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What Are the Rhetorical Strategies and Consequences of Food Labels Regarding Health, Lifestyle, and Ethics of Consumers with Food-related Diseases and Allergies?

Delaney Borchers
borchdm@bgsu.edu

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MASTER'S PROJECT:

What are the rhetorical strategies and consequences of food labels regarding health, lifestyle, and ethics of consumers with food-related diseases and allergies?

Laney Borchers

In this study, it is investigated on how health, lifestyle and ethical factors of a consumer with a gluten-related disease and allergy influence their understanding and awareness of gluten-free food labels. This study was implemented through an online survey on a Facebook support group with a total of 195 respondents. The results show that consumers do have a strong awareness and understanding of the differences between certified gluten-free and non-certified gluten-free food labels. This indicates that having this strong awareness and understanding is influenced based upon a consumer's health, lifestyle and ethical factors of following a gluten-free diet.

INTRODUCTION

Food labels have always played an important role in the food industry. The increase of particular and specified food labels placed on product packaging has grown in popularity due to the shift in society's dietary needs and restrictions. Individuals have become interested in the aspects of a healthy and organic diet, such as plant-based vegan or vegetarian diets. Some individuals have become intrigued by the aspects of following mainstream media trends with fad diets like paleo and keto. Then there are the individuals who do not have a choice but to follow a dietary restriction due to a medical condition, like a food-related disease and allergy, such as celiac disease. The acknowledgement of food-related diseases and allergies has introduced rhetorical strategies and consequences of food labels with regards to health, lifestyle, and ethics of consumers.

Gluten refers to “a family of proteins known as prolamins (primarily glutenin and gliadin) that constitute the storage protein in the starchy endosperm of many cereal grains such as wheat, barley, and rye” (Niland, 2018, p. 2). Depending on the level of severity with their diagnosis, some individuals can tolerate the processed pre-packaged gluten-free foods, while others have to consume fresh, organic gluten-free foods to avoid the risk of cross contamination. In order to have a reliable diagnosis, individuals have to consult with a gastrointestinal doctor to conduct the appropriate bloodwork to be taken along with an esophagogastroduodenoscopy, which is a procedure to examine the esophagus, stomach and upper small intestine (Bulsa, 2018).

Gluten-free products can be beneficial to those who have a gluten-related disease or allergy. These products offer individuals with these particular medical conditions an opportunity to eat like they use to before their diagnosis. The options for gluten-free products to be purchased

and consumed have grown immensely with the rise of food-related diseases and allergies (Khoury, 2018).

Over the past decade, gluten-free labels have become more common on food products with the better understanding of gluten-related diseases and allergies to let individuals know that no traces of gluten exist in these products. Now, there is no longer just a single food label that puts all gluten-free products under one category.

The introduction of certified gluten-free food label over the years no longer makes the gluten-free label the sole label for gluten-free products. Acknowledging that there is no longer a single gluten-free food label is important for this study due to the fact that these labels create a huge impact on consumers' decisions. These labels guide consumers with food-related diseases and allergies to make the safe and correct consumer choice on what product will be beneficial towards their overall health and diet.

The certified gluten-free food label has raised confusion with those who suffer with gluten-related diseases and allergies. The focus of this study is on how consumers with gluten-related diseases and allergies conduct their purchase decision based on their health, lifestyle and the meaning behind each label. The texts chosen for this study discuss the different kinds of gluten-related diseases and allergies, what causes individuals to make the decision to go on a gluten-free diet, and the meanings and regulations behind the gluten-free and certified gluten-free food labels.

The theory that will help frame this study is the concept of semiotics. Ferdinand de Saussure, John Locke and Charles Sanders Peirce introduced the concept of semiotics through their work from the late 19th and early 20th centuries (Fiske, 2011). Semiotics is the study of signs and the way they work. A sign is consisted of a signifier and a signified, where a signifier

is the sign's image and the signified is the mental concept conformed by an individual in order to understand what is meant by the sign. For these specific food labels, the sign would be the food label, the object would be the product that the food label is placed on and the interpretant would be the thought process of what that food label means to the consumer deciding to purchase the product or not. The semiotics of gluten-free labels would focus on the symbolism of each label and the arbitrary relationship between those labels and the consumer (Fiske, 2011).

In this paper, a literature review will first be discussed going through health, lifestyle and ethical factors of individuals with food-related disease and allergies, specifically with gluten-related diseases and allergies. Following the literature review, it will be discussed how gluten-free food labels influence consumer behavior in an individual with a gluten-related disease and allergy. Next, it will be discussed what the motivations are behind the three most common third-party certification organizations for gluten-free food labels. The study of this paper will lastly be introduced, first discussing the research questions and hypotheses, followed by the method structure of the study, data analysis of the results and the discussion of the results.

LITERATURE REVIEW

Health: Food-related Diseases and Allergies

One of the most common gluten-related diseases is known as celiac disease. Celiac disease is “an autoimmune disorder that is triggered by the consumption of gluten” (Allen, 2015). Individuals who are diagnosed with celiac disease can only consume 10 to 50 milligrams of gluten per day in order to avoid damaging mucosa in their small intestine while on a gluten-free lifetime diet. Symptoms of this disease can vary by the individual, but the main external symptoms are elevated levels of IgA antibodies to tissue transglutaminase, flattening of the villi in the small intestine and loss of the tight junction barrier (Allen, 2015).

One of the most common reactions related to gluten is having a gluten allergy, also known as a wheat allergy. This reaction causes an immune response in the small intestine that is linked to immunoglobulin, which causes the release of histamine throughout the body. The allergic reaction, either in the form of affecting the GI tract, respiratory tract or skin, can happen within minutes or hours once an individual has consumed gluten. Food-dependent, exercise-induced asthma can occur in individuals with a systematic allergen response to gluten. However, in comparison with individuals diagnosed with celiac disease, individuals with a gluten allergy can consume small amounts of gluten without serious consequences while on a gluten-free diet (Allen, 2015).

Another most common gluten-related disease is known as non-celiac gluten sensitivity. This disease causes a variety of symptoms, whether external or internal, due to the consumption of gluten in individuals who do not have celiac disease or a gluten allergen. These various symptoms can be similar to celiac disease or a gluten allergy. Due to the uncertainty of this disease, many individuals look for a self-diagnosis and conform to a gluten-free diet to alleviate their symptoms. However, even with consultation of a professional, the elimination of celiac disease or a gluten allergy as a diagnosis still recommends the individual to utilize a gluten-free diet to lessen their symptoms (Allen, 2015).

Lifestyle: Fad Diet Trend in Mainstream Media

The trend of fad diets has grown in popularity due to the influence of celebrities and social media over the past decade. In May of 2012, Kim Kardashian tweeted a link to an Instagram photo with a caption that stated, “Gluten free is the way to be....OH Hiiiiiiiiiiiiiii” (Kardashian-West, 2012). The meaning behind the caption was to reference that the results of her slim figure was due to following a gluten-free diet. In August of 2012, it was reported that Lady

Gaga was eating wheat-free in order to lose weight and maintain her energy throughout the rest of her international tour (Hauser, 2012). In October of 2018, Kourtney Kardashian published a blog post about reintroducing gluten into her diet, stating that, “Lately, I’ve been less strict about avoiding gluten and dairy. I noticed my tummy would hurt when I occasionally treated myself to ice cream or pizza, so I’ve switched things up. I’m trying to keep small amounts of both dairy and gluten in my system, so my body is used to it when I do have a little” (Goldstein, 2018). For individuals with gluten-related diseases and allergies, reintroducing gluten into their diet is not an option.

Due to the increase in fad diets, the United States gluten-free market reached an estimated \$4.2 billion in retail sales due to the increase of availability of gluten-free products in grocery chains and consumers believing gluten-free products are healthier, bring relief from various disorders or help with weight loss (Kent, 2013). The gluten-free diet is perceived as healthy and tasty in comparison to decades ago when most products under the gluten-free diet tasted dry and had a crumbly texture. However, it is important to understand the various gluten-related diseases and allergies in order to know when a gluten-free diet is no longer considered a fad diet (Pietzak, 2012).

When it comes to searching whether or not the gluten-free diet helps with weight loss, there are five million hits related to this specific concept. The internet claims that the potential benefits of following a gluten-free diet involve a variety of beneficial factors, with weight loss being one of them. However, there is no scientific evidence that a gluten-free diet can aid in weight loss (Marcason, 2011). It is known that following a gluten-free diet can cause individuals to consume foods that are higher in fat and calories, which can counteract their motivation to

lose weight (Marcason, 2011). It is only known for a gluten-free diet to cause weight loss with individuals with a gluten-related disease or allergy after their confirmed diagnosis (Jones, 2017).

Ethics: Gluten-Free verses Certified Gluten-Free Food Labels

On September 4, 2013, the Food and Drug Administration (FDA) of the United States proposed a regulation for gluten-free food labeling. This regulation stated that in order for food products to be labeled as ‘gluten-free’, the product itself has to be naturally gluten-free or has to contain the following: no gluten-containing grain, no ingredients derive from a gluten-containing grain that has been processed to remove any traces of gluten, if the product contains less than or equal to 20 parts per million of gluten and the presence of gluten within the product must be less than 20 parts per million (FDA, 2013). This regulation is only in compliance with products are that labeled ‘gluten-free’, ‘no gluten’, ‘free of gluten’ or ‘without gluten’ (Nagle, 2016).

Certified gluten-free food labels exist due to certification organizations, such as Gluten-Free Certification Organization (GFCO), the Celiac Support Association (CSA) and the Gluten-Free Certification Program (GFCP). These certification organizations follow FDA’s regulation on gluten-free food labeling, however they go to other measures of making sure food products are free from gluten-containing ingredients. All three organizations test all products to make sure they meet the FDA’s requirement of 20 parts per million of gluten or lower. With CSA, products must meet the threshold of 5 p.p.m. of gluten or lower in order to be certified. With GFCP and GFCO, products must meet the threshold of 10 p.p.m. of gluten or lower to be certified (Thompson, 2015).

Certification Organization	Gluten Threshold
Celiac Support Association	5 p.p.m. of gluten or lower

Gluten-Free Certification Program	10 p.p.m. of gluten or lower
Gluten-Free Certification Organization	10 p.p.m. of gluten or lower

Table 1

Individuals with a gluten-related disease or allergy rely heavily on food labels on product packages in order to know what is safe or unsafe to consume. There has been a growing confusion and mistrust with gluten-free food labels due to the lack of knowledge of the meaning behind each label (Rostami, 2017). Research has shown that the use of packaged, processed gluten-free foods provides a challenge to individuals with a gluten-related disease or allergy due to a lack of a uniform standard for claiming to be gluten-free which results in difficulty following a gluten-free diet (Verrill, 2013).

GLUTEN-FREE FOOD LABELS INFLUENCE CONSUMER BEHAVIOR

Gluten-Free Food Labels are Not the Only Factor to Rely On

A study conducted in Switzerland used focus group interviews to collect and analyze data among children and young adults who were diagnosed with celiac disease. The 7 focus groups consisted of 23 children and young adults with their parents present with their child. The purpose of this study was for researchers to understand how the impacts of celiac disease affect children and young adults in their everyday lives and the coping mechanisms developed after their diagnosis. One of the major findings of this study was the difficulty these children and young adults faced by understanding if a gluten-free food product was safe or unsafe for them to consume (Skjerning, 2014).

An 11-year-old boy stated, “I think it’s very difficult sometimes, even if you know it’s gluten-free, you have to become accustomed to think about it constantly” (Skjerning, 2014, pp. 1889). Another participant, a 16-year-old girl, stated, “...if I see wheat flour at once, then I might

as well simply not read it” (Skjerning, 2014, pp. 1889). These statements illustrate how relying only on a gluten-free label is not enough for individuals with gluten-related diseases and allergies. Individuals not only rely on the gluten-free food labels, but also the listed ingredients.

Individuals with gluten-related diseases and allergies feel the need to check a food product for gluten-containing ingredients even with a gluten-free food label visible on the package. If a product is labeled gluten-free, it should contain no traces of wheat, barely or rye or manufactured in a facility that handles gluten-containing ingredients that can increase the risk of cross contamination.

Gluten-Free Food Labels Increase the Prices

Another study was conducted in the state of New York to showcase the economic burden that individuals diagnosed with a gluten-related disease or allergy face when transitioning to a gluten-free diet to alleviate their symptoms and improve their overall health. This study compared and analyzed data of the availability and price of gluten-free food products in three settings: a local grocery store, an upscale grocery store and a health food store in New York, Oregon, South Dakota and Illinois (Lee, 2007). The study examined four online websites that also provided gluten-free food products that are nationally accessible to individuals living in the United States. In order to conduct this study, a market basket of gluten-free food products such as pasta, bread, crackers, cereal, waffles cookies, pretzels, pizza, macaroni and cheese and cake was gathered that had an equal gluten-containing counterpart (Lee, 2007).

In conclusion, all of the gluten-containing counterparts of the gluten-free food products were readily available in the in-store locations and the online websites. When it came to the availability of gluten-free food products, the online websites carried all the products, health food stores carried 94% of the products, upscale grocery stores carried 42% of the products and local

grocery stores carried 36% of the products (Lee, 2007). When it came to the cost of gluten-free food products, the online websites and the health food stores were the most expensive settings. There was a noticeable correlation with an increase in price between gluten-containing food products and gluten-free food products. The products with the highest price difference was gluten-free pasta being twice the price than its gluten-containing counterpart (Lee, 2007).

With the placement of a certified gluten-free food label on a product package, consumers notice a price difference between gluten-free and gluten-containing food products. Gluten-free products were calculated to be 200 to 500% more expensive than gluten-containing products, but also takes into account the type of product and store location (Bulsa, 2018). This can cause a growing concern and financial burden among individuals diagnosed with gluten-related diseases and allergies. The price difference and lack of availability in-stores can affect these individuals' consumer behavior by overspending to stay on their gluten-free diet or risk their health by purchasing gluten-containing food products to stay within their financial means.

MOTIVES BEHIND GLUTEN-FREE CERTIFIED ORGANIZATIONS

Gluten-Free Certification Organization (GFCO)

Established in 2005, the Gluten-Free Certification Organization was created to provide “certification services to producers of gluten-free products using quality assessment and control measure throughout production” (Gluten-Free Certification Organization, 2016). These services include on-site inspections of producers and overseeing of test results in their products to make sure the gluten standards for this organization are met. According to their website, GFCO is a non-profit organization that is also associated with the Gluten Intolerance Group. In the organization's Frequently Asked Questions section, they state that their gluten-free certification label establishes confidence and reassurance that their products are safe to consume by

individuals with gluten-related diseases and allergies (Gluten-Free Certification Organization, 2016).

In a survey conducted by GFCO (2016) involving 5,000 consumers, 80% said they buy products that are labeled gluten-free, 65% stated they low trust with manufacturing of gluten-free food products and 97% are brand loyal. When it came to specific labeling of gluten-free food products, 76% stated that they actively look for gluten-free certification labeling on food packages (Gluten-Free Certification Organization, 2016). The certification symbol presented by this organization can be described as a small circle outlined in black with bold, capitalized G and F within the circle. Above the circle, a consumer would see the word ‘Certified’ and below the circle the word ‘Gluten-Free’. This symbol can be found on many gluten-free food products due to the popularity of manufacturing companies utilizing the services of this organization.

The motives behind this certification organization is that they encourage manufacture companies of gluten-free products to follow stricter guidelines in order for individuals with gluten-related diseases and allergies to feel more confident with following a gluten-free diet. This organization not only looks for the common ingredients of wheat, barley and rye in food products, but also ingredients such as wheat starch, malt, oats, other grasses and a blend of any of these gluten-containing ingredients in manufactured products (Gluten-Free Certification Organization, 2016).

The GFCO claims that they actively review the process of manufacturing and levels of gluten-containing ingredients in finished gluten-free products whereas “the FDA will not make a coordinated effort to monitor gluten-free claims” (Gluten-Free Certification Organization, 2016). This certified organization is dedicated to maintaining that consumers have a high quality and safe experience from purchasing and consuming products that contain their certification label.

The National Celiac Support Association (CSA)

The Celiac Support Association, now formally known as The National Celiac Association, is another non-profit organization to provide information and resources to people who are diagnosed with a gluten-related disease or allergy and their family members and local community. The goals of this non-profit organization are to “provide education and support materials through various programs, educate medical professionals on gluten-related diseases and allergies, inform the public on up-to-date information on gluten-related diseases and allergies along with the procedures of following a gluten-free diet, improving the quality of life with individuals diagnosed with gluten-related diseases and allergies and expanding their support groups across the country” (National Celiac Association, 2019).

The CSA has formed a close partnership with a certification program called the Gluten-Free Manufacturing Program (Gluten-Free Finder, n.d.) that has been established in the food industry since 2004. This program was one of the first gluten-free certification programs in the United States to ensure that gluten-free products were safe and affordable for individuals with gluten-related diseases and allergies by meeting strict guidelines (Gluten-Free Finder, n.d.). This organization processes gluten-free food products to ensure that there are little to no traces of wheat, barley, rye and oats (Gluten-Free Finder, n.d.). The GFMP has a certification gluten-free food label known as a ‘Market of Trust’. This gluten-free food label can be described as two sky blue, capitalized letters of ‘G’ and ‘F’ with a green check mark inside the letter G and the word ‘certified’ in a green box placed sideways next to the letter ‘F’.

The CSA is an important organization for individuals with gluten-related diseases and allergies. Not only does this organization partner with a certification organization, but it also provides a variety of resources and services to individuals with gluten-related diseases and

allergies and the general public as well. If the general public becomes more knowledgeable about these diseases and allergies, it can also aid them in becoming more aware of gluten-free food labels to ensure the safety of friends, family members, co-workers and numerous individuals. Many gluten certification organizations work independently and provide their own resources, which are relatively small in comparison to support organizations.

Gluten-Free Certification Program

First created in 2009 and now in its third issue, the Gluten-Free Certification Program has been globally recognized to provide the framework for manufacturing and processing gluten-free products, including processed foods and ingredients used by food service and catering services along with food manufactures (BRCGS, 2019). This guideline program was endorsed by Beyond Celiac in order to bring this type of certification to the United States, since this program was originally developed by the Allergen Control Group and the Canadian Celiac Association based in Canada. The symbol for this certification organization can be described as a green circle with grain of wheat crossed out. Within this green circle, the phrase ‘Beyond Celiac’ are placed above the grain of wheat and the phrase ‘Gluten-Free’ is placed below the grain of wheat. The phrase ‘Gluten-Free Certification Program’ and the website ‘www.gf-cert.org’ conform around the green circle in green font.

On their website, Beyond Celiac states that “international alliances such as this partnership with GFCEP will play a critical role in ensuring that our gluten-free food supply is truly safe and trusted (Beyond Celiac, 2019, para 5). The Gluten-Free Certification Program is the first step for other certification organizations to follow in order to expand their services outside the United States and Canada. It is important for gluten-free food labeling procedures to

be followed globally in order for individuals with gluten-related diseases and allergies to feel comfortable and secure when consuming and purchasing gluten-free foods in foreign countries.

RESEARCH QUESTIONS AND HYPOTHESES

Research has shown that individuals with gluten-related diseases and allergies have consumed inadequate proportions of iron, folate, calcium, selenium, magnesium, zinc, niacin, thiamine, riboflavin, vitamin A and vitamin D due to following a gluten-free diet (El Khoury, 2018). Along with lack of nutritional intake, there is an uncertainty of the relationship between following a gluten-free diet and managing the symptoms of other autoimmune diseases.

Following this argument, it is asked that:

RQ1: To what extent do individuals follow a gluten-free diet for health reasons?

And hypothesized as follows:

H1: Individuals following a gluten-free diet will most likely be diagnosed with a vitamin deficiency.

H2: Individuals following a gluten-free diet will most likely be diagnosed with another autoimmune disease.

A study conducted in Mexico focused on the accessibility and availability of gluten-free products in local supermarkets. This study concluded that 83% of the participants found it difficult to find gluten-free products in their local stores (Arias, 2018), which indicates that they have to travel outside of their local city in order to follow their gluten-free diet. This can cause an economic burden on an individual that may influence them to no longer follow their gluten-free diet. This argument has raised the question of:

RQ2: How might the location of a grocery store affect an individual's motivation for following a gluten-free diet?

And hypothesized as follows:

H3: Participants who live an hour or more away from a grocery store are less likely to follow a gluten-free diet.

Previous research has indicated that a large majority of respondents expressed that they are unable to understand where the product originated from due to labeling and listed ingredients. Dietitians and family physicians were reported to be the least useful when it came to gaining knowledge about following a gluten-free diet (El Khoury, 2018). Due to this lack of information and resources, this can cause individuals to become unaware of the importance of gluten-free food labels and what they stand for when placed on a product package. Following this argument, it is asked that:

RQ3: To what extent are individuals aware of different gluten-free food labels?

RQ4: To what extent do individuals understand gluten-free food labels?

And hypothesized as follows:

H4: Participants will have little to no understanding of certified gluten-free food labels.

H5: Participants will have little to no awareness that certified gluten-free food labels have different regulations than non-certified gluten-free food labels.

H6: Participants will see non-certified gluten-free food labels more credible than certified gluten-free food labels.

METHOD

Sample and Procedure

The collection of data for this study was conducted by an online survey through Qualtrics. Random sampling was used to recruit respondents that have a gluten-related disease or allergy through an online support group on the platform of Facebook. The data was collected for

2 weeks from April 1 to April 15 of 2020. Respondents were informed that their participation would be utilized for research and their responses would be kept anonymous. The online survey was developed for respondents to complete in 10 minutes or less to increase response rate.

Demographics

In total, 195 respondents participated in the online survey. Of the respondents, n=173 (95%) were female, n=7 (4%) were male, n=1 (0.6%) were other and 2 respondents preferred not to answer. The respondent age ranged from 19 to 55 years and older. 3 respondents preferred not to report their age. With education level, n=36 (19%) completed high school, n=19 (10%) obtained an associate degree, n=76 (40%) obtained a bachelor's degree, n=29 (15%) obtained a master's degree, n=12 (6%) obtained a Ph.D. degree or higher and n=12 (6%) completed trade school. 4 respondents preferred not to report their level of education completed. With household income, n=20 (11%) make less than \$25,00, n=24 (13%) make \$25,000-\$50,000, n=56 (30%) make \$50,000-\$100,000, n=37 (20%) make \$100,000-\$200,000, n=8 (4%) make more than \$200,000. 42 respondents preferred not to report their annual household income. With employment status, n=91 (49%) are employed full time, n=26 (14%) are employed part time, n=12 (6%) are unemployed and not looking for work, n=27 (14%) are retired, n=16 (9%) are students and n=6 (3%) are disabled. 9 respondents preferred not to report their employment status.

Measures

The measures listed below were adopted from previous existing studies that have utilized similar measures. Each of these measures were self-reported by the respondents.

Following a gluten-free diet for health reasons

To measure how an individual follows a gluten-free diet for health reasons, respondents were asked, “How long have you been following a gluten-free diet?” and “Do you follow a gluten-free diet for health-related reasons?”. If a respondent answered no to the second question, a follow up question was asked on what other reasons an individual may follow a gluten-free diet. Respondents were also asked if they have been diagnosed with a vitamin deficiency and/or an autoimmune disease while being on a gluten-free diet. If a respondent answered yes to either of these questions, a follow up question was asked on what vitamin deficiency and how many autoimmune diseases they were diagnosed with.

Motivation to follow a gluten-free diet based on grocery store location

To measure how motivated an individual follows a gluten-free diet based on grocery store location, respondents were asked, “How often do you visit a grocery store on a weekly basis to purchase gluten-free food items?” and “How many miles do you travel to get to a store that carries the gluten-free products you want/need?” Following these questions, respondents were asked how accessible gluten-free food products are in comparison to gluten-containing food products. Respondents were also asked if they purchase gluten-free products on their own or have someone else purchase these products for them. The choices ranged from strongly disagree to strongly agree. Respondents were then asked to check all the products they purchase most often from the grocery store based on food category, which can be seen in Table 2. Lastly, respondents were asked if they would continue to follow a gluten-free diet if a grocery store that sells gluten-free food items is an hour or more away. The scale was composed of 5 choices ranging from 1 (least likely) to 5 (most likely).

Food Category	Number of Respondents
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Produce	159
Dairy, Eggs and Cheese	155
Meat and Seafood	143
Grains and Pasta	126
Bread and Bakery	122
Frozen Foods	117
Spices and Baking	105
Breakfast and Cereal	101
Canned Goods and Soups	88
Cookies, Snacks and Candy	84
Condiments	67
Deli	65
Beverages	53
Other	2
Prefer Not to Answer	0

Table 2

Awareness of different gluten-free food labels

To measure an individual's awareness of gluten-free food labels, respondents were asked a series of statements based on their knowledge and credibility of gluten-free food labels, such as certified gluten-free food labels and non-certified gluten-free food labels. Respondents were also asked if the type of gluten-free food label affects their decision-making when purchasing gluten-free food items. The choices to each of these statements ranged from strongly disagree to strongly agree.

Understanding gluten-free food labels

To measure an individual's understanding of gluten-free food labels, respondents were asked a series of statements based on if they purchase a gluten-free food item with one label over the other and if they rely on listed ingredients and/or gluten-free food labels to determine what gluten-free food item to purchase. Respondents were asked another series of statements based on if gluten-free foods are healthier, more expensive or least expensive than gluten-containing food items. The choices to each of these statements ranged from strongly disagree to strongly agree.

DATA ANALYSIS

Out of the 195 respondents, n=173 (95%) were females with, which was the focus for the data analysis. Looking at H1, n=60 (35%) of the females reported they were diagnosed with a vitamin deficiency while on a gluten-free diet, while n=112 (65%) reported they did not have a vitamin deficiency. The most reported vitamin deficiencies among respondents were n=50 (29%) reported a vitamin D deficiency, n=32 (19%) reported an iron deficiency, n=22 (13%) reported a vitamin B12 deficiency and n=17 (10%) reported a calcium deficiency.

Looking at H2, n=67 (39%) of the females reported they were diagnosed with another autoimmune disease while on a gluten-free diet, while n=106 (61%) reported they did not have another autoimmune disease. N=29 (17%) reported having only one autoimmune disease, n=24 (14%) reported having two autoimmune diseases, n=10 (6%) reported having three autoimmune diseases and n=4 (2%) reported having four or more autoimmune diseases. Analyzing H1 and H2, individuals following a gluten-free diet are not likely to be diagnosed with a vitamin deficiency and/or another autoimmune disease.

Looking at H3, n=13 (8%) respondents were least likely to continue following a gluten-free diet if a grocery store that provided gluten-free food items was an hour or more away, n=7

(4%) were less likely, n=10 (6%) were neutral, n=13 (8%) were more likely and n=130 (75%) were most likely. Analyzing this hypothesis, individuals are most likely to continue following a gluten-free diet even if a grocery store that provides gluten-free food items is an hour or more away from where they reside. This hypothesis answers RQ2, individuals are highly motivated for following their gluten-free diet regardless of the location of a grocery store.

Looking at H4, n=2 (1%) respondents strongly disagreed with hearing of certified gluten-free food labels, n=5 (3%) disagreed, n=8 (5%) were unsure, n=63 (36%) agreed and n=93 (99%) strongly agreed. With having heard of third-party organizations, such as Gluten-Free Certification Organization, n=8 (5%) strongly disagreed, n=35 (20%) disagreed, n=36 (21%) were unsure, n=52 (30%) agreed and n=42 (24%) strongly agreed. Analyzing this hypothesis, individuals have heard of certified gluten-free food labels but have somewhat heard of third-party certification organizations. This hypothesis answers RQ3, individuals do have a strong awareness of more than one gluten-free food label.

Looking at H5, n=1 (0.6%) respondent strongly disagreed that certified gluten-free food labels have different regulations than non-certified gluten-free food labels, n=5 (3%) disagreed, n=61 (35%) were unsure, n=62 (36%) agreed and n=44 (25%) strongly agreed. With agreeing if certified gluten-free food labels follow the same regulations as non-certified gluten-free food labels, n=37 (21%) strongly disagreed, n=43 (25%) disagreed, n=70 (41%) were unsure, n=17 (10%) agreed and n=3 (2%) strongly agreed. Analyzing this hypothesis, individuals somewhat agree that certified gluten-free food labels have different regulations than non-certified gluten-free food labels. This hypothesis answers RQ4, individuals do have a strong understanding of gluten-free food labels when it comes to certification regulations.

Looking at H6, n=46 (26%) respondents strongly disagreed that they find non-certified gluten-free food labels more credible than certified gluten-free food labels, n=68 (39%) disagreed, n=52 (30%) were unsure, n=3 (2%) agreed and n=1 (0.6%) strongly agreed. With finding certified gluten-free food labels more credible than non-certified gluten-free food labels, n=2 (1%) strongly disagreed, n=4 (2%) disagreed, n=48 (28%) were unsure, n=64 (37%) agreed and n=52 (30%) strongly agreed. Analyzing this hypothesis, individuals somewhat disagree that certified gluten-free food labels follow the same regulations as non-certified gluten-free food labels. This hypothesis also answers RQ4, individuals do have a strong understanding of gluten-free food labels when it comes to difference in regulations between certified gluten-free food labels and non-certified gluten-free food labels.

DISCUSSION

In this study, it was examined what factors influenced how an individual follows a gluten-free diet. The focus throughout the study was measuring if individuals follow a gluten-free diet due to health reasons, their motivation for following a gluten-free diet based on how far a grocery store is located, their awareness and understanding of gluten-free food labels. For this, 4 research questions and 6 hypotheses were developed. In this section, the results of the research questions and hypotheses are discussed.

It was found that individuals following a gluten-free diet are least likely to be diagnosed with a vitamin deficiency and/or another autoimmune disease. A majority of the respondents reported that they were not diagnosed with a vitamin deficiency or another autoimmune disease. This indicates that following a gluten-free diet does not always result in a lack of vitamins or increasing their chances of other autoimmune diseases. A small majority of respondents reported being diagnosed with a vitamin deficiency, where vitamin D, iron, vitamin B12 and calcium

were the top choices. These vitamin deficiencies could stem from other health conditions or dietary choices. A small majority of respondents reported being diagnosed with one or two other autoimmune diseases while being on a gluten-free diet. It is unknown if following a gluten-free diet was treatment or the cause of these autoimmune diseases, which could be pursued further in future research.

It was also found that individuals have a high motivation for following their gluten-free diet regardless of the location of a grocery store that sells gluten-free food items they may need or want. A majority of the respondents reported that would most likely still follow a gluten-free diet even if the grocery store was located an hour or more away from where they reside. This does not align with H3, which stated that individuals are less likely to follow a gluten-free diet if a grocery store is located an hour or more away. This indicates that individuals are willing to purchase the gluten-free food items they need or want, regardless of how far the grocery store is located, in order to stay consistent with their diet.

Lastly, it was found that individuals do have a strong awareness and understanding of gluten-free food labels. Almost all the respondents reported that they have heard of certified gluten-free food labels, while a small majority have heard of third-party certification organizations. A majority of respondents somewhat agreed that certified gluten-free food labels have different regulations than non-certified gluten-free food labels, while being unsure if certified gluten-free food labels follow the same regulations as non-certified gluten-free food labels. A majority of respondents also don't find gluten-free food labels more credible than certified gluten-free food labels and agreed that certified gluten-free food labels are the most credible between the two food labels. This indicates that individuals are educated on the some of

the differences between certified gluten-free food labels and non-certified gluten-free food labels, which results in being aware that more than one gluten-free food label does exist.

While following a gluten-free food diet may not necessarily cause a vitamin deficiency or developing another autoimmune disease, it could be a source of treatment to solve either of these health conditions. Vitamin deficiencies may also stem from an individual following another diet, such as veganism or dairy-free, on top of following a gluten-free diet. Other autoimmune diseases necessarily do not have to be related or caused to having an allergy or intolerance to gluten. An individual with an autoimmune disease, such as Hashimoto's Thyroiditis, can benefit from following a gluten-free diet to help elevate their symptoms throughout their lifetime.

When it comes to grocery shopping, it may be possible that grocery stores that are located further away may offer healthier gluten-free food options than grocery stores that are more local. Stores, such as Whole Foods and Trader Joe's, seem to be in locations that are further away from residential areas. However, those stores offer food items that are more organic and natural which are more appealing to consumers than processed food items. The location and food items offered of a grocery store may play a role on which type of gluten-free food items are accessible based on the gluten-free food label presented on the packaging. This may influence where an individual shops and/or decides which gluten-free food label is more credible due to their awareness of that particular food label. However, individuals may be unsure of the regulation process of certified gluten-free food labels versus non-certified gluten-free food labels because they may believe all gluten-free food labels are certified without having to have the word 'certified' within the label.

LIMITATIONS OF STUDY

There are several limitations of this study. First, there was a high number of female respondents and very few male respondents. This causes the results to not be as diverse among

gender, but also makes it more difficult to compare the two genders. Second, the sample size of this study was small with only a total of 195 respondents. The small sample size could be contributed to only being able to implement the online survey in one Facebook support group instead of several. The implementation of the survey is another limitation as well for this study. The small sample size also makes it more difficult to find significant relationships from the data collected. Lastly, the online survey for this study relied on self-reported data by the respondents who fully completed the survey. With self-reported data, the respondents could have potentially misunderstood how to answer a question or may have been unsure, which resulted in answering how the researcher may want them too. Respondents also may have answered the questions for another individual and not themselves, which could have resulted in miscommunication of the respondent's answers.

RECOMMENDATIONS

The recommendations of this study focus on how to further educate and bring more awareness to the regulations of certified gluten-free food labels versus non-certified gluten-free food labels. The results of this study showcased that respondents were unsure if certified gluten-free food labels either followed the same regulations as non-certified gluten-free food labels or had a different set of regulations to follow. To bring more awareness and education towards the regulation process, third-party certification organizations can take to their social media platforms and implement a campaign on how certified gluten-free food labels become certified per their organization regulations. This campaign can involve infographics explaining the step-by-step process, live-stream videos where their audience can engage in real-time and ask questions or provide a hashtag where their audience can submit their own questions with the chances of getting a response from the organization. Another idea for a campaign or an advertisement can

involve third-party organizations comparing the differences between the processes of regulation of the two gluten-free food labels and how they might be represented on particular gluten-free food item packaging.

FUTURE DIRECTIONS

For future research, scholars could further this study by possibly creating and implementing a separate online survey to sample individuals who do not have a gluten-related disease or allergy. This potential direction of research can showcase the similarities and differences between the two groups based on health, lifestyle and ethical factors that may influence their consumer behavior while following a gluten-free diet verses a non-gluten-free diet. Scholars could also further this study by collecting a similar sample size for an online survey targeting only male respondents who have a gluten-related disease or allergy. This potential direction of research can indicate which health, lifestyle and ethical factors influence males more or less in comparison to females. It can also help indicate if males have a similar level of awareness and understanding of certified gluten-free food labels verses non-certified gluten-free food labels, along with the regulations behind each label.

CONCLUSION

Nutrition research has shown that package information, such as food labels, “affects overall product attitudes, purchases intentions, and perceptions related to disease risk from consuming the product” (Andrews, 2011, p. 177). Other research has argued that the summary systems and symbols are better at encouraging healthier food choices, in comparison to the nutrient-specific systems and symbols perform better with comprehension and education (Andrews, 2014). When it comes to gluten-free and certified gluten-free food labels, it all comes down to how knowledgeable the consumers are of the meaning behind each label in order to

make an informed decision based on their health, lifestyle and ethics. Though this study has shown that consumers do have a strong awareness and understanding of gluten-free food labels, it is important for government agencies, like the FDA, and third-party organizations, like the CSA, to step up in engaging with their audience. These agencies and third-party organizations need to educate and bring more awareness about the processes behind gluten-free food labels to those not only those who suffer from gluten-related diseases and allergies, but to everyone.

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