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## More Than Just A Diet: An Inquiry Into Veganism

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## More Than Just A Diet: An Inquiry Into Veganism

### Abstract

**BACKGROUND:** The vegan diet has gained momentum in recent years, with more people transitioning to the diet, whether for health or more ethically based reasons. The vegan diet, often characterized as very restrictive, is associated with health benefits but raises concerns. Controversy regarding the diet exists within the public sphere, with those actively supporting and advocating for it, and others questioning its purpose and proposed benefits, even disparaging its existence, perhaps because of a lack of knowledge about the diet. **OBJECTIVE:** This study aimed to provide a fuller picture of the vegan diet, encompassing both the nutrition and health of the vegan diet as well as related ethical beliefs by studying scientific and popular literature in tandem. Furthermore, the study aimed to provide an insider's perspective of the vegan diet as a means of combating stereotypes and making the diet more relatable/understandable to those who are not vegan. By combining all three sources, the project aims to educate the public regarding a diet and lifestyle that is often perceived, at least partially, in a negative manner. **METHODS:** The research was conducted in two parts – literature review and interview study. A literature review of both the scientific and the popular literature was conducted and reviewed from August to November. Pubmed database was used to research the scientific findings while food blogs, vegan websites, and newspaper articles comprised the popular literature. The interview study involved semi-structured, one-time, in-person private interviews conducted during February and March. Twenty vegans (10 students from the University of Pennsylvania and 10 Philadelphia residents) were interviewed and questions targeted personal history of veganism, related health beliefs, factors influencing the decision to become vegan, and diet composition. Once all data was obtained, it was analyzed in tandem. **RESULTS:** Findings suggest that a well-rounded vegan diet is healthy and such is evidenced by the variety of whole foods and increased vegetable and fruit intake. Health benefits include a decrease in cholesterol, lipid levels, blood pressure, weight, and a reduced risk for a variety of diseases including obesity, diabetes, cardiovascular disease, and cancer. Despite the benefits, health concerns do exist, especially in regard nutrient deficiencies, without a well-planned and varied diet. Nutrient concerns include calcium, vitamin D, iron, and particularly vitamin B-12 for which supplements should be taken. The nature of the interviews conducted for this paper was such that a comprehensive but diverse collection of information was obtained, precisely because the interviewees have chosen the vegan diet for a multitude of reasons, and approach their diet and lifestyle in varied ways. However, there are some commonalities that were revealed. Results of the interview studies demonstrate that about half of the vegans are potentially at risk for vitamin D deficiency because most are taking neither vitamin D supplements nor a multivitamin. Comparing the scientific literature with the interview results reveal that most of the vegans include working out within their daily routines, such that they place emphasis upon physical fitness, suggesting that the vegan lifestyle has benefits beyond merely nutritional. Finally, comparing popular literature to the information gleaned through the interviews conducted establishes that many of the stereotypes regarding the vegan diet are unfounded. **CONCLUSIONS:** The vegan diet is one that is chosen by individuals for various reasons, including health and/or ethical reasons. While many health benefits exist, it is essential for those who are vegan or are planning to become vegan to be educated about potential nutrient deficiencies to prevent adverse outcomes. In addition, it is evident that the vegan diet is much more than a diet itself, but has developed into a lifestyle, often associated with animal rights and environmental advocacy as well as a greater concern for physical activity and mindfulness. Further research begs the question of whether the health benefits associated with the diet are solely attributable to the diet or in conjunction with a greater physical activity level and mindful living. With regard to providing an accurate picture of veganism in the popular literature, it is essential to combat negative unsubstantiated stereotypes and myths by providing vegans with unbiased voice with which to share their own stories and beliefs. Lastly, the popularity of the vegan diet and the question of whether it is nutritionally sound, raise issues of anthropologic significance. Specifically, it prompts consideration of whether our ancestral diet

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was vegetarian in nature, or depended upon meat for evolutionary progress. Moreover, this study demonstrates that the human diet has changed over time, such that our dietary needs, choices and preferences are inherently reflective of cultural and nutritional anthropology.

**Disciplines**

Anthropology

**MORE THAN JUST A DIET: AN INQUIRY INTO VEGANISM**

**By**

**Sarah E. Mann**

**In**

**Biological Anthropology**

**Submitted to the  
Department of Anthropology  
University of Pennsylvania**

**Thesis Advisors: Dr. Babette Zemel and Dr. Theodore Schurr**

**[2014]**

## Abstract

**BACKGROUND:** The vegan diet has gained momentum in recent years, with more people transitioning to the diet, whether for health or more ethically based reasons. The vegan diet, often characterized as very restrictive, is associated with health benefits but raises concerns. Controversy regarding the diet exists within the public sphere, with those actively supporting and advocating for it, and others questioning its purpose and proposed benefits, even disparaging its existence, perhaps because of a lack of knowledge about the diet.

**OBJECTIVE:** This study aimed to provide a fuller picture of the vegan diet, encompassing both the nutrition and health of the vegan diet as well as related ethical beliefs by studying scientific and popular literature in tandem. Furthermore, the study aimed to provide an insider's perspective of the vegan diet as a means of combating stereotypes and making the diet more relatable/understandable to those who are not vegan. By combining all three sources, the project aims to educate the public regarding a diet and lifestyle that is often perceived, at least partially, in a negative manner.

**METHODS:** The research was conducted in two parts – literature review and interview study. A literature review of both the scientific and the popular literature was conducted and reviewed from August to November. Pubmed database was used to research the scientific findings while food blogs, vegan websites, and newspaper articles comprised the popular literature. The interview study involved semi-structured, one-time, in-person private interviews conducted during February and March. Twenty vegans (10 students from the University of Pennsylvania and 10 Philadelphia residents) were interviewed and questions targeted personal history of veganism, related health beliefs, factors influencing the decision to become vegan, and diet composition. Once all data was obtained, it was analyzed in tandem.

**RESULTS:** Findings suggest that a well-rounded vegan diet is healthy and such is evidenced by the variety of whole foods and increased vegetable and fruit intake. Health benefits include a decrease in cholesterol, lipid levels, blood pressure, weight, and a reduced risk for a variety of diseases including obesity, diabetes, cardiovascular disease, and cancer. Despite the benefits, health concerns do exist, especially in regard nutrient deficiencies, without a well-planned and varied diet. Nutrient concerns include calcium, vitamin D, iron, and particularly vitamin B-12 for which supplements should be taken. The nature of the interviews conducted for this paper was such that a comprehensive but diverse collection of information was obtained, precisely because the interviewees have chosen the vegan diet for a multitude of reasons, and approach their diet and lifestyle in varied ways. However, there are some commonalities that were revealed. Results of the interview studies demonstrate that about half of the vegans are potentially at risk for vitamin D deficiency because most are taking neither vitamin D supplements nor a multivitamin. Comparing the scientific literature with the interview results reveal that most of the vegans include working out within their daily routines, such that they place emphasis upon physical fitness, suggesting that the vegan lifestyle has benefits beyond merely nutritional. Finally, comparing popular literature to the information gleaned through the interviews conducted establishes that many of the stereotypes regarding the vegan diet are unfounded.

**CONCLUSIONS:** The vegan diet is one that is chosen by individuals for various reasons, including health and/or ethical reasons. While many health benefits exist, it is essential for those who are vegan or are planning to become vegan to be educated about potential nutrient deficiencies to prevent adverse outcomes. In addition, it is evident that the vegan diet is much more than a diet itself, but has developed into a lifestyle, often associated with animal rights and environmental advocacy as well as a greater concern for physical activity and mindfulness. Further research begs the question of whether the health benefits associated with the diet are solely attributable to the diet or in conjunction with a greater physical activity level and mindful living. With regard to providing an accurate picture of veganism in the popular literature, it is essential to combat negative unsubstantiated stereotypes and myths by providing vegans with unbiased voice with which to share their own stories and beliefs. Lastly, the popularity of the vegan diet and the question of whether it is nutritionally sound, raise issues of anthropologic significance. Specifically, it prompts consideration of whether our ancestral diet was vegetarian in nature, or depended upon meat for evolutionary progress. Moreover, this study demonstrates that the human diet has changed over time, such that our dietary needs, choices and preferences are inherently reflective of cultural and nutritional anthropology.

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## Introduction

“It is only by softening and disguising dead flesh by culinary preparation that it is rendered susceptible of mastication or digestion, and that the sight of its bloody juices and raw horror does not excite intolerable loathing and disgust.”<sup>1</sup> The words of Percy Bysshe Shelly the 18-19<sup>th</sup> century English Romantic poet and advocate for a vegetarian diet, illustrate the preparatory manner in which humans must alter animal meat for consumption – hinting at the destructive process of “meat” preparation. That is, it is only after the animal is stripped of its identity, the meat seemingly unrecognizable from its prior living form, that humans are able to consume it. This notion highlights what for many non-meat eaters is fundamental to their dietary choice, namely a sense of discomfort or distress that comes with vividly picturing the meat as a once living, breathing, sentient being.

While the concept of vegetarianism can be traced back to ancient Greece, in particular to Pythagoras and his followers, the history of veganism is seemingly far more recent. Presenting as a stricter branch of vegetarianism, ‘veganism’ caught the attention of Donald Watson and Elsie Shrigley.<sup>2</sup> The idea of a non-dairy vegetarian diet had previously been proposed numerous times by members of the Vegetarian Society in London, who argued that much harm came to animals as a consequence of dairy production and egg farming.<sup>3</sup> Attempting to bring the issue to the forefront, Watson and along with his wife Dorothy, Shrigley, and three friends who advocated for a non-dairy vegetarian, formed a new society in London in 1944, soon to be called the “The Vegan Society.”<sup>4</sup> In the first Vegan Newsletter, Watson wrote:

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<sup>1</sup> “Vegan Quotes,” *Vegan Campaign*, accessed March 21, 2014, [http://www.idausa.org/vegandays/vegan\\_quotes.html](http://www.idausa.org/vegandays/vegan_quotes.html)

<sup>2</sup> “History,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/about/history.aspx>

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

We should all consider carefully what our Group, and our magazine, and ourselves, shall be called. ‘Non-diary’ has become established as a generally understood colloquialism, but like ‘non-lacto’ it is too negative. Moreover it does not imply that we are opposed to the use of eggs as foods. We need a name that suggests what we do eat, and if possible one that conveys the idea that even with all animal foods taboo, Nature still offers us a bewildering assortment from which to choose. ‘Vegetarian’ and ‘Fruitarian’ are already associated with societies that allow the ‘fruits’(!) of cows and fowls, therefore it seems we must make a new and appropriate word.<sup>5</sup>

In an attempt to adopt a name for this new movement, Watson coined the term “vegan,” combining the beginning and ending of the word, “vegetarian” – symbolizing the transition to veganism, which starts with vegetarianism and is carried only to its rational foremost conclusion, the elimination of animal products from one’s diet as explained by Watson.<sup>6</sup> “The pronunciation is ‘VEEGAN’ not ‘VAI-GAN,’ ‘VEGGAN,’ or ‘VEEJAN.’ The stress is on the first syllable.”<sup>7</sup> Greatly influenced by the vegan movement in Britain and Donald Watson’s philosophy to prevent any harm to living creatures, Hom Jay Dinshah founded the American Vegan Society in 1960.<sup>8</sup>

Just as any movement progresses, the beliefs, causes, and ideals behind veganism grew in strength and number. Veganism was initially a shift to eliminate dairy from the vegetarian diet. Today, a vegan is defined as a “strict vegetarian who consumes no animal food or dairy products” as well as “one who abstains from using animal products,” extending beyond merely dietary exclusions.<sup>9</sup> Such forbidden foods include, eggs, honey, and gelatin, while animal

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<sup>5</sup> “Donald Watson,” *Vegan Peace Home*, accessed March 21, 2014,

[http://www.veganpeace.com/famousvegans/profiles/donald\\_watson.htm](http://www.veganpeace.com/famousvegans/profiles/donald_watson.htm)

<sup>6</sup> “History,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/about/history.aspx>

<sup>7</sup> “Donald Watson,” *Vegan Peace Home*, accessed March 21, 2014,

[http://www.veganpeace.com/famousvegans/profiles/donald\\_watson.htm](http://www.veganpeace.com/famousvegans/profiles/donald_watson.htm)

<sup>8</sup> “Founder,” *American Vegan Ahimsa Lights The Way*, accessed December 17, 2013,

<http://www.americanvegan.org/founder.htm>

<sup>9</sup> “Vegan,” *Merriam-Webster*, accessed December 17, 2013, <http://www.merriam-webster.com/dictionary/vegan>



products such as leather, wool, fur, and silk are excluded from clothing and upholstery.<sup>10</sup> In other words, veganism is no longer simply a diet, but also a lifestyle, a key aspect that often goes unnoticed today. The American Vegan society proclaims vegans to “live on products of the plant kingdom” as veganism “is compassion in action. It is a philosophy, diet, and lifestyle.”<sup>11</sup> However, the reasons for becoming vegan are numerous and varied.

### **Background to the Research Problem: Intellectual Framework**

The vegan diet is becoming more popular today – even celebrities and those in the spotlight are making the decision to become vegan. With growing interest in the diet, whether among those interested in making the transition to veganism or those just simply wanting to access more information, , accurate portrayals of the diet are necessary. Easy access to information about the vegan diet can be obtained simply by searching online using one of the many search engines. However, this still begs the question as to whether a popular literature search such as this will provide a full picture of the vegan diet – including the more scientific or medical perspective on a diet that, to many, is worrisome due to the elimination of staple foods. That is, can a popular literature search find scientific details about the vegan diet that provide information about the health benefits, noteworthy concerns, and actual nutrient composition?

This question is raised given the inherent differences between popular literature and that of scientific or scholarly literature. Popular literature is often written by journalists, covering news and/or current events in a field. These sources tend to often summarize, omit, and/or sensationalize information coming from the primary source, which with regard to veganism is

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<sup>10</sup> “What is Vegan,” *American Vegan Ahimsa Lights The Way*, accessed December 17, 2013, <http://www.americanvegan.org/vegan.htm>

<sup>11</sup> “What is Vegan,” *American Vegan Ahimsa Lights The Way*, accessed December 17, 2013, <http://www.americanvegan.org/vegan.htm>

the scientific community. The information presented may lack in qualifying statements (the omission of some information, evidence, or even a phrase, making the statement read less strongly or honestly) as well as in a discussion of methodology. In addition, a change of emphasis may occur or even a generalization of the data. Oftentimes, information is presented in this manner to appeal to people with different interests and backgrounds, keeping in mind that the audience will have a range of knowledge on the topic. That is, these articles are intended to inform and entertain the general reader.

In contrast, the scientific literature is written by researchers who are experts in their field with the intention of presenting their findings in an unbiased manner. These writings are submitted to journals and before publication often must undergo a committee review determining whether the paper is suitable for publication. The peer review constitutes an evaluation of the work by qualified members in a similar field to the topic, including suggestions of possible changes and improvements as well as a recommendation to the editor of the journal whether or not to publish. These works are intended to communicate research and scholarly ideas and to apply this information to provide professional support to other scholars and students or practitioners in the field.

Since the two bodies of literature have different purposes and are intended for different audiences, it is reasonable to hypothesize that discrepancies between or simply differences among both bodies of literature would be found. Perhaps even, the popular and scientific literature do not intersect – with certain information lacking in each when studied and analyzed separately.

It is important to note that, as a generalization, the general public obtains much information from popular literature and media, due to its accessibility in terms of availability

online and, more importantly, comprehensibility, being written typically in layman's terms. It is reasonable, then, to hypothesize that the health effects of a vegan diet and precautions one should take when vegan are not as well known or understood by the general public than it would be if they were to rely more heavily on scientific sources, . To study veganism then, it is vital to review the popular literature to find the stereotypes about it, the general beliefs about the diet, and the media advertisements about veganism, while utilizing the scientific literature to either support or reject the information gathered. .

Integrating the findings from both the popular and scientific literature may help to present a fuller, more accurate picture of the vegan diet. However, further research to illustrate an insider's perspective of the diet in terms of reasons for becoming vegan, diet patterns, lifestyle ways, related health beliefs, studied health benefits, and consequences, would be beneficial.

To clarify these details, a study entitled "Veganism Inquiry: Scientific Literature in Contrast to Popular Culture and Individual Beliefs" was conducted after a thorough literature review. The study aimed to compare and contrast the published scientific literature with popular literature and individual beliefs related to the vegan diet. I developed questions targeting the personal history of veganism, related health beliefs, diet composition, and other factors influencing the decision to become vegan, as a means to bridge the gap between scientific literature and the popular culture literature by providing an insider's perspective. In addition, this project was designed to shed light on whether the vegan cohort has substantiated knowledge about the diet from the scientific literature, which would allow for a greater, healthier diet to be practiced.

## **Research Design/Methodology**

As previously noted, this research project has two components, namely the literature based research review and analysis and the interview study. Discuss the study received IRB approval from the University of Pennsylvania (see Appendix, Exhibit A).

### Part One

Part One of the research project involved a search of both the scientific and popular culture literature pertaining to veganism. It focused on information about diet composition, nutrient composition, health benefits and precautions/risk/consequences, body composition, and personal beliefs of vegans. This literature search was completed over a period of four months, spanning from August 2013 to November 2013. The search was conducted online using keywords that were refined over time to obtain as much material as necessary while focusing on all the intended areas of interest.

Keywords/search terms were used to place boundaries on the literature review. PubMed was used as the database search engine for the scientific literature review. Articles were accessed using the University of Pennsylvania's PubMed license. Keywords/search terms included: vegan, vegan diet, veganism, vegetarian, vegetarian vs. vegan, omnivores vs. vegan diet, body composition of vegans, health effects of vegan diet, cardiovascular and veganism, and nutrients in vegan diet. The time boundary on the search was post 1970, between 1970-2014.

The scientific articles selected represented a good survey of the search results. Inclusion criteria were determined prior to conducting the literature search. Articles had to be either written or translated into English and published after 1970. These articles focused on the nutrient composition of the vegan diet, the health benefits of veganism, dietary precautions and

health risks, body composition, and the health profile of vegans, in particular the lipid profile. Primary studies and review articles were included.

Google search engine was used for the popular literature search. Keywords/search terms included vegan, vegan diet, veganism, vegetarian, vegetarian vs. vegan diet, omnivores vs. vegans, stereotypes of vegan diet, vegan lifestyle, vegan substitutes, vegan foods, vegan companies, vegan products, history of veganism, vegan food blogs, and vegan recipes. No time boundary was placed on the search, although most websites, blogs, and articles identified were fairly recent, all dating to the twenty-first century (2000-2014).

The popular literature was much more accessible than the scientific literature – that is, accessing these websites and articles did not require the school’s license. Multiple online vegan food blogs were reviewed with particular attention being paid to the author’s profile or “about” page as well as the recipe index to gain information about personal beliefs and reasons for becoming vegan as well as diet composition. Other popular literature reviewed included vegan society/club websites and vegan and vegetarian food product websites, both of which provided information about the vegan movement’s ideals, beliefs, and philosophy, and diet composition, in particular vegan substitutions for meat and dairy products. Online magazines and newspaper articles were reviewed for information about how the general public views the vegan diet and how the media portrays veganism, including any overarching qualities and/or stereotypes.

## Part Two

Part Two of the research project, as described briefly in the introduction section, involved an interview study conducted between January-March. The purpose of the study was to examine vegan diets perspective of the published scientific literature and to popular culture and individual

beliefs. The results obtained from the dual literature search informed the interviews. That is, particular focus was placed upon eliciting personal reasons for becoming vegan and individual beliefs about the health benefits and consequences of the vegan diet, as discrepancies undoubtedly exist between the popular and scientific literature.

The study involved a one time non-recorded semi-structured interview with subjects who are vegan. Participants in the interview process were all voluntary – no compensation for participation was given. The only selection criteria were currently being vegan and having been vegan for at least one month, to ensure that the dieting practice was not just a brief, transient phenomenon. The interviews involved study population was a target population of 20 adult subjects who practice a vegan diet and/or vegan lifestyle. To ensure a varied age demographic, 10 subjects were recruited from the University of Pennsylvania students, while the other 10 subjects were recruited from the broader Philadelphia community. Based on this strategy the age range for students was anticipated to be 18-22 years, and that for Philadelphia residents 20-70 years. It was very unlikely that children and teenagers would participate. While impossible to predict what the female to male ratio of participants every effort was made to involve roughly an equal proportion. Furthermore, the study attempted to involve a study population of vegans who vary in their duration of practicing a vegan diet.

Subject recruitment was undertaken from January through March 2014. IRB approved posters, were placed on the University of Pennsylvania's campus as well as in local vegan friendly restaurants (i.e. Blackbird Pizzeria), food co-ops (i.e. South Philly Food Co-op) and/or similar venues in the broader Philadelphia community (see Appendix, Exhibit B). The posters were also posted on Facebook pages, including that of the Penn Vegan Society and the Humane League of Philadelphia. An initial meeting with the board of the Penn Vegan Society was held

to introduce the research study and form a partnership for recruiting participants. The poster was subsequently distributed to all Penn Vegan Society members via their monthly newsletters. Furthermore, word of mouth likely played a role in finding participants, especially in the student population. No University of Pennsylvania media or personal services for outreach via social media avenues were used to recruit participants for the research.

In-person interviews were conducted in a private setting (not a group setting), and generally lasted between 30-60 minutes per participant. The information gathered was not electronically recorded due to IRB considerations; written notes were taken during the interview process. The interview questions aimed to gather information regarding the personal history of veganism, related health beliefs, and diet composition (see Appendix, Exhibit D, for sample interview questions)

Subject confidentiality was ensured through the assignment of numeric identifiers. No names or identifiable information were present on the written notes other than age, sex, and student status. In keeping with IRB regulations, the data was not transferred to a computer at any time and will be destroyed after thesis submission. The written notes were used as source material to be contrasted with the published scientific and popular literature, in order to shed light on an insider's perspective of the vegan diet.

Verbal consent was obtained from each study participant prior to beginning the interview. The project was described in detail, any questions the participant had were answered, the risks and benefits were explained to each participant, and only after verbal consent was obtained, did the interview proceed (see Appendix, Exhibit C, for verbal consent script). The study involved minimal risk – the only potential risk was that a subject may feel uneasy about answering a question. Should this have occurred, the subject would have been reminded that his/her

participation was voluntary and he/she did not need to answer any questions. There were no direct benefits of study participation. Potential indirect benefits included having the opportunity to express opinions and benefits about the vegan diet and perhaps combat negative popular beliefs about the diet including unconstructive and/or faulty stereotypes. While monetary compensation was not given, the subjects were offered access to the thesis upon completion.

Interview data was compiled and reviewed thoroughly. Participants' answers to all the interview questions were compared and contrasted. Qualitative analysis was used, looking for and making note of common responses and themes that developed. The data review also included quantitative analysis when applicable; specifically when a common response was obtained from more than one interviewee, the number of such responses was calculated.

## **Results**

### Scientific Literature

#### *Diet Composition and Nutrient Intake*

Diet composition provides an understanding of the foods and in particular the nutrients that are consumed in the vegan diet. The vegan diet is defined by the scientific literature as one that includes only plant foods, namely, “grains, vegetables, fruits, legumes, nuts, seeds, and vegetable fats.”<sup>12</sup> As a result, it is described as a restrictive diet due to its exclusion of meat and fish, abundant sources of protein, and dairy products, both high in essential vitamins and minerals.<sup>13</sup>

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<sup>12</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661.

<sup>13</sup> Ibid.



The literature focuses on specific nutrients in the diet as “the likelihood of nutritional deficiencies increases with more restrictive diets.”<sup>14</sup> This is not to suggest, though, that the vegan diet is unable to provide one with all of the necessary vitamins, minerals and nutrients, but rather to emphasize the importance of a well-planned vegan diet to support normal growth and development in children and maintain health and wellness in adults. Nutrients of special interest include protein, calcium, vitamin D, vitamin B-12, riboflavin, zinc, iron, fiber, as well as fat and essential fatty acids.<sup>15</sup>

Dietary protein sources in the vegan diet are plant-based proteins. Interestingly, “on a global basis, plants provide [about] 65% of the world supply of edible protein.”<sup>16</sup> Such products include, soymilk, tofu, tempeh, seitan, legumes, grains, nuts, and seeds. Unlike protein from meat sources however dietary protein from plant foods is only about 85% digestible.<sup>17</sup> In order to counter the effects of the lower digestibility of plant proteins, the Recommended Dietary Allowances (RDA) suggest increasing daily recommendations for vegans by 10 to 15%. Currently the recommendations for an omnivorous diet are 56 grams per day for men and 46 grams per day for women. Therefore, vegans need to increase their protein intake by about 4-8 grams of protein per day.<sup>18</sup> However, it is important to note that:

Although protein and amino acid requirements are conventionally expressed as daily rates (of intake) there is no implication that these amounts must be consumed each and every day. Therefore, it is not essential, at least in adults, that daily intakes of protein, or presumably of each indispensable amino acid, must equal or

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<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Vernon R. Young and Peter L. Pellett. “Plant proteins in relation to human protein and amino acid nutrition,” *The American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1203S.

<sup>17</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661.

<sup>18</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 662.

exceed the physiological requirement; it is apparently sufficient for the average intake over a number of days to achieve this level.<sup>19</sup>

While a popular belief among vegetarians and vegans is to combine complementary proteins at each meal, called mutual supplementation, scientific literature actually contends that this may not be necessary to ensure an adequate protein intake, though, further research is needed to make a definite conclusion. That is, complete protein foods such as meat, poultry, eggs, and dairy have all the essential amino acids (amino acids the body cannot produce), while incomplete protein sources like plant foods have only certain amino acids. In order to receive a balanced distribution of essential amino acids it was thought that mutual supplementation within a meal was required (i.e. consuming legumes such as beans, high in lysine content with grains such as rice, high in sulfa content).

Using physiological data, Young & Pellett (1994) believe that for “usual conditions of healthy living it is not necessary to consumed complementary proteins at the same time and that separation of the proteins among meals over the course of a day would still permit the nutritional benefits of complementation.”<sup>20</sup> The conclusion was reached that this is due to the physiological nature of lysine. Lysine is considered to be the limiting amino acid in a diet based on cereal grains. Within the skeletal musculature in the intracellular space of free amino acids, there is a sizeable pool of lysine, which responds to changes of lysine consumption. Data from the study showed that, “after a protein-rich meal (providing 50 g bovine serum albumin) 60% of the adult daily requirement for lysine may be deposited in this intracellular pool within 3 h.”<sup>21</sup> This means that, even if a food with a low lysine content such as maize was consumed hours later than a complementary, higher lysine food, “the free-lysine pool in the muscle would buffer the low

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<sup>19</sup> Vernon R. Young and Peter L. Pellett. “Plant proteins in relation to human protein and amino acid nutrition,” *The American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1209S.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

lysine content of the amino acid mixture derived from the digestion of maize.”<sup>22</sup> Thus, an adequate state of protein retention and utilization will be achieved regardless of whether complement proteins are consumed during the same meal or not, with the balance over a day being more vital. However, the supplementary effect in children “of the addition of *Phaseolus vulgaris* to a maize-bean diet was somewhat less when the supplement was given at intervals” of greater than six hours.<sup>23</sup>

In addition, it is important to address the question of the perceived benefits of consuming protein throughout the day or at a particular time. It has previously been shown that nitrogen utilization is affected by a “time-dependent interaction between the carbohydrate and protein components of the diet” and in addition, “rhythms in protein and amino acid metabolism appear to be generated by the cyclic ingestion of energy and amino acids.”<sup>24</sup> As a result, it has been suggested that the “efficiency of amino acid utilization for protein synthesis may depend upon the time of their ingestion.”<sup>25</sup> In an older study looking at the relationship between plant proteins, amino acid nutrition, and human nutrition showed that “overall dietary protein utilization was similar whether the daily protein intake was distributed among two or three meals,” however this study did not focus on mutual supplementation.<sup>26</sup>

The study involved two experiments of 30 days each looking at the effects of varying daily protein intake among meals, using dried skim milk as the sole source of protein, in seven male college students all in good health.<sup>27</sup> The first experiment’s daily protein intake was 0.5

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<sup>22</sup> Vernon R. Young and Peter L. Pellett. “Plant proteins in relation to human protein and amino acid nutrition,” *The American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1210S.

<sup>23</sup> Vernon R. Young and Peter L. Pellett. “Plant proteins in relation to human protein and amino acid nutrition,” *The American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1209S.

<sup>24</sup> Y.S.M. Taylor, V.R Young, and E. Murray et al. “Daily protein and meal patterns affecting young men fed adequate and restricted energy intakes” *The American Journal of Clinical Nutrition* 6 (1973): 1216-1221.

<sup>25</sup> *Ibid.*

<sup>26</sup> *Ibid.*

<sup>27</sup> *Ibid.*

g/kg body weight and for one-half of the 30 day period, the protein was divided among three equal meals, while during the other 15 days, the protein was divided equally between lunch and dinner with protein omitted at breakfast.<sup>28</sup> In the second experiment, daily protein intake was 0.4 g/kg body weight and once again for one-half of the 30 days period, the protein was divided equally among breakfast, lunch, and dinner.<sup>29</sup> For the other 15-day period, the meal pattern was quite similar but the men were given a glass of skim milk at breakfast (only protein source at breakfast), which provided 105 calories and 8.8g of protein while the remaining daily protein was divided between lunch and dinner.<sup>30</sup> Urine samples were collected for a urea urine test, and blood samples taken, analyzed for serum protein and albumin.<sup>31</sup>

Results showed that the “efficiency of N utilization in young men is unaffected by the daily distribution of calories and protein consumed at the levels evaluated.”<sup>32</sup> In particular the results from experiment 1 showed that protein is “as well utilized when consumed only at lunch and dinner as when divided evenly among the three major daily meals,” suggesting that perhaps protein does not need to be consumed with each meal. However it is important to note that the source of protein in this study was dried skim milk, which would not be consumed in a vegan diet. This begs for further research to be conducted on mutual supplementation and the distribution of the consumption of vegan friendly protein sources throughout the day.

However, consuming complement proteins during a meal may be slightly more advantageous in assuring adequate nitrogen retention and utilization, – particularly for children. In a study “where beans were added to a corn-based diet, the supplementary effect was

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<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Ibid.

somewhat less than when the beans were added at intervals of more than 6 hours.”<sup>33</sup> This finding shows that there may be some slight advantage in consuming complementary proteins at the same time or within a few hours’ time, although more research is necessary. Furthering this idea is the suggestion to eat a variety of protein sources to meet the needs of protein recommendations.

Furthermore, in conjunction with protein recommendations, amino acid composition must be taken into consideration. For example, “to allow for amino acid composition and digestibility of a vegan diet, it appears that protein needs are increased by 30% to 35% for children younger than age 2 years, 20% to 30% for ages 2 to 6 years, and 15% to 20% for children over 6 years.”<sup>34</sup> The lower percentages for older children are due to the fact that amino acid requirements per unit of protein decrease with age, meaning they require “only a small adjustment of [their] protein requirements for amino acid composition.”<sup>35</sup>

Calcium is associated with dairy as most dairy products are very concentrated in calcium – however, as a result of deliberate fortification, much calcium is found within soy and grain based milk, as well. The contents of calcium are quite similar between dairy and non-dairy milks, with an eight ounce cup of dairy milk having around 300 mg of calcium and an eight ounce cup of soy/almond/rice milk having anywhere between 250 and 300 mg of calcium.<sup>36</sup> Interestingly, recent studies have demonstrated that vegans require perhaps even less calcium than omnivores do. Findings have shown that vegans have “lower acid production resulting from metabolism of plant proteins and increased calcium excretion in response to increased

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<sup>33</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 662.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid.

<sup>36</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 663.

protein intake”.<sup>37</sup> In fact, recent studies have demonstrated that the reduction of gastric acid may impair calcium uptake via the intestine. Also, in comparison to omnivorous diets, which tend to result in higher protein intakes, vegans often consume an adequate amount of protein, but not an excess amount, which has been linked to increased calcium excretion, negatively affecting calcium levels in the body. In an older study, “meat eating has been hypothesized to increase calcium requirements because of increased metabolic acid production due to sulfur-containing amino acids, which leads to increased urinary calcium losses and bone resorption.”<sup>38</sup> However, more recent studies have shown that increased calcium excretion is actually accompanied by increased fractional and net absorption of calcium.<sup>39</sup> Thus, the question of whether vegans require less calcium than omnivores is still highly debated and would benefit greatly from additional research.

It is important to keep in mind, though, that unlike dairy products, calcium bioavailability found in plant foods is slightly decreased due to the oxalates, phytates, and fibers within the vegetables. However, despite the decreased calcium availability, research has shown that fractional calcium absorption from plant foods is still quite high.<sup>40</sup> In one study absorbable calcium was measured using a variety of foods and adjusting absorption efficiency for the “calcium load of the typical serving size for that food.”<sup>41</sup> Applying the relationship of fractional absorption to calcium load, different foods were tested, under the assumption that low-oxalate vegetables would have similar calcium oxalate content to kale, which had been validated in

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<sup>37</sup> Ibid.

<sup>38</sup> Connie M. Weaver and Karen L. Plawecki. “Dietary calcium: adequacy of a vegetarian diet.” *American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1240S.

<sup>39</sup> Annabelle M. Smith. “Veganism and Osteoporosis: A review of the current literature.” *International Journal of Nursing Research*, no.12(2006):302-306.

<sup>40</sup> Connie M. Weaver and Karen L. Plawecki. “Dietary calcium: adequacy of a vegetarian diet.” *American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1239S.

<sup>41</sup> Ibid.

previous research. The results may fall short in determining absorbable calcium for high-oxalate vegetables as no previous validations exist.

Nevertheless the results showed that within low-oxalate vegetables including broccoli, kale, and collard greens, fractional absorption ranges from 52 to 59% in comparison to a lesser 32% for dairy based milk. Calcium absorption from beans, nuts, and seeds was lower.<sup>42</sup> However, it is important to keep in mind that low-oxalate vegetables have much smaller calcium contents. While the calcium content is about 300 mg in dairy milk, the calcium levels contained in a half-cup of broccoli is 32 mg and 64 mg in a half-cup of mustard greens. To provide a greater perspective, one would need to consume for example either 2.5 cups of broccoli or 1 cup of turnip greens to meet the recommended number of 2 servings of dairy products a day to meet daily calcium requirements – an additional 200 mg of calcium must be consumed in addition to 2 serving of dairy a day.<sup>43</sup> The findings are limited to adult populations, not intended to be applicable to either children or adolescents.

Furthermore, calcium is an important component of bone health. Too little calcium can result in an increased risk of bone fracture, particularly in children and adolescents, leading many to be wary of the vegan diet. However, soy products, a large component of the vegan diet, may actually increase bone health, as research has demonstrated that “soy isoflavones help to prevent breakdown and stimulate growth of bones.”<sup>44</sup> Though, research has yet to be conducted in children. To err on the side of caution and despite studies showing vegans requiring less calcium intake than omnivores, , it is recommended (by the FDA and ADA) that vegans should still meet

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<sup>42</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 663.

<sup>43</sup> Ibid.

<sup>44</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 663.

the standard recommendations for calcium to prevent low bone mass as a result of low calcium intake.<sup>45</sup>

The standard recommendations for calcium differ depending on age – RDA allowances recommend 1200 mg/d for 11-24 year-olds and 800 mg/d for those ages 25-50+ years.<sup>46</sup> Vegans can easily meet the daily requirements without supplementation through consumption of both vegetables and calcium fortified non-dairy milks. As previously mentioned, non-dairy milk/yogurt averages 200-300 mg per cup while raw dark leafy greens may have between 30-70 mg per cup, although cooking these vegetables increases their calcium bioavailability to anywhere from 200-350 mg per cup depending upon the green (cooked collard greens 350 mg per cup, cooked turnip greens 250 mg per cup).<sup>47</sup> Lastly, if vegan diets are unvaried, especially in children, it is advisable to consume calcium supplements between meals.<sup>48</sup>

Vitamin D, an essential nutrient, is both produced by the body by exposure to sunlight and found within foods. However, vitamin D is limited in non-fortified foods, with the best sources being fortified products, in particular fortified dairy milk. For vegans, vitamin D-fortified foods include soymilk, rice milk, and breakfast cereal, some “cereals containing animal-derived vitamin D may not be acceptable to many vegan families.”<sup>49</sup> On average, adequate vitamin D is obtained both by sun exposure and consumption of fortified foods.<sup>50</sup>

Vitamin B-12, an animal derived nutrient, is often classified as a nutrient that both vegetarians and vegans lack. However, this issue should not be a source of concern if eating a varied diet of fortified foods. Similar to vitamin D, the best source of vitamin B-12 is fortified

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<sup>45</sup> Ibid.

<sup>46</sup> Connie M. Weaver and Karen L. Plawecki. “Dietary calcium: adequacy of a vegetarian diet.” *American Journal of Clinical Nutrition*, no. 59(suppl) (1994): 1239S.

<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

<sup>49</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 663.

<sup>50</sup> Ibid.



food. Adequate vitamin B-12 can be achieved by consuming fortified foods such as breakfast cereals, soy beverages, nutritional yeast, and meat analogs. Those that are unfortified are unreliable sources.<sup>51</sup>

Similarly, riboflavin (vitamin B2) is seen as a nutrient of concern in vegan diets. However, the intake in comparison to omnivores is quite similar. Good sources of riboflavin include nutritional yeast, wheat germ, soybeans, mushrooms, leafy green vegetables, avocados, almonds, sea vegetables, fortified cereal, and certain brands of soymilk, as well as enriched grains.

Zinc, an essential mineral, is found in similar densities in vegan, omnivorous, and vegetarian diets, although a certain concern exists due to the reduced bioavailability of zinc in plant sources.<sup>52</sup> Bioavailability is defined as “the degree and rate at which a substance (as a drug) is absorbed into a living system or is made available at the site of physiological activity,” meaning how available a nutrient is in food to be absorbed by the body.<sup>53</sup> While vegans consume zinc via legumes, whole grain pastas, wheat germ, fortified cereals, nuts, and tofu, “the bioavailability of zinc from plant foods is reduced by phytate in whole grains and legumes.”<sup>54</sup> Phytates, high in fiber and whole-grains, bind with minerals, preventing mineral absorption, in this case, namely zinc. In being high in whole grains and legumes, vegan diets have increased levels of phytate, which would suggest a decrease in mineral absorption. However, while there exists an increase in phytates, whole grains have higher levels in zinc than refined grains.

Furthermore, phytates are decreased in leavened whole grain breads and in fermented soyfoods

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<sup>51</sup> Ibid.

<sup>52</sup> Ibid.

<sup>53</sup> “Bioavailability,” Merriam-Webster, accessed December 17, 2013.  
<http://www.merriamwebster.com/dictionary/bioavailability>

<sup>54</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 664.

including miso and tempeh. Thus studies suggest that, “because of these effects on phytate content of foods, zinc absorption may be higher than expected in vegan diets that utilize more leavened bread and fermented soyfoods.”<sup>55</sup>

However, this is not to say that zinc deficiencies are not a concern in vegan diets. Studies have shown that vegetarians have lower levels of total zinc as well as plasma zinc concentrations, although most often they are within acceptable ranges. This is due to lower zinc intake and absorption. However, it is important to note that over time, vegetarians and vegans may adapt to their lower zinc absorption levels by compensating such that “zinc excretion decreases when dietary zinc is low.”<sup>56</sup> Overall, while zinc is abundant in the vegan diet, high levels of dietary phytates reduce its absorption.

Similar to zinc, iron consumption is often a concern in vegetarian and vegan diets. Despite the fact that, on average, iron intake appears at or above the RDA recommended daily levels, nonheme iron has a lower absorbability.<sup>57</sup> There are two different forms of dietary iron, namely heme and nonheme.<sup>58</sup> While nonheme iron is found in plant foods, heme iron is only found in animal foods that originally contained hemoglobin. Such sources of heme iron are red meats, fish, and poultry, while legumes and beans are sources of nonheme iron, meaning that vegans are only consuming nonheme iron.

Low levels of iron cause iron deficiency anemia. While studies show that vegetarians have lower iron stores than omnivores, and a greater percentage have stores below the normal range, they conclude that vegetarians and vegans “have no higher rates of anemia than those seen

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<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

<sup>58</sup> “Iron,” *Office of Dietary Supplements: National Institute of Health*, last modified August 24, 2007. <http://ods.od.nih.gov/factsheets/Iron-HealthProfessional/>

in the general population.”<sup>59</sup> While this may seem slightly contradictory, research has shown that the absorption of nonheme iron is greatly enhanced by vitamin C and other organic acids found in vegetables and fruits, both large components of vegetarian and vegan diets. High intakes of vitamin C and other organic acids then “may compensate for the lower bioavailability of nonheme iron.”<sup>60</sup>

Although vegans do not have an increased risk of anemia, lower levels of iron are detected in vegans, which may be explained by the composition of the vegan diet. Once again, increased levels of phytates in vegan diets decrease the absorption of minerals, such as iron. Similar to the adaptations due to lower bioavailability of zinc, studies have suggested that some adaptations for low iron bioavailability too can occur. Vegans do not adapt to their lower levels of iron, but instead have an adaptive regulatory response which allows for increased absorption. That is, for vegans, “ascorbic acid and other dietary factors can promote iron absorption even in the presence of phytates,” increasing the once lower levels of iron in vegetarians and vegans.<sup>61</sup>

Fiber is a necessary part of every diet. Dietary fiber is a type of indigestible carbohydrate and is either soluble or insoluble. While soluble fiber attracts water and slows digestion, insoluble fiber helps food to pass more quickly through the digestive system from the stomach into the intestines.<sup>62</sup> Studies have shown fiber intake to be higher in vegans in comparison to omnivores and vegetarians, even exceeding daily recommendations. High fiber intake is generally believed to result in more favorable lipid profiles and lower triglyceride levels.

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<sup>59</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 664.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

<sup>62</sup> “Soluble vs. insoluble fiber,” *MedlinePlus: Trusted Health Information for You*, last modified October 31, 2013. <http://www.nlm.nih.gov/medlineplus/ency/article/002136.htm>

However, the benefits and potential consequences of such high fiber intake are currently still being researched – no negative consequences are known thus far.<sup>63</sup>

The last nutrient of special interest to researchers studying the vegan diet is fats – both fat and essential fatty acids. Fats should make up about 30% of energy in the diet. Of particular concern are long-chain omega-3 fatty acids, namely docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). While diets fats are more often associated with meats and dairy products, in non-vegans must rely on nuts, seeds, avocado, soy products, and vegetable oils to consume and meet their energy and nutrient needs. In general vegan diets lack in DHA and EPA. While the omega-3 fatty acid, linolenic acid, can be converted to EPA and DHA, its “efficiency of conversion is reduced in diets high in the omega-6 fatty acid linoleic acid,” of which vegan diets seem to have a high amount.<sup>64</sup> Currently, there are no known risks for diets low in long-chain omega-3 fatty acids, although an increase in such to obtain a more desirable ratio of omega-6 to omega-3 fatty acids is beneficial. Increasing the intake of linolenic acid, as well as slightly decreasing the intake of linoleic acid in the diet, then will enhance the conversion of linolenic acid to DHA. Foods high in linolenic acid include ground flax seeds, canola oil, walnuts, and soy products, while vegetable oils such as olive oil are high in linoleic acid. Research has shown trans fatty acids to inhibit the synthesis of long-chain omega-3 fatty acids. This finding promotes the use of vegetable oils and tub margarine in substitution for stick margarine.<sup>65</sup> See Table 1 on page 84 for a summary of the findings.

### *Dietary Considerations and Recommendations*

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<sup>63</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

<sup>64</sup> Ibid.

<sup>65</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

Revisiting the diet composition and nutrient intake discussed above, there are specific nutrients of concern in vegan diets. That is, greater attention to the intake of these nutrients should be given.

Vegans must make a greater effort to consume more protein, as plant based protein is less digestible. The RDA recommendations should be increased for vegans by 10-15% and even more for younger children in order to satisfy the amino acid composition requirements. With regard to minerals, the intake of zinc and iron should be monitored by a well balanced diet as the bioavailability of both minerals in plant foods are reduced by high levels of phytates found in the vegan diet. Furthermore, a diet rich in vitamin C will help improve the absorption of nonheme iron.<sup>66</sup> While the results are mixed, studies have shown vegetarians to be at risk for zinc deficiency, suggesting vegans are, as well. However “there may be facilitators of zinc absorption and compensatory mechanisms to help vegetarians adapt to a lower intake of zinc.”<sup>67</sup> That being said, if plasma zinc and/or iron levels are low then, supplementation may be necessary. Furthermore, if diets do not contain enough adequate sources of dietary calcium, found in low-oxalate vegetables and fortified foods, then supplements should be taken.<sup>68</sup>

Specific vitamin intake may be of concern for vegans who do not eat a well-balanced and varied diet that includes many fortified foods. Vegans should be careful to consume vitamin D- as well as vitamin B-12 fortified products. In particular, those living at high latitudes may need vitamin D supplementation due to decreased sun exposure for several months of the year.<sup>69</sup>

Furthermore, supplementation may be necessary in areas where fortified foods are unavailable as

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<sup>66</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

<sup>67</sup> Ibid.

<sup>68</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

<sup>69</sup> Ibid.

vitamin D<sub>2</sub>, the “form of vitamin D acceptable to vegans, is substantially less bioavailable than the animal-derived vitamin D<sub>3</sub>.”<sup>70</sup> With regard to vitamin B-12, mixed findings have been found. While some studies suggest that vegans are at no greater risk for deficiency, others show the prevalence of vitamin B-12 deficiency to be higher. Foods naturally rich in omega 3 fatty acid, ALA, including flaxseed, walnuts, canola oil, soy products, and hemp seeds, should be increased in the diet.<sup>71</sup> Once again, if levels of these nutrients are low, supplements may be taken to achieve recommended levels. Riboflavin, vitamin B-2, is also an essential nutrient, though its intake is often not a worry as it is found in a variety of foods and enriched grains.<sup>72</sup>

Lastly, the intake of essential fatty acids should be taken into greater consideration in the vegan diet, as they are important to cardiovascular health, and brain and eye functions.<sup>73</sup> Since the vegan diet excludes fish, eggs, and sea vegetables, vegans often lack in long-chain omega-3 fatty acids, namely DHA and EPA. As a result, it is important for vegans to make a conscious effort to increase their consumption of omega-3 fatty acid, linolenic acid as it enhances the synthesis of both DHA and EPA.<sup>74</sup> Lowering the amount of omega-6 fatty acid, linoleic acid, will increase the efficiency of conversion of linolenic acid to both DHA and EPA.<sup>75</sup> Furthermore, foods fortified with DHA should be consumed and microalgae supplements containing DHA should be taken if levels are very low.<sup>76</sup>

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<sup>70</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1629S, doi: 10.3945/ajcn.2009.26746N

<sup>71</sup> Ibid.

<sup>72</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

<sup>73</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

<sup>74</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

<sup>75</sup> Ibid.

<sup>76</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

Considering the specifics discussed above, a list of guidelines or certain dietary recommendations for optimal vegan diets should be followed. The vegan diet should include a wide variety of vegetables and fruits, especially green leafy vegetables, as they are rich in calcium and riboflavin. With regard to grains, emphasis should be placed on whole grains, which have many nutrients, both essential vitamins and minerals. More particularly, leavened whole grain breads are ideal as this decreases the phytate content, which reduces bioavailability of many minerals. Legumes, such as soy, dried beans, peas, and lentils, are also essential to the vegan diet as they are great sources of energy, protein, iron, zinc, and calcium. An intake of nuts and seeds is important as they increase essential fat intake and help to meet energy and protein needs. Fortified foods (including vitamin B-12, calcium, and vitamin D) must be consumed, as often, for some vitamins, they are the only adequate sources in the vegan diet.<sup>77</sup>

Having discussed the general dietary requirements of the vegan diet, it is important to demonstrate how such considerations may differ depending on the individual. Toddlers and preschoolers are at an increased risk for under consumption of calcium, iron, zinc, and vitamin B-12 and, as a result, supplementation may be needed. Due to heightened growth during these years, toddlers should consume high-energy dense foods. As food preferences begin to develop, research suggests that “repeated exposure can result in eventual acceptance of foods and parents should offer a variety of foods and model food preferences.”<sup>78</sup>

Another important subject group is adolescent girls who are often concerned with body weight, “and may restrict energy, making it difficult to meet the high nutrient needs of this stage

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<sup>77</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 661-669.

<sup>78</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 665.

of life.”<sup>79</sup> A 1986-87 Minnesota study even showed the relationship between vegetarian diets and an increased risk of adolescent girls to engage in disordered eating behaviors. Furthermore, while adolescents in general do not consume enough calcium, teenage girls are particularly at risk. Studies have shown that adolescent girls on a lacto-ovo-vegetarian diet do not meet the recommended daily allotment of calcium and, as a result, dietary supplementation is necessary. Similarly, teenage girls are at a high risk for developing iron deficiency anemia and those who are vegan must make an even greater effort to consume adequate amounts of iron and “vitamin C to enhance bioavailability of non-heme iron.”<sup>80</sup>

Furthermore, a cross-sectional study by Clarys et al. (2014) of 1475 individuals looked at the quality of a vegan diet in comparison to both vegetarian and omnivorous diets.<sup>81</sup> Dietary intake was estimated using a cross-sectional online survey with a 52-items food frequency questionnaire including items typical in vegan and vegetarian diets (i.e. tofu, fortified soy drinks, quorn).<sup>82</sup> Results showed that the vegan diet “had the lowest energy intake, better fat intake profile, lowest protein and highest dietary fiber intake in contrast to the omnivorous diet.”<sup>83</sup> However, calcium intake was also found to be lowest for vegans and below the dietary recommendations. Despite this, the vegan diet “received the highest index values and the omnivorous the lowest for HEI-2010 [Healthy Eating Index 2010] and MDS [Mediterranean Diet Score].”<sup>84</sup> The better overall score for the vegan diet was attributed to a higher fruit and vegetable intake, lower sodium intake, and lower intake of saturated fat.<sup>85</sup>

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<sup>79</sup> Virginia Messina and Ann Reed Mangels. “Considerations in planning vegan diets: Children,” *The American Dietetic Association*, no. 101: 6 (June 2001): 667.

<sup>80</sup> Ibid.

<sup>81</sup> Peter Clarys et al. “Comparison of Nutritional Quality of the Vegan, Vegetarian, Semi-Vegetarian, Pescovegetarian and Omnivorous Diet.” *Nutrients* no.6 (2014): 1318-1332.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid. p.1319

<sup>84</sup> Ibid. p.1319

<sup>85</sup> Ibid.



In conclusion, research studies have shown that vegan diets can definitely meet the nutritional needs of children and adults alike, as long as diets are well planned, balanced and include a variety of foods, in particular fortified and enriched products. It is even suggested that vegan diets can be more beneficial than vegetarian and omnivorous diets, as, in general, vegans consume a higher intake of fiber, vitamins and minerals.

### *Health Effects*

Further research has been conducted in terms of the health effects of the vegan diet – both benefits and potential negative consequences, including nutritional concerns or shortfalls.

The vegan diet includes higher levels of dietary fiber, magnesium, folic acid, vitamins C and E, iron, and phytochemicals.<sup>86</sup> The vegan diet in comparison to others is lower in calories, saturated fat, cholesterol, omega-3 fatty acids, vitamin D, calcium, zinc, and vitamin B-12. While some lower levels of nutrients are a means of nutritional concern, in general the diet “appears to be useful for increasing the intake of protective nutrients and phytochemicals and for minimizing the intake of dietary factors implicated in several chronic diseases.”<sup>87</sup> From an overall health perspective, the World Health Organization and Food and Agriculture Organization assert that, “cancer risk reduction associated with a high intake of fruit and vegetables was assessed as probable or possible, risk of CVD reduction as convincing, whereas lower risk of osteoporosis was assessed as probable.”<sup>88</sup> Furthermore, basing the health effects of the vegan diet on studies of the health benefits of a vegetarian diet, it would be plausible to

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<sup>86</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

<sup>87</sup> Ibid.

<sup>88</sup> Ibid.

suggest vegans “enjoy a lower risk of cardiovascular disease (CVD), obesity, type 2 diabetes, and some cancers.”<sup>89</sup>

Cardiovascular disease is greatly influenced by obesity. That is, obesity is a significant risk factor for CVD. In general, vegans are thin and have lower mean body mass indexes (BMIs) than both vegetarians and omnivores, in turn decreasing their risk for CVD. Furthermore, “the substantially lower mean BMI observed in vegans may be an important protective factor for lowering blood lipids and reducing the risk of heart disease.”<sup>90</sup> In a similar light, vegans in general consume greater quantities of fruits and vegetables than omnivores, which are rich in fiber, folic acid, antioxidants, and phytochemicals. Fruits and vegetables are seen as cardioprotective. Therefore a diet high in fruit and vegetable consumption, like the vegan diet, is believed to lower blood cholesterol concentrations, decrease the incidence and mortality rate of strokes, and lower the risk of mortality from ischemic heart disease.<sup>91</sup> Similarly, whole grains, soy, and nuts, all large components of the vegan diet, provide cardioprotective effects.<sup>92</sup> In addition, clinical studies in Great Britain and the United States have concluded that the vegan diet may have some protective properties against certain diseases, including the hypocholesterolemic effect of vegetable protein.<sup>93</sup> That is, patients suffering from severe angina pectoris have found relief when switching to the vegan diet.<sup>94</sup> Overall it is evident that while the

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<sup>89</sup> Ibid.

<sup>90</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

<sup>91</sup> Peter Clarys et al. “Comparison of Nutritional Quality of the Vegan, Vegetarian, Semi-Vegetarian, Pesco-Vegetarian and Omnivorous Diet.” *Nutrients* no.6 (2014): 1318-1332.

<sup>92</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1627S-1633S, doi: 10.3945/ajcn.2009.26746N

<sup>93</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2464-2477.

<sup>94</sup> Ibid.

vegan diet may not prevent the onset of CVD and other related diseases, it helps to lower one's risk of disease.<sup>95</sup>

Likewise, data from the Adventist Health Study has demonstrated that vegetarians have a decreased risk of both colorectal and prostate cancer when compared to omnivores, suggesting that similar findings would be seen in vegans. The vegetarian diet provides cancer-protective dietary factors similar to the vegan diet. Also, much like CVD, obesity is a risk factor for cancer. Thus for vegans, “because the mean BMI of vegans is considerably lower than that of nonvegetarians, it may be an important protective factor for lowering cancer risk.”<sup>96</sup>

Analyzing the vegan diet more carefully for nutrients that are cancer protective foods substantiate<sup>s</sup> the argument. Research has shown that vegans consume more legumes, total fruit and vegetables, tomatoes, allium vegetables, fiber, and vitamin C in comparison to omnivores, all of which are cancer protective. While fruits and vegetables are protective against lung, mouth, esophagus, and stomach cancers, legumes are considered more protective against stomach and prostate cancer. Furthermore, high intakes of phytochemicals, fiber, vitamin C, carotenoids and flavonoids are protective against varying cancers, while high levels of lycopene found in tomatoes protect against prostate cancer. The abundance of phytochemicals found within fruits and vegetables “possess potent antioxidant and antiproliferative activity and show additive and synergistic effects...interfer[ing] with cellular processes involved in the progression of cancer.”<sup>97</sup> That is, the phytochemicals inhibit cell proliferation, DNA adduct formation, signal transduction pathways, oncogene expression, and induce cell-cycle arrest and apoptosis.<sup>98</sup>

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<sup>96</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1628S, doi: 10.3945/ajcn.2009.26746N

<sup>97</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1628S, doi: 10.3945/ajcn.2009.26746N

<sup>98</sup> Ibid.

Furthermore, the exclusion of certain foods from the vegan diet shows protective cancer effects. In particular, red meat and processed meats are seen to increase the risk of colorectal cancer, esophageal, liver, and lung cancers anywhere from 20% to 60%. White eggs are associated with an increased risk of pancreatic cancer. Avoiding such protein sources, vegans must rely on others, including legumes and soy products. New studies have demonstrated that high legume intake moderately reduces the risk of prostate cancer, while decreased levels of dairy in childhood lessens the risk of breast cancer later in life. However, further research must be conducted on the effects of soy milk in relation to cancer protection – some studies suggest protection, while others indicate an increased risk of prostate cancer.<sup>99</sup>

While studies have concluded that vegan diets reduce the risks of cancer, the difference in incidences and mortality rates appear less substantial than expected. This may be attributable to the decrease in bioavailability of phytochemicals depending upon food preparation. The scientific literature concludes that “epidemiologic studies have not provided convincing evidence that a vegan diet provides significant protection against cancer.”<sup>100</sup> Yet benefits have been shown, and little harm in terms of increasing cancer risk has been found.<sup>101</sup>

Nevertheless, studies of the vegan diet have shown it to have potential nutrition concerns and/or shortfalls. One such concern is bone health. While cross-sectional and longitudinal population-based studies from the 1990s to 2010 showed no difference in bone mineral density for trabecular and cortical bone between omnivores and lacto-ovo-vegetarians, more recent studies have suggested otherwise. Studies of vegetarian Asian women have shown them to have lower intakes of protein and calcium, both of which were associated with an increased risk of

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<sup>99</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1628S, doi: 10.3945/ajcn.2009.26746N

<sup>100</sup> Ibid.

<sup>101</sup> Ibid.

fracture at the hip and spine in older age. These results are partially attributed to low calcium intake, suggesting, “adequate calcium intake may be a problem for vegans.”<sup>102</sup> Furthermore the EPIC-Oxford study concluded, “the higher risk of bone fracture seen in vegans appears to be a consequence of a lower mean calcium intake.”<sup>103</sup> However, “no difference was observed between the fracture rate of the vegans who consumed > 525 mg calcium/d and the omnivore fracture rates” – which does not even meet the RDA recommendation of 800 mg of calcium per day.<sup>104</sup>

Despite these results, there are some data to suggest that calcium levels may benefit from a vegan diet. The high intake of fruits and vegetables, rich in potassium and magnesium, “provide an alkaline ash, which inhibits bone reabsorption...[and] [is] associated with greater BMD of the femoral neck and lumbar spine of premenopausal women.”<sup>105</sup> Furthermore, soy isoflavones, often abundant in the vegan diet, though not all vegans consume large amounts of soy, have been shown to have a favorable, beneficial affect on BMD and are seen to inhibit bone reabsorption and stimulate bone formation. In summary, when calcium and vitamin D intake is adequate in vegans, their diet has no negative influence affecting bone health.<sup>106</sup> See Table 2 for a summary of the findings, found on page 85.

As is evident, the scientific literature presents differing results, begging for further research. A literature review, Smith (2006), explained that “questions regarding blood calcium/Vitamin D levels and increased risk for bone fractures in vegans remain largely unanswered by the current literature,” however, “the same literature consistently shows lower

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<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

<sup>104</sup> Craig Winston, “Health effects of vegan diets,” *The American Journal of Clinical Nutrition*, no. 89:5 (May 2009): 1628S, doi: 10.3945/ajcn.2009.26746N

<sup>105</sup> Ibid.

<sup>106</sup> Ibid.

BMD in vegans,” supporting the need for further investigation.<sup>107</sup> Smith (2006) suggested that practitioners counseling vegans should discuss the importance of adequate calcium intake from vegan friendly sources and recommend increased exposure to sunlight, especially during winter months.<sup>108</sup>

#### *Health Status and Profile (body composition and lipid profile)*

Looking at a particular study published in 1981 by Abdulla et al. information regarding the nutrient intake and health status of 6 vegan adults, 3 male and 3 female.<sup>109</sup> While energy intake varied between individuals, on average the mean daily intake was 1700 kcal for men and 1400 kcal for women, compared to an average of 2050 kcal and 1600 kcal for men and women following omnivore diets. Respectively, these results suggest that, on average, vegans consume less energy, corresponding with the results of previous studies. Compared to an omnivorous diet composed of 20% fat, 12.5% protein and 47.5% carbohydrates, the vegan diet contained 29% fat, 10% protein, and 61% carbohydrates. In general, the mean food density was 0.13 and 0.14 for women and men compared to 0.2 usually seen in mixed diets, respectively.<sup>110</sup>

In this study fat intake was also measured. Substantially lower fat intake was observed; participants were consuming an average of 55 g of fat a day in comparison to a mixed diet, in which fat intake ranged from 71 to 90 g per day. The fatty acid composition also differed from mixed diets, where linoleic acid “predominated in the vegan diet, comprising to 50-60% of the

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<sup>107</sup> Annabelle M. Smith, “Veganism and Osteoporosis: A Review of the Current Literature,” *International Journal of Nursing Practice* no.12 (2006):305.

<sup>108</sup> Ibid.

<sup>109</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2464-2477.

<sup>110</sup> IMohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2464-2477.

total fatty acids, whereas oleic and palmitic acids were the dominant fatty acids in the normal mixed diet.”<sup>111</sup> The ratio of polyunsaturated to saturated fats was found to be 3.7 in vegans and 0.18 in omnivores.<sup>112</sup>

Sterols are found in both animal and plant foods. While there was no significant difference in the total amount found between the vegan and omnivorous diet, the sterol composition varied. In normal mixed diets, cholesterol makes up a larger part of sterol composition while the vegan diet showed sitosterol as the main component. The vegan diet had little saturated fat and cholesterol, being rich instead in polyenoic fat and plant sterols, decreasing plasma lipid levels, often considered beneficial to health.<sup>113</sup>

The protein intake also differed, being lower for vegans than omnivores. The mean daily intake was found to be 29 and 37 grams per day for males and females, expressed as 24g/1000 kcal, which is lower than the recommended average of 20g/1000 kcal. The protein intake by the participants in the study was below recommendations, although the intake of essential amino acids exceeded recommendations set by the RDA.<sup>114</sup>

In terms of carbohydrates, results were similar for the amount of sucrose consumed by vegans and omnivores. However, a great difference existed between male and female vegans where males consumed twice as much as females. Furthermore, the intake of monosaccharides differed between mixed and vegan diets, with vegan diets having glucose and fructose rates three

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<sup>111</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2468.

<sup>112</sup> Ibid.

<sup>113</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2464-2477.

<sup>114</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2464-2477.

times higher, attributed to high fruit intake. On average, the vegan diet contained 2.5 times more dietary fiber than mixed diets.<sup>115</sup>

Minerals and trace elements differed between the vegan and mixed diets. The potassium and magnesium content was between two and three times higher in the vegan diet. Comparing the daily intake of minerals and trace elements to the recommendations by the RDA showed important findings. Although the vegan diet exceeded the recommendation for magnesium, it fell short in meeting the daily iron and zinc recommendation as well as calcium. The vegan diet was also low in iodine and selenium.<sup>116</sup>

Only vitamins B-12 and folate (vitamin B9) were studied. On average, the vegan diet had three times higher rates of folate content than the mixed diets, most likely due to the high intake of green vegetables. This study contends, “vitamin B-12 deficiency [to be] the most common nutrient deficiency ascribed among vegans.”<sup>117</sup> The daily intake of vitamin B-12 was found to be 0.3 to 0.4 µg in the vegan diet falling quite short of the recommended 2-3 µg by the RDA and FAO/WHO.<sup>118</sup>

Furthermore, specific clinical and biochemical findings have been made pertaining to vegans. With regard to body weight, vegans have on average lower body weights than those practicing mixed diets. In Abdulla et al. (1981) no vegans were overweight. This lower body weight may be attributed to the lower energy intake of the vegan diet combined with a high intake of dietary fiber. However, this study, unlike others, is careful to point out, “the role of physical exercise induced in the vegan life style should not be dismissed.”<sup>119</sup>

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<sup>115</sup> Ibid.

<sup>116</sup> Ibid.

<sup>117</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2472.

<sup>118</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2473.

<sup>119</sup> Ibid.



Similarly, Abdulla et al. study found the blood pressure of the vegan participants to be low for their ages. Risk factors for high blood pressure include high salt intake and being overweight, both of which are reduced by the vegan lifestyle. Furthermore, vegans had lower concentrations of plasma lipids, namely lower levels of cholesterol, triglyceride, HDL and LDL. The vegan diet tends to be low in fat, but high in fiber and polyunsaturated fatty acids, which may explain the findings. The low LDL/HDL cholesterol ratio found has “been suggested to be advantageous from the atherogenetic point of view and may also reflect the preferential use of endogenous rather than exogenous fats.”<sup>120</sup>

Looking at protein levels, the vegan participants had lower plasma albumin levels, bordering on the low protein/energy ratio. However, no participants showed any clinical or biochemical signs of protein deficiency. Varying levels of folate levels were found, with no deficiency being detected. Five of the six participants had “subnormal serum total iron-binding capacity.”<sup>121</sup> Despite the low iodine intake, no clinical signs of deficiency were seen. Interestingly, “the urinary excretion of calcium and sodium was lower than the normal range, whereas potassium was excreted in amounts above the normal range” which is probably due to the lower levels of calcium and sodium intake and increasing intake of potassium in the vegan diet.<sup>122</sup>

Another study by Sanders et al. (1978) of 22 vegans focused specifically on the fatty acid composition of plasma choline phosphoglycerides, erythrocytes, and adipose tissue, providing insights into the health status of vegans.<sup>123</sup> Results of the study showed all subjects to appear

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<sup>120</sup> Ibid.

<sup>121</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2475.

<sup>122</sup> Ibid.

<sup>123</sup> T.A.B. Sanders, Frey R. Ellis, and J.W.T. Dickerson, “Studies of vegans: the fatty acid composition of plasma choline phosphoglycerides, erythrocytes, adipose tissue, and breast milk, and some indicators of susceptibility to

healthy, although it is necessary to mention that a quarter of the participants were taking supplements, in particular vitamin B12. In terms of body composition, vegans were lighter than those following a mixed diet in weight for the same height and had lower skinfold thickness measurements. These findings were in agreement with other studies, in showing that vegans have smaller amounts of body fat. Since obesity is a risk factor for certain diseases, including CVD, cancer, gout, and gallstones, it is suggested that the vegan diet could have a beneficial effect.<sup>124</sup>

The serum cholesterol and triglyceride concentrations were lower in vegans. Since high plasma lipid concentrations, in particular cholesterol, are associated with an increased risk of ischemic heart disease, vegans as a result of lower plasma lipid concentrations have a decreased risk. Furthermore, current recommendations to reduce plasma lipid levels include a decrease in cholesterol, which is often achieved by substituting vegetable fats for animal fats, namely the only fats found within the vegan diet. The “adipose tissue samples contained lower proportions of 16:0 and 18:1 fatty acids and a high proportion of 18:2 $\omega$ 6 [which is linoleic acid].”<sup>125</sup> That is, vegans were consuming more linoleic acid than those on mixed diets. The erythrocytes from vegans had lower proportions of fatty acids, as well. The study further provided a glimpse into the potential uses of vegan diets to treat certain medical conditions, in particular severe angina pectoris, in which four patients suffering from the condition were treated with the vegan diet leading to beneficial results. “It is tempting, therefore, to suggest that a vegan-type diet may be

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ischemic heart disease in vegans and omnivore controls,” *The American Journal of Clinical Nutrition*, no. 31 (May 1978): 805-813.

<sup>124</sup> Ibid.

<sup>125</sup> T.A.B. Sanders, Frey R. Ellis, and J.W.T. Dickerson, “Studies of vegans: the fatty acid composition of plasma choline phosphoglycerides, erythrocytes, adipose tissue, and breast milk, and some indicators of susceptibility to ischemic heart disease in vegans and omnivore controls,” *The American Journal of Clinical Nutrition*, no. 31 (May 1978): 806.

the one of choice in preventing and even treating IHD, angina pectoris, and certain hyperlipidemias.”<sup>126</sup>

Summarizing the findings from this Sanders et al. study and comparing it with others, the health status of vegans can be generalized. While on average the nutritional quality of the vegan diet differed in comparison to that of a normal mixed omnivorous diet, and in certain cases nutrient recommendations were not met by the vegan diet, “clinical and biochemical data of the vegans revealed no symptoms of nutritional deficiencies.”<sup>127</sup> However as noted previously, Clarys et al. (2014) found the vegan diet to have the index values compared to omnivorous diets for the Healthy Eating Index and Mediterranean Diet Scores.<sup>128</sup> Furthermore, findings indicated that the vegan diet composition led to low levels of blood lipids, low blood pressures, and normal to low body weights for age, all of which are beneficial for health.<sup>129</sup>

### Popular Literature

The popular literature provides many insights into the vegan diet. However in comparison to the scientific literature, the popular literature lacks hard evidence in the form of scientific studies, instead relying on popular beliefs, personal opinions and statements by groups, and generalized stereotypes that have been perpetuated in the public sphere. As a result, the

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<sup>126</sup> T.A.B. Sanders, Frey R. Ellis, and J.W.T. Dickerson, “Studies of vegans: the fatty acid composition of plasma choline phosphoglycerides, erythrocytes, adipose tissue, and breast milk, and some indicators of susceptibility to ischemic heart disease in vegans and omnivore controls,” *The American Journal of Clinical Nutrition*, no. 31 (May 1978): 812.

<sup>127</sup> Mohammed Abdulla, et al, “Nutrient intake and health status of vegans. Chemical analyses of diets using the duplicate portion sampling technique,” *The American Journal of Clinical Nutrition*, no. 34 (November 1981): 2470.

<sup>128</sup> Peter Clarys et al. “Comparison of Nutritional Quality of the Vegan, Vegetarian, Semi-Vegetarian, Pescovegetarian and Omnivorous Diet.” *Nutrients* no.6 (2014): 1318-1332.

<sup>129</sup> T.A.B. Sanders, Frey R. Ellis, and J.W.T. Dickerson, “Studies of vegans: the fatty acid composition of plasma choline phosphoglycerides, erythrocytes, adipose tissue, and breast milk, and some indicators of susceptibility to ischemic heart disease in vegans and omnivore controls,” *The American Journal of Clinical Nutrition*, no. 31 (May 1978): 805-813.

topics studied in the popular literature are inherently different than those upon which the scientific literature focuses.

### *Vegan Nutrition*

Findings in the popular culture regarding vegan nutrition often contend that the diet can provide one with the essential nutrients making up a healthy diet so long as careful planning is made – similar to the results of scientific studies. The detail to which the popular literature explains vegan nutrition on average is quite vague in comparison to the scientific literature and lacks any substantiated evidence in terms of research studies.

The Vegan Society has a tab on their website dedicated to vegan nutrition, to help promote a healthy, well-planned vegan diet.<sup>130</sup> The Vegan Society also provides its viewers with a number of links to resources elsewhere and downloadable pamphlets and charts about vegan nutrition. In general, though, the Vegan Society suggests adhering to four specific guidelines. Using the UK Department of Health five-a-day recommendation, the Vegan Society promotes the consumption of five portions of varying fruits and vegetables a day at minimum to ensure intake of all essential vitamins and minerals. The society suggests the use of whole grains instead of refined grains, as they are more nutritious. With regard to fats, hydrogenated fats are to be avoided while omega 3 fatty acids are to be consumed more frequently. Lastly, the Vegan Society suggests limiting the use of salt.

In conjunction with these guidelines, the Vegan Society highlights the importance of obtaining the recommended daily levels of vitamin B-12, iodine, vitamin D, and omega 3. The society suggests the use of fortified foods as a source of vitamin B-12 or supplements, namely 10

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<sup>130</sup> “Lifestyle & Nutrition,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/nutrition/>

micrograms as an alternative. Iodine can be found in green leafy vegetables and about 150 micrograms should be consumed daily. Much like vitamin B-12, vitamin D levels can be met with fortified foods or a supplement of 10 micrograms a day, especially in cases where sun exposure is limited. The Vegan Society recommends “one heaped tablespoon of ground flaxseed or two tablespoons of rapeseed oil” to meet the required omega-3 levels.<sup>131</sup>

Furthermore, the Vegan Society provides information about nutrients that may be of concern when practicing a vegan diet. These nutrients include vitamin B-12, calcium, essential fatty acids, iodine, iron, protein, and vitamin D, consistent with the scientific literature findings. Unlike other popular literature sources, the Vegan Society provides detailed explanations of why vegans may be at greater risk for certain nutritional deficiencies and must take extra care to ensure that they are following daily recommendations. Often for each nutrient, the Vegan Society not only explains what every vegan should know about the nutrient, but also shows how certain deficiencies can lead to serious health consequences. They provide guidelines on how to get the adequate amount of the nutrient, sometimes even including recipes.

Similarly, the Vegetarian Resource Group provides an outline of vegan nutrition on its website to illustrate that “a healthy and varied vegan diet includes fruits, vegetables, plenty of leafy greens, whole grain products, nuts, seeds, and legumes.”<sup>132</sup> The site focuses on protein, fat, vitamin D, calcium, zinc, iron, omega-3 fatty acids, and vitamin B-12. Not only are the characteristics of vegan diets with regard to each nutrient stated, but dietary recommendations are also made. For example, under “protein,” the vegetarian resource group suggests that it is easy to meet the recommendations for protein if calorie intake is adequate, meaning that either

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<sup>131</sup> “Lifestyle & Nutrition: Nutrition,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/nutrition/>

<sup>132</sup> “Veganism in a Nutshell,” *The Vegetarian Resource Group*, last modified 2013. <http://www.vrg.org/nutshell/vegan.htm#nut>

calorie dense foods or multiple meals/snacks should be consumed each day. The site provides an example of how a vegan adult male could meet the RDA for protein by including these foods throughout the day: “1 cup oatmeal or 1 cup soy milk; 2 slices whole wheat bread or 1 bagel with 2 tablespoons peanut butter; 1 cup vegetarian baked beans; 5 ounces of tofu and 2 tablespoons of almonds; 1 cup broccoli and 1 cup brown rice.”<sup>133</sup> The guidelines are similar to common knowledge, including assuring that fat sources are low in saturated fats, increasing the intake of dark leafy vegetables to meet iron requirements, and consuming fortified foods to ensure nutritional needs are met for vitamin D and B12 in particular. Overall, the site seem to be very similar to the nutritional issues reported in the scientific literature, stressing the need for paying particular attention to certain nutrients and the need for variety in the vegan diet.

### *Health Effects*

The popular literature also discusses the health effects of the vegan diet. In particular, the Vegan Society not only notes that “decades of experience have shown that appropriate vegan diets support good health at all stages of life and reduce the risk of heart disease” but also provides a fuller picture by reviewing some potential health concerns.<sup>134</sup> Such concerns include bone health and vitamin/mineral deficiencies. In order to prevent poor bone health, the Vegan Society suggests following a list of recommendations including increasing the intake of low oxalate high calcium green leafy vegetables, reducing sodium intake, consuming at least 600 mg of calcium whether from fortified foods or supplements, eating adequate amount of protein, maintaining adequate stores of vitamin D, making certain to consume omega-3 fatty acids,

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<sup>133</sup> Ibid.

<sup>134</sup> “Lifestyle & Nutrition: Healthy Choices,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/nutrition/healthy-choices.aspx>

limiting caffeine consumption, increasing vitamin A intake from carotenes rather than retinol, and, lastly, maintaining a good physical activity level.<sup>135</sup>

As the vegan diet receives increasing attention from the media, the beneficial health effects are often discussed in articles to promote the vegan diet. For example, *US News & World Report's* Health & Wellness section recently provided an overview and summary of health effects of a vegan diet.<sup>136</sup> It addressed the question of whether or not one will lose weight by adopting a vegan diet, and concluded this to be likely, as research has shown vegans to consume fewer calories. The consumption of fewer calories logically means a decrease in weight and lower body mass index. However, the article does suggest that one's physical activity level will influence how quickly one will lose weight and whether one will keep the weight off. The article also suggests that the vegan diet could have cardiovascular benefits, as the consumption of fat, in particular saturated fat, and salt is lower. The decrease in fat and salt consumption is associated with lower cholesterol and blood pressure levels. With regard to diabetes, the article suggested that the vegan diet will decrease one's risk, as well.

Similarly, an article written by James McWilliams in *The Atlantic* in January of 2012, titled, *The Evidence for a Vegan Diet*, suggests a variety of health benefits.<sup>137</sup> However, compared to other articles that cite scientific findings, McWilliams instead argues, "there's plenty of science to justify a plant-based diet, but the stories of personal transformation – curing diabetes, losing 100 pounds, living an active lifestyle – make the biggest impression."<sup>138</sup>

McWilliams himself is a vegan and aims to "reiterate the equally healthful consequences of a

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<sup>135</sup> "Lifestyle & Nutrition: Diet & Bone Health," *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/nutrition/diet-and-bone-health.aspx>

<sup>136</sup> Angela Haupt, "Vegan Diet," *U.S. News & World Report: Health & Wellness*, last modified January 2, 2013, <http://health.usnews.com/best-diet/vegan-diet>

<sup>137</sup> James McWilliams, "The Evidence for a Vegan Diet," *The Atlantic*, January 18, 2012, <http://www.theatlantic.com/health/archive/2012/01/the-evidence-for-a-vegan-diet/251498/>

<sup>138</sup> James McWilliams, "The Evidence for a Vegan Diet," *The Atlantic*, January 18, 2012, <http://www.theatlantic.com/health/archive/2012/01/the-evidence-for-a-vegan-diet/251498/>

health vegan diet” that may have been neglected by books such as *The Vegetarian Myth* and other “recovering vegan” stories.<sup>139</sup> He suggests that the best evidence for the health benefits of the vegan diet is anecdotal, citing many of his friends who are in their 50s, 60s, and 70s and have “conquered obesity, chronic disease, depression, and a host of food-related disorders by exclusively eating an exciting diversity of plants.”<sup>140</sup> In particular, he provides the story of a morbidly obese diabetic who became vegan and as a result lost over one hundred pounds while also curing his diabetes. Another example is of a woman in her 60s who doctors suggested would not live much longer, having suffered heart problems leading to two bypass surgeries and confinement in a wheel chair. However, this woman adopted the vegan diet and dramatically improved her health, outliving her diagnosis into her 90s. Lastly, McWilliams speaks of Jasmin Singer, director of Our Hen House, who writes for Veg News. Once diagnosed as showing early signs of heart disease, Singer revamped her diet to become vegan and shed 80 pounds.<sup>141</sup> On a similar note, Angela in her food blog, “Oh She Glows – glow from the inside out” discusses the results of switching to a vegan diet, namely how her husband lost 20 pounds and controlled his high cholesterol without “dieting” or taking medications.<sup>142</sup>

However, despite the many articles promoting the vegan diet as extremely healthy, there exists a backlash against it, in the popular literature. For example, Ed Coffin in “There’s No Health Argument for Veganism,” suggests that, while there is no argument about the benefits eating more plant-based foods brings to health and the environment, a distinction must be made between the vegan diet and that of a plant-based diet.<sup>143</sup> Coffin suggests that it is unfair and

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<sup>139</sup> Ibid.

<sup>140</sup> Ibid.

<sup>141</sup> Ibid.

<sup>142</sup> Angela, “About,” *Oh She Glows: glow from the inside out* (blog), accessed December 17, 2013, <http://ohsheglows.com/about/>

<sup>143</sup> Ed Coffin, “There’s No Health Argument for Veganism,” *Huffington Post*, July 19, 2013, [http://www.huffingtonpost.com/ed-coffin/theres-no-health-argument\\_b\\_3582248.html](http://www.huffingtonpost.com/ed-coffin/theres-no-health-argument_b_3582248.html)



untrue to say “that someone who eats a predominately plant-based diet, which includes small amounts of animal products, is consuming an ‘unhealthy’ diet.”<sup>144</sup> While Coffin undoubtedly acknowledges the health benefits of a vegan diet, he contends that a diet where plants are the predominant food but meat is still eaten in limited quantities can be just as healthful.<sup>145</sup>

### *Diet Composition: recipes - common foods, ingredients, and replacements*

Within the vegan popular literature, much focus is on diet composition. Vegan organization websites, as well as food blogs, are good resources for obtaining information about common foods, ingredients, and substitutes, such as “egg replacements” in the vegan diet.

Contrary to the belief that the vegan diet is extremely limited, The Vegan Society’s website on the “Food and Recipes” tab begins by posing the question, “What do vegans eat?”<sup>146</sup>

The answer goes as follows:

Vegans enjoy all kinds of foods, such as curries, pizza, casseroles, burritos, chocolate cake, lasagna, soups, risottos, spicy bean chili, stir fries, falafel, cupcakes, samosas, bhajis, pies, sausage and mash, stews, paella, dhal, toad in the hole, pasta and pesto, quiche, pancakes, tagines, tortilla wraps, chocolate chip cookies, jacket potatoes, cannelloni, pad thai, noodle soup, stuffed pasta shells, spicy potato wedges, fruit crumble and custard, gnocchi, tagliatelle, salads, shortbread, spring rolls, Panini, spaghetti Bolognese, sushi, mezze...<sup>147</sup>

The list is extremely expansive. Some foods mentioned may be those the public automatically assumes are excluded from the vegan diet. This brings up the point that, while the vegan diet eliminates meat, fish, and other animal products such as dairy, eggs, and honey, there are

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<sup>144</sup> Ibid.

<sup>145</sup> Ibid.

<sup>146</sup> “Lifestyle & Nutrition: Food and Recipes,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/food/?ad=677745>

<sup>147</sup> “Lifestyle & Nutrition: Food and Recipes,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/lifestyle/food/?ad=677745>

“delicious vegan versions of all kinds of food products.”<sup>148</sup> Some such products include “vegan ice cream, mayonnaise, chocolate, sausages, cheese, yoghurt, haggis, fudge, jelly sweets, custard, cheese sauce, [and] chicken nuggets.”<sup>149</sup> That is, these foods mimic their animal food product counterparts, often in taste, texture, and nutritional value.

Similarly, while vegans do eat different versions of all kinds of animal based food products, they also use certain replacements to create vegan friendly recipes, one in particular being egg replacers. For example, the Vegetarian Resource Group provides a list of substitutions for eggs in recipes.<sup>150</sup> Eggs are often used in recipes to help the ingredients bind together. They suggest using one of the following for each substituted egg, “1/4 cup (2 ounces) soft tofu blended with the liquid ingredients of the recipe, or 1 small banana mashes, or ¼ cup applesauce, or 2 tablespoons cornstarch or arrowroot starch, or Ener-G Egg Replacer or another commercial mix found in health food stores.”<sup>151</sup> In recipes that call for dairy products, non-dairy milks are often substituted as well as non-dairy cheeses and even silken tofu.<sup>152</sup> Furthermore, Kathy Patalsky, in her blog, “Healthy.Happy.Life,” uses applesauce, coconut oil and mashed banana to substitute for butter; maple syrup or agave nectar to substitute for sugar; nutritional yeast for eggs; and frozen bananas to make vegan ice cream.<sup>153</sup>

In summary, vegans consume a wide variety of foods, substituting meat and dairy with vegan friendly versions of products. In particular, many vegans use non-dairy milks including soy or almond, soy based cheeses and spreads, as well as egg replacements. Vegans also enjoy soy based meat alternatives such as tofu and tempeh, as well as wheat gluten based meat

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<sup>148</sup> Ibid.

<sup>149</sup> Ibid.

<sup>150</sup> “Veganism in a Nutshell,” *The Vegetarian Resource Group*, last modified 2013, <http://www.vrg.org/nutshell/vegan.htm#nut>

<sup>151</sup> Ibid.

<sup>152</sup> Ibid.

<sup>153</sup> Kathy, “About,” *Healthy. Happy. Life.* (blog), March 16, 2008, <http://kblog.lunchboxbunch.com/2006/02/about-kathy-patalsky.html>

alternatives called seitan. The use of such products is demonstrated by the expansive list of recipes found on vegan food blogs.

Perusing food blogs can also provide insights into the composition of daily meals for vegans. That is, it can reveal what typical vegan breakfasts, lunches, dinners, and snacks are. Vegan breakfasts are similar to those of non-vegan breakfasts, and including foods such as bagels with soy cream cheese, cereal with non-dairy milk, smoothies, oatmeal with non-dairy milk, or toast with nut butters and jelly.<sup>154</sup> As a replacement for eggs, vegans may make tofu scramble and use meat alternatives to replace sausages and ham.<sup>155</sup> Vegan pancakes, French toast, waffles, and muffins are consumed, as well. Extra nutrients may be added to these foods by the inclusion of chia and flax seeds as well as varying nuts and certain types of oil or coconut water. Similar foods are eaten for lunch and dinner. Such meals may be baked potatoes with beans, chili and rice, non-dairy pizza, falafel and humus, and pasta with meatless meatballs, sausages, and/or beans.<sup>156</sup> To consume enough protein, some form of mock meat or beans is often consumed at every meal.<sup>157</sup> Common ingredients for lunch and dinner meals include tofu, hummus, beans, veggies, legumes, grains and/or quinoa.<sup>158</sup> For desserts, vegans may indulge in non-dairy cheesecakes, and eggless cakes, pies, and cookies. Vegan ice creams are becoming a new trend, made from either non-dairy milk or a frozen banana base.<sup>159</sup> Silken tofu is also used in recipes to mimic the texture of creamy desserts. For snacks, consumption is very similar to

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<sup>154</sup> Isa Chandra Moskowitz, "About," *Post Punk Kitchen* (blog), accessed December 17, 2013, <http://www.theppk.com/about/>

<sup>155</sup> Kathy, "About," *Healthy. Happy. Life.* (blog), March 16, 2008, <http://kblog.lunchboxbunch.com/2006/02/about-kathy-patalsky.html>

<sup>156</sup> Isa Chandra Moskowitz, "About," *Post Punk Kitchen* (blog), accessed December 17, 2013, <http://www.theppk.com/about/>

<sup>157</sup> Debbie, "About Me," *Maple Spice...and all vegan things nice!* (blog), accessed December 17, 2013, [http://www.maplespice.com/p/about-me\\_22.html](http://www.maplespice.com/p/about-me_22.html)

<sup>158</sup> "Eat," *Vegan Action*, last modified 2013, <http://vegan.org/eat/>

<sup>159</sup> Angela, "About," *Oh She Glows: glow from the inside out* (blog), accessed December 17, 2013, <http://ohsheglows.com/about/>

non-vegans. Fruits and vegetables with bean or non-dairy dips and nut butters are consumed. Veggie chips, pretzels, and popcorn, as well as nuts and seeds, are also popular.<sup>160</sup>

As is evident, vegan diet and meal composition is quite similar to that of non-vegan diets, as there are a slew of vegan alternatives and/or replacements to meat, dairy, and other animal based food products. See Tables 3 and 4 for a summary of replacers/alternatives and examples of vegan meals, found on pages 86 and 87.

### *Reasons for Becoming Vegan*

The reasons for becoming vegan can be broadly separated into three main categories, namely – animal rights/humane treatment, environment/sustainability, and health concerns. The popular literature provides first-hand accounts about becoming vegan, shared by members of vegan societies and groups, as well as the vegan movement at large.

The Vegetarian Resource Group (VRG), is a non-profit organization composed of health professionals, activists and educators who are “dedicated to educating the public on vegetarianism and the interrelated issues of health, nutrition, ecology, ethics, and world hunger.”<sup>161</sup> In contrast to vegetarians, VRG defines vegans as those who also avoid animal products and by-products, and explains that people choose veganism for health, environmental, and/or ethical reasons. VRG suggests that some choose to eliminate eggs and dairy products from their diet to show their disapproval of the meat industry – “that is, once dairy cows or egg-laying chickens are too old to be productive, they are often sold as meat; and since male calves do not produce milk, they usually are raised for veal or other products.”<sup>162</sup> The practices of the

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<sup>160</sup> “Eat,” *Vegan Action*, last modified 2013, <http://vegan.org/eat/>

<sup>161</sup> “Veganism in a Nutshell,” *The Vegetarian Resource Group*, last modified 2013, <http://www.vrg.org/nutshell/vegan.htm#nut>

<sup>162</sup> *Ibid.*

meat industry raise many ethical concerns for vegans, as they feel that animals are being raised simply for the purpose of being slaughtered. This fact directly relates to many vegans' belief in and practice of a "more human and caring world," where vegans may feel it their responsibility to demonstrate how such can be achieved.<sup>163</sup>

Similar to VRG, Vegan Action is another nonprofit organization that "works to reduce animal suffering, minimize environmental impact and improve human health" by creating a vision of a "happier, healthier, and cleaner world for all."<sup>164</sup> Vegan Action works to raise awareness of animal suffering and negative environmental impact, through their Humane Outreach Campaign and Share Vegan Campaign. As evidence of by their mission, Vegan Action contends that people choose veganism for ethical, environmental and health reasons, in agreement with VGR. That is, Vegan Action states, "veganism, the natural extension of vegetarianism, is an integral component of a cruelty-free lifestyle. Living vegan provides numerous benefits to animals' lives, to the environment, and to our own health-through healthy diet and lifestyle."<sup>165</sup>

Vegan Action explains these even further. In regard to their desire to protect animals by choosing veganism, vegans contend that the factory methods used to produce eggs and dairy products are unethical. Veganism promotes the philosophy that "animals are not ours to use."<sup>166</sup> Often, the same methods are used in the meat industry as in the egg and dairy industry such that "these cows and chickens live their short lives caged, drugged, mutilated, and deprived of their most basic freedoms."<sup>167</sup> In order to produce milk, the female cows must be pregnant, meaning dairy cows spend their life producing offspring. However, their offspring are either subjected to

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<sup>163</sup> Ibid.

<sup>164</sup> "About Us," *Vegan Action*, last modified 2013, <http://vegan.org/about-us/>

<sup>165</sup> Ibid.

<sup>166</sup> "For the Animals," *Vegan Action*, last modified 2013, <http://vegan.org/for-the-animals/>

<sup>167</sup> Ibid.

the same conditions if female, or often sold to veal farms for slaughter if male, where they are “tethered to a stall [and] deprived of food and exercise.”<sup>168</sup> Furthermore, dairy farms find it too expensive to continue to keep dairy cows once their milk production declines, at about five years of age. As a result, the dairy cows are often slaughtered at five, shortening their lifespan by about 20 years, “just to cut costs and maximize production.”<sup>169</sup>

Similar to the mistreatment of cows, hens and chickens are subjected to harsh, inhumane living conditions. As Vegan Action explains, “[o]n U.S. farms, an average of seven egg-laying hens spend their lives in a battery cage with a floor area the size of a vinyl record cover.”<sup>170</sup> As a result of the wires on the floor, the hens suffer deformities to their feet. Furthermore, the miniscule size of the cages prevents the chickens from spreading their wings. These chickens often suffer from “lameness, bone disease, [and] obsessive pecking, which is curbed by searing the beaks off young chicks” and live covered with excrement.<sup>171</sup> Similar to male and female calves, male and female chickens have different uses to farms. Male chickens in hatcheries provide little use to egg farms and as a result male chicks are often suffocated, decapitated, gassed, or crushed, soon after birth, while female chickens, who can live up to 15 years, are often slaughtered at about 2 years of age when their egg production rates decrease.<sup>172</sup> Once again, these facts show how the farming industry places a higher value on costs, profits, and production, than the humane treatment of animals.

With respect to the environment,” Vegan Action explains how animal agriculture “takes a devastating toll on the earth” because “it is an inefficient way of producing food, since feed for farm animals requires land, water, fertilizer, and other resources that could otherwise

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<sup>168</sup> Ibid.

<sup>169</sup> Ibid.

<sup>170</sup> Ibid.

<sup>171</sup> Ibid.

<sup>172</sup> “For the Animals,” *Vegan Action*, last modified 2013, <http://vegan.org/for-the-animals/>

have been used directly for producing human food.”<sup>173</sup> The land greatly suffers. Erosion occurs at a faster rate, making farmland less productive and increasing the need to expand grazing and farmlands into what once was the wilderness. Also, not only does animal agriculture affect the land itself, the results of animal agriculture, including animal waste, has been linked to other environmental problems according the United Nations Food and Agriculture Organization, such as “contamination of aquatic ecosystems, soil, and drinking water by manure, pesticides, and fertilizers; acid rain from ammonia emissions; greenhouse gas production and depletion of aquifers for irrigation.”<sup>174</sup> Furthering this argument, the United Nations has suggested that a vegan diet can feed more than an omnivorous diet can, which is important to consider given the fact that currently population pressures are increasing the stress on the environment.<sup>175</sup>

Lastly, Vegan Action promotes the vegan diet for health benefits, citing the American Diabetic Association which suggests that a diet free of animal fats and proteins reduces one’s risk for “heart disease, colon and lung cancer, osteoporosis, diabetes, kidney disease, hypertension, obesity, and a number of other debilitating conditions” by eliminating animal fats and proteins.<sup>176</sup> Vegan Action explains that the vegan diet can provide all the nutrients necessary, however educated planning of the diet is necessary.<sup>177</sup>

Furthermore, reasons for becoming vegan were found in a variety of food blogs accessible on the Internet. In “Post Punk Kitchen,” Isa Chandra Moskowitz, who is committed to creating fun cooking shows for vegans, started cooking vegetarian when she was a teenager and eventually made the jump to veganism as it seemed like the logical conclusion to follow.<sup>178</sup>

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<sup>173</sup> “For the Environment,” *Vegan Action*, last modified 2013, <http://vegan.org/for-the-environment/>

<sup>174</sup> Ibid.

<sup>175</sup> Ibid.

<sup>176</sup> “For Your Health,” *Vegan Action*, last modified 2013, <http://vegan.org/for-your-health/>

<sup>177</sup> Ibid.

<sup>178</sup> Isa Chandra Moskowitz, “About,” *Post Punk Kitchen* (blog), accessed December 17, 2013, <http://www.theppk.com/about/>

Unlike Isa, many bloggers became vegan for either ethical or health reasons. Celine Steen, author of “Have Cake Will Travel,” explains to her readers that she became vegan in 2005 for solely ethical reasons.<sup>179</sup> Similarly, Debbie in “Maple Spice...and all vegan things nice!” was first a vegetarian and in 2008 became vegan to further support the ethical reasons that made her vegetarian.<sup>180</sup> Combining health with the notion of spiritual wellness, Em, author of “This Rawsome Vegan Life” explains her choice to become vegan as a combination of her love for her body, planet, and all beings.<sup>181</sup> To her, they are all equal and all one. That is, Em’s reason for becoming vegan is one of mindfulness. As she explains, “I want it to nourish my body and soul, work in harmony with the earth, and allow other earthlings their right for freedom.”<sup>182</sup> Angela from “Oh She Glows – glow from the inside out” became vegan as a means to support animal welfare, raise awareness about impacts of factory farming, and to increase her nutrition, all of which were stated by Vegan Action.<sup>183</sup> Similarly, Kath Patalsky in “Healthy.Happy.Life” explains her choice to go vegan as stemming from inspiration of love for animals, affinity for wellness, and healthy eating.<sup>184</sup>

In summary, it is evident that, while there exists a host of reasons for becoming vegan, the three most evident are those pertaining to issues of animal rights and humane treatment, environmental impacts of animal farming, and health.

### *Stereotypes/Popular Beliefs About the Vegan Diet*

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<sup>179</sup> Celine Steen, “Info,” *Have Cake Will Travel* (blog), 2013, <http://havecakewilltravel.com/booksandbio/>

<sup>180</sup> Debbie, “About Me,” *Maple Spice...and all vegan things nice!* (blog), accessed December 17, 2013, [http://www.maplespice.com/p/about-me\\_22.html](http://www.maplespice.com/p/about-me_22.html)

<sup>181</sup> Em, “About Me,” *This Rawsome Vegan Life* (blog), accessed December 17, 2013, <http://www.thisrawsomeveganlife.com/p/about-me.html#UrfekWRDunA>

<sup>182</sup> *Ibid.*

<sup>183</sup> Angela, “About,” *Oh She Glows: glow from the inside out* (blog), accessed December 17, 2013, <http://ohsheglows.com/about/>

<sup>184</sup> Kathy, “About,” *Healthy. Happy. Life.* (blog), March 16, 2008, <http://kblog.lunchboxbunch.com/2006/02/about-kathy-patalsky.html>



Having discussed vegan nutrition, health effects, and dietary composition, it is important to mention the stereotypes and popular beliefs of veganism found within the popular literature. While some stereotypes may hold true, others may be based on exaggerated ideas and perceptions of veganism.

One such myth is that vegans only eat salads and fruits.<sup>185</sup> This is obviously not true, having already demonstrated the vast amount of different foods that vegans consume. While their diet is based on plant foods, vegans enjoy breads, pastas, beans and legumes, and mock meats. This characterization of the vegan diet is similar to the myth that vegans exclude sweets, sugars, and other treats from their diets.<sup>186</sup> This is hardly true, as vegans indulge in desserts and snacks, just those that are vegan friendly. However, it is true that vegans often eliminate white sugar and certain types of candies from their diets as “white sugar can be filtered with bone char” and “certain candies, which may seem vegan-friendly, include the ingredient confectioner’s glaze, made from bug secretions.”<sup>187</sup>

That being said, there are many companies currently specializing in alternative food products for vegans, including gelatin free gummies and marshmallows. Even certain packaged foods are considered vegan according to PETA but may not be according to strict vegans, as some contain refined white sugar. Some examples are Oreos, Krispy Kreme Glazed Apple Pie, Sara Lee Oven Fresh Apple Pie, and Brach’s Mandarin Orange Slices.<sup>188</sup> These two myths of the vegan diet fit under the broader characterization of the diet as extremely restrictive, stated even in the Health and Wellness section of *US News and World Report*.<sup>189</sup> Similar to this

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<sup>185</sup> Lisa Cottrell-Bentley, “Top 10 Vegan Stereotype Myths,” *vegan Mainstream*, July 3, 2010, <http://www.veganmainstream.com/2010/07/03/top-10-vegan-stereotype-myths/>

<sup>186</sup> *Ibid.*

<sup>187</sup> “12 Surprising Vegan Foods,” *Huffington Post: Healthy Living*, September 13, 2013, [http://www.huffingtonpost.com/2013/09/12/surprising-vegan-foods\\_n\\_3895853.html?utm\\_hp\\_ref=vegan](http://www.huffingtonpost.com/2013/09/12/surprising-vegan-foods_n_3895853.html?utm_hp_ref=vegan)

<sup>188</sup> *Ibid.*

<sup>189</sup> Angela Haupt, “Vegan Diet,” *U.S. News & World Report: Health & Wellness*, last modified

popular belief is the assumption that vegans have “limited and bland food choices.”<sup>190</sup> The section on diet composition in this paper greatly refutes both notions.

Another stereotype related to veganism is the idea that the diet requires a lot of work.<sup>191</sup> While preparing vegan meals may require greater planning, they hardly take longer to actually prepare than regular meals. Furthermore, more attention should be placed on making sure one meets the required nutrient levels, which could be considered more work in the beginning, just as anything new requires work at the start. Along similar lines is the idea that the vegan diet is also more expensive. However, vegan diets can be “extremely economical,” as the diet centers “around grains, beans, legumes, nuts, and seeds, all of which can be purchased in bulk.”<sup>192</sup>

Another characterization of the vegan diet is that it is perceived as feminine.<sup>193</sup> Obviously, not all vegans are women, but this idea of a feminine diet may stem from the belief that (male) vegans tend to be skinny, which can be perceived as weak.<sup>194</sup> Although, not all vegans are skinny; on average, vegans tend to be lower in weight due to the foods they eat and the low percentage of fat in their diet.<sup>195</sup> Furthermore, in an article written by Daniel Kucan in the Huffington Post this past August entitled, “You Eat Like a Girl: Why the Masculine Dilemma Towards Veganism Is No Dilemma at All,” he argues that while the diet may be

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January 2, 2013, <http://health.usnews.com/best-diet/vegan-diet>

<sup>190</sup> Emily Savage, “The Vegan Mystique: Smashing Myths, Misconceptions, and Stereotypes,” *PoorTaste: Feeding the Underbelly* (blog), March 9, 2011, <http://www.poortastemag.com/the-vegan-mystique-smashing-myths-misconceptions-and-stereotypes/>

<sup>191</sup> Angela Haupt, “Vegan Diet,” *U.S. News & World Report: Health & Wellness*, last modified January 2, 2013, <http://health.usnews.com/best-diet/vegan-diet>

<sup>192</sup> Perri Blumberg, “11 Convincing Reasons that Going Vegan Isn’t Crazy,” *Reader’s Digest*, accessed December 17, 2013, <http://www.rd.com/slideshows/going-vegan/#slideshow=slide4>

<sup>193</sup> “Vegetarian Stereotypes,” *VegBlogger – a vegan/vegetarian blog*, May 14, 2010, <http://www.vegblogger.com/blog/2010/05/vegetarian-stereotypes.html>

<sup>194</sup> Perri Blumberg, “11 Convincing Reasons that Going Vegan Isn’t Crazy,” *Reader’s Digest*, accessed December 17, 2013, <http://www.rd.com/slideshows/going-vegan/#slideshow=slide4>

<sup>195</sup> “Vegetarian Stereotypes,” *VegBlogger – a vegan/vegetarian blog*, May 14, 2010, <http://www.vegblogger.com/blog/2010/05/vegetarian-stereotypes.html>

perceived as “soft” it is not at all.<sup>196</sup> That is, the vegan diet mitigates potbellies, achy joints, wheezy lungs, and heart disease.

Similar to the notion of the vegan diet as soft is the popular belief that the vegan diet is unhealthy or incapable of providing for athletes.<sup>197</sup> In “Can Athletes Perform Well on a Vegan Diet,” written by Gretchen Reynolds in *The New York Times* in June 2012, Reynolds spoke with three experts. Her conclusion suggested that not enough research has been done on the effects of a vegetarian or vegan diet on athletes. The only potential consequence expert Nancy Clark, a sports nutrition expert, could think of was the lower levels of creatine in the vegan diet, which may affect the performance of short bouts of exercise. Furthermore, David C. Nieman, professor of health and exercise science at Appalachian State University, suggested that vegans may need to increase their intake of fortified foods or alternatively take supplements, in particular those found within protein, as more protein should be consumed for intense physical activity training.<sup>198</sup> Today, a number of top athletes are vegan, including triathlete Brendan Brazier, ultramarathoner Scott Jurek, former track and field star Carl Lewis, and retired professional boxer Mike Tyson.<sup>199</sup>

Lastly, another common stereotype is that the vegan diet may seem hypocritical. That is, since vegans exclude meat from their diet, why then do they consume “fake meat?” This question is addressed in a Huffington Post article titled, “Why Do Vegans Eat ‘Fake’ Meat?”

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<sup>196</sup> Daniel Kucan, “You Eat Like a Girl: Why the Masculine Dilemma Towards Veganism Is No Dilemma at All,” *Huffington Post*, August 19, 2013, [http://www.huffingtonpost.com/daniel-kucan/veganism-and-masculinity-b\\_3764555.html](http://www.huffingtonpost.com/daniel-kucan/veganism-and-masculinity-b_3764555.html)

<sup>197</sup> Gretchen Reynolds, “Can Athletes Perform Well on a Vegan Diet?” *The New York Times: Health/Science*, June 20, 2012. [http://well.blogs.nytimes.com/2012/06/20/can-athletes-perform-well-on-a-vegan-diet/?\\_r=1](http://well.blogs.nytimes.com/2012/06/20/can-athletes-perform-well-on-a-vegan-diet/?_r=1)

<sup>198</sup> Gretchen Reynolds, “Can Athletes Perform Well on a Vegan Diet?” *The New York Times: Health/Science*, June 20, 2012. [http://well.blogs.nytimes.com/2012/06/20/can-athletes-perform-well-on-a-vegan-diet/?\\_r=1](http://well.blogs.nytimes.com/2012/06/20/can-athletes-perform-well-on-a-vegan-diet/?_r=1)

<sup>199</sup> Perri Blumberg, “11 Convincing Reasons that Going Vegan Isn’t Crazy,” *Reader’s Digest*, accessed December 17, 2013, <http://www.rd.com/slideshows/going-vegan/#slideshow=slide11>

written by Ed Coffin this past July, in which he poses the question of why vegans would eat fake meat if the products mimic animal flesh both in taste and texture.<sup>200</sup> Coffin explains that the answer makes sense once one understands the reasons that people become vegan. He suggests that “vegans did not stop eating animals because they didn’t enjoy the taste...[but] chose to stop consuming and using animals on an ethical basis.”<sup>201</sup> Coffin explains that vegans are often not against the taste of meat, but rather that they do not want to participate “in the senseless killing of animals when we know that nutritionally, animal foods no purpose to live healthfully.”<sup>202</sup>

### *Vegan Lifestyle*

Lastly, another important topic found in the popular literature is the idea of a vegan lifestyle. As explained in the introduction, veganism is no longer just a diet, but also a philosophy by which to live. VRG explains that the lifestyle led by many vegans is one that “promote[s] a more humane and caring world.”<sup>203</sup> Unlike vegetarians, vegans also eliminate animal products found in clothing such as leather, upholstery such as silk, and personal care production, household goods, and other commodities including soaps, lip balms, cosmetics, and toiletries (made of animal oils and secretions).<sup>204</sup> A vegan lifestyle can be defined as one that objects to the “unnecessary ‘use’ and killing of animals – unnecessary as we do not need animal products in order to feed or clothe ourselves.”<sup>205</sup> It is a “daily demonstration of compassion for

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<sup>200</sup> Ed Coffin, “Why Do Vegans Eat “Fake” Meat?” Huffington Post, July 8, 2013, [http://www.huffingtonpost.com/ed-coffin/why-do-vegans-eat-fake-me\\_b\\_3543316.html](http://www.huffingtonpost.com/ed-coffin/why-do-vegans-eat-fake-me_b_3543316.html)

<sup>201</sup> Ibid.

<sup>202</sup> Ibid.

<sup>203</sup> “Veganism in a Nutshell,” *The Vegetarian Resource Group*, last modified 2013, <http://www.vrg.org/nutshell/vegan.htm#nut>

<sup>204</sup> “Personal Care,” *Vegan.com: Cutting Through The BS*, accessed December 17, 2013, <http://vegan.com/personal-care/>

<sup>205</sup> “Lifestyle & Nutrition: Why Vegan?,” *The Vegan Society*, accessed December 17, 2013, <http://www.vegansociety.com/default.aspx>

all [these] creatures].”<sup>206</sup> It is, “compassion in action.”<sup>207</sup> According to the American Vegan Society, “veganism is an advanced way of living in accordance with Reverence for Life, recognizing the rights of all living creatures, and extending to them the compassion, kindness, and justice exemplified in the Golden Rule.”<sup>208</sup>

However, a vegan lifestyle does not just refer to activism for animal rights and a belief in compassion for all living beings, also refers to an “enlightened concept of repairing and maintaining health” as well as “spiritual development.”<sup>209</sup> Many who practice a vegan lifestyle are concerned with nourishing their bodies and souls and fostering a sense of mindfulness, intentional living, in this respect paying particular attention to the care of one’s body, mind, and soul. With such concerns, vegans are likely to be more careful about what they eat, limiting foods that are seen as rather unhealthy (i.e. high in fats, sugars, and/or calories). Furthermore, this idea extends into the realm of physical activity, as exercise helps improve and maintain health. Concerned with caring for their bodies, vegans often have high activity levels. A vegan lifestyle then can be described as one in which ethically guided choices are made in many aspects of life, including diet, physical and mental health, as well as other life values.

### Interview Study

Over the course of two months (February and March), 20 semi-structured, non-recorded voluntary interviews were conducted with Philadelphia residents and University of Pennsylvania students. Overall, 13 females and 7 males participated, their ages ranging from 18 to 65 years (average age of  $28.85 \pm 2.81$ ). The study population of Philadelphia residents was comprised of

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<sup>206</sup> Ibid.

<sup>207</sup> *American Vegan Ahimsa Lights The Way*, accessed December 17, 2013, <http://www.americanvegan.org/>

<sup>208</sup> Ibid.

<sup>209</sup> Ibid

6 females and 4 males ranging from 21 to 65 years old (average age of  $35.7 \pm 4.43$ ). The study population of University of Pennsylvania students included 7 females and 3 males ranging in age from 18 to 38 years old (average age of  $22 \pm 1.8$ ). Participants were asked a series of questions (see Appendix, Exhibit D) targeting their personal history of veganism and related beliefs, as well as their eating habits.

Interview data was compiled and reviewed thoroughly. Participants' answers to all the interview questions were compared and contrasted. Qualitative analysis was used, looking for and making note of common responses and themes that developed. The data review also included quantitative analysis when applicable; specifically when a common response was obtained from more than one interviewee, the number of such responses was calculated.

### *Reasons for Becoming Vegan*

Participants were asked what made them consider becoming vegan and also asked to pinpoint a factor ultimately influencing their decision. Only three reasons for becoming vegan were provided, namely health, environmental, and animal rights/welfare. The animal rights argument was also described as a morality or ethical issue.

About a fifth of participants stated that all three reasons, a rather holistic view, made them consider becoming vegan. However all were able to state the ultimate influencing factor – and noted that in terms of importance the ranking would be ethical, environmental and then health. Two participants explained that they first considered becoming vegan for environmental reasons, and another three for health reasons. However, the majority of participants considered becoming vegan for ethical reasons (i.e. animal welfare). With regard to the influencing factor,

18 participants explained that they became vegan ultimately for animal ethical reasons and two for health reasons.

Looking more specifically at the reasons for becoming vegan, environmental proponents suggested that the vegan diet was more sustainable than an omnivorous diet or even a vegetarian diet that relies on the continued domestication and use of animals. Furthermore, the argument was made that the vegan diet can feed more people, suggesting that the yield per area of land in agriculture/horticulture vs. animal husbandry is higher. That is, animal husbandry requires more space than crops when comparing in terms of food produced. In addition, large amounts of grains, soy, and corn are used to feed livestock. Participants explained that if factory farming was minimized and farmed animals were no longer intensely bred, the food sources now used to feed the livestock could feed humans instead, diminishing the problem of world hunger.

Furthermore, participants explained that the impact on the environment is less significant on a vegan diet – helping to prevent global warming, land destruction, and pollution. The livestock emit global-warming gases direct as a result/by-product of digestion. Due to the increase in feeding cattle corn-based meal, there has been a significant increase in the amount of methane, a global-warming gas, being released into the air. Participants stated that deforestation is occurring on a larger scale to meet the need for cattle pastures and grasslands where wild animals once roamed are becoming trampled and replanted with grass.

Concerning the health argument, participants believed that the vegan diet was more healthful, bringing both benefits and eliminating certain potential negative outcomes or increased risk factors for disease associated with an omnivorous diet. In particular, one participant explained his story of making the transition to veganism at the advice of his doctor and his own research into the health benefits of a plant-based diet. In an attempt to lose a considerable

amount of weight, lower his blood pressure, decrease his risk for certain disease, and avoid being put on medications, he became vegan. He subsequently successfully lost weight, reduced his blood pressure and cholesterol, avoided medications and his risk for diabetes by this dietary modification and the incorporation of daily exercise.

While the majority of participants described going vegan for ethical reasons, each had his/her own story of the process – some participants even remembered the exact date/event and the last meal they had before pursuing veganism. Many participants explained that, after doing research about the meat, dairy, and egg industries, as well as watching certain documentaries (i.e. “Earthlings,” “Speciesism: The Movie, Food,” Inc., “Forks Over Knives”...), they felt compelled to change their diet as they could not bear to support such animal cruelty. Some participants made mention of their pets and how they would do anything to protect them so why not to do the same for other animals. One participant recalled her trip to a farm when she was five and how afterwards she could not think about eating the animals she saw. Furthermore, many explained that sacrificing something with such a high level of consciousness does not seem ethical.

It is important to note here that a quarter of participants were vegetarian before becoming vegan. The majority became vegetarian for ethical reasons. The idea of eating animals bothered many, participants with interviewees explaining that animals have feelings as well. Along this line of reasoning, explanations included becoming vegetarian as a way to refuse to support the conditions of factory farming and businesses that tolerate animal cruelty. However, some also mentioned that they simply did not enjoy eating meat – the taste and texture being unappealing. Two participants did become vegetarian for health reasons, explaining that vegetarian diets tend to be lower in fat and calorie content. For all of them becoming vegetarian was the precursor to the vegan diet, as a means of easing into veganism by first restricting the intake of meat and fish.



Even if it was not their intention when they initially became vegetarian, all felt as though adopting a vegan diet seemed like the only logical transition and end goal in a diet meant to eliminate animal cruelty. That is, after researching and learning more about animal cruelty, particularly in the dairy and egg industry, they felt as though the vegan diet supported their ideals of animal ethics even more. Some mentioned the hypocrisy inherent in becoming vegetarian for ethical reasons, as the conditions and treatment of animals in the dairy and egg industry are just as despicable. In general, becoming vegan after having already been vegetarian was considered a rather easy transition for most of them, though two participants struggled with eliminating cheese from their diet while one other participant was vegan for every meal other than dessert.

#### *Vegan Family/Friends*

Participants were asked if they had family members and/or friends who were also vegan. The question was aimed at gathering information about the influence of friends and/or family, and more so if such a support system made being vegan easier (i.e. in terms of comfort/similar mindset and ideals, ease in cooking and eating out).

About a fifth of participants had family members who were vegan. In two cases family members became vegan at the same time while, in the others, participants ended up influencing their own family members who made their own transition subsequently. It is important to note, though, that some participants did have family members who were vegetarian and some whose dietary choice to become vegan influenced a family member to start making the transition by becoming vegetarian. In most cases, participants stated that they never outwardly told their family to make a change, but perhaps acted as role models, explaining the conditions of factory

farming, and showing that a restricted diet is very doable. The same phenomenon occurred with close friends or significant others.

All participants did know at least one other person who was a vegan – although some participants made mention that those people were not their closest friends. Within the University of Pennsylvania student population, more participants had friends who were also vegan than the Philadelphia resident population. Many attributed their friendships to the Penn Vegan Society, an academic society researching and promoting conversation about the vegan diet. While all University of Pennsylvania students considered themselves a part of the Penn Vegan Society at one point, there were varying levels of involvement. Further, many participants indicated having vegetarian friends also. In terms of the Philadelphia resident population, a few were actively involved in animal rights activist groups and Philadelphia vegan groups, in particular the Humane League.

When asked if being surrounded by vegan family and/or friends made being vegan easier for them, the majority participants said yes. Even those who were not surrounded by family or friends suggested that having that support would make being vegan easier. Explanations ranged from feeling more comfortable explaining why they were vegan and actually being understood in terms of mindset by those who were either vegan or vegetarian. That is, they were not different for once, but rather the norm. Also, participants explained that cooking with vegans/vegetarians was easier as they had more recipes at hand and were happy to eat a variety of vegan dishes. By contrast non-vegans who were not accustomed to vegan food were unsure of what to cook and/or less willing to try certain foods.

In terms of going out, participants found eating out with vegans was easier largely because they were happy to go to an all vegan or vegetarian restaurant. However, ever so,

vegans felt that their non-vegan friends made too much of a big deal about finding a restaurant that offered many vegan options. That is, the non-vegans were overly concerned and/or slightly frustrated by this process. The participants themselves explained that their non-vegan friends often spent more time worrying about what vegan options were offered or boasted about their findings pointing out everything vegan on the menu. Furthermore, vegans noted that, while frequenting restaurants, they often had many questions to ask the waiter about how food is prepared and may make substitutions, a situation which made non-vegan friends uncomfortable.

What truly mattered to the participants was acceptance by family and close friends. About half of the participants stated that in the beginning family members were opposed to their decision to become vegan, primarily because of worries about their necessary nutrients, worrying about the decision to become vegan as a cover for an eating disorder, and simply not understanding the decision and seeing it as being rather pretentious. While participants did not turn back on their decision, knowing that the ones they cared about did not support them was hurtful and even angered them. One participant recalled that her extended family were farmers and would not listen to a word she said about the vegan diet and became very angry and judgmental. In retrospect, she wished she had taken a different approach, calmly explaining why she became vegan and being less adamant about trying to change them, as she felt she pushed certain family members away and took the stereotype of an “angry vegan.”

While acceptance and support were lacking in the beginning, many participants explained that, over time, once their families realized that the change was not temporary, they began to be more supportive and oftentimes became interested, wanting to learn more. Many students even explained that, when going home, their mothers happily made vegan meals, experimenting with different recipes, or at least supported their decision by stocking the house with vegan friendly

foods. Furthermore, participants explained that while some of their friends and family had been skeptical about vegan food, after creating some dishes for an event, their family and friends experienced how appetizing vegan food can be. One participant made a vegan Thanksgiving when she was home for break and another participant made vegan lasagna with Daiya cheese, soy meat, and lots of vegetables for a party with friends which has become her staple dish for potlucks.

### *Responses to Stereotypes*

Participants were asked to list a few stereotypes about vegans and/or the vegan diet and how they would respond to the stereotypes. This question aimed to verify stereotypes and to repudiate negative stereotypes, giving participants the chance for their own voices to be heard. Many felt as though this step was important, as veganism has acquired negative and misguided stereotypes. Participants also referred to stereotypes as “vegan myths,” wanting to show the lack of inherent truth in them.

The most common stereotype was that vegans do not get enough protein. Many participants found this stereotype to be extraordinarily frustrating and quite naïve. While participants most often had a negative initial reaction to this question and were frustrated by being asked, they stated that typically they would explain where they get protein from, since the individual asking was clearly uninformed. Participants explained that they get their protein from legumes, soy products, meat alternatives, and complement proteins. Further, not consuming enough protein was hardly a worry for them. Participants explained that as long as one’s diet is not calorie deficient (meaning consuming enough calories) one will most likely not be protein deficient. One participant took a joking stance, stating that he would negate the stereotype by

stating that elephants are huge and they are vegan – meaning they obviously get enough protein. A few other participants suggested that they might respond by posing the question of why one cares now that one is a vegan, but never did before.

A similar vegan myth was the idea that everyone needs dairy products in the diet. All vegans simply argued that this was completely untrue. Dairy products are not necessary in the diet and perhaps do even more harm than good. Participants stated that they get enough calcium without dairy products by consuming fortified nut and grain milks and cruciferous vegetables. Four participants also mentioned that our prehistoric ancestors did not consume dairy products at all and that evolutionarily we are not made to consume milk, as evidenced by lactose intolerance after weaning. Many participants suggested the benefits of eliminating dairy products from the diet including clearer skin and a decrease in allergies. Some participants even stated that milk is bad for bones, explaining their understanding that the protein leeches out calcium

Another common stereotype that many participants mentioned was the belief that vegans are tiny, pale, weak, and/or malnourished. Some participants suggested that they would negate the stereotype by explaining that some top athletes, even endurance runners and boxers, are vegan, hence the vegan diet does not make one inherently weak. Further, some explain that the vegan diet can provide a person with all the nutrients needed for the body given the diet is well rounded. Participants also explained that their vegetable and fruit intake increased when becoming vegan, stating that they are getting more nutrients now than before. All participants suggested feeling more active and less sluggish after eating vegan, negating the idea that the vegan diet makes one weak.

Participants mentioned the stereotype that vegan food is “gross” or bland and lacking in flavor. One participant even admitted to thinking prior to becoming vegan that some vegan

foods were unpalatable, such as tempeh. However, after consuming tempeh a few times the participant really enjoyed it, suggesting that it is an acquired taste. A few participants even stated that they believe vegan diets to be more flavorful as one must rely more heavily on spices to flavor vegetables than meats. One participant suggested that a true test for a chef is making a delicious vegan meal, as not only does it require creativity but also a thorough knowledge of spices. Some participants mentioned high quality restaurants that provide many vegan options, or even all-vegan restaurants that many non-vegans enjoy, such as Vedge Restaurant in Center City Philadelphia. Further, many participants stated they would refute this stereotype by explaining that vegan desserts exist. That is, vegans are not restricted to only “healthy” foods but consume desserts as well, such as vegan key lime pie, brownies, cakes, and even ice creams.

Participants wanted to deflate the stereotype of the angry vegan – radical and militant. Many participants felt as though they did not fit that stereotype at all and nor did those persons whom they knew were vegan. Some vegans attributed this stereotype to PETA and their promotion and advocating for animal rights. Participants explained that it is unfair to view them as radical when all they are doing is fighting for what they believe in, stating that they should not be subjected to negative stereotypes when trying to live by compassion.

Yet another stereotype participants mentioned was the portrayal of vegans as weird, liberals, hipsters/hippies, and/or dirty. Participants found these stereotypes to be generally untrue as there is a whole range of people who are vegan, though some suggested that there is an increase in hipsters who are vegan. That is, there is not a set personality or image that defines a vegan aside from the diet itself. Participants would respond to the stereotype by explaining who they are themselves and why they do not fit this portrayal.

In accordance with vegan portrayals, many participants suggested that vegans were seen as only healthy individuals, though participants stated that one can be unhealthy on the vegan diet. One participant suggested that she loves to eat chips and desserts and never exercises. Another participant shared her story of gaining weight on the vegan diet, relying on prepared foods, eating junk vegan foods (processed foods) and desserts, and not cooking herself.

With specific regard to men who are vegan, participants mentioned the stereotype that these men are unmanly and are more likely to be perceived as homosexual. Participants stated they would respond to this stereotype by stating that there are male athletes who are also vegan, intending to portray a sense of strength and muscularity, meaning one can have muscular image through a vegan diet. Two participants suggested that men who are vegan may be portrayed as homosexual because this may, in fact, be true. That is, men who are outwardly spoken about their sexual orientation are often very comfortable with who they are and are vocal about their feelings and beliefs, including the vegan diet.

There are also stereotypes also about the personality of vegans. Participants suggested vegans are viewed as being pretentious. In response, many stated that this is simply not true. While vegans may be perceived as pretentious because their dietary habits protect animals, better the environment, and guard health, they defend themselves by pointing out that their motives are admirable, as they advocate for a diet that is compassionate, ethical, and healthy. Further some vegans are described as overly sympathetic and emotional. Participants said that perhaps that is true but should not be viewed in a negative light, since being compassionate and caring not only to others but to animals is admirable.

Along similar lines to personality stereotypes, participants wanted to negate the stereotype that many vegans have eating disorders or became vegan to hide their eating disorder.

No participants admitted to experiencing an eating disorder, but rather described a healthy relationship with food. Many participants suggested that, after becoming vegan they developed a better relationship with food because they felt that there they were doing a greater benefit for their body by eating more whole foods, vegetables, and fruits, and eliminating hormones from milk and meat, as well as toxins found in cooked meats.

Participants were also asked about the stereotype that the vegan diet is hard to follow and expensive. In response, many responded by saying that it may have been a challenge in the beginning, but after a month or so, it became the norm for them. Further, many participants explained that their belief in the humane treatment of animals made it easier for them not to give into the temptation for meat or dairy. That is, while vegans do get cravings, they believe in the diet and reason for becoming vegan that override those enticements. Some participants did say that the vegan diet may be hard to follow when one cooks for oneself and when dining out, as choices may be limited and questions about food preparation may need to be asked. One participant suggested that being vegan may be harder in the sense that it can be alienating due to food choices.

With regard to the belief that the vegan diet is more expensive, some vegans agreed with this view and some did not. In general, though, participants explained that it is up to the individual to either make the vegan diet expensive or not. That is, if one chooses, the vegan diet can be expensive when purchasing many alternatives including prepared meat analogs and dining out at vegan restaurants as it is cheaper to cook. Participants explained that nuts, often a large part of the vegan diet, may be expensive, but can be cheaper when buying in bulk. On average though, since the diet is based largely on legumes, grains, fruits, and vegetables, which can all be



bought in bulk, it tends to be cheaper – though buying organic fruits and vegetables make it more expensive.

### *Vegan Lifestyle*

Participants were asked if they had heard of the term “vegan lifestyle.” Subsequently, they were asked what they believed it to mean, whether they practiced this lifestyle, and what they saw as the benefits to practicing a lifestyle as opposed to just a diet.

All participants were familiar with the term “vegan lifestyle” and all participants explained it to mean abstaining from using animal products in one’s daily life – including clothing (i.e. not purchasing or wearing leather, wool, fur), makeup (i.e. not tested on animals), household cleaning goods (i.e. not tested on animals) and so forth! However, despite knowing the term, not all participants followed a vegan lifestyle. Eighteen participants responded that they follow or attempt to follow a vegan lifestyle to the best of their ability, while two participants explained that they do not follow a vegan lifestyle, but rather just a vegan diet. It is interesting to note that the two participants who did not follow a vegan lifestyle became vegan solely for health reasons. This is not to say that ethical animal treatment and environmental sustainability did not matter to them, but rather these factors did not influence their decision to becoming vegan. Furthermore, these two participants explained that, after become vegan, they did research regarding animal rights and the environmental impact of a vegan diet and found those reasons to be important, as well.

The participants who did follow a vegan lifestyle had a variety of explanations for doing so, though all revert to the idea that in order to live a life that does minimal harm to animals, one must not only practice a vegan diet, but also extend that to other areas of life. Participants suggested that a vegan lifestyle allowed them to live animal cruelty free to the best of their

ability – though sometimes it was difficult, especially in terms of finding medications that are not tested on animals. In this case, one participant explained that she tried her best not to avoid medications because so many are tested on animals, which causes an ethical conflict for her. Participants felt as though they empathized even more so with animals by practicing a vegan lifestyle and it gave them a greater piece of mind knowing that they are doing the least harm possible. Other participants felt that practicing a vegan lifestyle enabled them to be more in touch with their reasons for going vegan and enabled them to advocate more freely. That is, some vegans felt that without practicing a vegan lifestyle they were living hypocritically. One participant stated that, if one goes vegan for ethical animal reasons, then that this approach should be employed in all aspects of one’s life, not just limited to diet.

Furthermore, some participants felt very strongly about the differences between diet and lifestyle. Four participants even stated that those who practice solely the vegan diet should not use the term “vegan diet” as the diet inherently is linked to lifestyle – instead the term “plant-based” diet should be used. These participants even suggested that those people are not vegan, but rather plant-based dieters.

However, all participants who practiced a vegan diet noted that they were not perfect in doing so. While they attempted to eliminate animal cruelty from their life, sometimes it was necessary, as in the case with medicine. Furthermore, many participants felt conflicted between the idea of sustainability and getting rid of previous purchases that were not animal friendly (i.e. men’s dress shoes, leather belts, wool jackets and sweaters, etc.). While they did not want to seem hypocritical by wearing previous purchases, they did not want to simply throw those items away either. That is, along with animal rights, many vegans believe strongly in sustainability and not wasting. As a result, some participants donated clothes and shoes while other

participants suggested that if they had the money to do so, they would donate everything non-vegan friendly and shop for new clothing. Others continued to wear the items, adopting the idea of grandfathering in past purchases. Many participants explained that wearing the articles after purchase is doing no more harm, but when making future selections they will not buy such items. However, some participants were concerned about looking like a hypocrite when wearing such articles of clothing and tended not to do so infrequently. One participant felt as though she was doing potential harm by wearing her leather boots as she often got complimented on them, being asked by others where they could purchase a pair. Interestingly, in this case, the participant downplayed her purchase, not raving about how durable and comfortable the boots were and stating that she did not recall where she got them.

### *Mindfulness*

Participants were asked about the idea of mindfulness. If they were unsure of the word/concept, as five were, a definition was provided – the psychological concept of focus of attention and awareness of consumption and the body. The majority of participants, 15, had heard of the term and had a general understanding. While five participants were unsure of the concept of mindfulness, after having explained it to them, one felt as though she practiced it. Out of the 15 participants who were familiar with the term, 10 believed themselves to practice mindfulness.

Many participants explained the concept of mindfulness beyond the extent of the diet and food and in the realm of physical activity. Some participants suggested the link between mindfulness and yoga and/or meditation while others suggested that it was associated with a positive body image and spirituality. One participant even suggested that the term was jargon for

fitness hippies who focus on health. Other participants suggested that it extended beyond yoga into the realm of basic physical activity including running, cycling, and swimming. The 15 participants who practiced mindfulness participated in yoga, meditation, running/jogging, swimming, cycling, weight strengthening, and even triathlons.

However, mindfulness for some was also a concept they practiced in other areas of their lives, in particular during interactions with people. That is, three participants suggested that they kept in mind the idea of mindfulness in their relationships. They focused on how they interacted and communicated with people in order to treat their friends, family, and even strangers the best they could. These participants were very aware of how their actions affected others and attempted to promote only positive energy in their relationships. Further, one participant who did not see herself as practicing mindfulness in terms of physical activity, did believe she practiced mindfulness of herself – that is, she felt very in tune with herself, aware of her expectations and goals and being the best person she could be.

With regard to mindfulness (exercise/physical activity) and veganism, 15 participants saw a link between the two – even those who did not practice mindfulness. A few participants mentioned the stereotype that exists relating mindfulness and veganism – the healthy, lean, hippie vegan. Many participants suggested that mindfulness tended to naturally go along with veganism because of the health benefits. That is, both veganism and mindfulness in terms of exercise promote healthy bodies. Once researching about the health benefits of the vegan diet and concerning oneself with healthy living, mindfulness is often the next step as regarded by many participants. Further, one participant suggested that mindfulness acted as a good bridge between the vegan diet and the vegan lifestyle. That is, essentially veganism is an all-encompassing notion of practicing compassion and well-being for humans and animals.

### *Diet Overview*

Participants were asked to describe what they eat on a daily basis including, breakfast, lunch, dinner, snacks, and dessert. This question aimed to provide a better picture of what vegans eat and the many vegan foods that are available. It attempted to counteract the portrayal of the vegan diet as a very restrictive diet. The results from this are displayed in a table at the end of this document on page 88, labeled “Table 5. Diet Overview from Interviews.”

### *Perceived Health Benefits*

All participants argued that the vegan diet provides many health benefits given that the diet is a well-rounded one. Participants suggested that the vegan diet lowers the risk for certain diseases including cancer and cardiovascular disease. Some suggested that this is due to the increase of fruits and vegetables in the diet and the elimination of certain toxins and hormones found in dairy and milk. Further, one participant even suggested that research has shown the vegan diet to reverse cancer. In regards to heart health, many participants believe the vegan diet to be beneficial as it eliminates dietary cholesterol, resulting in lowered cholesterol levels, reducing the intake of fat, both saturated and transfat, and in turn reducing one’s blood pressure. Also, participants stated that in general the vegan diet tends to be less calorie dense, leading to less weight gain than the average American diet. As mentioned previously, one participant who became vegan for health reasons experienced a great decrease in cholesterol, blood pressure, and weight, preventing him from needing to go on medication. Another participant found the management of his type II diabetes improved on the vegan diet. Also, participants suggested that the increase of fiber in the diet due to fruits, vegetables and whole grains has positive health

effects. Along the same lines, participants believed the vegan diet to supply them with a greater array of nutrients due to the many vegetables, fruits, nuts, and legumes being consumed.

Furthermore, participants mentioned that the vegan diet has provided them with noticeable general health benefits. Some participants explained that they have an improved immune system since becoming vegan, hardly becoming sick during the year, especially during flu season. Some attributed this to the decrease in dairy consumption. Other participants said that, after becoming vegan their skin cleared up, once again thinking this to be a result of the lack of dairy products in the diet. A few participants also found their allergies to decrease. One participant stated that her allergies and asthma (which were rather severe) got much better after becoming vegan. In addition, she saw an improvement in her joint pain. Another participant, who suffered from allergies as a child, found relief with the vegan diet. She initially was on five medications to combat her allergies but was able to eliminate three of them after becoming vegan, attributing this to the lack of dairy and her use of a juicing diet. Also, all participants stated that they feel more energized on the vegan diet, less sluggish and some even suggested that by doing so they will live longer.

### *Perceived Potential Health Consequences*

While all participants identified health benefits of the vegan diet, they were also aware of some health consequences. Many participants suggested that one should be well informed in terms of dietary nutrients and potential health concerns prior to making the transition to veganism to prevent any negative consequences from occurring.

All participants suggested that vitamin B-12 intake could be of concern. Despite this knowledge, only 12 participants took a vitamin B-12 supplement, and even those who did made

mention of not being as consistent as they should be (some only taking it when they remembered). Some stated that the dose of the supplement was so high that they would only take a supplement every couple of days. Many felt that initially when they became vegan they were more careful to take the supplement. A few of those who did not take a supplement admitted that they probably should with one participant even suggesting that it was unwise not to do so. However, some felt that they were getting enough vitamin B-12 from the fortified foods they were consuming including non-dairy milks and cereals. Two participants believed that their body could process an analog of B-12 naturally and that supplementation was not necessary.

In terms of supplementation, a few participants also suggested the potential concern of vitamin D deficiency. Two of these participants took supplements for vitamin D as a precautionary measure. Also, participants suggested that calcium intake could be of concern if not eating a varied diet and consuming fortified foods. Lastly, a few participants believed that iron deficiency could be a problem leading to anemia. One participant actually experienced this and as a result takes a supplement.

Many participants also said that the vegan diet could potentially be unhealthy. That is, they believed any diet to have potential for health concerns when portions are too large and junk/unhealthy foods (processed, high in calories, and fat) are not eaten in moderation. As a result, participants stated that vegans can consume too much food leading to weight gain. Further the idea of a junk food vegan was mentioned – one who relies heavily on processed foods and desserts. One participant acknowledged her weight gain while on the vegan diet due to consuming too much junk food.

## Discussion

In general, the findings from the scientific literature suggest that the vegan diet is very healthy as long as diets are well-planned, balanced, and include a variety of foods, in particular fortified and enriched products. While specific vitamin and mineral intake may be of concern for vegans, there is mixed evidence suggesting vegans are at an increased risk for nutritional deficiencies (in particular vitamin B-12, zinc, and iron deficiencies). Interestingly, though, studies have shown that an increase in certain vitamins may augment the absorption of other vitamins and minerals, (namely vitamin C and nonheme iron absorption) and furthermore that long term vegans may develop adaptations to low bioavailability of certain nutrients, their bodies adjusting to their diets. These biological adaptations, specifically to lower zinc and iron bioavailability, may lessen the need for supplementation, a speculation unmentioned in the popular literature.

Furthermore, as evidenced by the results from interviews, it would seem that very few vegans are being diagnosed with deficiencies. Only one young woman was diagnosed with an iron deficiency, which may or may not be a direct consequence of the vegan diet, which is important because as young women are generally at greater risk for anemia. Another participant was diagnosed with low levels of vitamin D from years before becoming vegan, and as a result has taken supplements ever since. Perhaps the low levels of deficiencies can be attributed to vegans' well-balanced diets and knowledge of the increased risk of certain nutrient deficiencies – being hyper-aware of potential health concerns, making sure to supplement and/or consume certain foods high in specific nutrients (i.e. fortified foods for calcium, vitamin D, and vitamin B-12).



However, it is important to note that the relatively low diagnosis of vitamin deficiencies could also be a result of the lack of medical testing being conducted, as sometimes the signs and symptoms can go unnoticed, especially if doctors are unaware that their patients are vegan. In particular, some participants mentioned that they do not outwardly tell their physicians of their vegan diet, unless specifically asked, apprehensive of the physician's response, as some may be unsupportive. Other participants have sought advice from nutritionists, dieticians, and physicians to make certain that their diets are healthy and are providing them with all necessary nutrients, and if necessary they are taking supplements.

Evidenced in the scientific literature and even the popular literature, many nutrient deficiencies can have serious health concerns, in particular vitamin B-12, which may result in deleterious neurological complications. This vitamin is not found naturally in food, although many foods, including non-dairy milks and cereals are fortified with it today. Despite the fortification of many foods, precautionary measures should be taken via supplementation, as the results of the deficiency make be irreversible, but easily preventable. One participant, a registered dietician, views vitamin B-12 supplementation as essential, noting though that, since the dose is so high, pills can be broken in half and consumed in this dosage. It is worrisome then that while so many vegans are aware of the health concerns of vitamin B-12, only about half of them are supplementing, evidenced in the interview study.

While the participants in the interview study may not be completely representative of the vegan population is not suggestive of the vegan community at large, it does provide some insight into the problems that may exist and perhaps changes that should be made. That is, since it seems like many are aware of the concern of vitamin B-12 deficiency but yet still not supplementing, perhaps physicians, dieticians, and vegan communities should advocate and

educate vegans about the issue, explaining the risk of suffering from the deficiency and the serious complications that can result. Further, the common myths regarding vitamin B-12 deficiency, such that it is possible to get the vitamin via consumption of fruits and vegetables and that it is produced in one's body, should be negated.

The scientific literature provides evidence that vegan diets are nutritionally sufficient and may in fact be even more beneficial than a normal mixed diet. That is, studies have shown vegan diets to reduce the risk of some chronic diseases and to have protective properties against certain medical conditions and diseases. It is interesting then to speculate on the practice of the vegan diet as a medical intervention. From the evidence presented in the results findings, it would seem beneficial for those who are overweight, obese, and/or suffering from high blood pressure or cholesterol to adopt a vegan diet to help alleviate these issues and reduce their risk of developing other diseases for which these are risk factors. Often, physicians suggest an exclusion of certain foods from one's diet to improve one's health. The idea of the vegan diet as a medical intervention is not farfetched then, but may be too drastic of a change for some to make. However, it may appeal to others who are weary of an overload of medications and multi-drug interactions.

In the interview study, one participant actually adopted the vegan diet as a medical intervention, at the advice of his physician – perhaps something more doctors should be recommending. At risk for diabetes, cardiovascular problems, and other comorbidities associated with obesity, the participant changed his diet and subsequently saw drastic results. The participant lost 80 pounds in four months, improving his cholesterol and lipid profile, and reducing his risk of cardiovascular and other related health problems. Granted, while this dietary intervention was accompanied by an increase in physical activity every day, alternating between

running/jogging and weight/strength training. Unfortunately, scientific literature has yet to propose and support such an idea. Associations only are made between the vegan diet and health benefits, not causal relationships – begging for further research.

In addition, results from the interview study suggest that the vegan diet may be beneficial when used as a medical intervention for allergies, asthma, joint pain, and even acne treatment. Two participants found significant improvement in allergies they had suffered from a young age. One participant even reduced her medication intake from five to two pills only after a few months of the vegan diet, with her physician approving such a reduction in her medication regimen. Both attributed such to a lack of dairy products and an increase in vegetable and fruit intake. In addition, many participants mentioned a decrease in joint pain, despite the increase in physical activity. Lastly, a few participants mentioned how their skin cleared after adopting a vegan diet, attributing it to the lack of dairy in the diet. Future research in these areas would be beneficial to show that a change in diet could be used instead of or in addition to medications.

Furthermore, with regard to healthfulness, studies have found vegans to be healthier in terms of body composition, namely body weight for height and fat distribution, than those with a normal mixed diet. However, it is important to mention that interview participants did suggest that an unhealthy vegan diet can exist and result in weight gain when the reliance on junk and processed foods is heavy. These findings are most often attributed to the diet alone in the scientific literature. The relationship between vegans and their health status may indeed not only be dependent on their diet but also their lifestyle.

The scientific literature largely ignores the idea, perhaps unaware of the philosophy of a vegan lifestyle. It would seem logical to speculate that the health status of vegans is a result not only of their diet but also in general their philosophy to care for their body as evidenced in the

popular literature. Before reaching this conclusion in the scientific literature, studies must be conducted to test the theory, considering the lifestyle of vegans, which may be more variable than the popular literature characterizes it to be. Regardless, this topic of mindfulness and concern for the health of mind, body, and soul should be studied to see its influence on the vegan lifestyle, including physical activity and concern with what is consumed.

The idea of mindfulness and its relationship to veganism was evidenced in the interview study. About half of the participants believed themselves to practice mindfulness, concerned not only with what foods they put in their body, but how they treat their body, in regards to physical activity. Participants explained that exercise was a large part of their routine, making time to run, swim, cycle, and do yoga/Pilates. Some participants even attended meditation classes, noting that the combination of exercise and relaxation as ideal.

While the scientific literature provides an expansive view on vegan nutrition, namely diet composition and nutrient intake, as well as health status and effects of the diet, the popular literature provides some key insights to further support these findings. Oftentimes, the health effects of the vegan diet may be even slightly exaggerated by popular literature references. That is, many sources highlight the health benefits of veganism, focusing little if at all on potential negative health effects, unlike the scientific literature. While this may seem like a good form of advertisement for the diet, it may have some negative consequences. The general public often depends on public literature to gain knowledge and information. Those relying on the popular literature to understand the vegan diet better and doing research with the intention of becoming vegan may be poorly informed about the diet depending on the resources they find as, in general, the popular literature does not provide as much of an in-depth depiction of the diet. This limitation, then, not only supports the importance of studying the scientific and popular literature

in tandem when researching the vegan diet, but also suggests that those wanting to gain more information to make informed decisions about their diets should not rely solely on popular culture. Interestingly, though, the potential health benefits of a vegan diet do not prevent veganism from being stereotyped in a negative light, such as being described as a “women’s diet” and “soft.” Findings from the scientific literature may be better able to counteract these and many other negative stereotypes with regard to diet composition and health, although, an insider’s perspective such as those obtained in the interview study are useful.

Advocacy for a vegan diet from vegans themselves, giving them a space and a forum to negate the stereotypes, is necessary. As evidenced from the results of the interview study, many stereotypes are simply that, views unsubstantiated by the truth. While stereotypes will always exist, it is important to give those who are affected by the stereotypes a chance to respond to these, perhaps by fostering greater communication between those who are vegan and those who are not. That is, limited knowledge about veganism propagates such negative stereotypes, begging the need for a greater understanding of such in the public eye.

There are other minute discrepancies between the scientific, popular literature, and interview study. For example, the popular literature characterized the vegan diet as relying heavily on “fake” meat. While the scientific literature suggests that vegans consume protein from soy products, there was no mention of the other major meat alternative, wheat gluten, also called seitan. In comparison, many participants explained that early in their transition to the vegan diet they relied heavily on meat analogs, especially if transitioning from an omnivorous diet to a vegan one, as it made cooking easier by replacing meat with alternatives in dishes. However, as participants become more comfortable with the vegan diet, they do not

consume/rely on as many meat alternatives. However, rather than purchasing pre-made meat analogs some, will make their own seitan and/or tempeh as it is much cheaper.

Furthermore, the scientific literature had no mention of what source of protein is best – whether legumes/beans, soy, or wheat gluten. It would be beneficial for more studies to determine which may be the most healthy to eat, considering the nutrient composition of each, as well as potential negative consequences, including the concerns raised in the popular literature about the consumption of too much soy, confirmed by participants in the interview study.

In addition, and provoking the need for further research, is the idea of the vegan lifestyle with regard to physical activity level and a practice of mindfulness. Further research into the effects of a vegan diet with and without exercise may provide a better illustration of the health benefits of adopting a vegan diet purely with regards to food consumption, not activity level. Unmentioned in the scientific literature, the idea of a vegan lifestyle is popularized in the popular literature and very much evidenced in the interview study. The popular literature defines the vegan lifestyle in many ways, including a focus on activism for rights of all living things, a life of compassion towards all beings, and the idea of mindfulness and spirituality. More in line with physical activity is the notion of a mindfulness lifestyle, which may indeed play an important role in the health status of many vegans, as the results from the interview study demonstrate. About 15 participants agreed that a link between mindfulness and the vegan diet exists and many practice one, making physical activity a very prominent part of their life.

This perspective is vital for the scientific literature to consider. It would seem likely that the health benefits of veganism stem not only from the diet, but the overall lifestyle, where vegans are more aware of what they consume in an attempt to nourish their bodies, minds, and souls. The spirituality and mindfulness embedded within the vegan lifestyle is a philosophy

about which the popular literature generalizes. More research is surely needed on this rather “new” philosophy.

While it is evident that studying the popular and scientific literature together fills in knowledge gaps that exist within each body of literature and provides a fuller picture of the vegan diet, certain topics still require further attention. In particular, the popular literature tends to stereotype veganism, as described in the Results section, and these stereotypes indeed seem to be myths as evidenced by the findings in the interview study. Perhaps, then, the idea of mindfulness within the vegan lifestyle is too broad of a generalization and an unfair characterization of the dietary practice. If this notion of a vegan lifestyle is not as consistently practiced as the popular literature suggests, (though it does seem to be as demonstrated by participants), then this would strengthen the scientific argument that the diet itself is the cause of high health status in vegans, regardless of the physical activity and conscious choices made about what foods are eaten.

In order to gain more information about the vegan lifestyle, it is necessary therefore to obtain an insider’s perspective via interviews. The findings of the scientific and popular culture helped frame the questions that were asked during the interview process – certain topics include meal composition (i.e. what are some popular foods eaten at each meal) and vegan lifestyle. Furthermore, information from vegans, varying in age, sex, and beliefs, provided perspectives on the diet that go unmentioned in the popular literature and indeed the scientific literature. Lastly, the interviews provided more information about the personal beliefs of vegans and why they decided to become vegan. This information helped support the reasons found in the popular literature or even provide new reasons, making what may seem to be a drastic diet change a more understandable one. In summary, while more information was gathered via the interview study

to help confirm and/or negate certain beliefs, further research and giving vegans themselves a voice will present an even greater, more accurate/fuller description of veganism.

### **Conclusion**

Studying the scientific and popular literature in tandem and incorporating individual beliefs into the study has provided for a fuller, more accurate illustration of the diet in terms of health and ethical notions. Future directions call for greater research in the area of the vegan lifestyle as opposed to veganism simply as a diet. That is, the question of whether vegan related health benefits are solely attributable to the diet itself or to the lifestyle, which incorporates the ideas of mindfulness and increased care for exercise, should be explored. In addition, having identified many negative stereotypes and myths regarding the vegan diet, it would be beneficial to provide vegans with a greater voice in popular literature to combat this phenomenon. These stereotypes and inaccurate portrayals would seem attributable to a lack of knowledge of the vegan diet as well as an inherent opposition to consider the potential inhumanity that exists with the consumption of meat as well as within meat, dairy, and egg industries. While much progress has been made to illustrate the vegan diet in its entirety, greater efforts should be focused on conducting further research comparing vegan diets to vegetarian diets and interviewing more vegans to further combat negative beliefs and substantiate the findings.

The popularity of the vegan diet and the question of whether it is nutritionally sound, raise issues of anthropologic significance. From both a human evolution and nutrition perspective, anthropologists have occupied two distinct factions when considering the diet of our ancestors. On the one hand, there are those who argue that our human ancestors were hunters and gatherers, who obtained most of their nutrition from fruits and nuts, while “successful kills



of big mammals may have been more of a treat than an everyday reality.”<sup>210</sup> On the other hand, some anthropologists contend that meat was the primary diet of our ancestors and that it was simply supplemented with fruits and nuts. This school of thought supports the view that raw food could not have supplied sufficient energy to man, and that meat was necessary in order “to build the big-brained, small-toothed modern human.”<sup>211</sup> In other words, meat eating is seen by many to have been an essential step in the evolutionary process. Moreover, meat had to be transformed through cooking in order for man to consume it, suggesting to some that humans were not biologically adapted to eat meat. Whether one accepts the notion of our ancestors sustaining themselves on vegetables, grains, and nuts, or whether one is persuaded that there was a necessary reliance upon meat in the diet, it is clear and undebatable that the human diet has been transformed over time. How we eat and what we eat is inherently a question of nutritional and cultural anthropology.

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<sup>210</sup> Rob Dunn, “Human Ancestors Were Nearly All Vegetarians.” *Scientific American*, July 23, 2013. <http://blogs.scientificamerican.com/guest-blog/2012/07/23/human-ancestors-were-nearly-all-vegetarians/>

<sup>211</sup> Christopher Joyce, “Food for Thought: Meat-Based Diet Made Us Smarter.” *NPR*, August 2, 2010. <http://www.npr.org/2010/08/02/128849908/food-for-thought-meat-based-diet-made-us-smarter>

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## Tables

**Table 1.** Summary of Diet Composition and Nutrient Intake Findings

<b>Nutrients of Interest</b>	<b>Sources</b>	<b>Potential Concerns</b>
Protein	Soymilk, meat analogs (tofu, tempeh, seitan), legumes, grains, nuts, seeds	Plant proteins only 85% digestible → increase RDA by 10-15%
Calcium	Soy/grain based milks, low oxalate/phytate vegetables	Reduced bioavailability – slightly decreased due to oxalates and phytates and fiber within vegetables
Vitamin D	Fortified foods – soy/grain based milks, cereal	Limited in non-fortified foods
Vitamin B-12	Fortified foods – cereal, nutritional yeast, meat analogs	Animal derived nutrient – only found in fortified foods
Riboflavin	Nutritional yeast, leafy greens, fortified foods	Seem to have similar levels as omnivores and vegetarians
Zinc	Legumes, whole grains, tofu, fortified foods	Reduced bioavailability – phytates bind with minerals preventing absorption
Iron	Plant foods – nonheme iron	Lack of heme iron Reduced bioavailability – high phytate levels bind with minerals preventing absorption
Fats (FFA)	Nuts, flax seeds, avocado, oils, soy products	Lack in long-chain omega-3 fatty acids (DHA and EPA)

**Table 2.** Summary of Health Effects

	<b>Findings: Benefits and Potential Concerns</b>
<b>General</b>	Lower in calories, saturated fat, and cholesterol Higher in protective nutrients and phytochemicals – high fruit and vegetable intake
<b>Obesity</b>	Lower risk <ul style="list-style-type: none"> <li>• Lower intake of calories, fat, and saturated fats</li> <li>• Lower BMIs</li> </ul>
<b>Cardiovascular Disease (CVD)</b>	Lower risk <ul style="list-style-type: none"> <li>• Risk factor obesity – lower in vegans</li> <li>• Lower BMI – protective factor for lowering blood lipids</li> <li>• Fruits, vegetables, whole grains, nuts, and soy seen as cardioprotective</li> <li>• Hypocholesterolemic effect of vegetable protein</li> </ul>
<b>Cancers</b>	Lower risk <ul style="list-style-type: none"> <li>• Risk factor obesity – lower in vegans</li> <li>• Total fruit and vegetable intake is cardioprotective (tomatoes, allium vegetables, fiber, vitamin C, carotenoids, and flavonoids)</li> <li>• Phytochemicals – potent antioxidant and antiproliferative activity</li> <li>• Exclusion of foods – red meat, processed meats, and eggs</li> </ul>
<b>Bone Health</b>	Concern – when diet isn't varied and nutrient levels not adequate <ul style="list-style-type: none"> <li>• No difference in BMD for trabecular and cortical bone</li> <li>• Fruits and veggies rich in potassium and magnesium – provide alkaline ash inhibiting bone resorption</li> <li>• Soy isoflavones – favorable, beneficial affect on BMD</li> </ul>

**Table 3.** Summary of Replacers/Alternatives

	<b>Vegan Replacements/Alternatives</b>
<b>Egg Replacers</b>	For 1 egg: 2 oz. soft tofu blended, 1 small banana mashed, ¼ cup applesauce, 2 tbsp. cornstarch or arrowroot starch, Ener-G Egg Replacer (commercial mix)
<b>Dairy Replacers</b>	Non-dairy milks (soy, almond, hemp, rice, coconut, etc.) and cheese, silken tofu <ul style="list-style-type: none"><li>• Butter = applesauce, coconut oil, mashed banana</li><li>• Ice cream = frozen bananas and non-dairy milk</li></ul>
<b>Substitute for refined white sugar and/or honey</b>	Sugar = maple syrup or agave nectar
<b>Meat Analogs/Alternatives</b>	Tofu, tempeh, seitan (wheat gluten)



**Table 4.** Examples of Vegan Meals

	<b>Common Foods</b>
<b>Breakfast</b>	Bagels with soy cream cheese, cereal with non-dairy milk, oatmeal, tofu scramble and meat alternatives to replace sausages and ham, pancakes, French toast, waffles, muffins
<b>Lunch/Dinner</b>	Meat analogs (tofu, tempeh, seitan), legumes/beans with grains, salads, stir fry with vegetables and mock meats, pasta, non-dairy pizza
<b>Snacks</b>	Fruits, veggies and dip (hummus, peanut butter), nuts and seeds, chips, pretzels, popcorn, granola bars, smoothies
<b>Desserts</b>	Non-dairy ice creams, cheese cakes, eggless cakes, brownies, cookies, and pies

**Table 5.** Diet Overview from Interviews

<b>Breakfast</b>	<b>Lunch</b>	<b>Dinner</b>	<b>Snacks</b>	<b>Desserts</b>
Cereal with non-dairy milk; toast with nut butter and fruit; smoothies with vegetables and fruits; oatmeal (both hot and overnight cold oats) with nuts and fruits; non-dairy yogurts with fruits; tofu scrambles with vegetables	Often leftovers from dinner the previous night – stir fry (vegetables with tofu/meat analogs), grains (rice, quinoa) with legumes and vegetables; salads and soups with bread; sandwiches (all vegetable or with meat analogs like Tofurky); hummus and vegetables	Stir fry (vegetables, tofu/meat analogs); meat analogs with vegetables and grains; pasta with vegetables/lasagna and salad; soups/chili, salads, and breads; legume/veggie burgers with vegetables/salad; baked potatoes;	Fruits with dip (nut butters); vegetables and dip (hummus, nut butters); chips; pretzels; crackers; nuts/trail mix; granola bars; non-dairy yogurts	Dark chocolate; vegan friendly cheesecakes, brownies, cakes, pies, cookies, bars; non-dairy ice creams (soy, almond, banana based) and sorbets, mousse (silken tofu), fruits

## APPENDIX

**Exhibit A.**

University of Pennsylvania  
Office of Regulatory Affairs  
3624 Market St., Suite 301 S  
Philadelphia, PA 191046006  
Ph: 2155732540/Fax: 2155739438  
**INSTITUTIONAL REVIEW BOARD**  
(Federalwide Assurance # 00004028)

Babette S Zemel  
Attn: Sarah Mann  
[mannsa@sas.upenn.edu](mailto:mannsa@sas.upenn.edu)  
Zemel@Email.Chop.Edu

PRINCIPAL INVESTIGATOR : Babette S Zemel  
TITLE : Veganism Inquiry: Scientific Literature In Contrast To Popular Culture And Individual Beliefs  
SPONSORING AGENCY : No Sponsor Number  
PROTOCOL # : 818969  
REVIEW BOARD : IRB #8

Dear Dr. Zemel:

The above-referenced research proposal was reviewed by the Institutional Review Board (IRB) on 13Nov2013. It has been determined that the proposal meets eligibility criteria for IRB review exemption authorized by 45 CFR 46.101, category 2.

**This does not necessarily constitute authorization to initiate the conduct of a human subject research study. You are responsible for assuring other relevant committee approvals.**

Consistent with the federal regulations, ongoing oversight of this proposal is not required. No continuing reviews will be required for this proposal. The proposal can proceed as approved by the IRB. This decision will not affect any funding of your proposal.

Please Note: The IRB must be kept apprised of any and all changes in the research that may have an impact on the IRB review mechanism needed for a specific proposal. You are required to notify the IRB if any changes are proposed in the study that might alter its IRB exempt status or HIPAA compliance status. New procedures that may have an impact on the risk-to-benefit ratio cannot be initiated until Committee approval has been given.

If your study is funded by an external agency, please retain this letter as documentation of the IRB's determination regarding your proposal.

**Please Note: You are responsible for assuring and maintaining other relevant committee approvals.**

If you have any questions about the information in this letter, please contact the IRB administrative staff. Contact information is available at our website: <http://www.upenn.edu/regulatoryaffairs>.

Thank you for your cooperation.

Sincerely,  
IRB Administrator



Exhibit B.

The University of Pennsylvania  
Department of Anthropology  
Senior Thesis Research

Volunteers Wanted for a Research Study

**Vegan Diet Inquiry:**  
**Personal history of vegans**  
**Related Health Beliefs**  
**Diet Composition**

At the University of Pennsylvania  
Museum of Archaeology and Anthropology

- If you are currently practicing a vegan diet.

You qualify for a research study that aims to contrast published scientific literature with popular literature and individual beliefs about the vegan diet.

Eligible subjects will participate in a one time private interview lasting 30 to 60 minutes.

Study Contact: Sarah Mann  
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## **Exhibit C.**

### **VERBAL CONSENT SCRIPT**

Veganism Inquiry: Scientific Literature in Contrast to Popular Culture and Individual Beliefs

Hi my name is Sarah Mann and I am the principal investigator in the research study called "Veganism Inquiry: Scientific Literature in Contrast to Popular Culture and Individual Beliefs" as a senior thesis at the University of Pennsylvania's Department of Anthropology.

#### Purpose of Study

I am asking you to take part in a research study because I am trying to learn more about the vegan diet from individuals' own experiences in order to contrast the data with scientific and popular literature. You will be asked a series of questions that will target your personal history or veganism, related health beliefs, other factors influencing your decision to become vegan, your views about the vegan lifestyle, and your diet composition. The private interview will last from 30 minutes to an hour.

It will not be electronically recorded. Instead I will take some notes during the interview on pen and paper. The data will not be transferred to a computer.

#### Risks/Benefits

This study involves minimal risk. The only potential risk is that you may feel uneasy about answering a question. Should this occur, I will remind you that your participation in this study is voluntary and you need not answer. You will not benefit directly from participating in this research study. You will not be paid for participating.

All of your answers will be coded by a special identifying number rather than your name. The only personal identifiers recorded will be your age, sex, and student status. All of the papers pertaining to the study will be kept in my research advisor's locked office in a secure research unit of the Children's Hospital of Philadelphia. Only people who are directly involved with the project will have access to those records. When the project is finished and my thesis is submitted, no individual will be identified in any way. The data will be destroyed thereafter.

#### Consent

Your participation is voluntary. You can decline to participate, and you can stop your participation at any time, if you wish to do so, without any negative consequences to you.

Do you have 30 to 60 minutes to participate in this research study? Would you like to participate now or at a later time? If so, let's schedule it for [state when, if appropriate].

By you answering the interview questions that I will ask, this means you consent to participate in this research project. Do you have any questions?

If you have any questions or concerns about the research, please feel free to contact:

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## Exhibit D.

### Draft of Interview Questions

1. How long have you been vegan?
2. When did you become vegan?
3. Why/what made you consider becoming vegan?
4. What ultimately influenced your decision to become vegan?
5. Do you have friends and/or family members who are also vegan?
  - a. If yes: Do you think that being surrounded by others who are also vegan or at least having them for support made your decision to become vegan easier? Do you find it easier to associate with vegans?
  - b. If no: How does this affect you? Do you think that it is easier to associate with vegans?
6. What stereotypes do you know of that are associated with veganism?
  - a. How do you respond to these stereotypes? Do you accept or reject them?
7. Have you heard of the idea of a “vegan lifestyle/”
  - a. What do you take this to mean?
  - b. Do you think a generalized vegan lifestyle exists?
  - c. Do you yourself practice one? Why or why not?
  - d. What do you see as the benefits of maintaining a vegan lifestyle?
  - e. Does mindfulness, the psychological concept of focus of attention and awareness, influence what foods you consume? (i.e. are you very health conscious – meaning you only consume certain foods because they are presumed to be healthy?)
8. What are some of your favorite vegan friendly foods?
9. What would you say are typical breakfast, lunch, dinner, dessert, and snack foods for vegans?
10. Do you believe that there are health benefits to being vegan?
  - a. If yes: What and why?
  - b. If no: Why not?
11. Do you believe that there are some potential health concerns associated with adopting a vegan diet?
  - a. If yes: What and why?
  - b. If no: Why not?
12. Do you find the vegan diet hard to follow/does it take more effort?
13. Lastly, do you have any other comments you would like to share about the vegan diet or your experience with being vegan?

