.

Based on the above discussion, the perceived nutritional value could be integrated as a moderator into the association between environmental concerns and purchase intention. To be more specific, since the directional association between environmental concerns and purchase intention towards sustainable dog food products might be not obviously clear, perceived nutritional value of sustainable dog food could be introduced to moderate such an association. Product innovation has an ultimate goal of providing acceptable solutions for consumers (Christofi, Leonidou, Vrontis, Kitchen, & Papasolomou, 2015). When consumers are highly concerned about the environment, their needs to maintain dog's health might still not be satisfied. If sustainable dog food products are believed to contain sufficient nutrients and bring nutritional values, they would be perceived as acceptable solutions for dog owners to manage dog's diets and take care of pet dog's well-being. Therefore, such products would be viewed as addressing both environmental concerns as well as worries related to nutritional values. That is to say, the concern towards environments are more likely to drive purchase intention of sustainable dog food products, if purchasers believe that they have sufficient nutritional values. Therefore, another hypothesis could be introduced as followed:

H2: With higher levels of perceived nutritional value, higher environmental concerns are associated with higher levels of purchase intention toward the corresponding dog food products.

2.5. Anthropomorphic tendency and purchase intention

2.5.1. Anthropomorphism

Anthropomorphism is a psychological process of endowing humanlike features to nonhuman agents (Basfirinci & Cilingir, 2015; Epley, Waytz, & Cacioppo, 2007). It means that some nonhuman agents are believed to behave like human beings or have traits which are specific to humans. This trait-attributing process suggests the assumption of the resemblance and similarity between human beings and the corresponding non-human agents (Waytz et al., 2010a). The shared humanlike characteristics could be both physical and mental. Non-human agents could be viewed or imagined to be physically like humans, or to have emotions, intentions, and other mental states that human beings are able to have. Physical features refer to observable appearances, behaviors or actions. For example, animals wearing clothes is an example of non-human agents engaging in human cultural activities (Root-Bernstein, Douglas, Smith, & Verissimo, 2013). Imagined beings such as gods and other religious beings are also believed to bear physical resemblance with humans (Waytz, et al., 2010a).

The mental aspect, on the other hand, refers to non-physical resemblance but seeing the mind in other non-human agents. Waytz, Gray, Epley, and Wegner (2010) discussed the perception of mind in other beings from two stages of experience as well as agency. By experience, it refers to the experiences of feelings; by agency, having a mind means being capable and having the freedom to make plans and behave based on one's own will. As a human feature, the mental capacities and status go beyond basic mental states to higher orders abilities, such as secondary emotions (e.g. admiration, embarrassment, hope), purposes, and motives (Waytz, et al., 2010a). By assuming the similarities, humanlike characteristics are endowed onto non-human agents. Human beings are thus enabled to use the most familiar characteristics of themselves and other human beings to explain and make sense of unfamiliar beings and the environment (Hodge, 2018).

In the context of anthropomorphism, the coverage of non-human agents is relatively broad. "People have the tendency to anthropomorphize everything around them" (Basfirinci & Cilingir, 2015, p.108). Actually, nothing cannot be anthropomorphized (Brown, 2010). The

anthropomorphized objects could cover not only other lives, for example animals, but also physical objects such as cars, computers and even imagined agents like gods. Tom and Jerry, the famous cartoon, is a vivid example of endowing humanlike characteristics on animals (Brown, 2010). In the business field, anthropomorphism has also been widely applied to attract consumers. Brand mascots which resemble animals like rabbits, dogs and even crocodiles, are used to trigger anthropomorphism of brands (Brown, 2010). This is believed to trigger positive emotions toward the brand and increase brand liking (Delbaere, McQuarrie, & Phillip, 2011). As personal values could be added to anthropomorphized objects, consumers would engage with the brand and establish a sense of loyalty (Chandler & Schwarz, 2010).

Animals, especially companion animals, are frequently related to anthropomorphism partly because of their biological similarity to human beings. As referring to animals, anthropomorphism denotes attributing humanlike characteristics to other non-human animals. Going beyond observable behaviors, human beings try to make sense of and understand what animals like, want and intend to do (Root-Bernstein et al., 2013). Being regarded as the analogue and a partly equivalence of humans, animals are sometimes viewed as family members, children, pet partners (Boya, Dotson, & Hyatt, 2012), and even the mirror of selves (Jyrinki, 2012). By anthropomorphizing pet dogs, some owners talk to dogs as the mother or the father (Dotson & Hyatt, 2008). For some pet owners, animals could even be a center around which they arrange their lives and build self-identity (Jyrinki, 2012). In their research, Dotson and Hyatt (2008) used the concept of “dog people” to describe those who view dogs as a part of themselves and a projection of their own egos.

2.5.2. Anthropomorphism and health concerns for pets

Taking the angle of the perceiver and the perceived, Waytz et al. (2010c, p. 383) discussed the concept of “mind perception”. Mind perception refers to the belief in whether others having a mind. It pertains two aspects. First, the capability of feeling and experiencing; second, being able to have free will and act proactively (Waytz et al, 2010c). Seeing a mind

in nonhuman agents such as animals is an example of anthropomorphism. Scholars (Waytz et al., 2010a) have discussed three consequences of anthropomorphism. First, the anthropomorphized agent could exert social influence on humans. Since human beings tend to leave good impressions on others, when anthropomorphizing a nonhuman agent, they tend to behave desirably and according to social norms. Second, humans might expect the corresponding agent to be accountable and responsible for its own behaviors. Third, empathic concerns and connections would be established and developed, which means that the non-human agent could be perceived as worthy of concerns.

When anthropomorphizing pets, pet owners tend to view pets as active agents in social interactions (Root-Bernstein, 2013). That is to say, pet dogs as active agents are perceived to be prosocial, intelligent and responsible for their self-directed behaviors. It has been found that dog's intelligence might be similar to that of a two-year-old child (Boya et al., 2012). What is more, pets would also be viewed as being capable of conscious experiences. They would be able to have similar primary and basic emotions as those of human beings such as pleasure, sorrow and anxiety (Morris, Knight, & Lesley, 2012). Such believed mental resemblances as a result of anthropomorphism could further lead to greater emotional solidarity with pet dogs (Amiot & Bastian, 2017) and also touches the moral status of humans (i.e. the perceiver) and dogs (i.e. the perceived).

The "moral regard" (Waytz et al., 2010a, p.222) granted to pet dogs contributes to anthropomorphism being the basis of loving pets (Bruni, Perconti, & Plebe, 2018). Being anthropomorphized, dogs are not a tool or a mean that are used by humans to fulfil purposes. Instead, they "exist as an end in themselves" (Waytz et al., 2010a, p.224). One outcome of anthropomorphism is the empathy towards the anthropomorphized objects (Root-Bernstein et al., 2013). Besides viewing pet dogs as non-food, owners would be more likely to feel the emotional attachments and also hold closer relations with their pets (Amiot & Bastian, 2017). The unique emotional bonds built with pets could deliver meanings for pet owners (Cavanaugh, Leonard, & Scammon, 2008). It has also been reported that owners would mourn and plan activities to memorize the death of their pets as pets are viewed as an integral part of family (Cavanaugh et al., 2008). With such emotional bonds, pets are therefore,

perceived as being worthy of care and concerns (Gray, Gray, & Wegner, 2007).

Being emotionally connected to pets' experiences and sufferings, owners tend to be sensitive to pets' experiences, show empathy to pets' feelings (Root-Bernstein et al., 2013), and be concerned about their wellbeing, life quality, and interests of pets (Butterfield, Hill, & Lord, 2012). The welfare of pets pertains illness, nutritional state, growth, fertility and fitness (Verga & Michelazzi, 2009). Since health status is one of the indicators for pet welfare, when anthropomorphizing pet dogs, pet owners should be concerned about pet health. In order to maintain the health and even lengthen the life span of pets, some pet owners resorted to health care services for improving health conditions of pets (Cavanaugh et al., 2008). Apart from medical-related healthcare, health concerns toward pets could be closely associated with pet feeding since diet management for pets is another accessible way to address such concerns. Pet owners are responsible for and actively determine the diets of pets (Downes et al., 2017). Anthropomorphism leads to dog owner's higher level of concerns for pets and is likely to drive their willingness of choosing healthy pet foods. Out of the concerns for pets, owners would be inclined to provide sufficient energy and nutrients to maintain the good health and improve the well-being of pets (Swanson et al., 2013).

2.5.3. Anthropomorphic tendency and purchase intention

Previous parts have discussed the positive association between perceived nutritional value and purchase intention. When perceiving sustainable dog food products as of sufficient nutritional values, dog owners are likely to consider purchasing the corresponding products. Taking the angle of the emotional bond built with pets, anthropomorphism of pet dogs could lead consumers to care about dogs' welfare and show their concerns in the form of healthy pet feeding. Anthropomorphism enhances dog owner's concerns for the health of dogs. In order to maintain and improve the health of dogs, dog owners would be more concerned with food products that are fed to dogs. The way people shop for pet dogs is related to the owner-dog relationship (Boya et al., 2012). Being concerned about the health of pet dogs, purchasers would worry about not providing nutrient-sufficient food for their dogs. Tesfom and Birch

(2012) found that some dog owners are even more serious about healthy dog food purchases than their own healthy diets.

The extent of anthropomorphism could vary among different individuals. While anthropomorphism is a rather general concept of the process of attributing humanlike features, anthropomorphic tendency is a trait and a characteristic at the individual level (Letheren, Kuhn, & Lings, Pope, 2016). It refers to the likelihood of anthropomorphism. With a higher level of anthropomorphic tendency, individuals are more likely to anthropomorphize (Waytz et al., 2010a); on the contrary, a lower level of anthropomorphic tendency indicates a lower likelihood to attribute humanlike features and characteristics to nonhuman agents. The individually different tendency in anthropomorphism matters for the responsibility and moral concerns that human beings perceive to have on the corresponding object (Waytz et al., 2010). With different anthropomorphic tendency, individuals might differ in their interaction with non-human beings. When having a higher level of anthropomorphic tendency, pet owners are more likely to care about the well-being of dogs and perceive themselves as being responsible for pets. Therefore, with a higher level of anthropomorphic tendency towards dogs, consumers tend to be concerned about dog's diets and attempt to provide them with nutritional-sufficient and healthy food products.

Considering this, anthropomorphic tendency could play a role of moderator to strengthen the association between perceived nutritional value and purchase intention. That is to say, with a higher level of anthropomorphic tendency specifically towards their pet dogs, owners would be even more likely to provide nutritional food to their pets. If sustainable food products are perceived as nutritional sufficient and sound, pet owners would then be more likely to show interests in purchasing such products. Therefore, we could further propose the third hypothesis:

H3: With higher levels of anthropomorphic tendency, higher levels of perceived nutritional value are associated with higher levels of purchase intention toward the corresponding dog food products.

2.6. Anthropomorphic tendency and loneliness

2.6.1. Reasons of anthropomorphic tendency

As discussed above, anthropomorphism is the process of attributing human characteristics to non-human objects and beings. It could be explained by human's needs of maintaining social connections (Tam, Lee, & Chao, 2013). As defined by Seppala, Rossomando, and Doty (2013), social connections are individual's subjective feeling of being capable to maintain a close relationship with other human beings. In a social world, building and developing positive relationships with other humans are of great importance for the survival, well-beings and health of humans (Seppala et al., 2013). Positive human social connections are therefore, a basic and primary psychological need of humans.

Anthropomorphic tendency is individual's likelihood of anthropomorphizing. It is not universal but varies among individuals in its strength and behavioral consequences (Epley et al., 2007). "People are selective in when and what they anthropomorphize (Tahiroglu & Tailor, 2019, p.285)." The differences in anthropomorphic tendency could be due to the different strength of reasons of anthropomorphism. Epley et al. (2007) discussed three factors, namely elicited agent knowledge, motivation to understand the world and environments, and sociality motivation. Elicited agent knowledge refers to the extent that knowledge about human beings is accessible and applicable to certain objects (Epley et al., 2007). Being a readily accessible reference, such knowledge is more likely to enable attributing human features to unknown non-human agents. The second factor is the motivation that human beings have to understand and make sense of the world (Epley et al., 2007). As unknown others might lead to the feeling of uncertainty and anxiety, humans might resort to anthropomorphism to enhance the understanding of their environments and unknown objects.

Sociality motivation is the need and desire to connect to others. As social animals, human beings desire for social interactions and bonds with other human beings. The perceived experience of isolation could negatively impact one's mental and physiological health (Stanley et al., 2014). When being deprived of social connection, it could be a painful

experience. Therefore, human beings have the motivation to actively alleviate the social pain (Epley et al., 2007). In order to do so, humans could establish new relationships in their environments and attributing traits related to social connections such as being considerate, to the non-human being (Maner, DeWall, Baumeister, & Schaller, 2007; Pickett, Gardner, & Knowles, 2004). Pets, for example, are usually being anthropomorphized to build such relationships and alleviate the feeling of being deprived of social connections.

Anthropomorphizing pets could facilitate the fulfilment of such needs by establishing similar social connections with nonhuman beings (Epley et al., 2007). Therefore, when the social connection with others is expected but perceived as a lack, the anthropomorphic tendency might be greater.

2.6.2. Anthropomorphic tendency and loneliness

Loneliness is a subjective feeling of disconnection (Cacioppo & Hawkley, 2010). It is the opposite state of social connection (Seppala et al., 2013). Loneliness is resulted from the discrepancy between expectation and reality of the quality and quantity of one's relationships (Perlman & Peplau, 1981). Lacking social connections, lonely people might suffer from psychological disorders, negative emotions as well as health problems (Seppala et al., 2013).

Being dissatisfied of one's social connections with others, people could be triggered to actively alleviate the pain of such undesirable situations by building connections with other people, imaging social connections, and resorting to alternative relationships. When the social connection with human beings is hard to build and maintain, non-human agents could serve as replacements and compensations. Epley, Akalis, Waytz, and Cacioppo (2008) discussed two ways that people use to alleviate the painful feeling of loneliness. When feeling lonely, individuals could enhance their believes in imagined beings having human like features, such as gods which have already been anthropomorphized. Besides, they could also resort to anthropomorphizing non-human agents such as gadgets and pets (Epley et al., 2008). By building human-like connections in the environment, the need of social belongingness could be fulfilled or at least compensated to some extent. That is to say, when lacking social

connection, lonely individuals would tend to pay more attention to the environmental cues (Epley et al., 2008). Thus, they would be more likely to see human characteristics in other non-human beings (Stanley et al., 2014). Bartz, Tchalova, and Fenerci (2016) found that when being reminded of other supportive relationships, people are less likely to attribute human-like features to non-humans. This also suggests that the lack of social connection and the feeling of loneliness could be the predictor of anthropomorphizing non-human beings.

Pets, as non-human animals, could also be anthropomorphized out of pet owner's need to alleviate loneliness. When feeling lonely, pet owners would attempt to build alternative social connections. In order to enhance the feeling of belongingness, they would tend to anthropomorphize available non-human animals in their environments, that is, their pets. Since anthropomorphism is such a motivated process (Bartz et al., 2016), the stronger the motivation, the higher likelihood of the corresponding behavior. Therefore, a higher level of the feeling of loneliness is expected to contribute to a greater likelihood of anthropomorphizing pets. Based on this, we could further argue that loneliness could be related to anthropomorphic tendency and introduce a hypothesis as below:

H4: Higher levels of loneliness are associated with higher levels of anthropomorphic tendency.

3. Method

This chapter offers an overview of the methodology design of the current research. Procedures of the data collection via online survey, sampling method and valid samples, operationalization of variables, and analysis approaches are introduced. The validity and reliability of the research is reflected upon.

3.1. Research design

The current research aims to answer the research question: To what extent is Western European adult's purchase intention toward sustainable dog food associated with their perceived nutritional value of products, environmental concerns and anthropomorphic tendency? According to the theoretical framework, purchase intention (H1, H2, and H3) and the anthropomorphic tendency (H4) are the DVs, while perceived nutritional value (H1 and H3), environmental concerns (H2) and the level of loneliness (H4) are the IVs. Perceived nutritional value (H2) and anthropomorphic tendency (H3) serve as the moderators. To examine the association between these variables and their interactions, a quantitative methodological approach was chosen.

Quantitative research methods follow a deductive process which aims to test patterns and models build on existing theories (Babbie, 2016). Previous research and findings serve as the base to find important aspects of a topic and the potential explanations. They further help with drawing hypotheses that could be tested. In such a deductive manner, the task of quantitative research is to find facts about the target population (Barnham, 2015) and test the assumptions. With a quantitative method, observations are quantified into numerical data (Choy, 2014). Different levels of agreement and disagreement could be measured (Choy, 2014). These help with statistical analyses to identify phenomena and to find connections and relations among different variables (Barnham, 2015). The current study has a specific interest in sustainable pet food and its consumers. It attempts to apply relevant theories to examine relations among different variables. Therefore, the quantitative approach matches the current

research. In addition, the quantitative method asks for and also enables a large amount of data to be collected (Barnham, 2015). Since the topic of this research is relatively new, a quantitative method could further enable the understanding of the target population.

This research has a primary interest in Western European adults who have the potential to become consumers for sustainable dog food products. With such an interest at the individual level, the units of analysis were thus, adults (i.e. no younger than 18) from Western European countries who have dogs, used to have dogs, or do not have a dog but are planning or interested in having one. This is due to the considerable pet ownership and the corresponding growing pet food industry in Europe. According to the statistics by FEDIAF (2018), around 80 million European households own at least one pet. Besides the growing pet food market, environmental protection pressures that European Parliament put on European countries further address the importance of reducing GHG emissions in these countries. A target of reducing 55% GHG emission by 2030 was considered to be included in the European Green Deal (Haahr, 2019). These two trends make the perspective of Western European adult consumers meaningful. In addition, due to geographic closeness, Western European countries could form one market. Therefore, to examine the market potential of sustainable dog food products, Western European adults who have pet dogs, used to have pet dogs, or do not have pet dogs but are considering having pet dogs are all within the target population. The age range of the target group was restricted to no younger than 18. This was out of the consideration that adult would be able to purchase responsibly. In addition, by setting the minimum age limit to 18, there would be no need to ask for permission from parents for their children to participate in the research.

As quantitative methods suit the aim and research question of this study, survey questionnaires were used. There are several reasons for this choice. Questionnaires enable the collection of people's "opinion, attitudes, knowledge and experiences" (Matthews & Ross, 2010, p.204), transforming them into quantifiable data for further analysis. Besides, the relatively short period of time required for filling the survey enables collecting a large number of data from samples within the target population. Collected with a standardized format of items, results from a large group would be more reliable to be generalized to the

population. It is also noteworthy that the nature of the target group being specifically related to pet dogs and their geographical dispersion suggests the difficulty to efficiently reach them offline but also the possible existence of (online) communities with common interests.

Therefore, the current research applied the approach of online survey for its low cost, high convenience (Ho, 2014) and the potential to enhance reach in particular.

Online survey is time-efficient for the ease to collect data and the availability to focus on other tasks while collecting data at the same time (Wright, 2005). When questionnaires are filled in and submitted, data is automatically saved in the database. By sharing the survey link online, respondents are enabled to fill in the questionnaire via portable devices anytime and anywhere (Baltar & Brunet, 2012), which makes the process easier and might help with increasing response rate. Online social networking sites provide cheap, fast and convenient ways to conduct survey research (Brickman-Bhutta, 2012). In addition, in order to conduct the research in a Western European context, sharing a survey link online could facilitate its spreading to different Western European adult dog owners and lovers beyond a specific country base. Facebook as a social networking site, has been widely used in academic research. It is primarily used for reaching people of interests who are hidden and hard to locate (Etikan, Musa, & Alkassim, 2016). Facebook groups enable the gathering and interaction among people of similar interests. It offers an easily accessible pool to reach respondents. Since researchers as well as their personal information are visible (Etikan et al., 2016), the trustworthiness of the research could be enhanced. This might further benefit reaching a higher response rate.

3.2. Procedure

Taking the approach of an online survey, respondents were approached on social media with a survey link of the questionnaire designed via Qualtrics, a commonly used online survey platform that could be accessed for free by students of Erasmus University Rotterdam. They were recruited in mainly two ways. First, the online survey link was distributed in Facebook groups which gather dog lovers and dog owners who live in Western European

countries. Second, the link was also shared by people who have access to individuals that meet the requirement of the target population.

Online survey research should be sensitive to ethical concerns, such as privacy and confidentiality (Ho, 2014). With such consideration, respondents were shown a consent form that explains that their participation is voluntary, and their data remains anonymous and confidential. This form was incorporated into the introduction page where the topic of the survey, which was said to focus on dog owners' acceptance and opinions on sustainable dog food products, was also communicated. As for the main content of the questionnaire, it was purposively designed with regard to the order of items. The general order was in line with the theoretical framework. However, since some questions might be viewed as a cue to desirable answers of other items by respondents, their order was adjusted to minimize such influence. Demographic data was retrieved at the end of the survey. This was out of the purpose to increase completion rate as some respondents might be reluctant to provide such information.

At the beginning, respondents were asked about their situation of dog ownership. Four closed-end options were given. Then, respondents were asked to report their environmental concerns by responding to five items. After this, respondents' perceptions of sustainable dog food were collected. Since sustainable dog food is relatively new in the market, its meaning could be obscure and unclear. Considering this, a definition of sustainable dog food was given, being products that contain no meat or fish but use plant-based proteins to satisfy the nutritional needs of dogs. This helped to make the context more concrete. This information was given before the items related to the perceived nutritional value of sustainable dog food were introduced. Also, considering the possible influence of brands, no brand name was shown in the explanation.

Following these, respondents were asked to measure their purchase intention of sustainable dog food with four items. Afterwards, the anthropomorphic tendency of respondents towards dogs was measured. Respondents were then asked to assess and report their loneliness levels. Respondents also reported their frequency of meat consumption. Besides, questions about demographic backgrounds were asked, including gender, age, country of residence, and the length of pet ownership. This order was designed because of the

composition of the target population. Since individuals who do not have pet dogs but consider having dogs in the future were also included, the question about the length of being with pet dogs might not be applicable to every respondent. Therefore, putting it at the end would minimize the chance of respondents to quit answering due to the perceived mismatch.

3.3. Sample

Surveys are primarily suitable for studies with individuals being the unit of analysis (Barbie, 2016). Sampling is the process of deciding suitable observations (Barbie, 2016). In the current research, Western European adults who have dogs, used to have dogs, or plan to have dogs form a specific target population. Since it is not feasible to enumerate every individual within the target population and obtain data from them (Barbie, 2016), sampling is needed to select those who are important incidents for a specific research. To improve the generalizability of the survey, the aim was to recruit a sample of at least 200 respondents. Non-probability sampling was applied in this research. This was because the sampling frame (Barbie, 2016) could not cover all members of the target population due to geographical limitation, language barriers, and some units of the population being not reachable.

In line with the research interest, convenient sampling and snowball sampling were combined in this study. By convenient, it means that samples were recruited for being easily assessible, available and willing to participate the study (Etikan et al., 2016). Making use of Facebook groups, key words such as “dog owners” and “dog lovers” were used to find relevant groups with people belong to the target population. After receiving the permission from group admins, the online survey link was then shared in these Facebook groups with tailored introductions. Snowballing refers to reaching individuals in the target population via those who are available and accessible to the researcher (Barbie, 2016). When there is difficulty to locate individuals of a specific target population, snowballing could facilitate reaching those people who suit the research interest and are otherwise hard to locate. Already reached respondents helped with sharing the survey to other respondents via WhatsApp and other Facebook groups.

Though having lots of benefits, the online survey method could still have some

disadvantages. One of them is the sampling bias. While some individuals are more likely to complete surveys, others might show no interests in the study and remain to be the lurker. Thus, those self-selected respondents might lead to systematic bias (Wright, 2005) of the research and influence the generalizability of the result. Besides, there are also access issues (Wright, 2005). The nature of online survey lies in its great reliance on the internet and devices. When distributing survey links online and in Facebook groups, people who do not have access to the internet and those groups would be excluded from the research, though they are within the target population. For example, 56.7% of Dutch population used Facebook, among which, users older than 55 accounting for only 22.8% (NapoleonCat, 2018). Therefore, it was planned to purposefully collect data from older people and those who are hard to reach through Facebook groups by conducting offline survey in gardening stores and supermarkets where some older people purchase dog food, as well as on the street where people walk dogs. This was also designed as a back-up plan if online survey received a low responsive rate or a high drop-out rate. However, due to the social distancing policy during the data collection period, this approach was no longer feasible and was not conducted. Still, having a large sample could help with reducing the influence of the above issues.

Guided by the research design and the sampling plan, an online survey questionnaire was distributed via social media. Over a period of two weeks (i.e. from March 31th to April 14th), respondents were successfully recorded. In total, 489 respondents were reached, among whom, 362 respondents (74%) completed the questionnaire. Among all recorded respondents, three criteria were applied to select the valid sample for the analysis afterwards, namely age, country of residence, and dog ownership. Respondents who were under 18 or reported living in a country outside of Western Europe were filtered out. Besides, those who reported that they had never had a dog and were not interested in having a dog were also excluded. This led to a number of 230 valid samples. As shown in Table 3.1, in general, the observed age range of the valid sample was 20 to 80, with a mean of 41.45 and a standard deviation of 13.96. As for the gender, 11.3% respondents identified themselves as male while 86.1% identified their gender as females. In addition, there were 2 respondents (0.9%) identified

with other genders as well as 4 respondents (1.7%) refused to provide this information. It is noteworthy that respondents from the United Kingdom took up 37.0% of the whole sample. They were followed by respondents from the Netherlands (13.9%), Germany (10.9%), Portugal (9.6%), France (7.0%) and Spain (4.3%). These respondents accounted for the majority (82.7%) in the current research. Less than 20% of valid respondents were recruited from other European countries, such as Belgium, Italy, Luxembourg, and Denmark, with less than 10 respondents in each country. The majority of respondents (89.6%) are current dog owners, while 5.2% of respondents used to have a dog and others (5.2%) never had a dog but showed interested in having a dog in the future.

Table 3.1. Descriptive demographic statistics

Samples	
Reached respondents	489
Completed respondents	362 (74.0%)
Valid samples	230 (47.0%)
Variables	
Gender (%)	
Male	26 (11.3%)
Female	198 (86.1%)
Other	2 (0.9%)
Prefer not to say	4 (1.7%)
Age	
Mean	41.45
SD	13.96
Min-Max	20-80
Country of residence	
The UK	85 (37.0%)
The Netherlands	32 (13.9)
Germany	25 (10.9%)

Portugal	22 (9.6%)
France	16 (7.0%)
Spain	10 (4.3%)
Italy	7 (3.0%)
Switzerland	7 (3.0%)
Belgium	6 (2.6%)
Denmark	6 (2.6%)
Greece	5 (2.2%)
Sweden	4 (1.7%)
Luxembourg	2 (0.9%)
Republic of Ireland	2 (0.9%)
Austria	1 (0.4%)
Dog ownership	
Used to have a dog	12 (5.2%)
Currently have a dog	206 (89.6%)
Never had a dog, but would like to have a dog in the future	12 (5.2%)

3.4. Operationalization

This study aims to demonstrate the association between purchase intention towards sustainable dog food and other consumer variables. To answer the research question, four hypotheses specifying the relations among variables were introduced. To further quantify such relations, related variables (i.e. perceived nutritional value of sustainable dog food, environmental concerns, purchase intention of sustainable dog food, anthropomorphic tendency towards dogs, loneliness) the corresponding measurements are identified. Besides, control variables (i.e. length of pet ownership, consumers' meat consumption frequency, and age) are also defined and operationalized.

3.4.1. Perceived nutritional value of sustainable dog food.

3.4.1.1. Measurement of perceived nutritional value of sustainable dog food

As discussed in the theoretical framework, perceived nutritional value refers to whether dog owners and dog lovers view certain products as being able to provide sufficient nutrients for dogs. Consumer's perceived nutritional value of sustainable dog food suggests how they view the healthiness of such products. This variable was measured by three statements, namely "I believe that sustainable dog food could provide sufficient nutritional value for a dog", "I think that sustainable dog food is just as healthy as conventional dog food that contains meat or fish", and "Sustainable dog food can improve the health of a dog" (adapted from Roininen, 2001). Respondents were asked to indicate on a Likert scale from 1 (Strongly disagree) to 7 (Strongly agree) whether the three statements apply to their individual situations.

3.4.1.2. Factor analysis and reliability analysis of perceived nutritional value of sustainable dog food

With a number of cases larger than 150, a factor analysis was conducted to test whether the three items formed one single scale. Principal Components extraction was used with Varimax rotation based on Eigenvalues (>1.00), $KMO = .73$, $X^2 (N = 230, 3) = 483.81$, $p < .001$. It means that factor analysis was applicable to the items. The result shows that only one component was found which could explain 84.8% of the variance in perceived nutritional value. Factor loadings of each item were shown in Table 3.2. After this, a reliability analysis was conducted. The Cronbach's alpha of this scale was .91 and could not be improved by removing any items. This indicates that the measurement was reliable. The score of the scale was derived from the average score of the three items, ranging from 1.00 to 7.00, with a mean score of 4.13 and a standard deviation of 1.62.

Table 3.2: Factor and reliability analyses for scales for perceived nutritional values ($N = 230$)

Item	<i>Perceived nutritional value</i>
SDF could provide sufficient nutritional value for a dog	.95
SDF is as healthy as conventional dog food with meat or fish	.92
SDF can improve the health of a dog	.90
<i>R</i> ²	84.8%
<i>Cronbach's α</i>	.91

3.4.2. Environmental concerns

3.4.2.1. Measurement of environmental concerns

Environmental concerns were included as a variable since the marketing of pet food product aims to leverage the environmental cause. Whether consumers care about the environment could influence their purchase intention. This variable was measured by five items, such as “I would be proud to be seen as having an environmental-friendly lifestyle”, “I feel strong ties with pro-environmentalist people”, and “I think of myself as an environmental-friendly consumer” (adapted from Brick, Sherman, & Kim, 2017; Whitmarsh & O’Neill, 2010). A seven-point Likert scale from 1 (Strongly disagree) to 7 (Strongly agree) was provided for respondents to choose from.

3.4.2.2. Factor analysis and reliability analysis of environmental concerns

The five items were entered into factor analysis using Principal Components extraction. The approach of varimax rotation was taken based on Eigenvalues (>1.00). With the following figures of $KMO = .88$, $X^2 (N = 230, 10) = 621.35$, $p < .001$, the factor analysis was suitable. 70.0% variance of environmental concerns was explained by the only component found in the model. Therefore, environmental concerns could be measured by one scale. Factor loadings were shown in the Table 3.3 below. The reliability analysis delivers a

Cronbach's alpha of .89, meaning that the scale was reliable. By deleting any items, the reliability of the scale would not be improved. To calculate the score of the scale, the average score of the five items was calculated. Ranging from 1.00 to 7.00, the scores has a mean of 5.36 and a standard deviation of 1.03.

Table 3.3: Factor and reliability analyses for scales for Environmental Concerns ($N = 230$)

Item	<i>Environmental concerns</i>
Myself as pro-environmentalist	.73
Strong ties with pro-environmentalists	.67
Myself as an environmental-friendly consumer	.68
Concerned with environmental issues	.76
Proud to be seen with an environmental-friendly lifestyle	.66
R^2	70.0%
<i>Cronbach's α</i>	.89

3.4.3. Purchase intention of sustainable dog food

3.4.3.1. Measurement of purchase intention of sustainable dog food.

In order to measure consumers' purchase intention of the sustainable pet food, four items were used (adapted from Lii & Lee, 2012), being "I would be interested in sustainable dog food", "I would be willing to give my dog sustainable dog food", "It's likely that I'll buy sustainable dog food", and "I would consider purchasing sustainable dog food". Answers were given on a Likert scale from 1 (Strongly disagree) to 7 (Strongly agree).

3.4.3.2. Factor analysis and reliability analysis of purchase intention of sustainable dog food

Similarly, the four items were put into the factor analysis. It was conducted with

Principal Components extraction and Varimax rotation based on Eigenvalues (>1.00), $KMO = .87$, $X^2 (N=230, 6) = 1286.25$, $p < .001$. One single component was found, which explained 92.4% of the variance in purchase intention. This means that the concept of purchase intention could be measured by one scale. The table below shows the factor loadings. According to the reliability analysis, the Cronbach's alpha was .97, which indicates that the measurement of purchase intention of sustainable dog food was a reliable scale. The scale score was calculated by averaging the score on all four items. Scale scores ranged from 1.00 to 7.00, with 4.44 as the mean and 1.81 as the standard deviation.

Table 3.4: Factor and reliability analyses for scales for Purchase Intention ($N = 230$)

Item	<i>Purchase intention</i>
I would be interested in SDF	.91
I would be willing to give my dog SDF	.93
I would consider purchasing SDF	.94
It is likely that I will buy SDF	.91
R^2	92.4%
<i>Cronbach's α</i>	.97

3.4.4. Anthropomorphic tendency

3.4.4.1. Measurement of anthropomorphic tendency

In their research, Waytz et al. (2010a) applied the Individual Differences in Anthropomorphism Questionnaire. The questionnaire included 15 anthropomorphism items and 15 non-anthropomorphic items. Among the 15 items referring anthropomorphism, 5 items specifically measure anthropomorphism on animals with eleven-point Likert scale from 0 (not at all) to 10 (very much). A shortened version of questionnaires was applied by Letheren, Martin, and Jin (2017), reducing items that are not related to anthropomorphism since they could be distracting. They also altered the scale to seven-point by asking

respondents to rate from 1 (not at all) to 7 (very much). The scale still covers the 5 animal-specific items of anthropomorphism. In the research by Epley et al. (2008), items about fourteen traits were used for respondents to rate their pets. Among those, seven were categorized as anthropomorphic traits. The seven traits were further classified into three traits (i.e. considerate, thoughtful, and sympathetic) that are specifically concerned about social connection and four traits (i.e. embarrassable, creative, devious, and jealous) pertaining other aspects.

The measurement of anthropomorphic tendency in the current research was based on the two types of scales. Animal-related items applied in the research of Waytz et al. (2010a) and Letheren et al. (2017) were chosen and further altered to refer to dogs exclusively. These items mainly describe mental capabilities that demonstrate the agency of individuals, meaning that animals are not means to be exploit or used by others, but “exist as an end in themselves” (Waytz et al., 2010a, p.224). Therefore, they lack an aspect of the connection between individual and others, which could be complemented by the three items (i.e. considerate, thoughtful, and sympathetic) used by Epley et al. (2008). The three items offer descriptions of human psychological features as being in the interaction with other beings. Based on the two scales, seven statements were used in the current research to measure whether pet owners anthropomorphize dogs. Items are, for example, “I believe that dogs have free will”, “I believe that dogs have intentions”, and “I believe that dogs can be thoughtful” (adapted from Epley et al., 2008; Letheren et al., 2017). Respondents assessed and reported their own situations on a Likert scale from 1 (Strongly disagree) to 7 (Strongly agree).

3.4.4.2. Factor analysis and reliability analysis of anthropomorphic tendency

A factor analysis was conducted with the seven items by using Principal Components extraction with Varimax rotation, $KMO = .80$, $X^2 (N=230, 21) = 697.15$, $p < .001$. When the Eigenvalue was above 1.0, it would be counted as a component. Therefore, two components were found in the model, which suggested that there were two subscales. To examine which item belongs to which subscale, the rotated component matrix was referred to. As shown in

the Table 3.5, there were two items categorized into both the two components. They were further classified based on the value of factor loading as well as their contents. When factor loading of one factor was obviously higher than the other, and there appeared to be a content match, the item was categorized into that factor. The two factors found were:

Individual ability anthropomorphic traits. Four items were included in this factor. They all pertain the individual subjective ability, such as having free will, intentions, emotions and own minds.

Supportive anthropomorphic traits. The other three items belonged to the second factor. They primarily focused on the relationship between individuals. Traits included being considerate, thoughtful, and sympathetic.

The two components explained 67.1% of the variance in anthropomorphic tendency, with 52.19% and 14.9% respectively. This result of a two-factor solution was not surprising since the initial scale was adapted from the combination of two scales. Therefore, two separate subscales were used in the data analysis. Reliability analyses were conducted on the two subscales separately. For the first subscale, a Cronbach's alpha of .70 was retrieved, meaning the scale was reliable. Though the Cronbach's alpha could be improved to .71 if deleting the first item, the improvement was slight. Therefore, the scale score was calculated with all the four items. The average score of the four items was used as the scale score, ranging from 3.75 to 7.00, The mean was 6.04 while the standard deviation was 0.73.

For the other three items, a reliability analysis was also conducted. The Cronbach's alpha was .87 and could be improved by removing the last item to .89. Since the original Cronbach's alpha was already high enough to prove the reliability of the scale, the scale score was calculated with all the three items with their average scores. The results ranged from 1.67 to 7.00, with a mean of 5.94 and a standard deviation of 1.07.

Table 3.5: Factor and reliability analyses for the scale of Anthropomorphic Tendency ($N = 230$)

Item	<i>Individual ability anthropomorphic traits</i>	<i>Supportive Anthropomorphic traits</i>
------	--	--

Dogs have free will	.91	
Dogs have intentions	.93	
Dogs experience emotions	.94	
Dogs have a mind of their own	.91	
Dogs can be considerate		.87
Dogs can be thoughtful		.91
Dogs can be sympathetic		.78
<i>R</i> ²	52.19%	14.9%
<i>Cronbach's α</i>	.71	.87

3.4.5. Loneliness

3.4.5.1. Measurement of loneliness

UCLA Loneliness Scale is the mostly used measurement of loneliness. Though having been introduced for 40 years, it is still applied in some research (McConnell, Brown, Shoda, Stayton, & Martin, 2011). To overcome the pitfall such as systematic bias led by the overall negative wording and inconsistency among results (Zarei, Memari, Moshayedi, & Shayestehfar, 2016), reversed items were included in the revised UCLA Loneliness Scale Version 3 (Russell, 1996). With high internal consistency and coefficient alphas (0.89-0.94), as well as adequate test-retest reliability, it has been frequently adapted in academic research (Dodeen & Hassan, 2019). Adapted from this scale, loneliness in the current research was measured by six statement, such as “How often do you feel that you can find companionship when you want it”, “How often do you feel that there are people who really understand you”, and “How often do you feel part of a group of friends” (adapted from Russell, 1996). Respondents answered on a Likert scale from 1 (Never) to 7 (Always). As some reverted questions were included in the original scale of Russell (1996), three items of the current research were also reverted. Therefore, they needed to be re-coded in the data analysis. The

scale score was calculated by averaging scores of the six items. It ranges from 1.50 to 6.67, with a mean of 3.28 and a standard deviation of 0.96.

3.4.5.2. Factor analysis and reliability analysis of loneliness

A factor analysis was conducted to test the validity of the scale. Principal Components extraction with Varimax rotation based on Eigenvalues (>1.00), $KMO = .85$, $X^2 (N = 170, 15) = 325.61$, $p < .001$. 54.2% of variance was explained by this factor. Therefore, there was a single scale to measure loneliness. Factor loadings were shown below in Table 3.6. A reliability analysis was also conducted. According to that, Cronbach's alpha was .83 which could not be further improved by item removals.

Table 3.6: Factor and reliability analyses for scales for Purchase Intention ($N = 170$)

Item	<i>Loneliness</i>
Can find companionship when want *Reversed	.70
Feel no one can turn to.	.73
Feel part of a group of friends *Reversed	.74
Interest and ideas are not shared by those around.	.69
There are people who really understand you. *Reversed	.80
Being left out	.77
R^2	54.2%
<i>Cronbach's α</i>	.83

3.4.6. Control variables

3.4.6.1. Consumer's meat consumption frequency

Since pet owners greatly decide pet dog diets, their own diet habits could also influence their purchase intention on sustainable dog food. For pet owners who avoid meat

consumption in their own diets, feeding dogs with meat-based products might conflict with their values and reasons behind non-meat consumption. Therefore, they might be more likely to provide non-meat pet food to their dogs. As the research by Dodd et al. (2019) shows, vegans reported no concerns for feeding food that is based on plants and vegetables to their dogs. For people who consume meat on the daily basis, the situation of might be different. Therefore, the frequency of consumer's meat consumption was included in this research as a control variable.

In particular, it was included into the test of H1, H2 and H3 because these three hypotheses had purchase intention towards sustainable dog food as the dependent variable. Two items were provided to measure this variable, namely "How often do you consume meat", and "How often do you consume fish". Respondents answered the two statements on a Likert scale from 1 (Never) to 7 (Always). In this scale, the Cronbach's alpha was .73, meaning it was a reliable measurement. By calculating the average score on the two items, the scale score was retrieved, ranging from 1.00 to 7.00. The mean was 3.57 and the standard deviation was 1.55.

3.4.6.2. Length of pet ownership

Consumer's pet ownership was also a control variable of this research. This is because that the amount of time that people have spent with their pets is also positively associated with empathic concerns that they have about pets (Cloutier & Peetz, 2016). With a length of pet ownership longer than ten years, owners are more willing to pay more for their dogs (Pauliuc & Fu, 2018). Second, the longer the owner has been with their pets, the older their dogs would be. Dog's age has been found to be associated with the amount of food to be fed as well as the length that illness could last (Heuberger & Wakshlag, 2011). Therefore, it could influence the dog-owner relationship and might also influence owner's purchase decisions. The influence of this factor was controlled in all the four hypotheses. It was measured by a question of "How long have you been keeping your (first) dog?". Since this variable might not be applicable to all respondents, those who have not had a dog were asked to skip the

question. Respondents chosen from 17 options with a range from “Less than 1 year”, “1 year”, to “15 years”, and “More than 15 years”.

3.4.6.3. Age

The demographic variable age was one of the control variables included into the test of H4. Previous scholarly research reported a negative correlation between age and anthropomorphic tendency (Letheren et al., 2016). Older people were found to be less likely to anthropomorphize. Besides, while loneliness is recognized as a prevalent problem among adults, Victor and Yang (2011) found that people younger than 25 and older than 65 reported the highest level of loneliness. Therefore, there might also be influence exerted by age of respondents. However, since age was not the key focus on the current research, it was included in the hypothesis test as a variable to be controlled. Respondents reported their age in the given blank under the question.

3.5. Data analysis

After finishing the data collection, data were input into SPSS for further analyses. Statistic techniques were chosen based on the combination of measurement levels. Since all variables, namely perceived nutritional value of sustainable dog food, environmental concerns, purchase intention of sustainable dog food, anthropomorphic tendency, loneliness, and consumer’s meat consumption frequency are all continuous variables, linear regression analysis was suitable. In particular, hierarchical linear regression was applied to the testing of all the hypotheses. Hierarchical linear regression is an analysis approach which aims to examine whether a new group of variables could improve the prediction value of the previous group of variables (Leech, Barrett, & Morgan, 2015). Therefore, this approach of analysis could test the effect of moderators. It is also useful for the inclusion of control variables that are not of primary interest but might have influence on the dependent variable.

To test the association between perceived nutritional value and purchase intention (i.e. H1), two control variables of length of pet ownership and frequency of meat consumption

were also included. Therefore, a hierarchical linear regression was used. H2 aimed to test the moderating effect of perceived nutritional value on the association between environmental concerns and purchase intention. The same two control variables were included. Therefore, hierarchical regression analysis was also a match. The same analysis went for the testing of H3 which expected a moderating effect of anthropomorphic tendency on the relation between perceived nutritional value and purchase intention. The same two control variables were also incorporated into the model. As for H4, loneliness was the independent variable and anthropomorphic tendency was the dependent variable; besides, two other variables, namely frequency of meat consumption and age, were designed to be controlled. Therefore, the approach of hierarchical regression analysis was still applied in testing this hypothesis.

3.6. Validity and reliability

Validity means whether a research measures what it aims to measure. It is closely related to measurement validity, which refers to whether the operationalization measures concepts that the research is interested in (Adcock & Collier, 2001; Heale & Twycross, 2015). In the current research, validity was enhanced in four ways. First, existing scales were used and adapted to suit the contexts of the current study. By using those already established scales which have been tested, the validity of the survey could be improved (Hyman, Lamb, & Bulmer, 2006). Second, factor analyses were conducted on the adapted scales to ensure that one single scale measured a concept. Third, the recruitment of respondents was facilitated by Facebook groups and snowballing. By resorting to groups of similar interests as well as snowballing, the survey distribution went beyond the reach of the researcher's personal connection. Individuals from different Western European countries, with different backgrounds, and having different demographic traits were recruited. Fourth, respondents were filtered by three criteria, namely age, dog ownership and country of residence. The setting of filter questions also helped to improve the confidence in recruiting respondents within the target population and obtaining data about them.

Reliability is another significant factor that influences the quality of research. It refers to

the consistency of the measurements (Heale & Twycross, 2015), which means that same results would be obtained if repeating the research using the same research designs. The reliability of the current research was improved by using a standard format of questionnaire. Instructions of how to fill the survey were given. It means that all respondents were asked the same questions and answered in a standardized manner. Besides, reliability analyses were conducted to test the reliability of each scale. Cronbach's α is one of the most commonly used tools to test internal consistency (Heale & Twycross, 2015). By measuring and analyzing the Cronbach's α , whether all items within a scale measure the same concept was tested. Moreover, the initial research design planned to employ offline data collection by distributing survey at physical dog food shops, supermarkets, and on the street. This was primarily out of the purpose to minimize the access bias in data collection by purposively reaching the old and other people who could not be located via social media. However, due to the force-majeure circumstance of the COVID-19 virus and the corresponding policy of self-distancing, this offline approach could not be applied. Still, online-retrieved samples were diversified as much as possible by purposively distributing the survey in diverse Facebook groups, such as All Things Dog UK, Dog Owners in Berlin, Copenhagen dog lovers club, and Expats with pets in The Hague.

4. Results

There were four hypotheses introduced based on the theoretical discussion. In order to test these four hypotheses, statistical analyses were conducted in SPSS with data retrieved from the online survey. This chapter includes the results of hypotheses testing with collected data. Important figures are organized in tables and further interpreted.

Hypothesis 1

In H1, a positive relationship between the level of perceived nutritional value of sustainable dog food and purchase intention towards the corresponding products was expected. The *independent variable* was perceived nutritional value, a continuous variable. The *dependent variable purchase intention* was also a continuous variable. Based on such a combination of variables, a hierarchical linear regression analysis was conducted to test whether the directional relation significantly existed. In the linear regression, purchase intention served as the criterium. To control possible influences from the control variables, frequency of meat consumption and length of dog ownership were put into the first model. Then the perceived nutritional value, which was the predictor, was put into the second model.

Results (Table 4.1) show that the second model, $F(3, 214) = 286.49, p < .001, \Delta R^2 = 72.9\%$, was significantly better than the first model, $F(2, 215) = 8.33, p < .001, R^2 = 7.2\%$. When the frequency of meat consumption and length of dog ownership were controlled, perceived nutritional value had a significantly positive influence on purchase intention ($\beta = .88, p < .001$). Therefore, H1 was accepted. It is also noteworthy that in model 1, the frequency of meat consumption by itself, one of the control variables, had significant but negative influence on purchase intention ($\beta = -.26, p < .001$). However, after the entry of perceived nutritional value in the second block, frequency of meat consumption was no longer significant ($\beta = -.04, p = .209$). The other control variable, length of pet ownership, did not have significant effect on purchase intention ($\beta = .03, p = .266$).

Table 4.1. Regression model for predicting the purchase intention towards sustainable dog food ($N=230$)

	Model 1	Model 2
	β^*	β^*
Frequency of meat consumption	-.26***	-.04
Length of dog ownership	.08	.03
Perceived nutritional value		.88***
	$R^2 = .07$	$\Delta R^2 = .73$
	$p < .001$	$p < .001$
Result: H1 was accepted		

Significance levels: * $p < .050$, ** $p < .010$, *** $p < .001$

Hypothesis 2

As for H2, the *independent variable* was environmental concerns while purchase intention towards sustainable dog food was the *dependent variable*. As discussed in the theoretical framework, perceived nutritional value was expected to play the role of *moderating variable* of the positive relation between the independent variable and the dependent variable. Since both the two variables and the moderator were continuous variables, hierarchical linear regression was suitable for the statistic testing of the hypothesis. To test the moderating effect, the moderator and the independent variable were standardized in SPSS. An interaction term was created by multiplying the independent variable and the moderator. Purchase intention towards sustainable dog food was put into the model as the criterium. Control variables of frequency of meat consumption and length of dog ownership were put into the first block. After being standardized, environmental concerns and perceived nutritional value were included into the second block. According to the results (Table 4.2), the main effects environmental concerns and perceived nutritional value explained 80.1% of the variance in purchase intention, $F(4, 213) = 214.67, p < .001$.

The interaction term was finally entered into the third block, but it did not significantly

increase the model's predictive power ($\Delta R^2 = .00$, $F_{\text{change}}(1, 212) = 0.04$, $p = .851$). Therefore, H2 should be rejected. In addition, as shown in the second model in Table 4.2, environmental concerns, the independent variable, had no direct and significant effect on purchase intention ($\beta = .03$, $p = .422$), while perceived nutritional value was significantly and positively associated with purchase intention ($\beta = .88$, $p < .001$). As for the two control variables, length of pet ownership did not significantly influence purchase intention ($\beta = .03$, $p = .269$). Frequency of meat consumption had a significant effect on purchase intention in the first model ($\beta = -.26$, $p < .001$). However, the effect was no longer significant ($\beta = -.03$, $p = .360$) with the entry of perceived nutritional value and environmental concerns.

Table 4.2. Regression model for predicting the purchase intention towards sustainable dog food ($N=230$)

	Model 1	Model 2	Model 3
	β^*	β^*	β^*
Frequency of meat consumption	-.26***	-.03	-.03
Length of dog ownership	.08	.03	.03
Environmental concerns		.03	.03
Perceived nutritional value		.88***	.88***
Interaction term			.01
	$R^2 = .07$	$\Delta R^2 = .73$	$\Delta R^2 = .00$
	$p < .001$	$p < .001$	$p = .851$
Result: H2 was rejected			

Significance levels: * $p < .050$, ** $p < .010$, *** $p < .001$

Hypothesis 3

In H3, perceived nutritional value was again the *independent variable* while purchase intention was still the *dependent variable*. What makes this hypothesis different from H1 was the expected moderating effect of anthropomorphic tendency on the relation between the two

variables. As mentioned above, perceived nutritional value and purchase intention were both continuous variables. Anthropomorphic tendency was also a continuous variable. Since two factors (i.e. individual ability anthropomorphic traits, supportive anthropomorphic traits) were found in the factor analysis of anthropomorphic tendency, this variable was divided into two subscales to be integrated into the models separately (Table 4.3).

H3-1. Purchase intention played the role of the criterium. In the first block, frequency of meat consumption and length of dog ownership were included as the control variables. Standardized perceived nutritional value and individual ability anthropomorphic traits were imported in the second block, explaining 80.1% of the variance in purchase intention, $F(4, 213) = 214.54, p < .001$. After the entry of the interaction term in the third block, however, it did not significantly increase the model's predictive power, $\Delta R^2 = .00, F_{\text{change}}(1, 212) = 0.50, p = .480$. For the main effect, perceived nutritional value had a significant effect on purchase intention ($\beta = .88, p < .001$), while individual ability anthropomorphic traits did not significantly associate with purchase intention ($\beta = .02, p = .463$). Length of dog ownership had no significant effect on purchase intention ($\beta = .03, p = .261$), while the significant effect of frequency of meat consumption no longer existed after the entry of perceived nutritional value and individual ability anthropomorphic traits in the second group ($\beta = -.04, p = .262$).

H3-2. The same control variables were entered into the first group, with purchase intention being the criterium. Along with the standardized variable of perceived nutritional value, the second subscale of anthropomorphic tendency (i.e. supportive anthropomorphic traits) was standardized and put into the second block. They explained 80.4% of the variance in purchase intention, $F(4, 213) = 218.138, p < .001$. However, by including the interaction term, the predictive value of the model was not significantly increased ($\Delta R^2 = .00, F_{\text{change}}(1, 212) = .351, p = .554$). It worth noting that in the second model, perceived nutritional value had a direct and significant effect on purchase intention ($\beta = .87, p < .001$). The effect of supportive anthropomorphic traits was marginally significant ($\beta = .057, p = .066$). As for control variables, no significant effect was found in the length of dog ownership on purchase intention ($\beta = .03, p = .286$). The effect of frequency of meat consumption was no longer significant when perceived nutritional value and individual ability anthropomorphic traits

were entered into the second group ($\beta = -.04, p = .241$).

Based on these two parts of analyses, H3 was also rejected.

Table 4.3. Regression model for predicting the purchase intention towards sustainable dog food ($N=230$)

H3-1			
	Model 1	Model 2	Model 3
	β^*	β^*	β^*
Frequency of meat consumption	-.26***	-.04	-.04
Length of dog ownership	.08	.03	.04
Perceived nutritional value		.88***	.88***
Anthropomorphic tendency: individual ability		.02	.02
Interaction term			-.02
	$R^2 = .07$	$\Delta R^2 = .73$	$\Delta R^2 = .00$
	$p < .001$	$p < .001$	$p = .480$
H3-2			
	Model 1	Model 2	Model 3
	β^*	β^*	β^*
Frequency of meat consumption	-.26***	-.04	-.04
Length of dog ownership	.08	.03	.03
Perceived nutritional value		.87***	.87***
Anthropomorphic tendency: individual ability		.06	.05
Interaction term			-.02
	$R^2 = .07$	$\Delta R^2 = .73$	$\Delta R^2 = .00$
	$p < .001$	$p < .001$	$p = .554$
Result: H3 was rejected			

Significance levels: * $p < .050$, ** $p < .010$, *** $p < .001$

Hypothesis 4

As for H4, a positive relation between loneliness and anthropomorphic tendency was expected. In this hypothesis, loneliness, which was a continuous variable, played the role as the *independent variable*. Besides, the *dependent variable* anthropomorphic tendency was also a continuous variable. Considering such a combination of variables, the hypothesis was tested with a linear regression analysis. Due to the two factors found in anthropomorphic tendency, the analysis was also divided into two parts (Table 4.4).

H4-1. Two control variables of age and length of dog ownership were included in the first step, with individual ability anthropomorphic traits as the criterium. Then, loneliness was included in the second step. As the result showed, only 0.1% of the variance of anthropomorphic tendency focusing on individual abilities was explained by the model, $F(3, 156) = 0.06$. The model was not significant ($p = .981$). The two control variables did not have significant effects on anthropomorphic tendency, with $\beta = -.03$, $p = .731$ for length of pet ownership and $\beta = -.01$, $p = .902$ for age.

H4-2. The same two control variables were put into the first block. The criterium was supportive anthropomorphic traits. Then, loneliness was entered into the second block. Still, the model only explained 1% of the variance in anthropomorphic tendency with a focus on supportive traits, $F(3, 156) = 0.29$. However, the model was not significant ($p = .833$). Effects of the two control variables of length of pet ownership ($\beta = .04$, $p = .672$) and age ($\beta = -.06$, $p = .434$) were not significant.

Therefore, H4 should be rejected.

Table 4.4. Regression model for predicting anthropomorphic tendency ($N = 170$)

H4-1			
	Model 1	Model 2	
	β^*	β^*	
Length of dog ownership	-.03	-.03	
Age	-.01	-.01	

Loneliness		-01
	$R^2 = .00$	$\Delta R^2 = .00$
	$p = .918$	$p = .942$
H4-2		
	Model 1	Model 2
	β^*	β^*
Length of dog ownership	.03	.04
Age	.02	.01
Loneliness		-.06
	$R^2 = .00$	$\Delta R^2 = .00$
	$p = .881$	$p = .434$
Result: H4 was rejected		

Significance levels: * $p < .050$, ** $p < .010$, *** $p < .001$

5. Conclusion

5.1. Summary of findings

In the context of sustainable dog food, this research focused on factors that have an influence on (potential) consumers' purchase intention towards sustainable dog food products. According to the results, the following conclusion could be drawn. A positive and significant association was found between perceived nutritional value of sustainable dog food and the purchase intention. It means that when consumers view sustainable dog food products as nutritional, they would be more willing to consider purchasing such products. Nutritional value perception is, therefore, a direct predictor of purchase intention towards sustainable dog food, and the hypothesis 1 could be accepted. Perceived nutritional value did not moderate the relation between environmental concerns and purchase intention, suggesting that the hypothesis 2 could be rejected. However, perceived nutritional value per se was still positively associated with purchase intention in the main effect while environmental concerns by itself had no significant influence on purchase intention.

The factor anthropomorphic tendency was expected to serve as another moderator that could enhance the relation between perceived nutritional value of sustainable dog food and the corresponding purchase intention. It was divided into two sub-factors, namely individual ability anthropomorphic traits and supportive anthropomorphic traits. Results show that neither the individual ability anthropomorphic traits nor the supportive perspective moderated the association. Therefore, the hypothesis 3 was rejected. Still, perceived nutritional value remained to be a significant factor that directly and positively predicted purchase intention. While individual ability anthropomorphic traits did not significantly influence purchase intention, supportive anthropomorphic traits had marginal significance to predict purchase intention. Thus, this demonstrates that when dogs are perceived as being capable of offering supports to human owners, owners are more likely to have the motivation to purchase sustainable dog food for their dogs.

As for the two control variables, how frequently that (potential) dog owners consumed meats and fish could influence their purchase intention towards sustainable dog food, their

effects only stayed significant when exerting influence on purchase intention alone. After the inclusion of other variables (e.g. perceived nutritional value), its effect was no longer significant. This means that the frequency of meat consumption could influence purchase intention, but other factors were more important predictors. Length of dog ownership did not have significant association with purchase intention. As for the association between loneliness and anthropomorphic tendency, loneliness did not correlate with individual ability anthropomorphic traits, nor supportive anthropomorphic traits. Neither of the two control variables, being length of dog ownership and age of respondents, significantly influenced the level of anthropomorphic tendency. Therefore, the hypothesis 4 was also rejected.

5.2. Theoretical implications

Guided by the research question, the current research examines predictors of purchase intention towards sustainable dog food products without livestock meats but using alternative ingredients, such as plants, as nutrients providers. As conscious plans made by consumers (Kim & Ko, 2012), purchase intention is based on the interplay of consumer's takes and gives (Khan & Mohsin, 2017). Takes refer to the values that consumers could receive while gives are the sacrifices they need to make. If being assessed as beneficial, desirable and capable to fulfill consumer's desires, products or services would then be viewed as valuable (Ramayah et al., 2010). Academic literature uses different typologies to categorize perceived values. The most discussed three are functional values, social values and emotional values (Hsiao & Chen, 2016). In the context of sustainable dog food, the purchase intention could also be explained from the perspective of value perception.

Functional value refers to the quality and consistent performances of products (Hsiao & Chen, 2016). The core function of most commercial dog food products is to satisfy the basic demand of dogs, support their daily activity and maintain their health. They are usually formulated and manufactured as "whole, nutritionally complete food commodities" (Wrye, 2012, p. 4), meaning that the intake demands for nutrients could be satisfied by consuming the products exclusively while additional feeding is rarely needed. For dog owners, compared

to home-cooked dog meals and human leftovers, the added value of commercial dog food products could be that they serve as a timesaving and reasonable feeding solution. Dog owners do not have to spend a lot of time preparing ingredients and cooking but could feed instant food products that are ready to be eaten by their dogs (Wrye, 2012). Dry dog food products, for example, could be poured into a bowl for a relatively long period of time without worries of food spoilage (Rolinec et al., 2016).

When considering sustainable dog food, which is also a type of commercial dog food products, consumers could also expect the product to be a time-efficient and reasonable feeding solution. According to the result of the current research, a significantly positive prediction effect of perceived nutritional value on purchase intention was found. It demonstrates that it is the good performance to maintain dog's health that matters for dog owners when they consider sustainable dog food products. The significance of nutrients in pet food is constructed (Wrye, 2012) by the interplay of pet food manufacturers, scientific research, pet food organizations, and consumers. Since dog owners could not directly experience the performance of sustainable dog food, they rely on nutritional metrics to assess its functionality and quality. When being nutritional is the function of sustainable dog food to maintain the health of dogs, it could also be translated into a functional value for dog owners to finish their daily feeding tasks. Being perceived as nutritional, sustainable dog food products could provide utilitarian values to dog owners as they reduce the time and efforts needed to be invested in dog feeding. Therefore, when viewing sustainable dog food as nutritional, dog owners are more likely to consider purchasing such products in the future.

Apart from its generic category of commercial dog food products, sustainable dog food could also be classified as green products which are viewed as environmentally friendly. Using no meat and fish as ingredients, sustainable dog food is expected to reduce ecological food prints and minimize environmental impacts. From a viewpoint of value proposition in products, sustainable dog food as green products may also address the functional value. For consumers who are concerned about the environment, one functionality of green products is to reduce negative environmental influences. However, results show that environmental concerns did not significantly influence purchase intention towards sustainable dog food.

This is in line with some previous research that argues environmental concern is not a direct predictor of purchase intention (Ramayah et al., 2010).

One reason could be that, although being concerned about the environmental issues, consumers may still not rank such concerns as the top priority (Ramayah et al., 2010). As previously mentioned, purchase intention is based on the assessment of benefits that could be derived from products and sacrifices that consumers need to make to get the products (Khan & Mohsin, 2017). While being environmentally friendly is the gain, other factors may be the pain. Individual inconvenience is a factor that has been found to negatively influence consumers to purchase responsibly (Ramayah et al., 2010). Sustainable dog food products are relatively new in the market. Since they are innovative, consumers might lack the knowledge of the actual benefits that such products could deliver to protect the environment (Suki, 2016) as well as the proper amount to feed their dogs. The unfamiliarity of sustainable dog food might lead consumers to view it as a burden to learn and understand innovative green products. Such a lack of understanding of sustainable dog food as environmentally friendly might lead consumers who care about environment protection to hesitate to consider purchasing. Therefore, it might explain the insignificant association between environmental concerns and purchase intention.

Moreover, the scale applied in the questionnaire included items pertaining respondent's self-concept and identification, for example, asking their ties with environmentalists as well as whether they are proud of environmentally friendly lifestyles and purchases. These items could touch the social value aspect of sustainable dog food products. Social value pertains the identification and recognition of individuals (Hsiao & Chen, 2016). When green consumption becomes a lifestyle and offers an approach towards self-recognition, it has a symbolic meaning (Wang, 2010) and brings benefits to individual's self-concept enhancement (Hsiao & Chen, 2016). The insignificant relation found in the current research could mean that consumers do not resort to sustainable dog food purchases to present their identity, but other environmentally responsible behaviors or fields to fulfill social recognition.

An explanation could be that dog owners view dogs and themselves as different individuals. It is their own behaviors rather than those of dogs that represent who they are.

Therefore, in order to present an environmental-friendly image and enhance such a self-concept, dog owners might choose to adapt to a vegetarian lifestyle or use recyclable items themselves, rather than impose such a lifestyle on their dogs. In addition, since non-meat dog food is new to the market, its value for both the environment and dog's health might not be fully understood by dog owners. Therefore, dog owners might not include consuming sustainable dog food into their self-concept. Besides, by raising and taking care of dogs, owners might already have a self-concept of caregivers and dog lovers. Such a self-concept could be strong as dog owners interact with their dogs on a daily basis. To enhance the self-image of a good caregiver, dog owners might resort to commonly acknowledged approaches, such as feeding premium meat products. If they value the self-concept of a good caregiver more than being environmental-friendly, they might hesitate to provide dogs with non-meat food as it conflicts with common practice and might harm their image of good caregivers. Therefore, by interpreting from a perspective of social values, the insignificance could also be explained.

Furthermore, although perceived nutritional value is a direct predictor of purchase intention towards sustainable dog food, results indicate that how consumers view the nutritional value could not moderate the association between environmental concerns and purchase intention. As discussed above, dog owners might tend to maintain an image of a good caregiver, compared to being viewed as environmentally friendly. Even though they are concerned about the environment, they might not consider purchasing environmentally friendly products if such products are not aligned with the image of a good dog keeper. On one hand, a good caregiver is a self-concept that owners build themselves. If sustainable dog food is believed to be nutritional by a dog owner, it might not be viewed as against such a self-concept. On the other hand, a good caregiver could also be an image perceived by others. Besides building a self-image, dog owners might also attempt to comply with other's views of a good dog keeper.

According to Ham, Jeger, & Ivkovic (2015), social norms refer to others' opinions on the proper and desirable behaviors, and descriptive norms are the actual behavior of others. Individuals tend to comply with the behavior and expectation of others in their reference

network (Delon, 2018). The way other dog owners feed their dogs could serve as important references for individual's feeding practices. Meats are important sources of nutrients that have been included into traditional dog food. It is a common practice of dog owners to include meats in dog's diets. The increasing demands for higher content and quality of meats (Okin, 2017) suggests that such a practice of feeding dogs with meat-included diets could be perceived as socially acceptable or even become a "normative force" (Delon, 2018, p. 4). Sustainable dog food is innovative products that have not been well-recognized as beneficial to dogs' health. Therefore, feeding sustainable dog food products might conflict with what other dog owners feed to their dogs and what others believe to be proper. Even though some consumers view sustainable dog food as nutritional themselves, they might still hesitate to consider such products because it has not become an acknowledged and desirable option. Purchasing sustainable dog food might not help improving their images of good caregivers in the eyes of others. Therefore, this might explain why perceived nutritional value was not found to be a significant moderator.

In addition, previous research has found that differences in attributes could influence consumer's product switching intentions (Irianto, Haryono, Haryanto, & Riani, 2015). Compared to traditional dog food products, being environmentally friendly is an added value of sustainable dog food that is different from conventional dog food products. However, since sustainable dog food products are relatively new in the market, though being concerned about the environment, dog owners might lack the understanding of environmental benefits of sustainable dog food. Even though they believe sustainable dog food is nutritional, such products might not be obviously distinct from other dog food products that could also satisfy dog's nutritional needs. Besides, when switching to new products, there could be switching costs such as the learning cost (Burnham, Frels, & Mahajan, 2003). In order to acquire knowledges to use the product, consumers need to invest time and efforts (Burnham et al., 2003). For example, dog owners need to spend time figuring out the proper amount to feed their dogs. If dog owners do not recognize the environmental benefits of sustainable dog food but merely view it as nutritional as some other products, they might not be motivated to switch from other nutritional dog food products that they have already chosen to sustainable

dog food products. Thus, this might also explain why no significant moderating effect of nutritional value was found.

While anthropomorphic ability traits were not significantly related to purchase intention, supportive anthropomorphic tendency could directly, though marginally significantly, predict purchase intention towards sustainable dog food. Anthropomorphism is the process of attributing humanlike features onto non-human agent. By anthropomorphizing dogs, humans see similarities between human beings and dogs in visible appearances and behaviors. More importantly, they perceive the mind (Waytz et al., 2010c) in dogs. Dogs are believed to have their own intentions, be able to have emotions, and exhibit behaviors as they want. This perspective of ability makes dogs being viewed as intelligent and serves as the foundation of animal ethics. However, it is not necessarily enough for the establishment of an emotional connection between owners and pet dogs.

Emotional bonds imply an interactive context. Human features go beyond mere abilities and wills, but also address traits related to interaction. The anthropomorphism of dogs could facilitate the “inter-species social referencing” (Martens, Enders-Slegers & Walker, 2016, p.74). In human families, dogs sometimes resemble children (Serpell & Paul, 2011). As family members, they may offer emotional supports to human family members. Emotional supports are subjective feelings that might be perceived when dog owners believe their dogs are thoughtful, considerate, or even sympathetic. Rather than taking care of dogs regardless of returns in a unilateral manner, the dog-owner relationship becomes an interactive and mutual connection. With dogs being viewed as comforts and stress relievers, the bond between owners and dogs could be strengthened. When emotional bonds are established and dogs are perceived as emotionally supportive, dog owners would be motivated to take better care of dogs and more importantly, take the reaction and visible feedback from their dogs into consideration rather than imposing what they believe to be good on their dogs.

Since dog owners are non-direct consumers of dog food products, their feeding might be in a try-and-see fashion in which owners try different products and see what the most appreciated option is. They might also consider the reaction of dogs to certain food products. The process of making efforts to find the most suitable products for their pets could bring

“experiential benefits” (Wu & Cheng, 2020). Sustainable dog food, as innovative products, becomes an approach to exert the trying. Its novelty may also arouse curiosity and trigger consumers to try and learn whether their dogs like the product. Offering sustainable dog food to dogs might, therefore, provides emotional values to the purchaser as they feel positive in the attempt to satisfy their dogs and repay dogs the emotional support that they receive. Therefore, consumers who tend to attribute supportive traits on their dogs might also tend to consider providing sustainable dog food products to their dogs. Merely anthropomorphizing dogs as having intentions and abilities to act out of their own wills might not be a sufficient trigger and motive.

Neither the two aspects of anthropomorphic tendency moderated the association between perceived nutritional value and purchase intention towards sustainable dog food. One reason might be that nutrients have been constructed and accepted as the most important metrics to determine the worthiness of choosing and purchasing a product. When a product is nutritional, it might already be perceived as worth choosing. Since the prediction effect of nutritional values is strong enough, anthropomorphic tendency could not enhance the effect further. The marginal significance of supportive anthropomorphic tendency also hints the relatively less importance of anthropomorphic tendency. There might be other factors, such as the price, that could play a better role as the moderator.

There could be another explanation. As previously discussed, when anthropomorphizing dogs, consumers might value the reaction of their dogs. Sometimes, this might even weaken or override the focus on nutritional value. If a sustainable product is believed to be able to provide sufficient and balanced nutrition but fails to be palatable, it might not be accepted by dogs. When dogs express their dislike via visible behaviors, dog owners who value the reaction of their dogs might not consider purchasing such products in the future. Besides, when viewing dogs as children, some owners might treat their dogs in a relatively spoiling and indulging manner and give what their dogs want regardless of nutritional balance. It was found that some owners of obese dogs would give treats and snacks to their dogs when dogs beg (Rohlf, Toukhsati, Coleman, & Bennett, 2010). When dog owners want to satisfy their dogs and try to avoid being bossy, the reaction of dogs might influence their choices of dog

food in the future. That is to say, when dog owners anthropomorphize their dogs and build emotional connections with their dogs, it does not necessarily enhance the effect of perceived nutritional value on purchase intention. Therefore, this might also explain why the moderation was not significant. Since the above two explanations might be mutually exclusive, more research is needed to examine and test them in the future.

Loneliness was expected to be positively associated with anthropomorphic tendency. However, no significant relation was found. Academic discussion on loneliness (Epley et al., 2008; Stanley et al., 2014) usually argues that when lacking social connections, lonely people are troubled and thus motivated to resort to different approaches to reduce social pains. For dog owners who feel lonely, anthropomorphizing their dogs, therefore, becomes an accessible approach. When seeing human features in dogs and nurturing emotional bonds with them, social connections would be regained while the social need would be satisfied. However, the above result suggests that there could be other different interpretations.

Apart from the need to build and maintain social connections, people who are lonely might also feel frustration due to their past undesirable experiences. Since they have failed to build and maintain social connections with other people, they might lose the confidence in their abilities to do so and lower down their evaluation of self-efficacy (Feng, Wang, Wei, & Zhou, 2016) regarding relationship maintenance. It means that without the belief in oneself to successfully maintain social connections with others, lonely people might be discouraged and reluctant to set such a goal to build social relationships with others and put effort into it. They may also fear of negative outcomes (Claus & Warlop, 2010), lack a sense of security (Cacioppo, Norris, Decety, Monteleone, & Nusbaum, 2008), and behave in a self-protective manner to avoid being reminded of previous lonely feelings and experiences when interacting with human beings (Cacioppo et al, 2008). Thus, the possible contradiction between the need of sociality and the avoidance tendency might become a dilemma that influence how lonely people behave in interactions.

For dog owners who feel lonely, on one hand, they might be motivated to anthropomorphize their dogs to build social connections; on the other hand, they could also be discouraged to do so since past experiences and negative feelings of loneliness may be

elicited when seeing humans in dogs. This could be due to that loneliness is not only based on the dissatisfactory quantity of connections, but also the quality (Perlman & Peplau, 1981). Loneliness feeling could occur even when people are physically together with each other. Even though owners are physically accompanied by dogs, the quality of the relationship might be low. They do not necessarily feel that their interests and ideas are shared by dogs. This could remind them of their past similar experiences of staying together with other people but still feeling lonely. Therefore, out of the fear of being reminded of such feelings, owners might hesitate to actively see humans in their dogs. In addition, since the average life of dogs is shorter than that of humans, it would be a painful feeling when dog dies. People who recover from loneliness by building connections with their dogs might immediately be dragged to the previous lonely stage and be hurt deeper than before. It might discourage lonely owners to anthropomorphize their dogs when imaging such a feeling. Therefore, these push-and-pull factors might explain why no significant association between loneliness and anthropomorphic tendency was found.

Moreover, there are different types of social disconnections. While some are physically left out, others might be living with people but feel emotionally disconnected (Paul et al., 2014). For dog owners who cohabit with others and have physical companionships, loneliness might not necessarily translate into anthropomorphism of dogs. Because of the physical existence of other people, they might first try to deal with loneliness by fixing and nurturing relationships with these people. Data of the current research was collected during the end of March and early April, a time span within the period of the outbreak of COVID-19 virus. During the epidemic of COVID-19 virus, people were encouraged and even forced to stay at home and to comply with social-distancing policies. The increased time spent with family members or cohabiting roommates provided a chance to fix past relationship and build emotional bonds with each other. The common experience of being forced to stay at home might also enhance closeness and belongingness.

In addition, dog-walking is a necessary daily routine for the well-being of dogs. During the staying-at-home phase, it would become a dilemma for dog owners who minimize going-out to stay safe but still want to maintain the regular activity of their dogs. Online

communities such as Facebook groups could bring supporters and helpers to those who are in trouble. Especially for those who live alone, social media sites and online communities might give them great emotional and practical supports to deal with problems they have never met before. By resorting to people with similar problems and experiences, they might feel that they are understood and are not alone through the hard time. Therefore, they might not be motivated to anthropomorphize their dogs for loneliness relief.

5.3. Practical implications

The current research takes a lens of sustainability in the field of the pet food industry. From a corporate perspective, by being sustainable, corporations need to balance the interests of different stakeholders to gain legitimacy (Cronin et al., 2011), be committed to CSR, and drive revenues in a long term (Baumgartner, 2014). Facing uncertainties, companies need to equip themselves with dynamic capabilities and agility to constantly reinvent themselves (Teece, Peteraf, & Leih, 2016). It suggests an entrepreneurial approach to scan the environment (Babatunde & Adebisi, 2012) and transform potential challenges into opportunities. Sustainable dog food products are an innovation with the purpose to tackle environmental consequences of pet food production and seize the opportunity. By using non-meat ingredients, they seemingly address the interests of those who are concerned about environmental issues. With such a unique value proposition, sustainable dog food products also help companies to differentiate themselves. Successful innovations are supported by technologies, desired by stakeholders, and viable (Mueller & Thoring, 2012). To further gain legitimacy from other stakeholders and drive cash in, the need of proper strategic communication (Falkheimer, 2014) and marketing is salient.

The results of this research suggest an angle of product' values to examine factors that could impact purchase intention towards sustainable dog food. When designing communication and marketing plans, dog food brands may also try to address multiple values. Firstly, perceived nutritional value, as a functional value, was a salient factor that greatly and directly relates to purchase intention towards sustainable dog food. It means when

considering pet food products, nutritional adequacy that indicates the quality and primary function of dog food products would be a key factor that could exert great influence on consumer's purchase. Therefore, when advertising sustainable dog food products, brands could firstly stick to a nutritional narrative (Wrye, 2015) by using nutritional values as a primary appeal. Besides nutrients proportion tables that are required to be presented on the packages, an easily understandable and vivid explanation of how non-meat ingredients suffice nutritional needs might help to promote the attributes and reduce obstacles that hinder consumers to understand the benefits of sustainable dog food. As nutritional value is the most significant concern that consumers have on vegan pet food (Dodd, 2019), this might help with reducing their worries.

Secondly, environmental concerns did not significantly associate with purchase intention. It could mean that the value of being environmental-friendly was either ranked lower or not perceived by consumers. Therefore, companies that position themselves around the concept of being environmental-friendly may need to alter their marketing strategies. Their advertising could empathize the issue of global warming and climate change and explain the specific ways in which plant-based products are sustainable and beneficial to these environmental issues. Certificated eco-labels could be also attached to the package (Delmas, Nairn-Birch, & Balzarova, 2013) to convince consumers the environmental benefits of sustainable dog food as compared to meat-included products. Besides, necessary information (e.g. product process, feeding recommendation) that help consumers to quickly understand sustainable dog food products could be given in a simplified, vivid, and clear manner. This may reduce obstacles that hinder consumers to try the innovation.

Thirdly, when attributing supportive humanlike traits on pet dogs, owners tend to consider offering their dog sustainable dog food products. This could further touch the emotional value of sustainable dog food. How consumers interact and think of their dogs may influence their purchase intention. Therefore, rather than merely advertising benefits of environment protection and nutritional values, the emotional bond with dogs and the positive feeling of taking care of dogs and offering them food that they like could also be reminded.

5.4. Research limitations and directions for future research

Several limitations of this research should also be mentioned. First, since the concept of sustainable dog food is relatively new and obscure, plant-based proteins were used as an example to give a contextual meaning of sustainable dog food. However, this explanation might not be concrete enough. For example, among the few comments from respondents, one reported being confused about “being plant-based”. She thought that meat-included products are also plant-based. Therefore, before the measurement of nutritional value perception, respondent’s knowledge (i.e. familiarity, usage, experience, and expertise) on products (Lacey, Closeb, & Finney, 2010) could have been measured. More concrete details (e.g. a specific plant ingredient that is used as a protein provider) should have been given in the example to better the understanding of sustainable dog food. Pre-tests should have been conducted on more respondents to avoid possible misunderstanding.

Second, with regard to the environmental aspect of sustainable dog food, environmental concerns were included as a variable in the current research. Related discussion in the theoretical framework was based on sustainable dog food being environmental-friendly and green compared to traditional dog food products that contain meats. However, it was unclear whether respondents were aware of the environmental benefits of sustainable dog food. If respondents do not view sustainable dog food as environmental-friendly, they might doubt the presentation of such products as sustainable. Therefore, respondents’ perception on the green attribute of sustainable dog food could have been measured, or a check question could have been set.

Third, the nonprobability sampling method applied in this research could influence the generalizability of results. Though questionnaires were distributed in different location-based Facebook groups, some people within the target population might not be reached due to the accessibility of internet and Facebook. The planned approach of offline data collection was not carried out due to the social distancing policy during the data collection period. This could also influence the generalizability of the results to all Western European dog owners and other potential dog food purchasers. Western Europe consists several countries with varied official languages. Since the survey was in English, language barriers might cause

troubles in reaching non-English-speaking dog owners online and lead to the majority of respondents to be located in the UK and the Netherlands where English are more popular. As for respondents' gender distribution, females accounted for the great majority (over 85%) in the current research. This may lead to some gender differences that could influence the results.

Fourth, the demographic data of age was collected via a blank for respondents to fill in. This way of question-setting might increase the chance of typos and undesirable answers that need to be filtered out. For example, some respondents filled a range in while others even used description such as "old", which led to a decrease in the number of valid samples. Besides, a check question should have been included to filter out random filling cases and avoid invalid samples being included in the analysis as valid samples. What is more, some respondents gave feedback in the form of comments under the survey link posted the Facebook groups. By adding a blank at the end of the survey, it may help collect more feedback to offer insights for explaining inconsistency between hypothesis and results.

Future research could focus on the following directions. First, other possible factors that might moderate the association between environmental concerns and purchase intention could be further explored and examined, such as the price level and environment knowledge. Pricing is an important unit of the marketing mix. The fairness of price was found to be another predictor of purchase intention towards green products that are advertised while a low pricing strategy was found to be able to improve perceptions on price fairness (Wei, Lee, Kou, & Wu, 2012). Therefore, as no direct influence of environmental concerns on purchase intention was found in the current research, future research could examine whether a low pricing strategy might interact with environmental concerns to impact purchase intention towards sustainable dog food. Besides, environmental concerns were found to influence environmental knowledge while the higher level of environmental knowledge increased willingness to pay a premium for biofuels (Pagiaslis & Krontalis, 2014). Therefore, in the context of sustainable dog food, consumer's environmental knowledge might also worth investigation.

Second, since perceived nutritional value has been found to be an important factor that

directly influence purchase intention, future research could dive into the phase of communication to examine the effect of different verbal and visual cues that communicate the nutritional value in advertising and packaging. Visuals cues, such as colors and pictures, could attract attentions and help building brand images while texts are informative (Xue & Muralidharan, 2015). Previous research has examined the effect of label colors on consumer's perception of the healthiness of food products. Though conveying the same textual information, a candy bar with a nutritional label in green was viewed as healthier than that with a label in red (Schuldt, 2013). In addition, it was found that both visuals and texts could improve the perception of brand's environmental-related efforts (Xue & Muralidharan, 2015). Since dog owners are not direct consumers of dog food products, visual and textual cues might be of great importance for their evaluation of products. Compared to the environmental-friendly cues that have attracted scholarly attentions, cues that target on consumer's perception on nutritional values are rarely examined. In the context of sustainable dog food, it would be interesting to further examine, for example, the usage of colors in packages and advertisements and the effect of other explicit quality cues (e.g. nutritional description) to communicate nutritional values.

Whether the advertising message is noticed and viewed as trustworthy would be further examined. For example, compared to indirect cues (i.e. texts of food), direct cues such as image of the food per se were found to improve the believability of health claims in a research (Bailey & Muldrow, 2019). Since dog food products usually take a dried form in which ingredients are hardly visible, it could be interesting to examine whether the image of non-meat ingredients would influence the credibility of their nutritional claims. The inclusion of experts, such as veterinarians in the context of dog food, as a persuasive source to enhance the believability of advertising messages might also be worth investigating. In addition, future research could examine consumers' attitudes and their evaluations on different types of corporate social initiatives (Kotler & Lee, 2005) regarding their trustworthiness.

Third, as supportive anthropomorphic tendency was found to marginally significantly influence purchase intention, it could also be incorporated into further advertising research. For example, whether an anthropomorphized dog character in advertising or a dog mascot

would trigger brand likeness and positive attitude towards sustainable dog food products is worth investigating. Previous research found that anthropomorphic agents increased the brand recall and improved attitudes towards hedonic products (Basfirinci & Cilingir, 2015). Whether a dog character could remind consumers of their emotional connections with dogs and improve their attitudes on sustainable dog food could be examined.

Forth, the current research focuses on Western European dog owners and lovers. Climate change and global warming are global issues. Pet ownership and expenditure on pets in other countries, such as China, are increasing as well (Look & Ye, 2019; Wang, 2020). Future research could be conducted in countries outside of Western Europe. Besides, for global pet food brands whose consumers are located in various countries, different advertising adaptation strategies and their effectiveness (Rajabi, Dens, De Pelsmacker, & Goos, 2017) could be further researched. Comparisons could be conducted to examine whether cultural differences would lead to different customer responses to the same advertising cues.

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Appendix

Survey

Dear respondent,

Thank you very much for responding to this survey. This survey is a part of the thesis research conducted by a student of the Media & Business master programme of the Erasmus University Rotterdam. The thesis aims to examine dog owners and lovers' acceptance and opinions on sustainable dog food products. It consists 11 questions, asking you for your opinions on your dog(s) and sustainable dog food. Completing the survey takes about 8 minutes. Please be aware that your participation is completely voluntarily. There are no correct or incorrect answers. Data collected from the survey are confidential, anonymous and for research purpose of this study only. By proceeding, you give consent to participate in the research. If you have any questions, please feel free to contact Kelly Yang (520690xy@student.eur.nl).

Q1 I would first like to learn about whether you have ever had a dog. Please select the statement that suits your situation the most.

- I used to have a dog(s).
- I currently have a dog(s).
- I never had a dog, but I would like to have a dog(s) in the future.
- I never had a dog, and I would not like to have a dog in the future.

Q2 Please respond to the following statements about your environmental concerns.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I see myself as pro-environmentalist	1	2	3	4	5	6	7
I feel strong ties with pro-environmentalist	1	2	3	4	5	6	7

people							
I think of myself as an environmental-friendly consumer	1	2	3	4	5	6	7
I think of myself as someone who is very concerned with environmental issues	1	2	3	4	5	6	7
I would be proud to be seen as having an environmental-friendly lifestyle	1	2	3	4	5	6	7

I would now like to ask you about your attitudes towards sustainable dog food. Sustainable dog food contains no meat or fish. Instead, sustainable dog food products use plant-based proteins to meet a dog's nutritional needs.

Q3 Below are some statements of attitudes on sustainable dog food. To what extent do you agree or disagree with these statements?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I believe that sustainable dog food could provide sufficient nutritional value for a dog	1	2	3	4	5	6	7
I think that sustainable dog food is just as healthy as conventional dog food that contains meat or fish	1	2	3	4	5	6	7

Sustainable dog food can improve the health of a dog	1	2	3	4	5	6	7
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Q4 The following questions focus on your interest in sustainable dog food products.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I would be interested in sustainable dog food	1	2	3	4	5	6	7
I would be willing to give my dog sustainable dog food	1	2	3	4	5	6	7
I would consider purchasing sustainable dog food	1	2	3	4	5	6	7
It is likely that I will buy sustainable dog food	1	2	3	4	5	6	7

The following questions will focus on your relationship with dog(s).

Q5 Please indicate the extent to which you agree or disagree with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I believe that dogs have free will	1	2	3	4	5	6	7
I believe that dogs have	1	2	3	4	5	6	7

intentions							
I believe that dogs experience emotions	1	2	3	4	5	6	7
I believe that dogs have a mind of their own	1	2	3	4	5	6	7
I believe that dogs can be considerate	1	2	3	4	5	6	7
I believe that dogs can be thoughtful	1	2	3	4	5	6	7
I believe that dogs can be sympathetic	1	2	3	4	5	6	7

I would now like to know more about you and your demographic background.

Q6 The following statements focus on individual relations. Reflecting your own experiences, please indicate how often you feel the way as described.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
How often do you feel that you can find companionship when you want it?	1	2	3	4	5	6	7
How often do you feel that there is NO one that you can turn to?	1	2	3	4	5	6	7
How often do you feel part of a group of friends?	1	2	3	4	5	6	7
How often do you feel that your	1	2	3	4	5	6	7

interests and ideas are NOT shared by those around you?							
How often do you feel that there are people who really understand you?	1	2	3	4	5	6	7
How often do you feel that you are left out?	1	2	3	4	5	6	7

Q7 Please also indicate your frequency of meat and fish consumption

	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always
How often do you consume meat?	1	2	3	4	5	6	7
How often do you consume fish?	1	2	3	4	5	6	7

Q8 Please indicate your gender:

- Male
- Female
- Other
- Prefer not to say

Q9 What is your age?

Q10 Where have you lived most of your life?

I have mostly lived in (Drop down to choose one)

- The Netherlands
- Belgium
- France

- The United Kingdom
- Republic of Ireland
- Germany
- Italy
- Austria
- Spain
- Portugal
- Vatican City
- Greece
- Monaco
- Switzerland
- Luxembourg
- Liechtenstein
- Norway
- Sweden
- Denmark
- Other

Q11 How long have you been keeping your (first) dog? (Please skip this question if you had never had a dog.)

It has been

<Dropdown menu with the following options>

- Less than 1 year
- 1 year
- 2 years
- 3 years
- ...
- 15 years
- More than 15 years