



VEGETARIANISM: CAN IT LIVE UP TO THE CLAIMS MADE ABOUT IT?

An examination of the claims about vegetarianisms that are made by advocates and scientific literature about the same issues.

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Abstract

Health is a multidimensional concept, and diet, lifestyle and social identity are all elements that influence it. For this thesis the focus was on examining the interrelations between a vegetarian diet and diet, lifestyle and social identity. The vegetarian diet and other diets which promote consuming less meat have become more popular over the last years, because the interest in a healthy lifestyle has grown and this type of diet could help in achieving this. This thesis uses a literature research to confront claims made about the effects of a vegetarian diet with scientific literature examining the same issues to see whether these claims can be substantiated. It appears that most of the claims that are made by advocates are substantiated by scientific literature. Especially health is an important element for the subject of a vegetarian diet, this was an important discourse for this subject. Overall following a vegetarian diet seems to have positive effects. Among other things, it reduces the risk of heart disease, high blood pressure, diabetes and overweight, and it promotes longevity and digestion. It also reduces the emission of greenhouse gases compared to an omnivorous diet. The effect on lifestyle and social identity depends on the motivation that people have for becoming a vegetarian. Ethical vegetarians are more concerned with sustainability, and for them vegetarianism is a bigger part of their identity. For future research, the analysis could be further elaborated and veganism could be examined, because in a couple of articles veganism had an even more evident effect than vegetarianism. For the discourse analysis an examination could be done of claims of advocates compared with claims with claims of antagonists of a vegetarian diet.

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1. Introduction

Health is a multidimensional concept and it is defined by the World Health Organisation [WHO] in 1948 as 'a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity'. Lifestyle is life-long in its health implications. Nowadays many people lead an unhealthy lifestyle, this can be caused for by example a stressful job (Heikkilä et al., 2013). Chronic non-communicable diseases are a big part of the disease burden today, they can account for three quarters of all disease burden worldwide (Martin, Zhang, Tonelli, & Petroni, 2013). There are several causes that can be pointed out for this increasing burden, including a longer lifespan, tobacco use, less exercising and an increasing consumption of unhealthy foods (Daar et al., 2007). The SENECA study as well found that diet, physical activity and smoking habits are related to survival and health status. Although diet is only one of the components of a healthy lifestyle, it has recently received a considerable amount of attention (Opie, 2000). Looking at this information, diet plays an important role in health for people. In supermarkets today a lot of the products that can be found are processed foods. These processed foods are for a big part low-cost and energy-dense, which may be part of the reason for the emergence of an unhealthy lifestyle and obesity, especially for people with a low socioeconomic status (Drewnowski, 2004).

At the same time however, there are a lot of people who try to live a very healthy life, as can be seen in the media every day. There are a lot of different ideas of a healthy lifestyle, the diet people follow is a big part of this. Some examples of different diets followed by people for their health are the paleolithic diet, different versions of a low carb diets (for example the Atkins diet), diets high in protein, diets low in fat, vegetarian and vegan diets and eating according to the recommended dietary guidelines. There is now strong evidence that eating more fruits and vegetables can help in preventing and even curing chronic diseases (Martin et al., 2013). More and more people keep taking the decision to eat (partly) vegetarian, and in Australia the new food pyramid that was adopted in 2015 makes the three plant-based foods groups (vegetables and legumes, fruits, and grains) the basis of the recommended diet, as can be seen in Figure 1 on the right. Nutrition Australia advises people to make sure that plant-based foods make up around 70% of their daily intake (Nutrition Australia, 2015). Taking this information into account, the focus of this thesis lays on the vegetarian diet, which in this case refers to people who do not consume meat or fish, but do consume other animal products such as milk and eggs (lacto-ovo-vegetarian).



Figure 1: New Australian Healthy Eating Pyramid. Source: 'Healthy Eating Pyramid' by Nutrition Australia, 2015.

According to (Van Dooren, Marinussen, Blonk, Aiking, & Vellinga, 2014), who compared six different diets in their research, vegetarians' diets are healthy if attention is paid to alternative

sources of certain vitamins and minerals or fortified foods such as meat substitutes and soymilk. Two extensive reviews of observational studies that used eating pattern methods show that a plant-based diet high in fiber-rich foods, such as vegetables, fruits, cereals, whole grains, and legumes, is inversely related to body mass index [BMI], overweight, and obesity (Togo, Osler, Sørensen, & Heitmann, 2001; Newby, 2004). Considering overweight and obesity are an urgent problem nowadays, this is a relevant subject to look into. There are a lot of claims that can be found on the internet and in popular media that are being said about a vegetarian diet and the effects it can have on health. In this thesis, these claims are examined by searching for matching scientific literature and in this way, looking whether these claims can be scientifically substantiated or not.

Aim of the research

Since diet has a very big impact on human health, it is important to find out what kind of diet can improve health. In this research, the focus was on looking into the claims made about the health effects of the vegetarian diet, and finding out until what extent they can be substantiated by scientific literature. The aim of the research is therefore trying to give insight into whether the vegetarian diet might be adopted to support a healthy lifestyle.

Research question

How is a vegetarian diet promoted as (part of) a healthy lifestyle and to what extent are these health claims substantiated by scientific research?

Sub questions

- Which health claims are made by advocates of a vegetarian diet about following a vegetarian diet?
- Which of the claims that were found can be substantiated by scientific literature?
- Are there different discourses to be found in the popular media and scientific literature concerning a vegetarian diet?

2. Theoretical framework

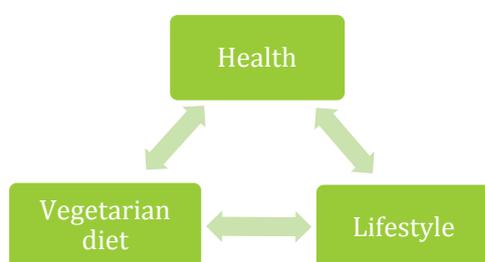


Figure 2: Interrelations Lifestyle, Diet & Health

In this thesis the focus was on the *interrelations* between lifestyle, diet and health, all with regard to a vegetarian diet. First the different concepts will be discussed and later the framework that is used to structure the results.

2.1 Lifestyle

It is increasingly recognised that a good health is maintained and improved not only through medicine, but also through efforts made towards adopting a healthy lifestyle. Lifestyle is defined by the Public Health Agency of Canada as the accumulation of personal decisions that can be said to contribute to, or cause, illness or death, but it also includes the influence of social, economic and environmental factors that people make about their health (PHAC, 2013). Findings from the Alameda county study reinforce lifestyle as a determinant in long-term health (Housman & Dorman, 2005). Smoking is a part of lifestyle and it still has a big impact on health (WHO, 2015). The location and associated culture in which people grow up has a big influence on the lifestyle that people obtain. The different environments which individuals encounter throughout their life help in developing individual and community lifestyles. Lifestyle is known to be related to the risks for developing cancer, circulatory diseases, and other chronic diseases (Morimoto, 2000).

2.2 Health

According to the Public Health Agency of Canada [PHAC], some of the key determinants of health are income and social status, social environments, physical environments, personal health practices and coping skills, and culture (PHAC, 2013). Lifestyle changes in diet and levels of exercise improve health of entire communities, shows a research conducted in Iran. A relatively small shift towards a healthy diet in a population may lead to a reduction in the prevalence of non-communicable diseases (Sarrafzadegan et al., 2009).

2.3 Vegetarian diet

According to the WHO, food is an important part of health (WHO, 2015). This has different aspects, one of which is access to food on a household and national level. Another aspect is dietary patterns, diversity of food available and home production. Examples of these are intake of plenty of fruits and vegetables, intake of healthy fats instead of unhealthy fats, and obtaining enough micronutrients such as iron, vitamin A, zinc and iodine (WHO, 2015). Food safety is also involved in health, because food and water are the major sources of exposure to both chemical and biological hazards. Examples of these are microorganisms such as salmonella, cholera, and E. coli, and viruses such as hepatitis A (WHO, 2015).

As said before, there are many different definitions of a vegetarian diet. Some consider a diet as vegetarian when it contains no meat, but it does contain fish (pesco-vegetarian). There are also people who call themselves semi-vegetarian and eat no meat on some days but do eat meat on other days (De Backer & Hudders, 2014). In this thesis however, when the word vegetarian is used this refers to the term lacto-ovo-vegetarian, this means a diet in which people don't consume meat or fish, but do consume other animal products like milk and eggs.

2.4 Sustainability

Health, diet and lifestyle are also related to sustainability. Sustainability is a broad term that has many different definitions. The basic idea of sustainability is quite straightforward: a sustainable system is one which survives or persists. Sustainability, at its base, always concerns temporality, and in particular, longevity (Costanza, 1995). Some define it simply as an environmental goal, for others it contains multiple dimensions. Three dimensions that are often used to define sustainability are the environmental, economic and social dimension. Environmental economists

define sustainability in terms of non-depletion of capital (Dresner, 2008). Nutrition ecology is an interdisciplinary scientific discipline that encompasses the entire nutrition system, with special consideration of the effects of nutrition on health, the environment, society, and the economy (Leitzmann, 2003). This discipline is a good fit with the model that Garnett used in her paper (Garnett, 2014):



Figure 2: Issues to consider when defining a sustainable diet. Source: 'What is a sustainable healthy diet?: A discussion paper' by T. Garnett, 2014.

As can be seen in Figure 2, the model includes a number of issues that may need to be considered while defining a 'sustainable diet'. For this thesis the subjects of 'Nutrition' and 'Society & Ethics' are most relevant, so the focus was on these. *Nutrition*: Since a vegetarian diet is not the 'normal' recommended diet, many people think that it won't provide all the nutrients that are needed to preserve a good health. This is where the energy, macro and micronutrients come in. Especially micronutrients like iron and vitamin B12 can be lacking in a vegetarian diet, but with the right additions to your diet, these nutrients that would normally come from the consumption of meat can easily be supplemented (Marsh, Zeuschner, & Saunders, 2012). Influences on nutritional status including lifestyle, affordability, access and availability are also an important factor for this thesis. Diet is a big part of lifestyle, and the affordability and availability of and access to the right foods can play a big part in implementing a healthy diet. Knowledge and beliefs are also important for the diet that people follow, because there are so many ideas of a healthy diet, as was discussed earlier in this thesis. A good example of this are the contradicting low-carb and high-carb diets, which can be an important factor in the health of people that follow these specific diets. *Society and ethics*: Since a vegetarian diet does not contain meat, following such a diet has a positive influence on animal ethics & welfare. Identity can also play a role in choosing which diet suits you,

this is partly determined by the region and accompanying culture that you grew up in. Another factor that is rather self-evident which is also a determinant in the diet that people choose is taste and natural preference for certain foods.

Similar to Figure 2 is Figure 3 that can be found below. This figure was used in the Scientific Report of the 2015 [U.S.] Dietary Guidelines Advisory Committee (Dietary Guidelines Advisory Committee, 2015). It also incorporates different factors into a model. For this thesis, 'Values' and 'Consumers' are relevant parts of this model because they are most related to the subject of vegetarianism. *Values*: Vegetarianism is often considered a healthy diet because it contains less

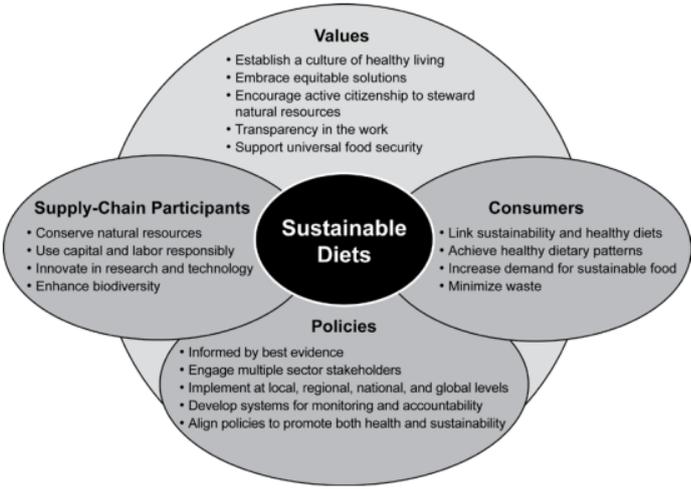


Figure 3: Elements needed for sustainable diets. Source: 'Scientific Report of the 2015 [U.S.] Dietary Guidelines Advisory Committee', 2015.

unhealthy fats and cholesterol, so it can be seen as a healthy lifestyle. If more people could be encouraged to obtain this view, this could be a good thing for the unhealthy society that we live in nowadays. A vegetarian diet is also one kind of a healthy sustainable diet, as the production of livestock has a big impact on climate change emissions, habitat loss, resource use and the availability of staples for consumers in developing countries (Beverland, 2014). *Consumers*: Following on the previous statement, if the link between sustainability and healthy diets would be made in the form of following a vegetarian diet, this would be a positive development which could

help in achieving healthy dietary patterns for more people. Because it would be related to sustainability, this would increase the demand for healthy and sustainable food.

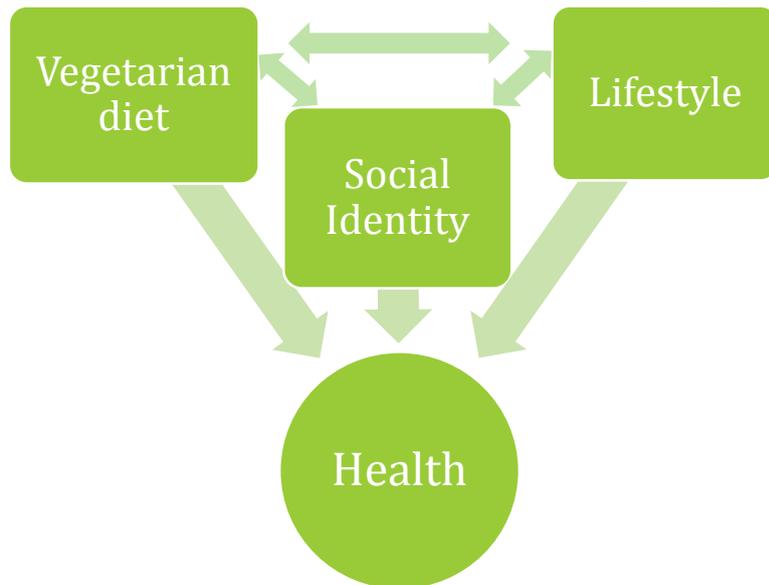
2.5 Social Identity

Food, and especially a special diet can also be a part of identity. Identity concerns how people classify and evaluate themselves as a result of ongoing socialization and interactional experiences. Identity includes the meanings attached to behaviours, experience, appearances, beliefs, and values (Kremmel, 2006). Food choice has long been recognized as a process that involves psychological, social, cultural, economic, and biological forces (Bisogni, Connors, Devine, & Sobal, 2002). To look at the process that precedes becoming a vegetarian for people, the social identity theory can be used. The social identity theory is a social-psychological theory that focuses on the group in the individual (Trepte, Bryant, & Vorderer, 2006), and it tries to explain cognitions and behaviour with the help of group-processes (Trepte et al., 2006). For many vegetarians, their diet is a part of their identity, so they identify with the 'social group' of vegetarians. This might help reinforcing their beliefs towards the vegetarian diet and help them adhere to this diet. There are different types of vegetarians that can be distinguished, the main types are health and ethical vegetarians. In a qualitative research conducted in 1998 it appeared that health vegetarians were motivated by a perceived threat of disease and the potential health benefits associated with vegetarian diets. Ethical vegetarians were motivated by moral considerations and viewed a vegetarian diet as a way to align dietary behaviours with beliefs and values about animal welfare and the environment. This can be seen as a more cultural or lifestyle decision. Adoption of a vegetarian diet was influenced by the receipt of information about the health and ethical impacts of vegetarian diets, physical aversions to animal-derived food, and life transitions (Jabs, Devine, & Sobal, 1998). The results of another study suggest that ethical vegetarians could experience stronger feelings of conviction and consume fewer animal products than health vegetarians, and

may remain vegetarian longer (Hoffman, Stallings, Bessinger, & Brooks, 2013). This could mean that for ethical vegetarians, their diet is more important for their identity.

According to Henri Tajfel we define categories and schemes in the information to encode and decode messages thanks to reduced capacities. Likewise, we categorize people into certain groups based on for example their clothing style (Tajfel, 1979). Of course, we also categorize ourselves into groups based on our interests and preferences. A group membership has to be notable to induce a certain behaviour, as is the case with following a vegetarian diet (Tajfel, 1979). As was said before, it can depend on the reason to start following a certain diet how important it is for identity.

From the elements selected from the two models discussed above and the other information that was found, a new analytical framework concerning a vegetarian diet was put together. This can



be seen in Figure 4 shown at the left. The framework shows the interrelations between the elements 'Vegetarian diet', 'Lifestyle' and 'Social Identity', and the impact they have on 'Health'. Using this framework when analysing the outcome of the literature review helped in structuring the results. This was done by using 'Health', 'Lifestyle' and 'Social Identity' as different chapters to divide the results that are found. This helped in maintaining the overview. The retrieved results were later analysed using the method of discourse analysis which is

Figure 4: Analytical Framework Vegetarian Diet

explained in the methods section below. This way, the interrelations between the different factors could be examined, and the differences in the way that vegetarianism is discussed by 'lay people' and scientists can be explored. It was also examined whether or not one or more discourses could be discovered in the results.

3. Methods

In this section the methods that were used for obtaining the results are explained. In the first section the analyses that were used are going to be named and explained, in the second section the search strategy is explained.

3.1 Analyses

This thesis was originally going to be a Systematic Literature Review. However, by using the formulated research question, not enough relevant articles were yielded. This is why the decision was made to use the method of a Traditional Literature Review. This method did result in enough relevant articles. The results of the search for 'popular' and scientific literature was analysed in the way of checking whether the claims that were found made by 'lay' people could be substantiated by scientific literature.

To look at the difference between which claims are made about the health effects of following a vegetarian diet and which of these claims can be substantiated by literature, a discourse analysis was used. Discourse analysis is the analysis of the different patterns that structure language that people use when taking part in different domains of social life (Jørgensen & Phillips, 2002). Starks & Brown Trinidad (2007) describe it as follows:

Discourse analysts argue that language and words, as a system of signs, are in themselves essentially meaningless; it is through the shared, mutually agreed on use of language that meaning is created. Language both mediates and constructs our understanding of reality. It also defines the social roles that are available to individuals and serves as the primary means through which they enact their identities. Careful analysis of language, using what (Gee, 2005) has described as the seven “building tasks” of language (significance, activities, identities, relationships, politics, connections, and sign systems and knowledge), can shed light on the creation and maintenance of social norms, the construction of personal and group identities, and the negotiation of social and political interaction. Discourse analysis involves tracing the historical evolution of language practices and examining how language both shapes and reflects dynamic cultural, social, and political practices (Gee, 2005). (p. 1374)

Discourse analysis is not just one approach, it is a series of interdisciplinary approaches that can be used to explore many different social domains in many different types of studies (Jørgensen & Phillips, 2002). There are different perspectives that offer their view as to how to analyse discourses, but there is not one clear definition of discourses. (Jørgensen & Phillips, 2002) propose the following preliminary definition of a discourse: “*a particular way of talking about and understanding the world (or an aspect of the world)*” (p.2). For this thesis, the two discourses that should be looked at are the statements that are made by ‘lay’ people and the ‘expert’ scientific support that can be found for these statements. Jørgensen and Phillips (2002) say: *The struggle between different knowledge claims could be understood and empirically explored as a struggle between different discourses which represent different ways of understanding aspects of the world and construct different identities for speakers (such as ‘expert’ or ‘layperson’)* (p.2). The aim of carrying out critical research is to investigate and analyse power relations in society and to formulate normative perspectives from which a critique of such relations can be made with an eye on the possibilities for social change. In this manner, discourse analysis could give an insight into how to achieve the goal of more people adopting a healthy diet that is good for both themselves and the environment.

For this thesis, the operationalisation of the discourse analysis consists of 1) looking at opinions and statements from ‘laypeople’ about following a vegetarian diet and 2) comparing these statements to scientific literature to see how much of the statements can be substantiated in this way. Therefore a comparison was made between a ‘lay’ and ‘scientific’ context concerning vegetarianism. An examination was done whether a ‘lay’ or ‘scientific’ discourse can be discovered with regard to a vegetarian diet.

3.2 Search Strategy

Again, the research question of this thesis is: ‘How is a vegetarian diet promoted as (part of) a healthy sustainable lifestyle and to what extent are these health claims substantiated by scientific research?’ To be able to do a structured literature research the question was divided into concepts. For this question these concepts were ‘vegetarian diet’, ‘sustainable’, ‘lifestyle’, and ‘health claims’. The sub questions also were divided into concepts.

The first sub question ‘Which health claims are made by advocates of a vegetarian diet about following a vegetarian diet?’ was not investigated with scientific literature, but by ‘popular’ media. Searching for the websites that were going to be used for finding the health claims about

vegetarianism was done through the search engine Google. The search terms that were used are 'benefits vegetarianism', and the Dutch translation, 'voordelen vegetarisch'.

For the second sub question 'Which of the claims that were found can be substantiated by scientific literature?' the results were of course retrieved from scientific literature, but there are no new concepts. Since health and nutrition are a big part of this research these were two of the concepts used. To make sure a sufficient amount of literature could be found, some search terms needed to be formulated for the different concepts. These can be found in the table below.

| Health | Vegetarian diet | Lifestyle | Nutrition | Sustainable |
|-------------|----------------------|----------------------|-------------|--------------------------|
| Health | Vegetarian | Lifestyle | Nutrition | Continual |
| Ill-health | Lacto-ovo-vegetarian | Behaviour | Food | Viable |
| Disease | Vegan | Habits | Consumption | Green |
| Good health | No meat | Style of living | Diet | Liveable |
| Limitation | Veg* | Status | Menu | Renewable |
| Condition | No fish | Socioeconomic Status | Nourishment | Supportable |
| | Vegetables | SES | Sustenance | Environmentally friendly |
| | Plant-based | | | |

Using these search terms, a search question was formulated. For this thesis, the search question was: *(health OR "ill-health" OR disease OR "good health" OR limitation OR condition) AND (vegetarian OR "lacto-ovo-vegetarian" OR vegan OR "no meat" OR veg* OR "no fish" or vegetables OR "plant-based") AND (lifestyle OR behaviour OR habits OR "style of living" OR status OR "socioeconomic status" OR SES) AND (nutrition OR food OR consumption OR diet OR menu OR nourishment or sustenance) AND (sustainable OR continual OR viable OR green OR livable OR renewable OR supportable OR "environmentally friendly")*.

This search question was used to search literature in different databases, namely Scopus, PubMed, Web of Science, Google Scholar and the WUR Library Global Search. The snowball effect was used to find more literature, by looking at the related articles and references of the found articles. During the search for literature new search terms were found by looking at the articles and keywords.

Because the search question that was prepared didn't yield enough relevant articles, later a new technique was used. A new search question was formulated per claim that was made, these questions were used in the same databases as named before. This way enough articles were found to write the results. Also during the writing of the Results section of this thesis, new articles were found that were interesting and relevant for this thesis, so they were also used.

4. Results

There are many positive claims made about following different diets by their advocates but also many negative claims by people who don't believe in them. For the purpose of this thesis, the focus is on the vegetarian diet, and the claims that are listed are made by advocates of a vegetarian diet. These claims are confronted with scientific literature concerning the same topic.

The first pro-vegetarian result with claims that was found is a list of six reasons to adopt a vegetarian diet compiled by Amy van Deusen for Women's Health Magazine online (Van Deusen, 2014), the second result was an article on the website of the male version of this magazine, namely Men's Health online, written by Alexandra Sifferlin (Sifferlin, 2014). The third result is an article

posted on a Dutch website written by Jack Boerhorst (Boerhorst, 2013). He starts off by saying that a vegetarian diet is not necessarily healthier because of the fact that eating meat is unhealthy, but vegetarians often change their entire diet so they have other sources of protein and vitamin B12. These don't give people the unhealthy substances that can be found in meat like antibiotics and hormones. The fourth result is an article posted on the American website vegetariantimes.com, the author is unknown (Vegetarian Times, 2015).

The first element that was examined is health. In the first part of every paragraph the claims and their explanation (if there was one) are stated, and in the second part of that same paragraph the scientific literature that was found concerning this statement is given. The results are stated per subject.

4.1 Vegetarianism and health

Heart

The first item that was named in the article by Amy van Deusen is *'To help your heart'*. The reason that they give for this statement is that eating high quantities of fatty red and highly processed meat increases the risk of death from cardiovascular disease (Van Deusen, 2014). The article by Alexandra Sifferlin also gave this argument: *'Less chance of heart disease'*. Vegetarians have a lower chance of getting ischaemic heart disease (Sifferlin, 2014). Jack Boerhorst stated the same: *'Healthier for your heart'*. Because vegetarians often eat plenty of nuts, they obtain a lot of healthy omega 3 and 6 fatty acids. This can help in keeping our heart healthy and keeping our veins from clogging. Soy, which is also consumed often by vegetarians, can have the same effects (Boerhorst, 2013). The fourth result also states the same argument: *'You'll ward off disease'*. Vegetarian diets are healthier than the average American diet, particularly in preventing, treating or reversing heart disease or cancer. Especially a low-fat vegetarian diet is very good at preventing or stopping the progression of coronary heart disease. Vegetarians consume less animal fat and cholesterol and instead consume more fiber and more produce that are rich in anti-oxidants (Vegetarian Times, 2015).

Multiple scientific articles were found that confirmed this statement as well. For example, a review article by Duo Li wrote that a big meta-study of seven prospective cohort studies with a combined number of 124,706 participants showed that vegetarians had a 29 percent lower mortality from ischaemic heart disease [IHD], 16% lower mortality from circulatory diseases and a 12% lower mortality from cerebrovascular disease compared with omnivores (Li, 2014). Another study found that in comparison with non-vegetarians, vegetarians were 24 percent less likely to die from ischaemic heart disease, and that especially at a younger age the vegetarian diet seemed to have a protective effect (Key et al., 1998). People who do not consume meat have a lower risk of cardiovascular mortality (Thorogood, Mann, Appleby, & McPherson, 1994).

Cancer

The second argument found in the article by Amy van Deusen is *'To shrink your Cancer Risk'*. Those who eat more red and processed meats are supposed to have the highest risk of breast cancer. They also write about a theory that the non-profit group 'The Cancer Project' has, they think that foods with high levels of fat artificially boost the hormones that promote cancer (Van Deusen, 2014). Alexandra Sifferlin gives the same argument: *'Lower risk of cancer'* (Sifferlin, 2014). Jack Boerhorst doesn't name this argument. The argument that concerns this subject in the fourth article is the same as in the first paragraph: *'You'll ward off disease'* (Vegetarian Times, 2015).

Multiple results were found that confirmed this argument. A prospective study looking at

the relationship between red and processed meat intake found that both the intake of red and processed meat were positively associated with colorectal and lung cancer, and red meat intake was also associated with an elevated risk for oesophagus and liver cancer (Cross et al., 2007). Thorogood et al. found that people who don't eat meat have a significantly lower risk of getting cancer than people who do eat meat (Thorogood et al., 1994). McEvoy et al. state that epidemiological data suggest that cancer incidence is lower in vegetarians compared with omnivores, although results are not consistent and probably differ between cancer sites (McEvoy, Temple, & Woodside, 2012). Results from the UK Women's Cohort Study do suggest that women who don't eat meat have a significantly lower risk of breast cancer than women who do eat meat (Taylor, Burley, Greenwood, & Cade, 2007). This contradicts the conclusion of Li's article, she concludes that all cancer incidences were significantly lower in vegetarians than in omnivores, except for breast cancer (Li, 2014). Marsh et al. concluded in their review study that overall, cancer rates in vegetarians appear to be moderately lower than others living in the same socio-cultural circumstances (Marsh et al., 2012).

Weight management

The third health argument mentioned by Amy van Deusen is *'To Stay in Your Skinny Jeans'*, by which she means losing weight/not gaining weight. She says that people who eat about 250g of red or processed meat, or poultry every day gain more weight over five years than those who eat less, even if the amount of calories consumed is the same (Van Deusen, 2014). Alexandra Sifferlin also brings up this argument: *'Less likely to be overweight'*. Vegetarians tend to be leaner and have a lower body mass index [BMI] than people who do eat meat (Sifferlin, 2014). Jack Boerhorst does not talk about this subject. In the fourth article they state: *'You'll keep your weight down'*. Americans eat too much saturated fats and processed foods and too little plant-based foods and complex carbohydrates. When overweight people start following a low-fat vegetarian diet, they can lose a great amount of weight without counting calories or carbs and without measuring portions or feeling hungry (Vegetarian Times, 2015).

According to McEvoy et al., vegetarians and particularly vegans have lower body weights compared to the general population, and have a low incidence of obesity (McEvoy et al., 2012). In another study in which people were divided into groups based on the amount of meat they ate, those in the highest quintile of red meat intake were more likely to have a higher BMI (Cross et al., 2007). From the review study done by Marsh et al., two studies concluded that vegetarians and vegans had a significantly lower BMI than omnivores. The BMI steadily rose with the amount of animal products people consumed (Marsh et al., 2012). Vegetarians have a lower BMI, and the proportion of obese patients among vegetarians is lower than non-vegetarians (Kwok, Umar, Myint, Mamas, & Loke, 2014).

Blood pressure

In the second article about health claims about vegetarianism that was found, written by Alexandra Sifferlin, another argument was *'Low blood pressure'*. Vegetarians have on average a lower blood pressure, but a vegetarian diet can also be used as a cure for high blood pressure (Sifferlin, 2014). This is the only of the used articles in which this claim was found.

In the EPIC study, people were divided into one of four groups: vegans, vegetarians, fish eaters or meat eaters. The outcome was that vegans had the lowest rates of hypertension, meat eaters had the highest rates of hypertension and vegetarians and fish eaters had similar rates that laid in between these two (Appleby, Davey, & Key, 2002). Compared to non-vegetarians, vegetarians have lower blood pressure, as well as lower plasma cholesterol (Kwok et al., 2014). According to the research conducted by McEvoy et al, the incidence of hypertension is lower in vegetarian populations, but this difference could be accountable to the lower BMI that following a vegetarian diet causes (McEvoy et al., 2012). In a randomized controlled trial conducted in 1983 omnivores were randomly allocated to either an omnivorous control group, or to one of two experimental groups. The members of these experimental groups ate an omnivorous diet for the first 2 weeks and a lacto-ovo-vegetarian diet for one of two 6-week experimental periods. Mean

systolic and diastolic blood pressures did not change in the control group but fell significantly in both experimental groups during the vegetarian diet and rose significantly in the experimental group which reverted to the omnivorous diet (Rouse, Armstrong, Lawrence, & Vandongen, 1983).

Longevity

The next result that was found in the article by Alexandra Sifferlin is '*Lower risk of death*'. Less saturated fats and cholesterol to clog the arteries for vegetarians, so they may be at lower risk for chronic diseases overall (Sifferlin, 2014). This argument corresponds to the argument '*You'll live longer*' in the fourth article. When you start following a vegetarian diet, you can add about 13 healthy years to your life expectancy. People who consume saturated animal fat live shorter and get more disabilities at the end of their life (Vegetarian Times, 2015).

Although the first argument is formulated a little oddly, there are scientific results that indicate that people who follow a vegetarian diet might live longer. People who prefer plant-based foods and whose diet consists for a big part out of plant-based foods, have reduced mortality compared with people who prefer food from animal sources, concludes a follow-up study (Martínez-González et al., 2014). A review study found that a very low intake of meat is associated with a significant decrease in risk of death in four studies, a non-significant decrease in risk of death in the fifth study, and made almost no difference in the sixth study. Moreover, they found that the longer people followed a diet with very low meat intake, the greater the results up until the ninth decade of following this diet (Singh, Sabaté, & Fraser, 2003). Marsh et al. also found that low meat intake is associated with greater longevity (Marsh et al., 2012). A study of 11000 vegetarians and other health conscious people also found a low overall mortality. This was mostly due to low cardiovascular mortality, low mortality due to diseases of the respiratory system, and less cancer of the bronchus and lung compared with the general population (Key, Thorogood, Appleby, & Burr, 1996). A British review study found that the death rates of all the subjects in all three studies they reviewed were much lower than average for the United Kingdom (Key et al., 2003).

Diabetes

The last health-related argument that was stated in the article by Alexandra Sifferlin is '*Lower risk of diabetes*'. She says that a vegetarian diet can't cure diabetes, but it can lower somebody's risk of getting it (Sifferlin, 2014). This is the only article in which this argument was named.

In his article, Li starts with stating that results from prospective cohort, population and case-control studies found that vegetarians have a lower prevalence of type 2 diabetes compared with omnivores, and his own research also indicated that type 2 diabetes prevalence was significantly lower in vegetarians (Li, 2014). In the study by Key et al., both men and women who followed a vegetarian diet had a lower death rate from diabetes mellitus (Key et al., 1996). In a study of the relationship between the intake of red and processed meats and risk of several diseases, Micha et al. found that the intake of processed meat was related to diabetes mellitus, but the intake of red meat was not related to diabetes mellitus (Micha, Wallace, & Mozaffarian, 2010). Vegetarians may be at lower risk of dying from diabetes than non-vegetarians. Plant foods that are high in fibre and have a low glycaemic index offer benefits in the prevention and clinical management of diabetes. Foods that have a low glycaemic index such as beans, legumes, and whole grains reduce incidence of diabetes by 40 percent (Salmeron et al., 1997).

Bone health

The next claim is from the fourth article, posted on the website vegetariantimes.com. They claim that '*You'll build strong bones*'. Our bodies will take calcium from existing bone if there isn't enough calcium present in the bloodstream. This result is that our skeleton will become porous and lose strength over time. Food is the best way to increase our intake of calcium and other minerals, according to most care practitioners. Even if you avoid dairy you can still get a healthful dose of calcium (Vegetarian Times, 2015).

Marsh et al. mention that calcium intakes are generally similar between lacto-ovo-vegetarians and omnivores, although vegans typically have lower intakes. They concluded that there are no significant differences in bone health between lacto-ovo-vegetarians and people who eat meat (Marsh et al., 2012). Many plant foods can provide a significant amount of bioavailable calcium despite generally being lower in calcium content than dairy foods (Weaver, Proulx, & Heaney, 1999). A review by Katherine Tucker suggests that there is some increased risk of osteoporosis and fracture for people who follow a vegetarian, and particularly vegan diet. If vegetarians use enough food sources which contain fortified products, vegetarian diets can provide a healthy foundation for building and maintaining healthy bones and for preventing fracture (Tucker, 2014). Experimental research by Jessica Knurick et al. suggested that in the short-term plant-based diets are not harmful to bone health in young adults. They also conclude that diet prescriptions for bone health may vary among different diet groups: more fruit and vegetable intake for individuals who eat a lot of meat, and more plant-based protein for people who follow a vegetarian diet (Knurick, Johnston, Wherry, & Aguayo, 2015). Some studies suggest that the consumption of too much protein can create an acidic state in the body, which may be compensated by taking calcium out of the bones. This is more likely to happen among people who eat meat (Dwyer, 1988; Wachman & Bernstein, 1968).

Foodborne illness

The next claim is *'You'll reduce your risk of food-borne illnesses'*. The argument that is given is that foods rich in protein, such as meat, poultry, fish, and seafood are frequently involved in outbreaks of food-borne illnesses (Vegetarian Times, 2015).

The first article that was found regarding this subject compared products from three food groups (aquatic animals, land animals, and plants), and they found that most illnesses were attributed to plant-based foods. The article attributed 46 percent of illnesses to fruits and vegetables, the large number of norovirus illnesses was mostly what caused this. More illnesses were attributed to leafy vegetables than to any other product, illnesses associated with leafy vegetables were the second most frequent cause of hospitalizations and the fifth most frequent cause of death (Painter et al., 2013). In another article that used two data sources about the cause of foodborne illnesses, both sources showed that the plants category was the second most common source of foodborne illnesses, it came after the meat-poultry category (Nsoesie, Kluberg, & Brownstein, 2014). Another article contradicts this by saying that in America only six percent of outbreaks of foodborne illnesses are linked to fresh fruits and vegetables, and in Australia about four percent (Lynch, Tauxe, & Hedberg, 2009).

Menopause

The next claim that the article on vegetariantimes.com makes, is *'You'll ease the symptoms of menopause'*. Certain foods such as soy are rich in phytoestrogens, this is a plant-based chemical compound that can mimic the behavior of estrogen. Thanks to this, it can help in maintaining a balance of estrogen and progesterone levels, this can help in ensuring a comfortable passage through menopause (Vegetarian Times, 2015).

In a study in which menopausal were assigned to a eating either wheat flour or soy flour for a twelve week period, the results of using soy flour on the reduction of health flashes were significant, but so were the results of the wheat flour (Murkies et al., 2008). Another study which compared the effects of hormones, soy-based phytoestrogen and a placebo proves that soy-based phytoestrogen can reduce the symptoms of menopause in women. The results of the soy-based phytoestrogen were just as good as hormone therapy (Carmignani, Pedro, Costa-Paiva, & Pinto-Neto, 2010). A randomized controlled trial showed that after ten months, there was a significant reduction in frequency of hot flashes among women who used isoflavone compared to women who were prescribed a placebo (Nahas et al., 2007), while a review study suggests that isoflavones (the kind of phytoestrogen found in soy) do not relieve menopausal heat flashes any better than placebo (Eden, 2012).

Energy

Another claim made by vegetariantimes.com is: *'You'll have more energy'*. Good nutrition generates more usable energy. Too much fat in your bloodstream means that your arteries won't open enough and your muscles won't get enough oxygen. Balanced vegetarian diets make sure this won't happen, and because they contain enough complex carbohydrates, supplied by whole grains, legumes, fruits and vegetables, they can supply your body with enough energy (Vegetarian Times, 2015).

An article about energy for athletes says that vegetarianism does not necessarily affect energy needs, though energy that is availability during activity could be reduced slightly if a vegetarian has an extremely high fibre intake. Vegetarians typically have a lower intake of protein, this might be compensated to assure that energy levels are high sufficient. Because of lower bioavailability of iron in plant-based foods, vegetarians may also have lower iron levels, even though they often consume more of it than people who eat meat (American Association of Sports Medicine & American Dietetic Association, 2000).

Digestion

The next claim that was made is: *'You'll be more 'regular''*. When you eat a lot of vegetables, you consume more fiber, which pushes waste out of the body. People who don't consume a lot of animal products tend to have less problems with constipation, hemorrhoids and diverticulitis (the formation of pouches within the bowel wall) (Vegetarian Times, 2015).

Dietary fibre by definition is the cellulosic material not digested by human pancreatic or intestinal enzymes. However, it is known that the plant cell wall are partly broken down during passage thanks to fermentation by the gut microflora (Joshi & Agte, 1995). Another study shows that a high intake of dietary fibre can reduce the risk for constipation. A balanced vegetarian diet is a good example of this thanks to the high intake of fruits, vegetables and legumes (Schmier et al., 2014). A cross-sectional study showed that the frequency of bowel movement overall was higher in vegetarians and especially vegans compared with omnivores, and that intake of dietary fibre was positively related to bowel movement (Sanjoaquin, Appleby, Spencer, & Key, 2004).

Chemicals

The last health-related result that was given by the article on vegetariantimes.com was: *'You'll avoid toxic chemicals'*. Nearly 95% of pesticide residue in the typical American diet comes from meat, fish and dairy products. Especially fish contains carcinogens and heavy metals that can't be removed through cooking or freezing. Meat and dairy products can also contain a lot of steroids and hormones (Vegetarian Times, 2015).

A study that compares the intake of dietary pesticides between vegetarians and the general population in France suggested that vegetarians are exposed to a higher number of pesticides than omnivores. Pesticide residues are mainly present in cereals, vegetables and fruit, which explains why intake is higher in vegetarians. Moreover, vegetables and fruit are found to contribute to respectively 75.8 percent and 20.5 percent of the estimated daily intake of pesticide residues of the Korean population (Van Audenhaege et al., 2009). A Danish study that looked at traces of pesticides in samples from different food groups found that in fruits and vegetables, residues were detected in 10 percent of 2515 samples, with higher incidences of detection for products that didn't come from Denmark. In 0.6 percent of these cases, the amount was violating regulations. In food of animal origin, low levels of pesticides were detected in most fish samples and in more than half of the animal product samples. For these, none of the cases violated the regulations (Juhler, Lauridsen, Christensen, & Hilbert, 1998).

4.2 Vegetarianism and lifestyle

The second element that was investigated for the subject of vegetarianism is lifestyle. There are not as many results as for the previous 'Health' part. The claims made here come from three articles that were found on popular media that list a number of arguments.

Accessibility

The first claim comes from the article by Amy van Deusen written for Women's Health online: '*Because It's Easier Than Ever*'. This argument concerns access to alternatives for meat. It's not easy for everyone to find enough 'fake' meat or other alternatives, but it is starting to get easier (Van Deusen, 2014). The website vegetariantimes.com makes the same argument by saying '*It's a breeze*'. It's easy to find great-tasting and healthy vegetarian foods in supermarkets and restaurants. This is also an argument about accessibility of vegetarian foods (Vegetarian Times, 2015).

Meat substitutes are a relatively new food group. Soy products like tofu and tempeh have been known in Asia for centuries, but were only introduced in the Western world in the 1960s. Other meat substitutes like Tivall and Quorn were only introduced less than 30 years ago. This means that neophobia plays a role in the acceptance of these products. Current products can also be three to four times more expensive than meat products (Hoek et al., 2011). Ready-made processed meat substitutes are however not the only products that vegetarians can use to complete their diet. Other options are products like beans and legumes. These are widely available in most supermarkets. The market for meat alternatives has grown in the last years, some important reasons for this are that consumer have concerns over food safety particularly in relation to animal products, a growth in the number of vegetarians, meat avoiders and meat reducers, meat eaters who are seeking more variety in their diet and growing interest in healthy eating which includes incorporating more plant-based foods into their diet. The growing market potential has stimulated the development of a wide range of ingredients that deliver improved taste and quality that simulates the texture of meat. This means that the market for meat alternatives today has a much greater variety of products than 20 to 30 years ago (Sadler, 2004).

Health interest

An online article said that many vegetarians are more highly educated and more likely to be married, to drink less alcohol, to smoke less, to exercise more and to be thinner. This suggests that people who choose to follow a vegetarian diet, are more concerned with health overall (Hope, 2013).

A cross-sectional study found that vegetarians or people who used to be vegetarian had a healthier dietary intake of fruit, vegetables and fat, and they were less likely to be overweight or obese, compared to people who had never been a vegetarian. However, vegetarians were more likely to report episodes of binge eating with loss of control compared to omnivores. Former vegetarians were also more likely to engage in extreme unhealthful weight-control behaviours compared to omnivores. A lower bodyweight among especially adolescent vegetarians, and a high percentage of adolescent vegetarians who report unhealthy dietary restrictions, suggest that vegetarianism is related to disordered eating. Adolescent vegetarians are less likely to report cigarette use compared to former vegetarians and are less likely to report alcohol use compared to former vegetarians and never vegetarians (Robinson-O'Brien, Perry, Wall, Story, & Neumark-Sztainer, 2009). Another study concludes that diets that are high in carbohydrate and low to moderate in fat tend to be lower in energy, of which vegetarianism had the lowest intake (Kennedy, Bowman, Spence, Freedman, & King, 2001). Another study reports that although vegetarian subjects often meditated, they generally had a positive opinion about modern medicine

and rarely resorted to non-traditional healers. This study also mentioned that vegetarians did not display a specific characteristic style such as hysterical or obsessional (Cooper, Wise, & Mann, 1985).

Sustainability

Another argument given by Amy van Deusen is: *'To Really Go Green'*. She says that cattle held for beef and milk produces more greenhouse gases than all cars together. Livestock also takes up vast amounts of scarce resources and pollutes the waterways more than probably any other industry. Eating no meat reduces carbon dioxide emissions, water and land (Van Deusen, 2014). This is more important for people who become vegetarian for ethical reasons concerning the environment than for health vegetarians. The same argument is given by *vegetariantimes.com*: *'You'll help reduce pollution'*. Some people become vegetarians after realizing the devastation that the meat industry has on the environment. Agricultural activities that cause pollution include confined animal facilities, ploughing, pesticide spraying, irrigation, fertilizing and harvesting (Vegetarian Times, 2015).

Vegetarians see more danger from pollution, are more willing to sacrifice to be green, and participate in more green political actions. They are much more likely to have in the last five years: (1) signed an environmental petition (2) joined a group dedicated to the environment and (3) demonstrated for environmental causes (Rozendal, 2015). The production of food contributes a great deal to the greenhouse gas emission, and especially the production of meat and dairy are a big part of this. Since the consumption of meat and dairy is still growing, especially in the developing world, this is worrying (Garnett, 2009). However, the percentage of the contribution of livestock to total greenhouse gas emission that is calculated by scientist ranges from 18 percent to 51 percent. This needs to be changed because it is important to know the relative contribution of livestock to the total emission of greenhouse gases (Herrero et al., 2011). A Swedish research suggested that diets that are low in emission of greenhouse gases are diets that contain few animal products and few 'exotic' imported products (Carlsson-Kanyama, 1998). Another research recommends the adoption of a vegetarian diet to reduce the emission of greenhouse gases (Audsley et al., 2010).

Mood

Another argument that was food was: *'Better moods'*, apparently people who follow a vegetarian diet generally have a better mood compared to people who eat meat (Sifferlin, 2014)

In a cross-sectional study Seventh Day Adventists who did or did not eat meat were examined for the relation between mood and polyunsaturated fatty acids. Vegetarians reported less negative emotions than omnivores did, despite a lower intake of some of the fatty acids. This study proves that vegetarianism doesn't have a negative influence on moods, despite the low intake of omega-3 fatty acids (Beezhold, Johnston, & Daigle, 2010).

4.3 Vegetarianism and Social Identity

The next element that was studied is social identity. For this part it was again not as easy to find claims as for the 'Health' part, so there are not as many results to be discussed here. The claims come from the same articles as were discussed in the previous sections of this thesis, plus one other article about religion. The extent to which these applies may depend on the reasons to become a vegetarian, health or ethical.

Religion

There are a number of religions in which vegetarianism is mandatory or advocated by some powerful in that religion. In Jainism vegetarianism is expected from everyone, Hinduism and Buddhism both encourage a vegetarian diet, though not every Hindu or Buddhist is a vegetarian. The Chinese religion of Taoism also favours vegetarianism. In other religions like Judaism, Islam and Christianity there are rules that prohibit cruelty against animals, but apart from some religious movements like the Seventh Day Adventists they don't really promote vegetarianism (Unknown, 2015).

For a study that compared motivations for following a vegetarian diet for people in India and North America, the outcomes differed significantly. The main reasons for people from North America were for their health, the environment or for animal rights, and they also differed in level of concern for these factors compared to meat eaters. For people from India on the other hand, the main reason was that eating meat pollutes the spirit and personality, and they were not more concerned about health, the environment or animal rights compared to meat eaters (Ruby, Heine, Kamble, Cheng, & Waddar, 2013).

Political activism

Political views of vegetarians concern mostly the animal rights, hunger and environmental subjects, seems from an interview on the website vegetarianliving.com (Vegetarian Living, 2015). These issues are addressed separately later in this thesis in the 'Social Identity' chapter.

Vegetarians overall are more likely to believe that it is the responsibility of government to reduce the differences between the rich and poor. However, in some countries, vegetarians do place a higher priority on law and order concerns (vs. democratization or free speech), and are more likely to teach their children obedience (vs. thinking for themselves). Vegetarians are exceptionally aware of and active in environmental politics (Rozendal, 2015). Another article that reviewed two other studies found that people who identified more strongly as omnivore associated stronger with social dominance and right-wing authoritarianism, this in contradiction to people who identified more as vegetarian or vegan, this was associated with weaker social dominance orientation and right-wing authoritarianism, although they do mention that the associations were weak (Allen, Wilson, Ng, & Dunne, 2000). The second article that they reviewed showed that the identity that people have towards meat consumption correlated with the endorsement or rejection of hierarchical domination. People who were omnivores placed greater emphasis on social power, while people who were vegetarian or vegan found equality, peace and social justice more important (Allen, Wilson, Ng, & Dunne, 2000).

Animal rights

Another claims given by Amy van Deusen is: *'To Stand Up for Animals'*. animals often suffer greatly in tiny cages, crates, and pens, before enduring frequently cruel slaughter practices (Van Deusen, 2014). Vegetariantimes.com also makes the same claim by saying *'You'll spare animals'*. Today most animals are factory farmed: crammed into cages where they can barely move and fed a diet tainted with pesticides and antibiotics. These animals spend their entire lives in crates or stalls so small that they can't even turn around. Farmed animals are not protected from cruelty under the law—in fact, the majority of state anticruelty laws specifically exempt farm animals from basic humane protection (Vegetarian Times, 2015).

Multiple scientists agree that mammals and birds (at least) are sentient beings capable of experiencing discernible physical pain and psychological distress. This means that they are suffering, but despite this, acts of animal abuse like long-term confinement, mutilation without anaesthesia, and deliberate starvation remain standard animal industry procedures (Prunty & Apple, 2013). However, this is not just the case in the meat industry, but also in the dairy and egg industries. The genetic selection of breeds for dairy cows in the past years for example resulted in

a decline in health in these cows, infection of the udder and digestive diseases (Sandoe, Nielsen, Christensen, & Sorensen, 1998).

Hunger

Another claim that is made by vegetariantimes.com is ‘You’ll help reduce famine’. A lot of the grain that is produced in the United States is fed to animals for slaughter. These animals eat five times as much grain as is consumed directly by Americans (Vegetarian Times, 2015). This is the only article in which this claim was found. This claim is related to the issue of sustainability as was discussed before in the theoretical framework.

Agriculture today requires a lot more input than it did before the industrial revolution. Now farmers also often produce only one product instead of more, which makes it a lot more efficient.

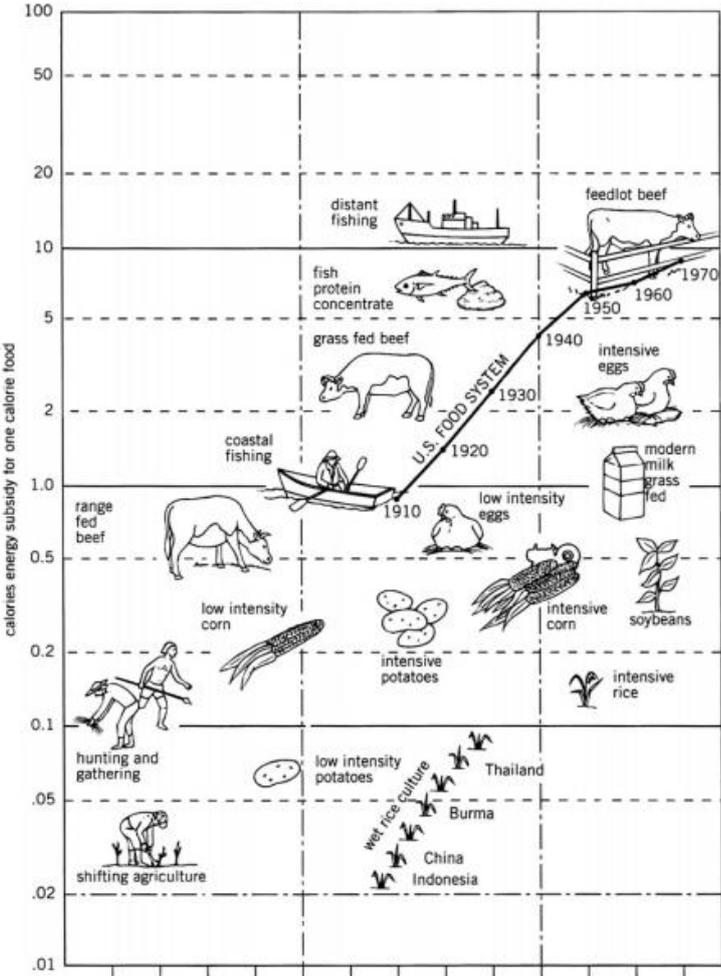


Figure 5: Graphic summary of the various types of food production: ratio of energy required to food energy delivery. Source: ‘Sustainability of plant-based diets: back to the future’ by J. Sabaté & S. Soret, 2014.

As can be seen in Figure 5, for the animal foods nowadays most energy is required. This makes it inefficient compared to eating more plant-based foods. A lot of the animals now are being fed grains, which can be consumed by humans too. Multiple scientists have calculated the efficiency ratio of animal compared to plant foods for human consumption. The amount of grain needed to produce the same amount of meat varies from a ratio of 2.3 for chicken to 13 for beef. The ratio for water used in the production of soy protein compared with the same quantity of animal protein ranges from 4 to 26, and for fossil fuel usage the ratio between soy protein and the different types of animal proteins varies from 6 to 20. The global population is growing, and so is wealth in large parts of the world, these trends result in a dramatic increase in the global demand for foods of animal origin, particularly meats and dairy foods. Since 1963, there has been a 62 percent increase worldwide in meat consumption, but a much greater increase of 300 percent has occurred in developing nations. Shifting diets from

animal-based to plant-based at the global level is of paramount importance in achieving food security and sustainability goals. Decreasing consumption of meat and other animal products will make sure that a lot more food can be consumed directly by humans, for example soy and grains (Sabaté & Soret, 2014).

4.4 Recapitulation of the results hitherto

For coronary health, which was mentioned in all the lists of claims as a big advantage of following a vegetarian diet, was proven by many articles to be better in vegetarians compared with omnivores (Key et al., 1998; Li, 2014; Thorogood et al., 1994). No articles were found which found the opposite results. For cancer the results were less unambiguous. There were studies that a vegetarian diet was related to a lower risk of cancer (Cross et al., 2007; Marsh et al., 2012; Thorogood et al., 1994), but there were also studies who said that the results were inconsistent (McEvoy et al., 2012). Two studies even said the complete opposite, namely about whether vegetarian women have a lower risk at breast cancer or not (Li, 2014; Taylor et al., 2007). Overall most articles said that there may be a positive effect of following a vegetarian diet on cancer risk. On the subject of weight management, all the results that were found agreed on the fact that vegetarians overall had a lower weight and a lower risk of becoming obese (Cross et al., 2007; Kwok et al., 2014; McEvoy et al., 2012). One study found that the more animal products people ate, the higher their BMI was (Marsh et al., 2012). All the results that were found concerning blood pressure also agreed that eating less meat and other animal products led to lower blood pressure (Appleby et al., 2002; Kwok et al., 2014; McEvoy et al., 2012; Rouse, Armstrong, Beilin, & Vandongen, 1983). The argument about 'risk of dying' is formulated a little oddly, but the articles that corresponded to the subject of longevity found that vegetarians had a lower risk of dying from many diseases (Key et al., 2003; Key et al., 1996; Marsh et al., 2012; Martínez-González et al., 2014; Singh et al., 2003). On the subject of diabetes, all the results that were found agreed that people who follow a vegetarian diet have a lower risk of getting diabetes mellitus or dying from diabetes mellitus (Key et al., 1996; Li, 2014; Micha et al., 2010; Salmeron et al., 1997). The results of the subject of bone health vary. Some articles say that a vegetarian diet may have positive effects (Dwyer, 1988; Knurick et al., 2015; Marsh et al., 2012; Wachman & Bernstein, 1968), while others say that it could have negative effects or make no difference (Marsh et al., 2012; Tucker, 2014). Although the claim is made that most food-borne illnesses come from animal origin, there were articles that found that plants were also a big cause of these (Nsoesie et al., 2014; Painter et al., 2013). One result found that only respectively four and six percent of outbreaks of foodborne illnesses are linked to fresh produce in the United States and Australia (Lynch et al., 2009). The results on the subject of reduction of the symptoms of menopause were quite different, with some saying that soy did reduce the symptoms (Carmignani et al., 2010; Murkies et al., 2008; Nahas et al., 2007), while one study found that the effects didn't differ from those of a placebo (Eden, 2012). With regard to energy, not many results were found, but it seemed like it might be a disadvantage when you're a vegetarian athlete, because of for example a lower bioavailability of iron in plant-based foods (American Association of Sports Medicine & American Dietetic Association, 2000). The results showed positive of a vegetarian diet on digestion and bowel movement (Joshi & Agte, 1995; Sanjoaquin et al., 2004; Schmier et al., 2014). The claim that said that there were less chemicals in plant-based foods could not be confirmed, the articles that were found, found the opposite (Juhler et al., 1998; Van Audenhaege et al., 2009).

There were no scientific articles available about how easily meat substitutes were to be found in supermarkets and restaurants, but the results showed that the developing of these products in the last decades means that there is now a much greater variety of products available (Hoek et al., 2011; Sadler, 2004). Vegetarians do seem to have a big interest in overall health, but the results didn't show whether they were more interested than omnivores. They were however more likely to report binge eating and extreme unhealthy weight-control behaviours (Robinson-O'Brien et al., 2009). The results do agree that a vegetarian diet could reduce the emission of greenhouse gases (Audsley et al., 2010; Herrero et al., 2011), but a vegan diet would have more effect because it is not just meat but also other animal products which cause a lot of emission

(Carlsson-Kanyama, 1998; Garnett, 2009). One result also showed that a vegetarianism at least didn't have a negative effect on mood, despite the low intake of omega-3 fatty acids (Beezhold et al., 2010).

For many people religion is the main reason that they follow a vegetarian diet, for example for people in India give as the main reason to eat vegetarian because eating meat pollutes spirit and personality. Many people in India are Hindu (Ruby et al., 2013). It also seems that vegetarians have another political interest (Allen et al., 2000). Vegetarians often give as one of the reasons to become vegetarian that it will help the animals, and it will reduce the number of animals that will be killed, but also in the egg and dairy industries animals suffer (Prunty & Apple, 2013). Agriculture nowadays is much less efficient than it was centuries ago because it requires a very big input, for animal products this input is the biggest and consists of among other things water and grains. Shifting to a plant-based diet would therefore be a good solution to achieve food security and sustainability goals (Sabaté & Soret, 2014).

4.5 Discourse Analysis

For this section of the thesis, a discourse analysis was done. This approach was chosen to examine whether a 'lay' and 'expert' discourse can be distinguished from articles on popular media and scientific literature about vegetarianism. Since the articles are written texts, not all the parts of discourse analysis apply here. A couple of factors that do apply here were selected. Due to the little time that was available for this thesis, the discourse analysis is not very comprehensive. To examine what was important to advocates of a vegetarian diet and scientists, a look was taken at which words were prominent. After that, the intonation of the popular and scientific results was compared.

Frequently used words

In the 'popular' articles, it differs per article which words are used often. In the article on vegetariantimes.com the word 'vegetables' is very prominent. This shows that they find the aspect of diet very important, and think that vegetables are a good choice. The words 'low' and 'lower' are also common, just like in the Men's Health article. A difference can be distinguished between the use of these words in these two articles. In the first article, the word low is mostly used to indicate terms like 'low fat' and 'low calorie'. This also shows the focus on diet of this article. In the second article, the words 'low' and 'lower' are used in combination with health issues like 'low blood pressure' and 'lower risk of death'. This shows that the focus of this article is on health. All the articles except the article by Jack Boerhorst also mention 'weight'. This has to do with diet and health as well as lifestyle. All four articles except the article on Women's Health also mention the word health. This article does however also talk about health-related subjects. The word diet is also used in all the articles except for the Women's Health article. All four articles except for the article by Jack Boerhorst also use the word 'disease', in the sense that following a vegetarian diet will ward off multiple diseases. This makes sense because all articles promote the vegetarian diet as a healthy diet to follow, and a part of a healthy lifestyle.

For the scientific articles, it depended on the subject they discussed which words were frequently used. Some articles discussed the most important or prominent effects of following a vegetarian diet, while some discussed one or a few specific effects. The word 'diet' was often spotted in most articles. This shows that vegetarianism is more seen as just a diet people follow than a whole lifestyle. 'Health' was also frequently used, which makes sense because for the most part, the health effects of following a vegetarian diet were examined. What stands out that in the

scientific articles the word 'health' is explained at the beginning of the article in some cases, in the popular articles this was not the case. The word 'vegetables' is also used often in the scientific articles, this makes sense because vegetables make up an important part of a healthy vegetarian diet. The words 'low' and 'lower' are also frequently used in the scientific articles, just as in the popular articles. Moreover, just like in the popular articles, they are used to point out a lower risk of multiple diseases but also a lower intake of for example macronutrients like fat. The word 'weight' was also used in the scientific relatively often, because this is one of the health effects that are supposed to go together with following a vegetarian diet. For the articles that directed a specific effect, the words that were most frequently used were all different, because they aimed their research at mostly one outcome of a vegetarian diet.

Overall, a lot of health-related terms can be identified. The scientific articles that were found mostly examined the health effects of vegetarianism. Fewer articles were related to the effects related to lifestyle or identity.

Intonation of the articles

Since all the claims about vegetarianism that were found were made by advocates, it was to be expected that all they said about following a vegetarian diet was very positive. They seemed to see it as the perfect solution for many problems, mainly health issues but also ethical questions were discussed. Since food is an important part of our lives, and the diet that people follow has a big impact on our health, this is an important subject to look at, and many people have an opinion about it. All the articles with claims in them had in common that the writers seemed to be wanting to persuade people into becoming vegetarian. A lot of the articles contained claims that were not only concerned with health, but also with sustainability and animal rights. This can point to a more activist side that especially ethical vegetarians have. Contrary to expectations, a lot of the claims that were found, already used scientific research in their articles, though they did not reference properly. The tone of these articles was casual.

The scientific articles on the other hand, seemed to be a lot more objective than the 'lay' articles, as was to be expected. They mostly saw the vegetarian diet as one of many options. A number of articles divided people into groups based on how much meat and other animal products they consume, ranging from vegans to omnivores. Most articles looked at physical health aspects, although some also looked at mental health, such as mood. The articles didn't all look at vegetarianism in the same way. Some saw it as a complete lifestyle, and some saw it merely as a person's eating habits. Some articles also looked at whether people chose to become vegetarian for health or ethical reasons, and showed the differences in for example eating habits that this caused. The tone of the scientific was also proper and a little bit formal, as can be expected from these kind of articles.

5. Discussion

As was told in the introduction of this thesis, the research aim was to compare claims made by advocates of a vegetarian diets with scientific literature about the same subjects, to see whether these claims could be substantiated with scientific evidence.

5.1 Findings

In the introduction of this thesis, one research question and three sub questions were formulated. With the help of these questions, the purpose of this thesis was to learn more about the subject of vegetarianism.

The research question was: 'How is a vegetarian diet promoted as (part of) a healthy lifestyle and to what extent are these health claims substantiated by scientific research?'. The three sub questions that were formulated were: 1] 'Which health claims are made by advocates of a vegetarian diet about following a vegetarian diet?' 2] 'Which of the claims that were found can be substantiated by scientific literature?' and 3] 'Are there different discourses to be found in the popular and scientific literature concerning a vegetarian diet?'.

The claims made by advocates of a vegetarian diet were harder to be found than was thought beforehand. Not as many claims were found with the formulated search terms as was expected. It turned out that many of the claims were named in more than one article, some claims were even named in all the articles. This does mean that these claims are known to be true by many people, whether they can actually be proven by scientific research or not.

It appeared that a lot of the claims that were made could be substantiated by scientific literature. But for some claims the results mutually varied; some articles supported the claims, while others said the opposite or were not certain. This was the case for the prevalence of breast cancer among vegetarians (Li, 2014; Taylor et al., 2007), bone health (Dwyer, 1988; Tucker, 2014) and the symptoms of menopause (Carmignani et al., 2010; Eden, 2012). The claims that were hard to find scientific literature about were the claims that said that vegetarians had a higher energy level, and the claim that said that vegetarians don't consume as many chemicals as people who eat meat. Especially for most of the health related claims a lot of results were found, and for a lot of them at least a part of the results were affirmative. For coronary health (Thorogood et al., 1994), weight management (Cross et al., 2007), risk of diabetes (Key et al., 1996), longevity (Key et al., 2003), blood pressure (Appleby et al., 2002) and digestion (Joshi & Agte, 1995). The scientific literature also agrees that a vegetarian diet reduces greenhouse gas emission compared to a vegetarian diet (Herrero et al., 2011), but a vegan diet would be even more effective for this (Carlsson-Kanyama, 1998). From the results can be concluded that there are many possible reasons for people to become vegetarian. These reasons can also influence social identity and the way that people look at other things, and how they compose their diet. Health vegetarians seem to be better at composing a complete diet that contains enough nutrients and substitutes for meat, because they pay more attention to this.

The discourse analysis was a time-consuming analysis to do, especially since the amount of literature that was found is big. For this reason, the choice was made to do a simplified discourse analysis with just a few factors. In this way, the possible discourses could still be examined, but it did also work within the time available. As is stated in the methods section of this thesis, Jorgensen and Phillips (2002) say: *The struggle between different knowledge claims could be understood and empirically explored as a struggle between different discourses which represent different ways of understanding aspects of the world and construct different identities for speakers (such as 'expert' or 'layperson')* (p.2). The outcome of the discourse analysis was that especially health-related subjects were frequently named in both 'popular' media and scientific literature. The 'popular' and scientific articles used some of the same words often, but they didn't always use them in the same sense. It was also notable that the tone of the scientific articles was a lot more objective than that of the 'popular' media, which was to be expected. The 'popular' media promoted the vegetarian diet as good for your health and the environment mostly. The 'popular' media seemed to be a little more concerned with sustainability and animal right. Since a lot of the 'popular' media already used scientific literature to support their claims, there was not such a big difference in the issues that they discussed. For future research, it could be interesting to look at the different discourses that can be discovered in articles written by advocates of a vegetarian diet and articles

written by antagonists of a vegetarian diet. These differences will most likely be more noticeable, because these two groups have a very different idea of health.

5.2 Methods

For the first sub question, the results had to be found on the internet, for this the search engine google was used. Finding enough results with the formulated search questions was harder than expected. What was surprising was the fact that a lot of the claims that were made were already (partly) based on scientific articles. The articles on which the claims were based were not named, so it could not be checked whether they used the information in these articles properly, but finding claims that were not based on scientific research at all proved difficult. It was interesting to see that a number of claims were mentioned in more than one article, these were often the claims that later seemed to be true based on the scientific literature that was found about the same subjects, such as coronary health and weight management.

The second sub question was answered with the use of scientific literature. At first the formulated search question was used in multiple databases of scientific articles, but the results that this yielded were not sufficient. Therefore the search strategy was changed and more specific search terms were used. This way enough results could be collected, and most of the claims that were found were researched so the results of the first and second sub question could be compared. For some claims however, no scientific literature could be found that exactly matched, but information on a similar subject was used to still be able to compare these results. By changing the research method, the results also changed. By formulating different search questions for every issue, the results were more specific for these different issues, and the search for literature that matched the claims was easier. On the other hand, this may have been cause to certain results being overlooked, if the right keywords to find them were not used. If only the first search question that was formulated would have been used, there would not have been enough results, and the research question should have been changed, otherwise the results could not have been used. A systematic literature research would however have given more power to the findings.

For the third sub question, a discourse analysis was done. Because of the short time period that was available to write this thesis, the choice was made to do a simplified version of this analysis. Some elements of discourse that were important were selected, and this way the 'popular' and scientific results were analysed. For future research, it would be interesting to do a more comprehensive discourse analysis to look deeper into the possible discourses that can be found related to this subject, and the differences between discourses from 'popular' and scientific literature concerning vegetarianism. Looking at discourses from advocates and antagonists of a vegetarian diet would also be interesting, since these differences would probably stand out more. It would also be interesting to look at the effects of veganism on health, lifestyle and social identity because in a couple articles in which they compared effects of different amount of meat intake, veganism had even more evident effects.

5.3 Theoretical reflection

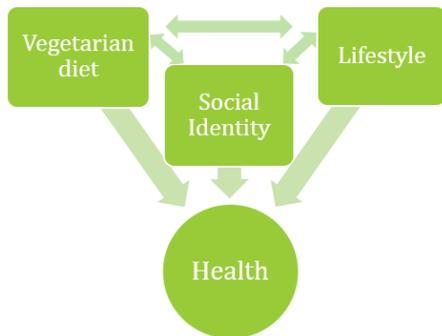


Figure 4: Analytical Framework Vegetarian Diet

The analytical model that was created in Figure 4 helped in structuring the results. It was helpful to divide the results into three chapters based on the framework (health, lifestyle, and social identity) as it created a clear overview of how many results were found for each element. The element of health seemed to be most researched in relation so vegetarianism, since most claims that were found were health-related, and also most of the scientific articles that were found looked at the health effects of vegetarianism. From the claims, it appeared that especially ethical vegetarians also cared about sustainability a lot. For them, vegetarianism is a bigger part of their identity than for health vegetarians. It appeared from the results that 'Vegetarian diet', 'Social identity' and 'Lifestyle' all influenced each other, and these three all influenced health. Vegetarians overall care more about health than omnivores, this shows that all the elements are interrelated. For future research, it would be interesting to try and expand the current framework with other elements that are related to vegetarianism, and explore the interrelations more extensively.

6. Conclusion

A lot of the claims made by advocates of the vegetarian diet that were found could be substantiated by scientific literature. A large part of the claims that were found were health-related, and many of the scientific results also examined health effects of the vegetarian diet, so this proves that there is a lot of interest for the relation between vegetarianism and health. The claims by advocates of a vegetarian diet also mentioned ethical arguments like sustainability and animal rights. Ethical vegetarians seem to have a tendency towards political activism for these causes. Overall, the vegetarian diet seemed to have a positive effect on health, at least for the issues that were examined for this thesis. Vegetarianism also seemed to be associated with identity, but this differed with the reason that people chose to become a vegetarian: health or ethical. This can also influence the way that people look at and feel towards other things. A lot of the articles looked at vegetarianism as just a dietary choice, but it also seemed to be related with lifestyle, this also differed based on the reason to become a vegetarian.

Personal reflection

This thesis was the first big assignment that I had to do on my own, since all the other papers that we have written for our courses were teamwork. This made it a difficult process with a slow start, because determining the way I was going to structure everything was difficult without being to brainstorm with other people. At the start of the process of writing this thesis, I was very enthusiastic about the subject of vegetarianism and I still am. This may partly be due to the fact that I am a vegetarian myself. I was curious to find out whether the claims that people make about the vegetarian diet are true, and it is actually beneficial for your health. I did not let my being vegetarian influence the research of course. At first the questions that I formulated were too broad and could never be answered in the eight weeks that I had for writing this thesis. Dirk Roep helped me a lot in formulating questions that were more focused on the relationships in particular and made it possible to finish within the timeframe. The whole process of writing this thesis did teach me a lot of things however, like independency, perseverance and the fact that going to a work environment to do your research really helps in speeding up the process, because you are more focussed. Because the first paper that I had to write on my own was such a big one, this really made the process very instructive. I do feel that it has prepared me a little bit for writing a master's thesis and it has given me a look into what this is going to be like. I did learn that a good preparation can really help, and making a planning for yourself can also help in keeping you focused. Because I didn't do this at the beginning of this process, and I did not yet know what I was going to do, this made the start a difficult one. At the end of the line, I think that writing this thesis did make me more independent and has taught me what it's like to work on one project for a longer period of time.

Wageningen, June 2015

Marte Vestjens

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