

THESIS

WHEAT-FREE FOR THE WRONG REASONS? COLLEGE STUDENTS' ATTITUDES AND
INFORMATION SOURCES PERTAINING TO THE GLUTEN-FREE DIET

Submitted by

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In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2016

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ABSTRACT

WHEAT-FREE FOR THE WRONG REASONS? COLLEGE STUDENTS' ATTITUDES AND INFORMATION SOURCES PERTAINING TO THE GLUTEN-FREE DIET

The gluten-free diet has grown popular over the past years, with more people on the diet than simply celiac patients. Health professionals were concerned by the high number of people on the diet for reasons other than celiac disease because of dietary deficiencies that stem from eating gluten-free. Health scholars believed that misleading media messages touting the weight-loss and general health benefits of the diet were leading to the popularity of the gluten-free diet. However, these statements were not supported by research. In the pursuit of knowledge, research questions were developed for attitudes and information sources of the diet. Agenda setting and framing theory were used to examine survey results to better understand the possible influence media sources are having on attitudes towards the diet. To achieve a better understanding of attitudes and sources of information about the gluten-free diet, an online survey was given to 351 college students assessing their attitudes and both interpersonal and media information sources. College students were chosen as the study population based on their proclivity for fad dieting, changes in eating habits, and issues with weight.

Results indicated that while students neither believed the diet was healthy nor unhealthy for everyone, they did hold negative attitudes about gluten-free as a fad diet, and believed others thought the diet was annoying and healthy. Search engine results were the most popular source of gluten-free diet information, and health type media sources were the most preferred type of media. Friends and family were the most used sources of interpersonal information, and health

care providers were the least used interpersonal source of information. Students who had celiac disease or a gluten sensitivity were more likely to find gluten-free information on a search engine, on followed blogs or websites, and in magazine articles; these students were also more likely to discuss the diet with friends, family, and a health care provider. Implications and recommendations for future research were also discussed.

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Chapter 1: Introduction

The gluten-free diet has become increasingly popular over the last few years (Hellmich, 2013; McCarthy, 2014; Murphy, 2007; O'Brien, 2011; Strom, 2014). The high percentage of people on the diet for reasons other than celiac disease is concerning to health providers and researchers because of inaccurate attitudes about the diet, noticeably weight loss (Marcason, 2011). The academic community (Else, 2013; Gaesser & Angadi, 2012; Marcason, 2011; Moore, 2014) has attributed the faulty attitudes about the diet to media messages, but current research has not established whether this is correct assumption or not. This study is an attempt to address assumptions about media messages and attention contributing to incorrect attitudes about the gluten-free diet.

Current research on media and health topics supports the basis for claims by scholars that the media is encouraging misleading information about the gluten-free diet. Misleading, incorrect, and potentially harmful information in both traditional and new media sources about health topics such as diet, exercise, and body weight have been extensively studied by scholars (Ellison, White, & McElhone, 2011; Nan, Briones, Shen, Jiang, & Zhang, 2013; Willis & Knobloch-Westerwick, 2014). Celebrities and other high profile people have also used media channels such as Twitter and books to promote weight-loss beliefs about the gluten-free diet, prompting reports claiming that going gluten-free is simply the latest fad diet (Hellmich, 2013; Kluger, 2014; McCarthy, 2014). All of this is worrisome to health providers and scholars, as the gluten-free diet is currently recommended for people diagnosed with celiac disease and gluten sensitivity because of the vital nutrients lost on the diet (Cross, 2013; Rubio-Tapia, Ludvigsson, Brantner, Murray, & Everhard, 2012). Despite recommendations, many more people are on the diet (Rubio-Tapia et al., 2012).

The purpose of this study is to examine what attitudes people have about the gluten-free diet and from what media sources they get information about the diet. Agenda setting and framing theory will be used to help analyze and understand possible answers to these questions. College students in particular are targeted for this study because of their susceptibility to dieting and generally unhealthy eating behaviors (Banjari, Keneric, Mandic, & Nedeljko, 2011; Downes, 2015). The main research question is what attitudes do college students have about the gluten-free diet, and from what media and interpersonal sources are they getting information about the diet?

Background and Setting

Dieting is a persistent factor of life in the United States. Recent research indicates that nearly everyone diets at some point in their lives (De Ridder, Adriaanse, Evers, & Verhoeven, 2014). Some of these diets, such as the Atkins diet, are treated as fads that are destined for momentary popularity, only to fade as a new and improved food plan snakes its way into the health decisions of the public. A new diet that has gained popularity over the last couple of years is the gluten-free diet. However, this diet is not simply the latest “how to lose 10 pounds fast” fad, but a lifestyle change that is necessary for about three million people in the United States. While the existence of fad diets is nothing new (Astrup, Larsen, & Harper, 2004; Banjari et al., 2011; Daniels, 2004), “going gluten-free” reflects the popularity of a diet that was primarily used as a medical treatment for celiac disease and gluten sensitivity.

Roughly three million Americans have celiac disease, with an estimated 83% of cases going undiagnosed (“Facts & Figures of Celiac Disease,” 2014). The symptoms of celiac disease are highly similar to other health problems, which can lead to the high percentage of undiagnosed cases. Discounting those people with celiac disease or gluten sensitivity, though,

there are still almost 1.6 million people in the United States on the diet for reasons other than intestinal health reasons (Rubio-Tapia et al., 2012). A 2014 study found 30% of adults are currently eating gluten-free (Moore, 2014). Considering only an estimated 1 in 133 people, or 1% of the population, has celiac disease (“Celiac Disease: Fast Facts,” 2015), there is a significant portion of the population on the diet for reasons not pertaining to celiac disease. Food manufacturers such as General Mills and advertising companies (Wahba, 2015) have noticed the popularity of the diet, with sales of gluten-free food expected to bring in \$15 billion in 2016 (Strom, 2014). What used to be a fairly niche market is now the latest way to attract more customers to a brand.

Being gluten-free is not a simple diet change for patients diagnosed with celiac disease or gluten sensitivity. Celiac disease requires an entire lifestyle change, often at a great monetary and social expense to the patients and their families. The only treatment for celiac disease is a gluten-free diet (Rubio-Tapia et al., 2012). Celiac disease is an autoimmune disease where the immune system attacks the small intestine after gluten is consumed. Gluten refers to a protein found in wheat, rye, barley, and oats. Over time, nutrients are blocked to the body, leading to osteoporosis, infertility, cancer, and neurological conditions such as depression (“Facts & Figures of Celiac Disease,” 2014). A diagnosis of celiac disease equals a lifelong change to gluten-free foods, with consequences such as cancer or depression if the diet is ignored over the long-term.

Since going gluten-free results in the loss of nutrients (Cross, 2013), doctors typically recommend that people with celiac disease or a gluten sensitivity go the diet. Gluten-free foods are often missing vital nutrients present in gluten containing foods and contain high amounts of saturated fats, salt and sugar, especially in processed gluten-free food (Cross, 2013; Nash &

Slutzky, 2014; Wild, Robins, Burley, & Howdle, 2010). The “healthiness” of the gluten-free diet, then, does not lie in gluten-free versions of gluten foods.

A common association with the gluten-free diet is weight loss (Marcason, 2011). Considering the relatively common experience most of the population has with dieting in general (De Ridder et al., 2014) and the focus on the weight loss in the media such as magazines (Bazzini, Pepper, Swofford, & Cochran, 2015), the attractiveness of the diet is not hard to imagine. However, using the diet as a weight loss tool has not been verified by research (Gaesser & Angadi, 2012). Studies (Cross, 2013; Gaesser & Angadi, 2012) have even suggested that going gluten-free may cause people to gain weight.

Health officials are understandably concerned about the multitude of people on the diet for perceived healthy reasons. Current literature (Else, 2013; Gaesser & Angadi, 2012; Marcason, 2011; Moore, 2014) is quick to blame media for the attractiveness of the diet to the public, but has yet to actually investigate the exact attitudes of people about the diet, what media sources are providing information, and whether those media sources have any relationship with attitudes about the diet.

Media Coverage and Influence

It is easy to understand why health scholars blame the media for inaccurate information about the diet. Social media platforms, and the media outlets that report on those posting, have drawn some attention in the past. In 2012, pop-singer and former Disney star Miley Cyrus used Twitter to inform her thousands of followers that her sudden weight loss was due to the gluten-free diet (“Miley Cyrus: Gluten-free diet is responsible for weight-loss,” 2012). Elisabeth Hasselbeck, a former host on *The View*, has celiac disease, and is credited for popularizing the diet by talking about it on the daytime TV show (“Gluten-free diet fad: Are celiac disease rates

actually rising?,” 2012). The sheer popularity of the diet drove late-night TV host Jimmy Kimmel out to interview people about whether they knew what gluten was; it was soon discovered that most people had no idea what they were actually cutting out of their diets (“Pedestrian Question - What is Gluten?,” 2014). Gwyneth Paltrow, a well-known actress, recently published a book and posted on various social media outlets about feeling better and looking healthier because of the gluten-free diet (Rousseau, 2015). Considering the supposed health benefits of a gluten-free diet include faster weight loss, thinner thighs, better sleep, and clearer skin (Marcason, 2011), it is not hard to draw the comparison between what people believe about the diet and what is presented in the media.

The media attention has not always been positive, though. An article in *The Washington Post* discussed the increasing backlash against the diet because it is viewed as simply another trend, or a silly problem people complain about (McCarthy, 2014). Other media sources, such as blogs, have been less kind by attacking the gluten-free diet and celiac disease as a “white-people disease trend” (Campbell, 2012). While those with celiac disease may enjoy having more food choices because of the attention to the diet, the bad press has not been helpful. Celiac sufferers have reported that the fad diet attitude has resulted in backlash when they go out to eat at restaurants and request gluten-free food (Moore, 2014). Despite naysayers against the diet, gluten-free products are still expected to produce upwards of \$15 billion in sales in 2016 (Strom, 2014).

Existing literature on the accuracy of health articles in media sources such as newspapers and magazines could also drive the scholarly belief that the media are to blame. Health articles in lifestyle magazines often lack credible evidence, do not present balanced eating habits, and promote popular dietary trends instead of medically based recommendations (Ellison et al.,

2011). Food advertisements present in magazines were similarly found to be misleading and promoting unhealthy lifestyles (Nan et al., 2013). Studies have investigated the harmful and unrealistic body images perpetuated in nearly every type of media and the impact that has on audiences (e.g., Aubrey, 2010; Van Vonderen & Kinnally, 2012; Willis & Knobloch-Westerwick, 2014; Wilson & Blackhurst, 1999). The combination of extensive literature on health information in the media and examples of media used as a way to impart flawed reasoning about the diet could easily lead to scholars believing the media is causing more harm than good when presenting information concerning the diet. The question then becomes: are the scholars right in their assumptions?

Health Information Sources

The ease of using the internet as a health source has not been lost on college students. According to recent research on digital usage by young adults (American Press Institute, 2015; Roberts, Petnj Yaya, & Manolis, 2014), 49% of young adults regularly use a search engine for information on health and fitness. High internet usage by young adults reflects findings from a survey where athletes got their information on the gluten-free diet from the internet (Lis, Stellingwerff, Shing, Ahuja, & Fell, 2015). The internet is also a common information source in general for health information seeking (Ruppel & Rains, 2012). Social media platforms such as Facebook were used by 80% of young adults for information on food and cooking and 74% of young adults used Facebook for information on health and fitness; however, 68% of the college students also reported using traditional news sources for information on health care and medical information (American Press Institute, 2015). Use of online sources is supported by past studies (Banjari et al., 2011; Kwan, Arbour-Nicitopoulos, Lowe, Taman, & Faulkner, 2010; Percheski &

Hargittai, 2011). As a health source goes, Googling the answer seems to be preferred method for information.

The use of traditional media sources by college students, such as print newspapers and magazines, is supported by other studies. Traditional media were used by college students around the same amount as online and professional health care sources (Banjari et al., 2011; Dobransky & Hargittai, 2012; Percheski & Hargittai, 2011). Male college students typically favor online information sources, while female college students generally use a combination of online and traditional sources such as newspapers, magazines, television, books, and interpersonal sources such as friends, and family (Dobransky & Hargittai, 2012). Magazines have been cited as one of the influential sex education sources with college students (Walsh & Ward, 2010), meaning students already have a health information relationship with traditional media sources.

While print newspaper readership is down for the typical age group of college students (18-25) (“Newspapers: Daily readership by age,” 2015), digital subscriptions are rising with almost 53% of students paying a subscription of some type for news (American Press Institute, 2015). News is listed as important to college students (American Press Institute, 2015), even if the format is digital rather than a physical copy of a newspaper. It is not difficult to believe that some college students are getting health information from checking the news, especially with traditional media such as magazines and newspapers still being listed as health information sources for college students (American Press Institute, 2015; Kwan et al., 2010).

In addition to media sources, college students value interpersonal sources quite highly with regards to health information, and because of this, the role of these sources cannot be ignored. Family members have been identified as popular health sources for college students

(Davy, Benes, & Driskell, 2006; Deliens, Clarys, De Bourdeauhuij, & Deforche, 2014; Kwan et al., 2010; Percheski & Hargittai, 2011). Family members are listed as trusted source of health information (Ruppel & Rains, 2012; Vader, Walters, Roudsari, & Nguyen, 2011), with enough influence, for example, to persuade daughters to take vitamins (Ferrara, Kopfman, Dorrance Hall, Navon, & Septor, 2011). Close peers, such as friends and coworkers, have also been identified as health sources, especially for dieting suggestions (Banjari et al., 2011; Deliens et al., 2014; Kwan et al., 2010; Percheski & Hargittai, 2011). Social support from friends has even been linked to motivation to research information on dieting and nutrition (McKinley & Wright, 2014). The combination of interpersonal and media sources could provide the push try a new diet craze, such as going gluten-free. Banjari et al. (2011) has questioned whether information from friends and family are “untouched” by media influence, and suggests that some interpersonal health sources are an extension of media messaging about health. Information about diets from the media could still indirectly be getting to college students through their peers and family.

College students, perhaps obviously, also utilize medical experts such as doctors. However, their use of professional sources, such as health care providers and faculty, was much less than their use of family members as health sources (Kwan et al., 2010; Percheski & Hargittai, 2011; Vader et al., 2011). In the instance of athletes on the gluten-free diet, health care professionals were the least used source of information (Lis et al., 2015). Whether health care providers are utilized with college students seeking information about the gluten-free diet remains to be seen.

Types of Media Sources

The general types of media sources may play a role in how health information is framed and understood by college students. Lifestyle media sources such as fashion, beauty, and gossip magazines have been linked to popularizing dieting and weight-loss for appearance reasons (Aubrey, 2010; Rousseau, 2015; Van Vonderen & Kinnally, 2012; Willis & Knobloch-Westerwick, 2014). Included among the top 25 magazines for 2014 were *People*, *Cosmopolitan*, *Glamour*, *US Weekly*, *Star Magazine*, and *In Style* (Lulofs, 2014). Reading up on the latest diet, complete with celebrity endorsements and promises of instant beauty, could be interpreted as truth by students who already have received health information from these types of sources. If the gluten-free diet is popping up on both the physical and digital magazine pages, the lifestyle themes of fashion, beauty, and celebrity could add to the incorrect attitudes about the gluten-free diet.

Health media sources have shown the same problems with misleading diet information and unhealthy body image (Bazzini et al., 2015; Ellison et al., 2011). Top circulated health-focused magazines include *Sports Illustrated*, *ESPN the Magazine*, *Women's Health*, and *Men's Health*, with *Shape*, *Maxim*, and *Men's Fitness* leading in digital subscribers (Lulofs, 2014). News specific sources such as *USA Today* and *The New York Times* are among the top two news sites with digital traffic, followed by *The Washington Post*, *New York Daily News*, *LA Times*, *New York Post*, and the *Chicago Tribune* (Barthel, 2015). Many of these magazines also have an online website and blog, extending the reach of the publications. College students have a trend toward digital media (American Press Institute, 2015), meaning that even if a print copy of *Cosmopolitan* or *Men's Health* was not picked up, a digital version could be consumed instead.

Regardless of the medium, various types of media sources exist, all with varying ways of portraying the gluten-free diet.

Need for the Study

The current body of research on celiac disease and the media leaves even more questions than answers. While much is known about celiac disease and the nutritional components of the gluten-free diet, the social and mass media side of the diet is relatively unexplored. Interviews with celiac patients have yielded glimpses into how the fad diet attitude is hurting their actual health need for the diet. A few key barriers to maintaining the gluten-free diet include the belief the person with celiac disease was inconveniencing others with the diet, and lack of trust in others (such as chefs in a restaurant) to prepare gluten-free food because of incorrect or missing information about the diet (Sainsbury & Mullan, 2011; Zarkadas et al., 2013). Those with celiac disease are worried that restaurant staff will not take their request for gluten-free food seriously, a finding that was not explored further in the study (Taylor, Dickson-Swift, & Anderson, 2013). Researchers have also investigated the high chance of self-diagnosis away from the doctor's office because symptoms are common to other digestion issues (Copelton & Valle, 2009). Interestingly, there is apparently even a problem within the medical community with fad diet beliefs (Pietzak, 2012). Marcason (2011) reported attitudes about the gluten-free diet, but neglected to delve further into where those attitudes came from or even who believes it. Slivers of information have been gleaned over the years, but more research needs to be done about what those attitudes mean and how the media has impacted them.

Little information is known about gluten-free diet attitudes and information sources. Beliefs and sources have been explored with athletes, who use the diet for a variety of health reasons not related to celiac disease, such as increased performance and improved body

composition (Lis et al., 2015). The authors noted that those athletes who believed their intestinal distress decreased because of the diet could instead have been impacted by how sensitive their digestive systems are from the amount of exercising done by professional athletes. Common sources for athletes on the gluten-free diet (in decreasing order of use) were the internet, trainers/coaches, other athletes, registered dietitians, naturopath care providers, people with celiac disease, and last and least consulted, medical professionals. Research still needs to address what the general population believes, where they are getting their information, and whether those information sources are impacting attitudes of the diet.

Overall questions yet unanswered include what the media sources for messages about the gluten-free diet, whether these media message influence audiences and what types of media sources present information on the diet. The views of the public, and especially college students who are in a period of life associated with weight-gain and diets (Downes, 2015; Hebden, Chan, Louie, Rangan, & Allman-Farinelli, 2015; Laksa, Hearst, Lust, Lytle, & Story, 2015), needs investigating by scholars. A study of students in Croatia supports college students' predispositions towards fad dieting, especially with female students (Banjari et al., 2011). This age is also prone to unhealthy eating habits in general (Downes, 2015; Hebden et al., 2015), which can lead to unhealthy dietary practices, especially if the student was in a family eating environment where dinner was prepared for another family member besides the student (Deliens et al., 2014). Unhealthy eating behaviors such as eating disorders have also been linked to college life (Ackard, Croll, & Kearney-Cooke, 2002; Calder & Mussap, 2015). Trying a new diet could be tempting to a college student struggling with weight gain or the stress of being away from home.

College students use media for health information such as weight loss motivation (Siervo et al., 2014), and often gain nutrition information from magazines and newspapers (Banjari et al., 2011; Davy et al., 2006). As research by the American Press Institute (2015) shows, college students use a wide variety of media sources for health and diet information. With studies also indicating the traditional media has not fallen entirely out of use, the intersection of media and health is a likely occurrence for college students. Interpersonal connections also likely play a role based on previous studies (Banjari et al., 2011; Deliens et al., 2014; Kwan et al., 2010; McKinley & Wright, 2014). The combination of this age group's vulnerability to weight-gain and diet with their media usage suggests a viable population to study regarding diet attitudes and media sources.

Purpose and Research Questions

In an attempt to address a few of the questions, the purpose of this study focuses on public attitudes of the gluten-free diet and possible media sources for those attitudes. This study focuses more on obtaining information than testing hypotheses because more research is needed about information sources and attitudes of the gluten-free diet. The overarching research question is what attitudes do college students have about the gluten-free diet and from what media sources are they possibly getting those attitudes?

The following research questions will be examined:

RQ1: What are college student attitudes toward the gluten-free diet?

RQ2: From what media sources are college students getting their information about the gluten-free diet?

RQ3: Which types of sources (ex: lifestyle, health, news) are preferred for gluten-free diet information?

RQ4: From what interpersonal sources (ex: friends, family, health care professionals) are college students getting information about the gluten-free diet?

RQ5: Do students' attitudes and information sources about the gluten-free diet differ based on their personal experience with gluten?

To help investigate the role of the media with the gluten-free diet, two theories will be utilized to analyze and understand survey answers, and provide future research suggestions. Agenda setting, or how the amount and kind of coverage in the media determines how prominent the topic is in an audience's mental processing of information (D. A. Scheufele & Tewksbury, 2007), will help ground overall student knowledge about the diet, as well as illustrate the possible influence of the media sources that they are getting gluten-free diet information from. The second theory is framing, which focuses on how a topic is made salient to audience members through the highlighting of certain aspects (Entman, 1993). Framing will help provide understanding on why the college students might have a certain attitude about the gluten-free diet, as well as which types of media sources might have certain health frames.

Addressing this research question is important in investigating the statements in the literature blaming the media for inaccurate diet representations, learning more about the popularity of the gluten-free diet despite nutritional deficiencies in the diet, and what misconceptions nutritionists, health care providers, and celiac support organizations face when discussing healthy choices with people on the gluten-free diet. Research from some of the studies (Araujo & Araujo, 2012; Moore, 2014; Sainsbury & Mullan, 2011; Taylor et al., 2013;

Zarkadas et al., 2013) indicates that incorrect attitudes about the diet in the public could be a contributing barrier to eating out. To address any of these concerns, there needs to be a better understanding of where the public, such as college students, are receiving gluten-free diet messages and whether that could be shaping their attitudes of the diet. While *Time* dismissed the gluten-free diet as another fad diet similar to the low-carb and fat-free crazes (Kluger, 2014), there is a true need to know and understand the sources contributing to the discrepancy between legitimate information about the diet and what people actually believe about the diet's intended purpose.

Chapter 2: Literature Review

The theoretical background for the analysis of this study is based on agenda setting and framing theory in their applications as media effects theories. Agenda setting provides the basis for analyzing the attitude of the gluten-free diet as important based on media attention, and framing theory provides background for possible reasons why certain media messages might inform the public on what attitudes to hold about the gluten-free diet. While these theories do not directly inform the research questions asked in the study, the theories will be used to analyze and understand the findings of the research.

Several conceptual definitions are discussed. Attitude, media sources, media messages, media effects, media source effects, media message effects, and the gluten-free diet are all discussed and defined. The study is then placed in context and research questions and hypotheses are provided.

Theoretical Background

Agenda Setting. One of two theoretical backgrounds for this study is agenda setting. Agenda setting is based on the idea that the more the mass media emphasizes certain issues and topics the more that audience members will believe these issues and topics are important (McCombs, 1997; McCombs & Shaw, 1972; D. A. Scheufele & Tewksbury, 2007). Topics prominent in the media agenda typically then become prominent in the public agenda as well (McCombs, 2005). The more a certain topic is highlighted in the media can influence whether an audience believes the topic is important.

Effects of agenda setting are accessibility based. Media consumers are impacted by the amount of time and attention that an issue has been emphasized in the news because the more coverage the issue gets in the media, the more audience members believe that issue is important

(McCombs, 2005; McCombs & Shaw, 1972). People will then think more about the subject because of the prominence it has in the media (McCombs, 2005; D. A. Scheufele, 2000; D. A. Scheufele & Tewksbury, 2007). Agenda setting impacts audience members because of the psychological need for orientation present in most individuals, or the need for information, news, and facts (McCombs, 2005). Need for orientation is determined by the relevance of the topic and audience uncertainty about the topic (McCombs, 2005; McCombs, Shaw, & Weaver, 2014). Agenda setting involves the connections made between an issue's prominence and audience attention.

The effects of agenda setting assume the center of the effect is derived from this heightened salience of a topic. Effects come from awareness and mental processing about an issue, not the information about the issue (D. A. Scheufele & Tewksbury, 2007). The effects of agenda setting are not immediate, but occur over time. Repeated similar coverage about a topic result in salience over time (Conway, 2013; McCombs et al., 2014). The repetition of coverage over time can lead to increased salience about a topic such that audience members believe that the topic is important.

Due to this prominence of an issue in an individual's mind, agenda setting is founded off a memory-based model. Information that is quickly retrievable and easily accessible in memory is often used to process situations and topics (D. A. Scheufele, 2000). Attitude formation has been connected with what information is easily accessible when approached with a topic (McCombs, 2005; McCombs et al., 2014; D. A. Scheufele, 2000). Again, continuously seeing media coverage of a topic over time can impact whether media audience members easily think about a topic. Thus, the salience and prominence of an issue like the gluten-free diet could

influence attitudes about the diet because of repeated media exposure across different kinds of media.

Agenda setting can be examined at both the macro- and microscopic level. The macroscopic level typically focuses on the agenda of the media promoting the messages (McCombs, 2005). Microscopic level agenda setting focuses on salience of the topic in the memory of the audience (McCombs, 2005; D. A. Scheufele, 2000). For the purposes of this study, agenda setting will be examined using a microscopic lens focusing on the audiences of media messages. This focus on the audience enables the close examination of the respondents' answers for possible salience about the gluten-free diet because of exposure to media information.

Traditionally, there have been three themes of research regarding agenda setting (McCombs, 2005; Wallington, Blake, Taylor-Clark, & Viswanath, 2010). The first theme is public agenda setting, which concentrates on what issues are in the media and public priority of those issues. The second theme is policy agenda setting, or how media attention to an issue impacts policy. Finally, the third theme is media agenda setting. Media agenda setting emphasizes the how and why media select certain issues to cover. This study falls under the public agenda setting theme since the sources of information on the gluten-free diet are under investigation.

Levels of Agenda Setting. There are two main levels to agenda setting. The first level of agenda setting is concerned with the subject under discussion in the media source (McCombs, 1997, 2005; B. Scheufele, 2004). First level agenda setting is focused on whether a topic is salient with audience members. For example, media messages created audience salience about trans fat, and later reduced the number of trans fat purchases (Niederdeppe & Frosch, 2009).

First level agenda setting would only be concerned with whether the topic, such as trans fat, was accessible and salient to audience members.

Second level agenda setting focuses on the cognitive and emotional components attributed with the subject (McCombs, 2005; B. Scheufele, 2004; D. A. Scheufele & Tewksbury, 2007). The descriptions, or attributes, used to describe objects indicate to media consumers how they should think about that particular subject. Attributes are characteristics or features that describe a subject (Kiousis, Park, Kim, & Go, 2013; McCombs, 1997, 2005). Attributes are either substantive, or qualities that help audiences differentiate between topics, or affective, the tone taken with the topic in the article (Kiousis et al., 2013). The more salient the aspects of the media coverage, the more those attributes will stick with media audiences (Conway, 2013).

Some scholars (Entman, 1993; McCombs, 2005; B. Scheufele, 2004; D. A. Scheufele & Tewksbury, 2007) have linked second level agenda setting with the concept of framing. Second level agenda setting focuses on the specific attributes of the object under study, while framing observes the overall message about the object (McCombs, 2005; McCombs et al., 2014). Agenda setting basically focuses on whether individuals think about an issue in the first place, while framing focuses on how people are thinking about a subject.

For the focus of this paper, both levels of agenda setting will be examined. First-level agenda setting will be analyzed based on audience awareness of the gluten-free diet from media sources, and second level agenda setting will (in conjunction with framing) help determine some of the ways that the gluten-free diet is portrayed in the media based on audience attitudes toward the diet.

Agenda Building. Agenda building refers to the reasoning behind how journalists and news corporations specifically emphasize and select events and subjects (Kiousis, Mitrook, Wu,

& Seltzer, 2006; D. A. Scheufele & Tewksbury, 2007). Agenda building refers to the decisions behind the constructed message and is not focused on the effects of the construction (McCombs, 2005; McCombs et al., 2014). Agenda building recognizes journalists, the news organization, and external sources such as interest groups or politicians impact message construction (McCombs, 1997; McCombs et al., 2014; D. A. Scheufele & Tewksbury, 2007). For example, journalist education level can impact what sources are evaluated and used for an article (Wallington et al., 2010). Journalists with higher levels of education typically choose scientific articles and interviewed sources outside the government more than journalists with only a bachelor's degree. Journalists with a bachelor's degree or lower relied on press releases and local sources for information (Wallington et al., 2010). The motivations behind a journalist covering a topic a certain way are important, but not covered under the scope of this study.

The news source for a particular issue can have an impact on the media as much as the journalists crafting the article in the first place (McCombs et al., 2014; Weaver & Elliott, 1985). While larger media organizations can afford a dedicated staff for health issues, many smaller media operations do not have a health expert on staff. These smaller media journalists are less likely to use the health sources typically used by larger media organizations (Wallington et al., 2010). The specific reasoning behind why some issues are created and covered, while other issues fail to make any headlines, is of interest to those covering agenda building (McCombs, 2005; D. A. Scheufele, 2000). As stated previously, the scope of the study focuses more on the agenda setting aspect, instead of agenda building; however, since it is a component of the larger theoretical framework, it could provide a basis for our implications and recommendations.

Framing. The second theory behind this study is framing theory. Framing theory stems from two different origins, sociological and psychological. In the sociological perspective,

frames were used to make sense of how people go about their everyday lives so effortlessly without having to question or mull over every event (Goffman, 1974). A suggestion for why that might be is that members of a community have primary frameworks, or ways to see, understand, and navigate through the world (Gamson, Croteau, Hoynes, & Sasson, 1992; Goffman, 1974). Included in these primary frameworks are learned social cues, or how people are supposed to react to certain situations, actions, or individuals (Goffman, 1974). Today, primary frameworks are targeted by media discourse in an attempt to influence media consumers. Frames provide a way to tap into these socially constructed category frameworks that are inherent in all cultures (Goffman, 1974).

The psychological origins of framing grew from prospect theory and the concept of frames of reference (Kahneman & Tversky, 1979; M. Sherif, 1967). Prospect theory asserts that people evaluate a situation depending on whether it is presented as a loss or gain for them (Kahneman & Tversky, 1979); in other words, individuals weigh the likely outcome of the situation as good or bad. Decision-making is based on the likelihood of a certain outcome; framing of a situation can influence whether individuals see the topic as a gain or a loss (Kahneman & Tversky, 1979, 1984). Frames come from subtle changes in wording that influence how audiences interpret the information in the article (D. A. Scheufele, 2000). The way a topic is phrased in an article can lend audience members a certain way of understanding the topic.

Presenting the same message with different frames can garner vastly different reactions. While initial studies mainly focused on gain or loss frames, the psychological side of framing was later expanded by including the concept of frames of reference (M. Sherif, 1967). Frames of reference refer to each individual's internal opinions and ways of seeing the world depending on

the circumstances of the reference (M. Sherif, 1967). For instance, if a loss frame is used in a news article, individuals will use different judgments and beliefs to view the situation than if a gain frame was used instead. Linked to the concept of frames of reference is also the idea of reference dependency, or that information will be interpreted differently depending on the situation and the interpretive schemas each individual uses for that situation (M. Sherif, 1967). In other words, the context of the frame in an article can activate different schemas for different individuals.

Frames. Building on these two points of origins, the framing has emerged. Frames are socially constructed category systems that people use to manage and process complex information by reducing social perceptions to judgments about casual attribution (Gamson, 1985; Goffman, 1974). The main concept of this theory, framing and frames, has been operationalized in several different ways. Scholars have yet to agree on an exact definition for frames and framing (Entman, 1993; McCombs, 2005; D. A. Scheufele, 1999).

The most popular of current definitions is Entman's (1993) explanation of framing "is to select some aspects of a perceived reality and make them more salient in a communicating text in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (p. 52). Other researchers have completely eschewed the notion of frames, and instead call the concept by another name. Tuchman (1979) explicitly decided to define frames as myths, which are "ways of seeing the world that resonate with the conscious mind and the unconscious passions and that are embedded in, expressive of, and reproductive of social organization" (p. 541). Gamson (1989) refers to frames as "interpretive packages" (p. 2). Countless other scholars from disciplines outside the communications field have their own definitions and ways of operationalizing frames and framing.

Frames lead to a particular way of knowing because there are elements intentionally left in and out of the frame (Entman, 1993). The omissions of the frame are just as important for understanding as the elements left in the frame. Frame omissions include other issue evaluations, definitions, opinions, and explanations that could harm the desired frame (Entman, 1993). Framing of health issues has resulted in ignoring vital information, such as not differentiating between multiple kinds of diabetes (Entman, 1993; Stefanik-Sidener, 2013). Issues are viewed a certain way based on the frame and what internal schemas are present already in individuals. The power of framing comes from telling the audience which aspects of a topic matter more than others (Entman, 1993; D. A. Scheufele, 1999; Wise & Brewer, 2010). Framing theory focuses on the deliberate, socially constructed messages present in everyday lives.

Frames are also culturally bound, in that they stem from cultural assumptions about race, gender, business, crime, how society is structured, and other commonalities (Entman, 1993; Gamson, 1985; Goffman, 1974). Frames hold together these diverse cultural assumptions into coherent ways of understanding (Gamson et al., 1992). Every culture has a stock of frames that are commonly used in media and other texts (Entman, 1993; Gamson, 1985). The more powerful frames access existing cultural beliefs. An example of a powerful frame in the United States' culture could be the emphasis on thinness and weight loss (Bazzini et al., 2015; Conlin & Bissell, 2014; Willis & Knobloch-Westerwick, 2014). Effective framing needs no supporting arguments to give it meaning in a context because it relies on cultural-based meanings, norms, and values. The presence of attitudes that reflect cultural health frames could indicate that framing has a role in how the gluten-free diet is understood.

Effective framing also is salient and selective in the message presented to the audience. A good frame needs the selection of one aspect of reality that is then made significant, or important, to individuals (Entman, 1993). The salient aspects of the overall message by the frames then serve as cues to the audience member. These cues activate the internal schemas that are best associated with that particular frame (B. Scheufele, 2004). If the frame can access these internal, culturally bound schemas for a particular population, there is a high chance of success for that frame to influence how audiences view a topic. The culturally bound nature of frames enables journalists and other media communicators to quickly explain issue or topics using frames (D. A. Scheufele, 2000). The center of framing effects hinges on the way frames tap into existing audience beliefs and connect those beliefs to a particular subject (D. A. Scheufele & Tewksbury, 2007). Again, if media messages are to blame for incorrect attitudes about the gluten-free diet, framing of the diet in the media is likely part of the problem. One way to established possible framing effects is to look at attitudes about a subject.

Framing, like agenda setting, is both a macro- and micro-level theory. On the micro-level, framing refers to how journalists and other media communicators relay information about a topic that resonates with audiences (D. A. Scheufele & Tewksbury, 2007). In the macro-level side of framing, the focus is on how media consumers then use the information presented in messages and how the frames impact consumer attitudes of that topic (D. A. Scheufele & Tewksbury, 2007). Thus, frames can have an impact on multiple levels of a media message, both with the constructor and consumer of the frame.

Since Entman's (1993) definition of framing has been widely used both in framing theory research and health communication research (e.g. Andsager, Chen, Miles, Smith, & Nothwehr, 2015; Borah, 2011; Conlin & Bissell, 2014; De Vreese, 2005; Kean, Prividera, Howard, &

Gates, 2014; Nelson, Oxley, & Clawson, 1997; B. Scheufele, 2004; D. A. Scheufele & Tewksbury, 2007; Stefanik-Sidener, 2013) and his definition focuses on a particular reality and interpretation based on how a topic is described, his above definition will be the chosen definition for the purposes of this study. For this survey, the particular reality around the gluten-free diet will be examined through past knowledge about health framing themes in certain media sources, and the attitudes of the college students.

Frame Building. Two important aspects of frames are frame building and frame setting. Frame building, similar to agenda building, refers to the production of the frames, or how journalists decide to frame certain issues. Journalists construct frames based on their own ideas, values, opinions, and professional characteristics (Entman, 1993; D. A. Scheufele, 1999). This production process, however, depends on more than just the journalist's views. Frames are also built according to news production/organization standards and values, the political and corporate actors that exist outside the news production team, journalistic routines, and the culture of the society where the news team is located (B. Scheufele, 2004; D. A. Scheufele, 1999). Journalists do not typically build frames that would offend external actors or not comply with corporation standards (D. A. Scheufele, 1999). A frame is built so that it makes a reference to an existing and resounding assumption of the surrounding culture. The frame then invites media consumers to apply the information from the assumption to the subject under discussion (Entman, 1993; D. A. Scheufele, 1999). Audience members are often unaware of frames (Entman, 1993; Goffman, 1974), leading to the possibility of widespread, inaccurate knowledge because of a particularly resounding frame. This study will not examine frame building, or the reasons why journalists constructed certain frames. Like the agenda building component of agenda setting theory, frame building is helpful for our study's implications and recommendations.

Frame Setting. Frame setting refers to how the audience is being affected and influenced by frames (Entman, 1993; D. A. Scheufele, 1999). There are two types of frame setting effects: applicability and audience level (D. A. Scheufele, 1999). Applicability effects center on the two primary ways that framing processes operate. One process consists of both an issue and the considerations relevant to it that are presented together in a media message (D. A. Scheufele, 1999). If audience members lack a set of existing linkages between an issue and the consideration towards the issue, how the news frames the issue could strongly determine how individuals viewing the media message understand the issue (Goffman, 1974; B. Scheufele, 2004; D. A. Scheufele, 1999).

The second framing process includes the creation of linkages between familiar subjects in the news and existing cultural attitudes (Goffman, 1974; D. A. Scheufele, 1999). Frames then suggest to audiences how they could think about an issue. This type of framing effects is at audience level, or the extent to which the frame taps into these existing cultural beliefs and impressions (D. A. Scheufele, 1999). As stated earlier, media message frames are more powerful if they activate previously existing beliefs in the audience members (Entman, 1993; Gamson et al., 1992; Goffman, 1974). Both levels of frame setting will be considered in this study. While the exact frames present in media messages about the gluten-free diet are not directly under examination in this study, the specific attitudes presented by the students in conjunction with past research about health frames in specific media sources can enable the researcher to present possible explanations for why the students might hold that attitude.

Conceptual Background

Attitude. Attitude has a variety of definitions. Initial definitions are vague, characterizing attitude as “a functional state of readiness” that is formed regarding a subject

(Sherif & Cantril, 1945, p. 300). Or, attitude as “an implicit, drive-producing response considered socially significant in the individual’s society” (Doob, 1947, p. 136). In other words, attitude is a way of responding to the environment outside of an individual, a response that can happen without the awareness of others besides the individual. Attitude is an internal manifestation, with both visible and hidden ways of showing the attitude (Eagly & Chaiken, 2007). Attitudes are internal states that represent a reaction to an outside stimulus in one’s environment.

Attitudes are not just a reaction, though. This internal state becomes cognitive thoughts directed at external objects (Lovejoy, Riffe, & Lovejoy, 2015; Shen, 2010). More specifically, attitude is an evaluation of an object that can stem from previous values (Hahn, Judd, Hirsch, & Blair, 2014; Judd & Krosnick, 1982). Past experiences can inform beliefs about a subject, and one’s attitude can also influence possible new beliefs about the same subject (Eagly & Chaiken, 2007; Shaw, 1982; Muzafer Sherif & Cantril, 1945). Attitude is a belief about an object (Rosenberg, 1960; Shaw, 1982), that can be favorable or unfavorable (Ajzen, 1991; Eagly & Chaiken, 2007). Attitudes also comprise of both cognitive (thoughts) and affective (emotional) components (Rosenberg, 1960).

The thoughts can also be implicit (hidden or denying the attitude) or explicit (awareness of a particular feeling toward a topic) (Arendt & Northup, 2015; Hahn et al., 2014; Payne & Cin, 2015). Through explicit and implicit attitudes, people have a particular way of understanding the world. Explicit attitudes are known evaluations made by an individual, while implicit attitudes can remain unknown unless activated by the particular object concerning the attitude (Arendt & Northup, 2015; Eagly & Chaiken, 2007). For the purposes of this study, only explicit attitudes

will be used because the participants can readily recall these attitudes toward the subject of this research.

In addition, attitudes can be spontaneous and in the moment (Payne & Cin, 2015). For example, the emotion behind an attitude can suddenly bubble up and impact overt reactions to an object (Spence & Townsend, 2008). Implicit attitudes have also been linked to spontaneous behavior toward the self and objects (Conner & Barrett, 2005; Spence & Townsend, 2008). Emotions behind attitudes can also influence how well information is received at that time, such as risk information (Panzer & Renner, 2008).

Attitudes can also change over time depending on information (Eagly & Chaiken, 2007; Shaw, 1982; Shen, 2010). If the basis of the original attitude was either emotionally or logically processed, new information from the opposite base can possibly change the original attitude (Ya Hui Michelle & Petty, 2008). Even the time of day can make a difference in attitudes, as morning and evening messages resulted in different attitudes towards the message depending on the time disposition of the individuals (Martin & Martin, 2013).

Information can come from outside sources (Loken & Hoverstad, 1985; Payne & Cin, 2015). Health information on Facebook, for example, has been linked to more positive attitudes towards the health message (Stephens, Goins, & Dailey, 2014). How these outside sources portray information, whether emotionally or factually-based, can impact how attitudes are formed toward that topic (Ryffel, Wirz, Kühne, & Wirth, 2014).

Attitudes can also predict intent to engage in a specific behavior later in life (Loken & Hoverstad, 1985; Payne & Cin, 2015; Quick & Heiss, 2009). The theory of reasoned action states that both attitudes toward the behavior and subjective norms determine intention to perform the behavior (Ajzen & Fishbein, 1980; Ajzen & Madden, 1986; Fishbein & Ajzen,

1975). The theory of planned behavior, which is an extension of the theory of reasoned action, adds perceived behavioral control to the mix of factors that determine intention (Ajzen, 1991). Attitudes are the positive or negative feelings toward the behavior (Ajzen, 1991; Ajzen & Madden, 1986). The more positive the attitudes and subjective norms, and greater perceived behavioral control, the more likely the intention to do the behavior (Ajzen, 1991).

However, the purpose of this study is not on behavior but on the attitudes of respondents concerning the study topic. Since previous literature (Marcason, 2011; Moore, 2014) blames the media for encouraging incorrect views of a gluten-free diet, the focus is on the attitudes toward the diet by participants, not whether they act on those attitudes. Attitude as a definition will focus on the explicit beliefs, both favorable and unfavorable, toward the subject of this specific study.

Media Sources. Media sources originally referred to radio, television, print newspapers, movies, music, and print magazines (Banning & Sweetser, 2007; Hofstetter, Schulze, & Mulvihill, 1992; Johnson, Braima, & Sothirajah, 1999; Larsen & Hill, 1954; Lorimer, 2002; Waisanen & Durlak, 1967). These media are also known as old or traditional media. Each of these sources present information to audiences (Christensen & Bailey, 1997). Prior to the Internet and other new media technologies, health information came predominantly from television news, print magazines, and print newspapers (O’Keefe, Hartwig-Boyd, & Brown, 1998).

As technologies developed the purview of media source has been expanded to also include the Internet, online newspapers, online magazines, social networking sites, and blogs (Banning & Sweetser, 2007; Johnson et al., 1999; King, Glascock, & Levitt, 2012; Lorimer, 2002). Online articles, websites in general, and new technology developing every day are often

termed new media. For the purposes of this study, both new and traditional media will be included as options for participants.

Media sources for health today have been expanded to include new media such as blogs, online magazine articles, online news, and social media. People use a variety of sources for health information, including friends, family, fellow workers, primary care providers, and the media (Rains, 2007). Media have consistently been a popular source to find and view health information (Kean et al., 2014). The likelihood of running across health information in a variety of locations in the media is high (Lovejoy et al., 2015). Therefore, multiple health messages across various media could impact attitudes about that topic. Common health and nutrition related subjects in media sources include losing weight, different body shapes, GMOs, food recalls due to safety reasons, vitamins, food allergies, and diet (Hampl, 2004).

The Internet has become a popular choice for seeking and viewing health information. The popularity of websites as information sources was initially concerning to the academic and health communities due to the ability for anyone to publically post anything (Rains & Karmikel, 2009). Posts could be made by anyone, and the content could be anything the poster wanted to say, regardless of existing facts. This aspect of the World Wide Web has not changed. Many health sites that are not hosted by the government or hospitals contain messages heaped with values, inconsistent information, and confusing advice (Wills, Dickinson, Short, & Comrie, 2013). Online commenters viewed as being knowledgeable about health influenced consumer attitudes about that site, even if the information presented was erroneous (Kareklas, Muehling, & Weber, 2015).

Briefly, source credibility is when sources are viewed as having high credibility, audiences believe that source as having informational value and as being more persuasive, and

when sources are viewed as having low credibility, audiences believe the source as not having informational value and being less persuasive (Greenberg & Miller, 1966; Lashbrook, Snively, & Sullivan, 1977). For example, website users view sites as credible if there is a strong gatekeeping presence (Yifeng & Sundar, 2010) or evidence of a brick-and-mortar location (Rains & Karmikel, 2009), harkening back to use of newspapers and magazines before the Internet. However, those seeking health information online could still view entertainment-oriented sites as credible (Rains, 2007). Due to the nature of the overall research question for this study, whether participants believe sources are credible is not under analysis.

Media Messages. Not all media messages about health information are correct. Newspapers and magazines are typically viewed as more information-oriented than entertainment-focused television and radio (Rains, 2007), but both newspapers and magazines have a history of incorrect and misleading health messages. Conflicting nutrition and health information abound in media messages (Nagler, 2014; Nagler & Hornik, 2012), leading to confusion about nutrition in general for media consumers. Confusion can stem from sources that provide incorrect or limited health information, and also from sources that have a more commercial goal, such as advertising or sponsored messages in articles (Cornish & Moraes, 2015; Nagler, 2014; Nagler & Hornik, 2012).

Additionally, newspapers can leave out important information in health messages. The lack of information can hide important facts about health from media consumers, such as the media minimizing the sexually transmitted disease aspect of the HPV vaccine in the news (Kelly, Leader, Mittermaier, Hornik, & Cappella, 2009). Both magazines and newspapers often carry narratives of a celebrity discussing a disease or recommending a health action (Beck, Aubuchon, McKenna, Ruhl, & Simmons, 2014). Attitudes about that particular health issue combined with

the celebrity status can influence general viewpoints about that health topic (Brown & De Matviuk, 2010).

The diet emphasis is particularly common in magazines. Numerous studies of men's and women's magazines have found an emphasis on diet and appearance, regardless of whether the overall magazine topic was health or fashion (Aubrey, 2010; Bazzini et al., 2015; Conlin & Bissell, 2014; Kean et al., 2014). Women's magazines in particular often promote fad-diets, instead of the combination of a healthy diet and exercise recommended by health care providers (Bazzini et al., 2015; Conlin & Bissell, 2014; Kean et al., 2014). Magazines have been listed as popular sources for health information (Dobransky & Hargittai, 2012; Kean et al., 2014; Walsh & Ward, 2010).

The articles themselves in magazines are not the only messages presented to readers. Other health information in magazines comes from advertisements that may be missing important health information, such as consequences of sun exposure without sunscreen and nutrition information (H. Jensen & Kesavan, 1993; Kang & Walsh-Childers, 2014; Nan et al., 2013). Even articles promoting the use of HPV vaccines left out important information about the vaccine involving the transmission of the disease (Kelly et al., 2009; Lepre, 2013). Additionally, magazines could be a source of incorrect information because of advertising, mirroring worry (Cornish & Moraes, 2015; Nagler, 2014) that contradictory information could spur media consumers to other sources for information.

Based on the previously mentioned research on health information in media messages, the definition of media sources used for this study includes both the media source and messages of traditional and new media. Both traditional and new media are included in the media source definition because media sources for information about the gluten-free diet are under

investigation. Media will be operationalized through respondents selecting media sources they used and/or saw information about the gluten-free diet.

Media Effects. Media effects as a concept has an extensive communication history. The etymology of media effects has gone through several transitions through the years. Originally, media effects were understood with respect to the Direct Effects Model, or that anything presented in media would have a direct and strong impact on passive audiences (Sears & Kosterman, 1994). Audiences could not help but be affected by media messages. The media, through television, radio, movies, and newspapers were charged with holding enormous power over citizens (Carey, 1996). Propaganda during World War II only served to cement the thought in the minds of researchers the helplessness and inability of the general society to resist media messages (Lasswell, 1927; Lippmann, 1922).

As understanding of media effects grew, the popular view swung the other direction toward limited effects, where audiences were actively processing media messages and forming their own opinions about topics independent of media (Becker & Dunwoody, 1982; Lord, Ross, & Lepper, 1979). Media effects were considered weak and dependent on individual characteristics (DeFleur, 1970; Hovland, Lumsdaine, & Sheffield, 1950; Lazarsfeld, Berelson, & Gaudet, 1944).

Today, media effects are understood more as an indirect impact over time, and effects are examined through a meaning-making lens (McQuail, 2005; Potter, 2011). Small effects can be expected in research (McQuail, 1979). People use media for their own reasons. The focus of attitude as a definition is underlined by the assumption that viewing media sources and messages over time have led to a particular attitude about the gluten-free diet. This particular way of thinking is dependent on both topic salience and the presentation of the topic in the media

source. While this study does not investigate directly the explicit messages present in the media, the researcher is operating under the assumption that respondent attitudes could have stemmed from repeated exposure to media messages about the gluten-free diet. This assumption is based on knowledge about attitude formation, and past health framing and agenda setting studies.

Media Source Effects. As described in the theoretical background, agenda setting and framing both address media effects, and effects in a health context. Public knowledge about a topic is constructed with the help of media messages pertaining to the subject (Philo, 2008). From agenda setting theory, the more the subject is mentioned, or the more salient it becomes to audience members, the more audience members believe the subject is important (McCombs & Shaw, 1972). Following the current model in mass communication research, the effects of agenda-setting occur over time through exposure to similar messages (Conway, 2013; J. D. Jensen, Bernate, Wilson, & Goonewardene, 2011; McCombs & Shaw, 1972). While the effects may not be immediate, exposure through multiple sources over a period of time can influence how important a subject is viewed by audience members.

Message source can influence attitudes, such as a health magazine or professional website prompting positive attitudes in readers about health communication compared to a personal blog about health (Bioarsky, Rouner, & Long, 2013; Yifeng & Sundar, 2010). Certain types and combinations of media sources even have an impact on intention to avoid exposing bare skin without sunscreen on sunny days (Lovejoy et al., 2015) or to promote health conversations within families (Lee, 2010; Seo & Matsaganis, 2013). Magazines, long tied to unhealthy body image representations (Bazzini et al., 2015; Nan et al., 2013; Van Vonderen & Kinnally, 2012), have been linked to eating disorders (Ackard et al., 2002; Harrison & Cantor, 1997). The source of information can have an impact on attitudes about that topic over time.

Again, while this study is not explicitly examining the media messages, the sources of information are under investigation because the source messages could have an impact on attitudes about the gluten-free diet.

Interpersonal sources, working with media sources, can also influence health attitudes. For example, college students who talked to family members about breast cancer and read magazine articles about breast cancer were more likely to follow screening recommendations and talk to their doctors about the disease (K. O. Jones, Denham, & Springston, 2006). Receiving mass media messages about health and speaking with interpersonal sources like family or friends were associated with meeting government recommendations for healthy behaviors such as exercise or fruit and vegetable consumption (Redmond, Baer, Clark, Lipsitz, & Hicks, 2010). In another similar example, cancer patients have been linked to higher rates of vegetable and fruit intake after viewing health information online and talking to family about their diet (Lewis et al., 2012). Speaking with close others such as friends or family can also mediate the health message effects in media messages (Seo & Matsaganis, 2013), meaning hearing the same information from both interpersonal and media sources could strengthen a particular attitude formation for a health topic. Interpersonal source information combined with similar health information from media sources could foster certain attitudes about health topics.

Media Message Effects. How the subject is presented, or framed, in the media message also contributes to media effects on attitudes about a topic. Framing involves selecting “some aspects of a perceived reality and mak[ing] them more salient in a communicating text, in such a way as to promote a particular problem, definition, [or] causal interpretation” (Entman, 1993, p. 52). Topics can be framed multiple ways based on different values and goals (Entman, 1993; Wise & Brewer, 2010), which can then influence public opinion on the topic that is already

salient to the media consumer. Frames both include and exclude certain aspects of a topic by presenting a particular way of knowing (Goffman, 1974; D. A. Scheufele, 1999). Through frames, media consumers are told which aspects of the topic are most important (Wise & Brewer, 2010). Framing effects, similar to agenda-setting effects, happens as media consumers are exposed to similar frames over time (Conlin & Bissell, 2014).

Different media sometimes use consistent frames. Health and fashion magazines themselves have a history of framing health as appearance focused, with an emphasis on diets and exercise to attain those goals (Aubrey, 2010; Bazzini et al., 2015; Willis & Knobloch-Westerwick, 2014). The combination of consistent appearance framing across multiple media sources and the emphasis placed on body image in the media messages in the first place can contribute to unhealthy body image expectations in audience members (Aubrey, 2010; Van Vonderen & Kinnally, 2012; Willis & Knobloch-Westerwick, 2014; Wilson & Blackhurst, 1999). While the specific framing surrounding gluten-free diet messages is not directly under the research goal of this study, the above information about health frames in certain sources can provide a possible explanation for certain attitudes surrounding the gluten-free diet.

Effects can result as powerful attitude changers over time. Media have the opportunity to influence many people on health issues related to food and nutrition (Hampl, 2004). For example, a high amount of coverage about trans fat in the 1990s and early 2000s results in public concern about trans fat and less purchases of food containing trans fat (Jarlenski & Colleen, 2013; Niederdeppe & Frosch, 2009). In this case, the news acted as an agenda setting entity because audiences became aware of the trans fat issue, and the news also framed the trans fat issue in such a way that audiences understood trans fat as a danger to their health. The media messages present in newspapers were salient enough to readers that consumers decided trans fat

was a legitimate issue in their lives. Numerous studies have looked at the impact of continuous attention to unattainable body images and how the salience of those images and the way body image is framed impacts attitudes enough for media consumers to develop body dissatisfaction attitudes and even eating disorders (Aubrey, 2010; Harrison & Cantor, 1997; Van Vonderen & Kinnally, 2012).

For the purposes of this research, the following definition of media effects will be used: media effects refer to the way media coverage and presentation impact attitudes of the gluten-free diet through the salience and framing of the diet in the mass media sources and messages. Effects can range from impacting attitudes to actual behaviors. The effects focused on for this study are based on attitudes. Media effects are illustrated for the purposes of this paper in the way the gluten-free diet is possibly highlighted and framed by the media in media messages and media sources.

Gluten-Free Diet. A gluten-free diet is a diet excluding any foods containing the gluten protein in wheat, rye, barely, and oats (“Celiac Disease: Fast Facts,” 2015, “Facts & Figures of Celiac Disease,” 2014; Rubio-Tapia et al., 2012). Gluten-free foods are often lacking nutrients such as foliate, iron, and fiber (“Vitamins & supplements,” 2015; Wild et al., 2010). Processed gluten-free food typically contain higher amounts of saturated fats, salt, and sugar than non-gluten free foods (Cross, 2013; Nash & Slutzky, 2014; Wild et al., 2010). Going on a gluten-free diet is the only way to treat celiac disease, an autoimmune disease (“Celiac Disease: Fast Facts,” 2015; Rubio-Tapia et al., 2012). The diet is a lifetime commitment for people diagnosed with celiac disease for this reason, as even a little gluten in the body can be harmful (Rubio-Tapia et al., 2012). Doctors do not recommend eating a gluten-free diet unless diagnosed with celiac disease or gluten sensitivity because of the nutrient loss (Cross, 2013; Gaesser & Angadi, 2012).

There have been opponents to the gluten-free diet for medical reasons who claim the diet is either unnecessary (Biesiekierski et al., 2013) or a diet everyone should be following (O'Brien, 2011; Specter, 2014). However, current nutritional recommendations ("Celiac Disease: Fast Facts," 2015; Rubio-Tapia et al., 2012) still specify the use of the gluten-free diet as a treatment for celiac disease or gluten sensitivity.

Gluten-Free Diet Messages. There are claims by researchers (Else, 2013; Gaesser & Angadi, 2012; Marcason, 2011; Moore, 2014) that the media is causing inaccurate and misleading information about the diet. Current media messages question whether the gluten free diet is a fad diet that will disappear in another few years ("Gluten-free diet fad: Are celiac disease rates actually rising?," 2012; Kluger, 2014; McCarthy, 2014). The high amount of advertising (Cross, 2013; "Gluten-free foods market to hit \$4.2 billion this year: Report," 2012; Wahba, 2015) put towards gluten-free foods (Strom, 2014) could contribute to multiple media exposures containing information about the diet. With the gluten-free diet, confusion over whether it is simply another trend and inaccurate media messages could contribute to misconceptions about the diet being healthier.

Other sources in the media could be celebrities such as Gwyneth Paltrow, who touts the benefits of being on a gluten-free diet and other food trends through books and social media sources (Rousseau, 2015). Miley Cyrus attributed going gluten-free to her weight loss and general sense of health – all to her thousands of followers on Twitter ("Miley Cyrus: Gluten-free diet is responsible for weight-loss," 2012). While one source (Marcason, 2011) ties the gluten-free diet to weight-loss, more research on the topic is needed in order to draw any conclusions.

Study in Context

The purpose of this study is to examine the attitudes of college students about the gluten-free diet and the media sources where they get their information about the diet. If a media consumer consistently sees the same messages concerning the gluten-free diet over a period of time without personal knowledge of celiac disease or gluten sensitivity, the consumer's attitude about gluten-free diets could be partially based on the attitude presented in the media messages. Then, when the same consumer sees an option for gluten-free food at the store, he or she will view the food based on attitudes formed earlier. For example, a person could have a more negative attitude towards gluten-free diets because of fad-diet media message frames associated with the gluten-free diet.

Similarly, only framing the gluten-free diet as a fad diet could lead to media consumer attitudes that the diet is akin to past popular diets, instead of a lifestyle change necessary for patients with celiac disease or gluten sensitivity. After seeing the same weight-loss or fad diet frame applied to the gluten-free diet over time and in multiple sources, media consumers could easily start to view the diet that way, too. Based on the popularity of the gluten-free diet (Kluger, 2014; McCarthy, 2014; Rubio-Tapia et al., 2012; Strom, 2014), a fad diet frame or general weight loss frame could be easily applied, instead of taking time to explain celiac disease to an audience that wants information fast. Seeing similar frames for the gluten-free diet could lead to a particular way of perceiving the diet.

Media source could have an impact as well. If media consumers are used to seeing diets in magazines as the latest trending topics instead of lifestyle choices, attitudes of the gluten-free diet could be negatively impacted by the inclusion of those messages in those particular media. If newspaper articles are confusing to media consumers because of conflicting nutritional

information about the gluten-free diet, these articles could contribute to incorrect attitudes about the gluten-free diet. As mentioned before, the exact messages present in the media are not directly examined, but knowledge about confusing messages and frames could provide possible explanations for why respondents have certain attitudes about the diet.

Additionally, advertisements typically present in all media sources could be for gluten-free foods, which combined with articles on the gluten-free diet, could be contributing to consumer attitudes about the diet. Thus, agenda setting effects with the gluten-free diet would not happen if the topic was brought up only a few times in the media; however, since the gluten-free diet has been in media messages for multiple years now (“Gluten-free diet fad: Are celiac disease rates actually rising?,” 2012, “Miley Cyrus: Gluten-free diet is responsible for weight-loss,” 2012; Hellmich, 2013; Kluger, 2014; Murphy, 2007), there is most likely an accumulated salience in audiences about the gluten-free diet that could result in misguided views about the diet (D. A. Scheufele, 2000).

As the gluten-free diet became popularized by celebrities and discussed in multiple media sources, it can be reasoned that media consumers also viewed the diet as relevant. Similarly, seeing multiple celebrities such as Miley Cyrus and Gwyneth Paltrow exclaim to their fans about the benefits of the gluten-free diet, could influence whether diet attitudes include the diet as entertainment news or a serious news item. In this sense, if media consumers keep seeing the gluten-free diet popping up in magazine articles, celebrity gossip, and health news, an attitude of the diet could be that the gluten-free diet is important, and thus people could be aware of the diet regardless of experience with celiac disease or gluten sensitivity. In the case of the gluten-free diet, framing could easily provide a way to interpret the diet as a lifestyle choice or a trend. Coverage and framing could have brought the gluten-free diet into popular knowledge. The first

step towards addressing the purpose of this study is to look at what people believe, and what sources they are using or where they are seeing information about the diet. Possible explanations for those attitudes can be drawn from past research on health agenda setting and framing, and provide direction on which information sources to further investigate in the future.

Research Questions

The following research questions are proposed below. The analysis of these questions will draw on the above theoretical and conceptual background

RQ1: What are college student attitudes toward the gluten-free diet?

RQ2: From what media sources are college students getting their information about the gluten-free diet?

RQ3: Which types of sources (ex: lifestyle, health, news) are preferred for gluten-free diet information?

RQ4: From what interpersonal sources (ex: friends, family, health care professionals) are college students getting information about the gluten-free diet?

RQ5: Do students' attitudes and information sources about the gluten-free diet differ based on their personal experience with gluten?

Chapter 3: Methodology

Design

The type of study was a survey, more specifically an online questionnaire. An online survey was chosen over other research methods for a variety of reasons and advantages. First, the technological habits and focus of the population under study and historically high response rate with online surveys (American Press Institute, 2015; Roberts et al., 2014) made this the best possible survey method for this study. Second, an online survey allows a topic to be investigated in a natural setting (Evans & Mathur, 2005; Van Selm & Jankowski, 2006). This survey was available to take anywhere a participant has internet access, instead of filling out responses in an artificial laboratory setting. Attitudes and information habits were under study, both of which are natural processes.

Third, online surveys are relatively cheap to set up and administer once a survey tool is acquired (Dillman, Smyth, & Christian, 2014; S. Jones, Murphy, Edwards, & James, 2008; Umbach, 2004; Van Selm & Jankowski, 2006; Wright, 2005). As detailed below, the department license to Qualtrics provided the ability to quickly administer and invite respondents to the survey. Fourth, online surveys allow for the collection of large amounts of data without inconveniencing the survey respondents or researchers (S. Jones et al., 2008; Umbach, 2004; Van Selm & Jankowski, 2006). Fifth, surveys can be taken anywhere since location does not constrain participation (Evans & Mathur, 2005; Van Selm & Jankowski, 2006; Wright, 2005). This survey did not need to be taken on campus or in a laboratory, leaving respondents free to answer survey questions wherever and whenever they desired.

Survey Program. The survey program, Qualtrics, was used for this survey. Qualtrics is an online survey tool widely used for market research and academic studies. The tool provides a

secure, password protected server for data. Unlimited questions can be asked, and a paid license to the tool allows access to templates that are responsive to participant devices, operating systems, and browsers. The frequent use of cellphone among the target population (Roberts et al., 2014) increased the chance a survey could be conducted on a mobile device. The program also has many timesaving capabilities, such as setting up automatic survey email reminders and invitations. Lastly, the Journalism and Media Communication Department at Colorado State University uses Qualtrics as an online survey tool.

Limitations. There are also a few disadvantages to surveys. First, it is hard to establish causality with surveys because the independent variables cannot be influenced like it could be in an experiment (Dillman et al., 2014). Second, the order or wording of questions can introduce bias (Dillman, 2007; Umbach, 2004; Van Selm & Jankowski, 2006). Questions were carefully ordered and phrased to prevent biasing, and pretesting occurred to establish question clarity and reliability. Third, there is never 100% certainty that the person the researcher wanted to take the survey actually participated (S. Jones et al., 2008; Van Selm & Jankowski, 2006; Wright, 2005). As discussed in the next section, screener question and unique survey links helped with eligible respondents. Fourth, the type of survey can influence response rates (Evans & Mathur, 2005; S. Jones et al., 2008). In order to achieve a higher response rate (Evans & Mathur, 2005), an online survey method was chosen.

Fifth, the design of an online survey can vary depending on how the electronic device and web browser are used to open the survey (Dillman et al., 2014). Researchers have more control over the appearance of paper surveys (Dillman et al., 2014). Sixth, longer surveys can be difficult to answer on mobile devices (Dillman et al., 2014). Seventh, if the survey is optimized for a mobile device, questions are often split up into separate pages, which means the question

context can be forgotten by respondents (Dillman et al., 2014). Eighth, if the online survey is presented on just one web page, then respondents might decide not to finish the survey because of the scrolling needed to get to the bottom (Dillman et al., 2014). Ninth, there is a chance that survey responses might be lost if the respondents experience technical problems or quit the survey before hitting ‘submit’ (Dillman et al., 2014). Tenth, while online data security has improved over the years, there is still a chance of a data breach that could occur out of the researcher’s control (Dillman et al., 2014).

Population and Sampling

Population. The study population consisted of freshmen, sophomore, junior, and senior college students at Colorado State University. College students were selected as the population because of their receptiveness to fad dieting and overall unhealthy eating behavior (Banjari et al., 2011; Downes, 2015). College students are also in a period of life characterized by weight issues (Hebden et al., 2015; Laksa et al., 2015). Dieting can be seen as an attractive solution to weight struggles for college students (Banjari et al., 2011; Downes, 2015). All undergraduate grade levels (freshmen, sophomores, juniors, and seniors) were included in the survey population to achieve a greater picture of current student attitudes and information sources for the gluten-free diet.

Sampling. A convenience sample was conducted out of three sections of JTC 300 and five sections of CO 150. Both writing classes are optional course available to satisfy the writing requirement to graduate, thus bringing in a wide variety of majors and student backgrounds. These classes were selected based on their large number of students in varying grade levels and varying majors that are not always sampled. The needed sample size was at least 380 students,

based on a population of around 32,000 students with 95% confidence and 5% margin of error (Dillman, 2007).

The survey was closed once the needed number of respondents has been attained. Survey data was then examined and cleaned up due to the chance of respondents being in multiple surveyed classes. After duplicates were removed, all identifying information was scrubbed from the data. In compliance with IRB standards, the data was stored on a secure server that was password protected. All study-relevant data remained anonymous.

Respondent Eligibility. To ensure respondents were eligible, unique survey invites were only sent to the above classes under study. Data was examined for possible duplications before identifying data was separated from the main data set. A screener question about whether the respondent had heard about the gluten-free diet helped ensure that survey respondents were already familiar with the survey subject. Respondents who had not heard of the diet were directed to the end of the survey and still received extra credit for all classes. A final screener question at the end of the survey asked the participant to select the class he or she is in; this answer was checked against the class lists.

Limitations. This was a convenience sample, which limited generalizability to the undergraduate student population at Colorado State University because of the exclusion of other groups of people (ex: non-college students, professionals, people who live in other parts of the United States) (Dillman et al., 2014). However, since little research exists on the topic of the study in the first place, this survey was a good starting place for future research endeavors. Convenience sampling also runs the risk of low participation rates (Dillman et al., 2014).

Recruitment

Class lists were first be obtained from the surveyed class instructors. A panel with columns containing names, emails, and the surveyed course number were uploaded to Qualtrics. Qualtrics then created survey invitations for each student containing a unique hyperlink to the survey. Data collection was open for 10 days until the needed response rate was achieved.

Contact Techniques. Prenotification occurred through an in-class announcement made to all classes included in the study (Dillman, 2007). Prenotification is helpful for increasing response rates (Dillman, 2007). This announcement informed the students that they would receive a survey invitation the following day in an email, the general topic of the survey, why this study is important, and information about extra credit, including alternative extra credit assignments (see Appendix A). The in-class announcement was scripted so that all students heard the same study information.

An invitation email was sent to the students through Qualtrics approximately one day after the prenotification (Dillman, 2007). The invitation email was addressed to that participant specifically to help increase response rate (Dillman, 2007; Dillman et al., 2014). Names were pulled from class list information uploaded to Qualtrics. Messaging included reasoning for getting the survey, a restatement of the usefulness of answering the survey, confidentiality information, and contact information if the participant has questions about the survey (see Appendix B). The email also contained messaging about an alternative extra credit assignment if the participant does not want to take the survey.

A maximum of two reminder emails were then sent to respondents (Dillman, 2007). The first reminder email was sent three days following the email invitation, roughly halfway through the survey window (Dillman, 2007). Messaging in the first reminder email drew on social

exchange theory by thanking those who had already taken the survey and emphasized the opportunity to still provide feedback on the study (Dillman, 2007). The messaging also included slightly different messaging from the invitation email that again emphasized the chance to contribute to knowledge and to have their voice heard (see Appendix C). The second reminder email was sent two days before the survey closed (Dillman, 2007). Included in the second email was different messaging from the first reminder email; the message let respondents know the survey was closing soon and so will the chance at extra credit. A final attempt at illustrating the benefits of lending their opinion through the survey was made at this time (see Appendix D).

It is estimated that the needed sample size will happen after 7-10 days based on the strong extra credit incentive to take the survey (Benfield & Szlemko, 2006; MacDonald, 1972). Based on pretesting and average respondent time, the estimated time to take this survey was around 10 minutes, which made a minimal impact on respondents' day. Respondents were able to pause the survey and return to the survey within a 72-hour window. If the respondent did not return to the survey and finish answering questions within 72 hours, the data from that unfinished survey was deleted. Allowing respondents to stop and then finish the survey at a later time shows that the researcher is aware of respondents' needs (Dillman et al., 2014).

IRB Requirements. An IRB application exempt under Category 2 application was submitted for approval prior to class announcements and invitations (see Appendix E). A study consent form, with waived signature, was available at the beginning of the survey (see Appendix F). Respondents were able to quit the survey at any time without penalty. All survey data was initially stored on the secure Qualtrics server. After the survey was completed, data was downloaded onto a secure, password protected computer. Any identifying information was immediately separated from the main data set and stored in a separate location. An alternative

extra credit assignment to the offered survey extra credit was provided by the instructors, ensuring equal access to extra credit for respondents.

Incentives. Extra credit was offered as an incentive to take the survey. Instructors provided an alternative extra credit assignment if students did not wish to take the survey. A high response rate (~85%) typically occurs with an extra credit incentive (Benfield & Szlemko, 2006; MacDonald, 1972). A unique survey link sent to each student and embedded data ensured no student takes the study more than once. Class lists were cross-referenced to guarantee only one survey per student was answered prior to the survey invitation being sent to respondents. Any students in more than one class received extra credit for both classes after taking the survey once. After the survey window closed, the identity data was separated from the main data set. The identity file was then securely sent to the class instructors in order for extra credit to be given to participating students.

Limitations. Conducting invitations and reminder emails online has a few hazards. First, the invitation and reminder emails could be seen as spam by the respondent or classified as junk mail by the email provider (Dillman et al., 2014). Second, the use of electronic incentives (such as money to a PayPal account) can be difficult based on perceived respondent cost to go get the incentive (Dillman et al., 2014). Third, the use of mobile devices can mean a longer invitation or reminder email is not read fully, or is deleted for not fitting on the screen (Dillman et al., 2014). Fourth, the survey program servers could be overwhelmed with sending out the invitation and reminder emails, and then when receiving data from respondents taking the survey (Dillman et al., 2014). Fifth, technology issues due to errors from browser windows, email providers, and other code issues could prevent respondents from reaching the survey (Dillman et al., 2014).

Instrumentation

Behavioral Characteristics Related to Gluten-Free Diet and Dieting. The survey began with a few questions to gauge relevant behavioral and psychological characteristics that are easy to answer, related to the survey topic, and help gain respondents' interest in continuing (see Appendix G). Research shows this is an effective technique to create buy-in for the respondents (Dillman et al., 2014). These questions included simple 'yes/no' nominal questions addressing whether the respondent has personal experience with the gluten-free diet due to having celiac disease or a gluten sensitivity but no diagnosis of celiac. A screener question to ascertain familiarity with the gluten-free diet was also asked; if respondents were not familiar with the diet, they were directed to the end of the survey.

Conceptualization of Gluten-Free Diet. The survey then introduced questions that addressed respondent definitions of the gluten-free diet (see Appendix G). A series of open-ended questions was used to measure how respondents conceptualize the gluten-free diet. Two open-ended questions assessed how respondents described the purpose of the gluten-free diet, and what they believed others thought about the diet (using three words or phrases). A nondirective probe (ex: "Can you think of any other purpose for the diet?") was used after the gluten-free diet purpose question as research (Dillman et al., 2014) has indicated probes could garner a slightly longer answer. Only two nondirective probes were used in the survey on important questions to keep effectiveness high (Dillman et al., 2014).

Attitude Toward the Gluten-Free Diet. This section began with an open-ended question asking students to explain their opinion about the gluten-free diet (e.g., "What do you think about the gluten-free diet? Please also include *why* you feel the way you do about it.") (see Appendix F). A nondirective probe ("What more can you tell me about your feelings about the

gluten-free diet?") was used after the initial question to possibly attain a longer answer (Dillman, 2013).

The open-ended question was followed by one bi-polar ordinal Likert-like question containing four statements to assess attitudes about the diet. Examples of statements included "The gluten-free diet assists with weight loss," and "The gluten-free diet is a healthy diet for most people." Respondents chose from the following answer choices: strongly agree, agree, neutral, disagree, and strongly disagree. Answer options were based on the research findings from Lis et al. (2015), Marcason (2011) and Rousseau (2015).

Recall of Media Health Sources. One nominal forced-choice 'yes/no' question investigated media sources actively used for gluten-free diet information, and media sources where the respondent had passively seen information about the gluten-free diet (see Appendix G). Forced choice answer type was selected instead of check-all-that-apply answer type because research (Dillman et al., 2014) has shown a higher response rate and more respondent processing when selecting answers with forced-choice questions.

Media sources included social media, a local newspaper, a magazine, and a blog. These sources were adapted from the millennial media use survey done by the American Press Institute (2015) and the results of a study conducted by Davy, Benes, and Driskell (2006). One multiple-choice nominal question was also included to ascertain the general type of media source used by respondents learning the gluten-free diet. Answer choices included lifestyle, health, fashion, sports, gossip, and news. Each type was provided with a brief example behind it (ex: lifestyle magazine, blogs, and websites) to provide more information to the respondents.

Recall of Interpersonal Health Sources. One forced-choice 'yes/no' nominal question was used to ascertain interpersonal health sources for respondents (see Appendix G). The

question asked with which sources discussion of the gluten-free diet had occurred; sources included family, friends, professors, and health care providers.

Demographics. Age and gender were asked last (see Appendix G). Age was measured by having respondents enter the year they were born. Gender identity consisted of radio buttons with the choices of: male, female, and other. Class options were JTC 300 and CO 150 with specific section numbers, times, and instructors for each class. A separate page after the survey asked for respondents' names, and for respondents to check the class or classes in which they should receive extra credit.

Pretesting. Survey questions were first checked for face reliability and validity by a panel of experts consisting of committee members knowledgeable in food science and nutrition, journalism, and agricultural communication. These committee members were knowledgeable about the study subject matter and the construction of survey questions (Chaudhary & Israel, 2014). The survey questions were then pretested with 33 students (Chaudhary & Israel, 2014; Krosnick, 1999; Umbach, 2004) from JTC 419 and JTC 374. Retrospective verbal probing was used to conduct the pretesting (Chaudhary & Israel, 2014). To accomplish this method, questions such as “What questions and/or question choices in this survey were confusing” and “Were there any technical difficulties with completing the survey? If so, what were the difficulties?”, were added at the end of the survey to address overall feelings about the survey, what questions they had difficulty answering, and whether the survey was interesting to them (Chaudhary & Israel, 2014). Since further details about specific, problematic questions were not needed, cognitive interviewing with seven to ten students was not conducted (Chaudhary & Israel, 2014). After receiving feedback from the pretested students, survey questions were tweaked and refined as necessary. Any amendments were submitted to IRB for its records.

The overarching reason for pretesting was to reduce measurement error by clarifying questions, gain an understanding of participant views toward the survey, and help develop the survey based on the respondents' perspectives (Dillman, 2007). Pretesting also assisted in addressing potential problems with open-ended questions, seeing what questions were skipped, where respondents stopped taking the survey, and any technical problems that might have arose during the survey (Chaudhary & Israel, 2014; Dillman et al., 2014). Answers to open-ended questions were used to construct possible answer categories (Chaudhary & Israel, 2014). Pretesting was also done to test the usability of the survey program. Pretesting also helped with computing reliability analysis on question scales, too (Chaudhary & Israel, 2014; Dillman et al., 2014).

Additionally, pretesting was done to reduce respondent burden (Dillman et al., 2014). Retrospective verbal probing questions illuminated whether the survey was easy to take, whether the survey took too long, what questions are confusing, and whether the respondents felt the survey was interesting and pertinent to them (Chaudhary & Israel, 2014; Dillman et al., 2014). Questions were then altered to decrease the perceived cost of taking the survey.

Data Analysis Plans

All data analysis was done using SPSS, version 23. Face validity was tested with the expert panel at the beginning of pretesting; if any questions did not appear to measure what they should be measuring, the questions were altered and reviewed again by the expert panel.

Demographics. Demographics was measured with a frequency table for gender and year born. Mean was used to measure average year born. Gender was assessed simply by a count in a frequency table. Demographic results from the survey were then compared to spring 2016 demographic information for Colorado State University.

Personal Experience. Personal experience with the gluten-free diet due to health reasons was broken down into three separate categories. These categories were: no personal experience, respondent has celiac disease, or the respondent has a gluten sensitivity but has not been diagnosed with celiac disease. A ‘no’ to both questions indicated the respondent had no personal experience with the diet for health reasons, and a ‘yes’ to either one or both of the questions indicated personal experience. Answers for both questions were assessed in a frequency table.

RQ1: What are College Student Attitudes Toward the Gluten-Free Diet? Attitude was measured through one index composed of four statements and three open-ended questions. The index was coded 1 (strongly agree) to 5 (strongly disagree). Internal reliability was measured using Cronbach’s alpha (Dillman et al., 2014). If any statement tested low for reliability, that statement was removed from the index. The average coding score will indicate overall attitude toward the diet for each respondent. A low average score (1-2) indicated a “fad diet” attitude towards the gluten-free diet, while a high average score (4-5) indicated a non-fad diet attitude towards the gluten-free diet.

The three open-ended questions were examined in two coding passes by the lead researcher. Answers were first examined for themes, allowing for both themes that emerged during pretesting and new themes present in the respondents’ answers. All themes were then compiled into a list, and examined for similarities. A mutually exclusive and exhaustive coding theme list developed from the theme examination. Answers were then coded again using the theme list. The list was reexamined if the second coding pass revealed a poor fit for the themes in the list. Exemplar words and phrases from the answers were included when discussing the final themes below. If the same theme was present more than once in a respondent’s answer, the

theme was counted only one time. The lead researcher was also aware of her family history with celiac disease, and practiced researcher reflexivity through self-awareness before, during, and after theme coding. The lead researcher was aware of her annoyance with those on the gluten-free diet for fad dieting reasons, and attempted to separate herself from those feelings while examining respondents' answers. In an effort to show this separation, multiple exemplar quotes were included with each theme..

RQ2: From what Media Sources are College Students Getting their Information About the Gluten-Free Diet? Media sources were measured using a frequency table and a mode summary statistic. A frequency table assisted in organizing which media sources were most and least used, while finding the mode highlighted the most popular media source. Media sources were dummy coded to find the mode.

RQ3: Which Types of Sources are Preferred for Gluten-Free Diet Information? A frequency table and mode summary statistic were used to measure the results of which type of sources respondents' used. The most and least popular types of sources were also reported.

RQ4: From what Interpersonal Sources are College Students Getting Information about the Gluten-Free Diet? Interpersonal sources were measured using a frequency table and a mode summary statistics. The frequency table again assisted in addressing the rates of use, and the mode highlighted the most popular media source. Interpersonal sources were dummy coded to find the mode.

RQ5: Do Students' Attitudes and Information Sources about the Gluten-Free Diet Differ Based on their Personal Experience with Gluten?

An Mann-Whitney *U* test was conducted to measure attitude and personal experience. Attitude was measured against personal experience (none, gluten sensitivity, celiac disease). A

Chi-square test for independence was conducted to analyze the relationship between personal experience with the gluten-free diet and information sources. The test compared the personal experience with gluten-free diet groups (none, gluten sensitivity, celiac disease) on use of each media source. A Chi-square test for independence was also conducted with interpersonal sources. These test helped analyze whether there is any relationship between experience and information sources.

Chapter 4: Results

A total of 373 responses were recorded, with the valid responses at 351 after removing respondents who failed the screener question about familiarity with the gluten-free diet and respondents who left the majority of their questions blank.

Respondent Demographics and Personal Experience with the Gluten-Free Diet

Slightly more of the respondents ($n= 189$, 53.8%) were female than male ($n= 160$, 45.6%), with two respondents (0.6%) selecting 'other' for gender. The average age of the respondents was 21.5 years old ($n= 350$, range = 19, $SD = 2.4$, mode = 21). Personal experience, measured by the respondent having celiac disease or a gluten sensitivity, was also measured. The majority of respondents did not have experience with the gluten-free diet due to celiac disease or a gluten sensitivity ($n= 326$, 92.9%). Only 25 respondents (7.1%) either had celiac disease or a gluten sensitivity.

RQ1: What are College Student Attitudes Toward the Gluten-Free Diet?

Attitude Scales. A reliability test of the four attitude statements revealed that the third statement, "The gluten-free diet is only a fad diet," had low reliability with the other statements (registered negative item-total correlation with all statements). The removal of the third statement increased Cronbach's Alpha coefficient from 0.34 to an acceptable score of 0.718. All three attitude statements ranged from 3.02 to 3.32, with an average total attitude score of 3.19, indicating a slight attitude that the diet is broadly healthy for everyone. See Table 1 below for a breakdown of each statement.

Table 1

Gluten-Free Diet Attitude Statement Means and Standard Deviations

Attitude Statement	<i>n</i>	<i>M</i>	<i>SD</i>
Weight Loss Attitude	350	3.02	0.98
Healthy Diet Attitude	350	3.24	1.03
Helps with Appearance Attitude	350	3.32	0.83
Total Attitude	350	3.19	0.76

Note: Scale was 1= favorable attitude toward diet as a broadly healthier for everyone to 5= unfavorable attitude toward diet as a broadly healthier for everyone.

Conceptualization of the Gluten-Free Diet. Respondents were asked about what they believed to be the purpose of the gluten-free diet. A total of 349 unique responses were examined for common themes. Out of 349 answers, nine different gluten-free diet purpose themes emerged. The **most common** purpose reported ($n= 235, 67\%$) was to manage or treat celiac disease, gluten sensitivity, or other intestinal illnesses such as irritable bowel syndrome and Crohn’s disease. Exemplar quotes include:

The purpose of the gluten free diet is to cut out gluten in order to avoid the negative effects of gluten for those with celiac or gluten sensitivity.

The purpose of a gluten-free diet is to eliminate adverse reactions that some individuals have when they consume gluten containing foods.

To provide those with gluten allergies or sensitivities an alternative diet.

Gluten free diet is meant for those who can not properly digest gluten often making them sick and possibly worse conditions may happen if continued to eat gluten with an intolerance.

To help those with celiac disease, so that their stomachs don’t hurt when they eat gluten.

To prevent flare ups of celiacs disease.

To prevent people from having severe stomach pain or worse symptoms depending on how severe their allergy is.

The **second most common** purpose of the diet was to be healthier and help overall well-being ($n= 129, 37\%$). Exemplar quotes include:

To be healthier

To eliminate gluten from your diet and become healthier.

Other people choose to do it to feel better and be healthier.

I heard it is supposed to make you feel better over all.

People cut gluten out of their diets in order to eat healthier by avoiding many of the processed chemicals that come in gluten foods.

To be healthier, it cuts out a lot of bad fats and processed foods.

For those who are learning to eat healthier and to learn what they are eating.

Become more health aware.

The **third most common** purpose for the diet was to help with specific health goals, such as weight loss and fatigue ($n= 121, 30\%$). Exemplar quotes include:

Some people also use the diet to lose weight because it avoids a lot of carbohydrates.

I think the main purpose for a gluten-free diet is to help someone lose weight.

To have your body focused on getting energy from foods other than wheat, barley, and oats, so that your body feels better and still has energy.

For a lot of products, glutenous foods are usually empty calories. For people trying to loose weight, sometimes it is easiest to cut gluten.

To have more energy.

To stay skinny.

Acne can be caused by gluten for some people I've heard.

Not to get fat.

It's a diet that enables weight loss due to the lack of carbs and sugars that come from gluten.

It can be used to control weight issues some may have, as it can reduce carbohydrate intake.

I think sometimes people use it to lose weight in order to cut down on carbs.

The **fourth most common** purpose for the gluten-free diet was the diet simply lacked gluten ($n=56$, 16%). Exemplars included: "to avoid wheat," "to eat no gluten," "to keep gluten out of your diet," and "to eliminate gluten from every part of daily food." The **fifth most common** purpose was to help with general digestion and inflammation issues not related to having celiac disease or gluten sensitivity ($n=50$, 14%). This theme was separated from the most common medical theme because answers were general, and did not specify that the digestive distress came from symptoms of a disease or syndrome. Exemplar quotes include:

Better for digestion.

Promoting digestive health.

To eliminate gluten from your diet making it easier for your body to digest food and to make it easier on your stomach.

For those who are not gluten sensitive, they believe it will reduce inflammation.

To avoid stomachaches.

Just want to have a happier stomach.

To reduce irritation by foods.

To eliminate gluten which can cause inflammation (acne, bloating, lethargy).

The **sixth most common** purpose was for the gluten-free diet to be a fad or trendy, or as a way for companies to make more money ($n=40$, 10%). Exemplar quotes include:

Marketing tactic to increase prices on goods.

It's just another silly health trend and probably doesn't do anything except

exclude you from the joys of gluten, such as beer and pizza.

The purpose of the gluten free diet is to lose weight and make you eat healthier. This a fad because it does neither.

It's trendy.

I think it is starting to become a health trend that some follow blindly without knowing the research or reasoning behind it.

Gluten-free could also be part of other fad diets, such as the Paleo diet.

Jumping on the bandwagon of "being healthy."

Marketing gimmick.

The rest of the purposes were listed by under 10% of respondents, but still warrant explanation.

As the **seventh most common** theme ($n= 33, 9\%$), the purpose of the gluten-free diet was also cast as a way to save oneself from gluten. Exemplar quotes include:

To avoid consuming gluten because it is not good for your body. There have been numerous medical studies showing the damage that gluten causes to the human body.

Gluten-free is good because it is non-processed food, and processed food has chemicals and bad things in it.

Gluten foods are usually low in nutrition.

To keep gluten, which some people believe is a toxin, out of someone's body.

I have heard claims that gluten can contribute to depression.

It's healthier overall not to eat gluten.

Many foods that contain gluten are unhealthy for us. Mostly being processed foods and breads.

The **eighth most common** theme ($n= 27, 7\%$) was on the opposite side of the above purpose, as some respondents viewed the purpose of the gluten-free diet as a diet to avoid altogether.

Exemplar quotes include:

Other people follow it simply because they believe it is "healthier" which is not

true.

I do not think it is a good diet for people who are able to digest gluten.

I do believe from the little I've researched that it's all in your head and that gluten has been part of the human diet for thousands of years yet somehow it becomes a problem recently? It doesn't sound plausible to me.

It's all a hoax. Simply drinking enough water and eating a balanced diet will solve all the problems that a gluten free diet tires to solve, with the exception of celiac disease.

It's just a protein found in wheat. No need to avoid it unless you are sensitive to it.

A certain amount of gluten is good for you, so I don't know why people would completely cut it out of their diets when they have no allergy.

The **ninth most common** theme ($n= 13, 3\%$) linked the purpose of the diet to expressing some form of identity, often to annoy others. Exemplar quotes include: "to be a hipster," "to be pretentious," "to act superior at parties," "to seem special," and "to look cool and healthy for your friends." Only 2% ($n= 8$) indicated they did not know what the purpose of the diet was (they had heard of the diet, though), and 1% ($n= 7$) provided answers that did not fit with the rest of the diet purposes. These answers included: "religious obligations," "beliefs," and "it's just a diet change."

Respondent Attitude about the Gluten-Free Diet. Attitude was examined asking respondents in an open-ended question what they personally thought about the diet. Out of 351 responses, 11 unique themes emerged. The **most common** theme ($n= 259, 74\%$) centered on the use of the gluten-free diet for medical or disease purposes. These responses distinctly linked the gluten-free diet to medical purposes that were separate from general "it's healthier" comments. Exemplar quotes of this theme include:

For people with gluten intolerances, it seems like a good option.

I feel that if one truly has celiac's disease, the diet is completely necessary for nutrition and comfort.

I feel that the diet is best for people with actual diet limitations like gluten sensitivity.

I believe that for those suffering from celiac disease the gluten-free diet is a logical and beneficial means of controlling negative symptoms.

I think that people who are on the gluten free diet because of medical problems should be on the diet.

I feel like it is only necessary/beneficial for people who do not (or believe they do not) have the enzymes required to process gluten.

I believe it is beneficial to some people who have CD or gluten intolerance.

I believe the gluten-free diet is a valid way to stay healthy in terms of if you are allergic or have severe reactions to it.

The **second most common** theme ($n= 96, 27\%$) proclaimed that gluten was healthy to eat and the gluten-free diet is not meant for everyone. Exemplar quotes include:

It should be used for people with celiac or gluten sensitivities because otherwise you can lose out on important nutrients. The diet should be used carefully.

For those who believe gluten free is healthier, I would encourage them to do some research and discover what gluten is (small seedlike portion of cereal crops) and notice that for centuries gluten has been in foods without adverse effects. To me, if someone wants to be healthy, avoiding gluten is not the way to go. Instead, they should compose a diet of fresh and unprocessed foods, as gluten is natural and not a product of processing.

I believe you should do it if your body specifically requires it, otherwise I see no point. Your body normally can digest gluten, but like anything it should be eaten in moderation.

It is only necessary for people with Celiac disease. Gluten itself isn't bad for you.

I don't think a gluten free diet is necessary unless you have celiac or a severe intolerance. This is because if you choose the right products that contain gluten such as whole grain and whole wheat you are eating something healthy that will contribute well to the function of your body.

I think wheat is a good source of energy/ carbohydrates and should be eaten in

moderation but still eaten unless you have celiac.

The **third most common** theme ($n= 90, 26\%$) once again associated the gluten-free diet with fad diet and marketing tactics in order for companies to make money. Exemplar quotes include the following:

Unless it's medically applicable to you, it's just a fad. Of course bread will make you fat, it's not that humans can't process it as food, it's that most people are eating too much of it.

It's the modern day Atkins' diet. It's about as useful as planning your life around what your daily horoscope tells you.

For those that are just going with the trend, it's silly and a waste of money, as gluten-free products are often times more expensive. Also, by looking in the grocery store and seeing products that advertise as gluten-free it is evident that they are selling to the consumer of today. It is even more apparent when naturally gluten-free products are advertised as gluten-free anyway
It's the current trending diet. Just like kale and quinoa have been in the past, some people are eating it because it's the trendy thing to do.

I think gluten-free is mostly a buzz word, a fad, and a marketing ploy by companies to take advantage of uneducated consumers.

I believe it is just a trend. I have respect for people who have celiac a disease but other than that I think it's just a fad. I work in the restaurant business so I see a lot of people getting gluten free bread but then adding gluten ingredients making it pointless and annoying.

The **fourth most common** theme ($n= 89, 25\%$) questioned the existence of the gluten-free diet, especially for gluten-sensitive people, or outright called the diet a hoax. Exemplar quotes include:

I feel that being gluten intolerant is mostly a mind thing, and not an actual allergy. I'm inclined to believe that gluten sensitivity for people without the disease is not real.

I think it came about to solve a problem that's not really there. I think in the developed world we are so well off that we sometimes make up problems to solve.

It's ridiculous. The amount of food allergens in the world today is absurd in

general.

I do not think it works. I do not think people need to do a gluten-free diet; diets should be about proportions and not about what you eat.

I believe it's not entirely true and that it's a load of bs. I feel this way because gluten has been an integral part of the human diet for hundreds to thousands of years and now all of a sudden there are problems.

It's a hoax. People just need to eat a more balanced diet and drink more water.

I believe it is an unnecessary diet and started simply from pseudoscience that circulated on the Internet.

The **fifth most common** theme ($n= 84, 24%$) is that the gluten-free diet is healthy and generally makes people feel good. These responses were separate from the medical reasons theme because respondents referenced healthiness overall, and did not specify medical reasons.

The following quotes are exemplars of this theme:

Everyone should do it it's so good for you.

I also believe it's a good lifestyle choice for people that want to eat healthier.

I believe it is a healthy diet for people; however it is very difficult for me to imagine doing it. I LOVE bread.

I see nothing wrong with it if you like being healthy because it really is healthier for all people no matter whether you are sick or not.

I believe it is a healthy life to lead but it's just not for me. My favorite food is toast with all of the glutes.

I feel that gluten free diets can be healthier in the sense that you are eating more natural food.

I believe it is a healthy diet. The absence of grains in one's diet removes excess sugars and carbohydrates while encouraging more intake of fruits, vegetables, meats, and dairy.

I think it is beneficial and healthier, but it is hard cause I love pizza.

The **sixth most common** theme only was mentioned in 15% ($n= 53$) of the answers.

This theme focused on the hardships of following the gluten-free diet, such as the monetary expense and the general difficulty of adhering to the diet. Exemplar quotes of this theme include:

I personally would not want to be on a gluten-free diet because it would be too strict for me.

I believe that it's helpful to those who are allergic to gluten, but it can make their lives harder when they need to eat. A lot of foods have gluten in them, so they have to always check.

Its expensive.

I have tried to go gluten free just for the experience, and for me I just couldn't get enough food. Things like gluten free bread are a lot of the time too expensive.

I tried a gluten free cookie once and I did not think it was comparable to a normal cookie. I prefer to eat normal cooked food that does have gluten based on that experience.

It's frustrating because the most random things have gluten in them.

Being unable to eat gluten is a pain in the ass, and makes your diet difficult.

The **seventh most common** theme ($n=45$, 13%) involved the characteristics of people on the gluten-free diet for reasons other than celiac disease or gluten sensitivity. These descriptions were all negative in tone and content. Exemplar quotes of this theme include:

People who are "trying to go gluten-free" are either completely misinformed or just plain sheep.

I do think that people who go gluten free when they don't have a serious reason to are being way too picky though.

Honestly, it's a trend for extreme health freaks and hippies.

I think it is stupid. Ignorance and pretentiousness are the only reasons to be on it, unless of course you have celiac disease, then I hope they are on it for their sake.

Gluten free diet and vegans go hand in hand as dumb in my opinion.

I feel a lot of people do it to seem special or unique however.

It is just another health craze deal that is for people to use for excuses for their health. I believe this because the people who are on the diet are the cross-fit and organic "freaks".

I put the non-celiacs that go gluten-free in the same category as people who don't vaccinate their children to avoid autism.

It's fine for those that need it, however if you don't need to be on it you should not be acting with a prejudice towards those that don't feel the need to go on a gluten free diet.

The **eight most common** theme ($n= 41, 12\%$) focused on specific, non-medical benefits of the gluten-free diet, such as weight loss or increased energy. The following quotes are exemplars of this theme:

Its actually very easy to supplement with gluten free products or to find alternatives. A change in attitude, how you feel, and energy levels can be noticed when going gluten free.

More people should try it. Especially fat people who only eat fast food and frozen pizza.

It seems like an effective way to lose weight.

I believe that it is a good start to weight loss. I myself have tried it and it did make me feel a lot better.

One of my friends from high school switched to the diet in the middle of her freshman year, for health reasons, and she said that by going on the diet her skin cleared up and her whole body just felt more energized.

I believe it has helped me lose weight and has created a better life for me. My skin is more clear, my joints are less stiff, and I can see better.

The **ninth most common** theme ($n= 35, 10\%$) centered on the impact people who are on the diet for non-medical reasons have on people who eat gluten-free for medical purposes, and the impact on the general public. These answers circled around the feelings of "I don't care why you're on the diet – just don't bother me with it" and concern the non-medical dieting purposes were degrading the need to be on the diet for people with celiac disease or a gluten sensitivity.

Exemplar quotes of this theme include the following:

Now every food joint and grocery store are practically required to carry gluten-free options because the fake gluten-intolerant people will throw a fit if they have to eat something containing gluten even though they won't actually have a reaction if they do. Those people give the people who are clinically diagnosed with gluten-intolerance a bad reputation.

When I think about people becoming gluten free without having any sort of gluten allergy, I am annoyed and slightly angry. This is because I have watched my aunt drive around trying to find gluten free foods (that are expensive) for a relative who chooses to be gluten-free.

I feel like people can eat whatever the hell they want as long as they don't expect other people to cater to their weird eating.

It makes me feel bad for those who suffer from Celiac disease because the majority of people lump "gluten insensitivity" together, and few recognize the true severity of the disease.

Like any diet I think to each his own. I just don't want to constantly hear about like we do now. Deal with it and work around the diet but don't drag it on and on in a conversation.

I think people who don't have Celiac disease follow a gluten-free diet because they think it's cool or they think they have a gluten sensitivity but it's all in their head. These kinds of people are making light and invalidating people with Celiac disease.

I think it should only be used by gluten free people. It has no benefit to people doing a fancy diet, only if your body cannot process gluten. It makes fun of people that are actually gluten free to join a diet because it is trendy when it is how other people simply survive.

The **tenth most common** theme ($n= 23, 7\%$) focused specifically on gluten itself as harmful to the human body, often because of current wheat processing practices. The following quotes are exemplars of this theme:

The gluten free diet is over all better because the wheat that is used in bread and pasta is often processed and leads to inflammation and obesity where as gluten free options are limited so you can supplement your diet with more nutrient dense options.

I actually do think that gluten has few health benefits. But I eat it because I love

bread/baked items etc. I try to limit my intake of those items.

Gluten-free is a healthy way of living; gluten is not good more you as everyone is slightly allergic to gluten, inflaming organs.

I think to a certain extent it better for us not to ingest a lot of gluten. I think a lot of foods now a days contain too much gluten.

The **11th most common** theme was present in only 5% ($n=19$) of the answers. This theme was one of general disinterest with the gluten-free diet, either with respondents expressing their low likelihood of every going on the diet or how they have never really thought about the diet. Exemplar quotes of this theme include: “I will never go gluten free. Never.” “I don’t really have a strong stance either way,” and “I don’t really care about the diet because it does not effect me personally.” Finally, 3% ($n= 10$) of the respondents reported answers that did not fit into any of the themes. Example quotes in this group include: “I think the gluten-free diet is interesting,” “Weird how they have gluten-free bread tho – like how does that work,” and “products that contain gluten should always be labeled.” See Figure 1 below for a breakdown of the overall positive, negative, or neutral attitude for each theme.

Others’ Attitude about the Gluten-Free Diet. Attitude was also examined through another open-ended question that asked what respondents believed others thought about the gluten-free diet. A total of 333 respondents answered about the attitudes of others, resulting in 15 unique themes. The **most common** theme ($n= 182$, 56%) that emerged was centered others’ believing the gluten-free diet was healthy. Exemplar quotes of this theme include: “healthy,” “good for you,” “made others feel much better,” “good for everyone,” and “a healthier way to eat.” The **second most common** theme ($n= 181$, 54%) focused on the hardships of following the gluten-free diet. These responses tended to focus on the expensive nature of the diet, as well

Overall Attitude of Respondents' Beliefs about the Gluten-Free Diet

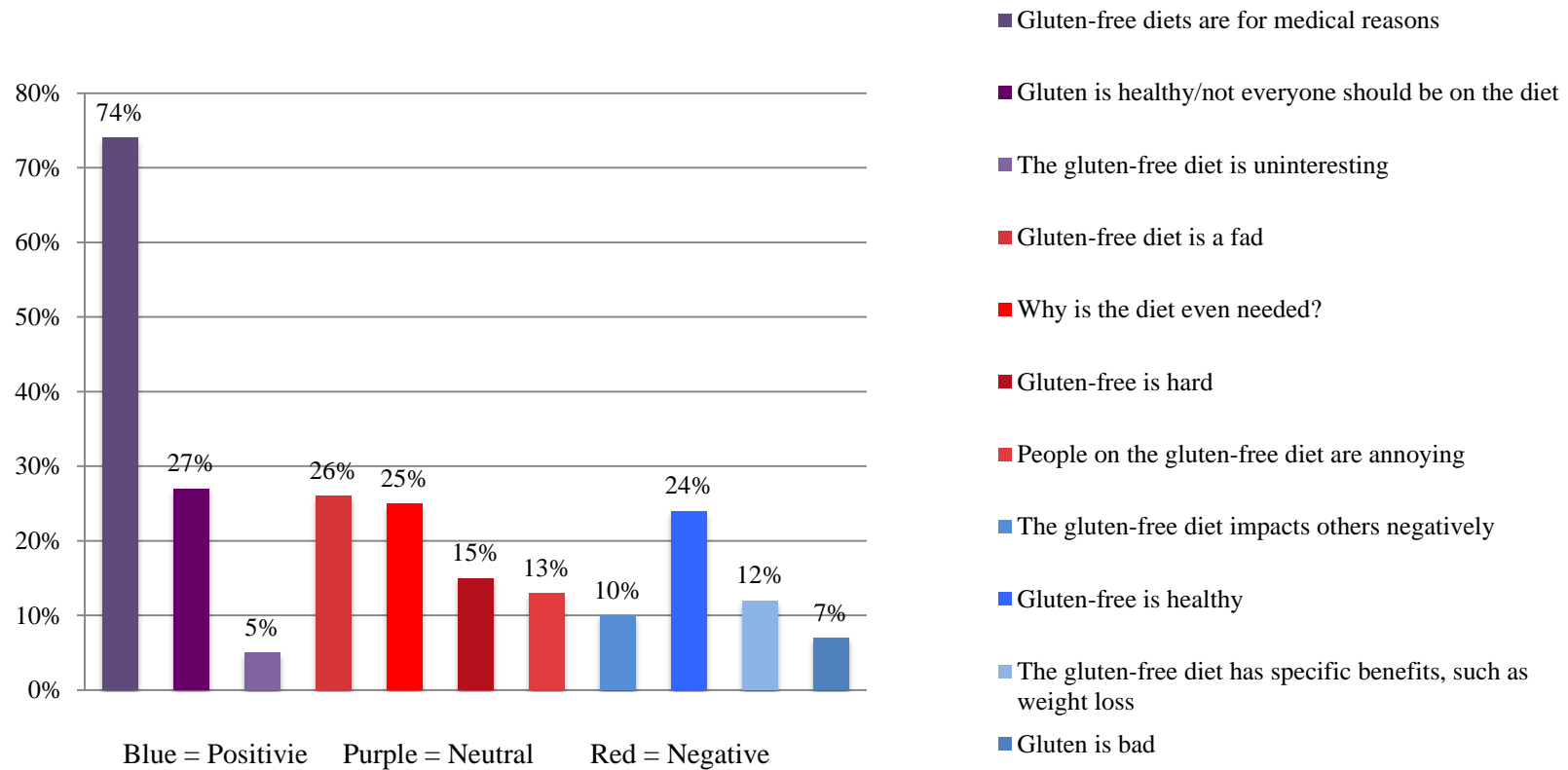


Figure 1. Pie chart shows the breakdown of positive, neutral, and negative attitudes by theme for respondents' beliefs about the gluten-free diet.

as the restrictive and unappetizing food options. Exemplar quotes of this theme include: “disgusting,” “a hassle,” “difficult,” “expensive,” “tasteless,” “restrictive,” and “costly.”

The **third most common** theme ($n= 91, 27\%$) involved others’ general annoyance with the gluten-free diet. Exemplar quotes of this theme include: “annoying,” “obnoxious,” “irritating,” “stupid,” “dumb,” and “silly.” The **fourth most common** theme ($n= 87, 26\%$) labeled the gluten-free diet as necessary and even beneficial. Exemplar quotes of this theme include: “necessary,” “required,” “essential,” and “beneficial.” The **fifth most common** theme ($n= 68, 20\%$) trended the opposite direction and characterized the gluten-free diet as unimportant and unnecessary. Exemplar quotes of this theme include: “unimportant,” “pointless,” “unnecessary,” and “useless.” The **sixth most common** theme ($n= 58, 17\%$) conveyed an attitude of the gluten-free diet as a fad diet, and a way for companies to make money. Exemplar quotes include: “a fad,” “trendy,” “marketing,” and “a way for companies to make money.”

The **seventh most common** theme ($n= 41, 12\%$) labeled the gluten-free diet as a hoax or scam. Exemplar quotes of this theme include: “fake,” “questionable,” “bogus,” “not a real thing,” “a scam,” and “a myth.” The **eighth most common** theme ($n= 33, 10\%$) reported attitudes of the diet as unhealthy. Exemplar quotes include: “not healthy,” “not healthier,” “bad for you,” and “unhealthy.” The **ninth most common** theme ($n= 29, 9\%$) linked the gluten-free diet with medical reasons such as celiac disease and gluten sensitivity. Exemplar quotes of this theme include: “for celiac’s disease,” “if you suffer from diseases that are affected by gluten,” and “necessary for celiac.” The **tenth most common** theme ($n= 24, 7\%$) indicated the gluten-free diet is a way to lose weight. Exemplar quotes of this theme include: “a weight loss diet,” “to lose weight,” “is just a way for girls to eat less,” and “carbless.” The **11th most common** theme ($n= 22, 7\%$) focused on the type of people who were on the diet, often negatively. Exemplar

quotes of this theme include: “for whiners,” “a Boulder thing,” “for glutards,” and “for hippies.”

The **12th most common** theme ($n= 19, 6\%$) characterized the diet positively, such as the diet being easy to follow or even fun. Exemplar quotes of this theme include: “fun,” “easy,” and “interesting.”

The **13th most common** theme ($n= 17, 5\%$) pertained to the gluten-free diet simply containing no bread or gluten. Exemplar quotes include: “no bread,” “free of gluten,” and “bread free.” The **14th most common** theme ($n= 6, 2\%$) described the gluten-free diet as a choice. Exemplar quotes include: “a choice,” and “optional.” The **15th most common** theme ($n= 6, 2\%$) related that the diet was either not popular or that the respondent had no idea what others thought about the diet. Exemplar quotes include: “no idea” and “no one talks about it.”

Finally, only 2% ($n= 7$) provided answers that did not fit into any of the above themes.

Exemplar quotes include: “wheat is not bad for you,” “new,” and “trial-and-error.” See Figure 2 below for a breakdown of the overall attitude of each theme for others’ beliefs about the gluten-free diet.

Others' Beliefs About the Gluten-free Diet (According to Respondents)

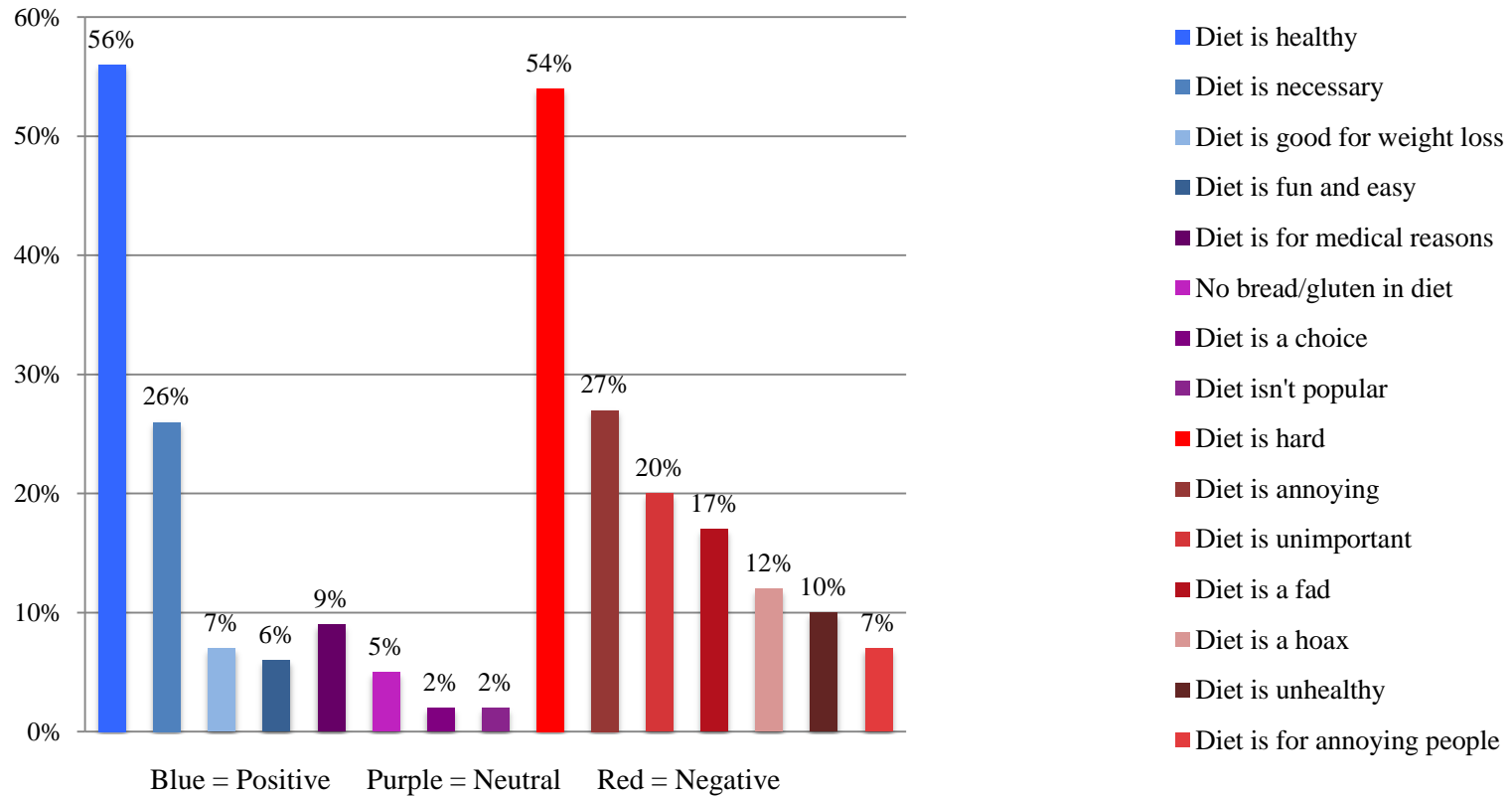


Figure 2. Pie chart shows the breakdown of positive, neutral, and negative attitudes by theme for others' beliefs about the gluten-free diet.

RQ2: From What Media Sources are College Students Getting Their Information About the Gluten-Free Diet?

The most common media source respondents saw gluten-free information were search engine results ($n = 171$, 49%). See Table 2 below for the breakdown of the other media sources.

Table 2

Percentage of Media Sources that Contained Gluten-Free Diet Information

Media Source	<i>n</i>	%
Search Engine Results	171	49.0%
Local/National TV	165	47.3%
Online-Only Publisher	163	46.7%
Social Media	152	43.4%
Magazines	148	42.7%
Online Aggregator	145	41.5%
Local/National Newspapers	126	36.4%
Followed Blog/Website	163	29.3%
Local/National Radio	90	25.9%
One-Topic Media Organizations	75	21.6%

RQ3: Which Types of Sources are Preferred for Gluten-Free Diet Information?

The most frequently preferred type of source for gluten-free diet information was health sources ($n = 221$, 60.1%). See Table 3 below for the breakdown of all types of media sources.

Table 3

Percentage of Media Source Types that Contained Gluten-Free Diet Information

Type of Media Source	<i>n</i>	%
Health	211	60.1%
News	135	38.9%
Lifestyle	127	36.5%
Sports	73	21.0%
Celebrity	63	18.2%
Fashion	33	9.5%

RQ4: From What Interpersonal Sources are College Students Getting Information?

The most frequently used interpersonal source for gluten-free diet information were friends or significant others ($n = 304$, 86.6%). The least used interpersonal source for information was health care providers ($n = 82$, 23.9%). See Table 4 below for information on the other interpersonal sources.

Table 4

Percentage of Interpersonal Sources for Gluten-Free Diet Information

Interpersonal Source	<i>n</i>	%
Friends/Significant Others	304	86.6%
Family	193	55.6%
Professors/Instructors	85	24.9%
Health Care Providers	82	23.9%

RQ5: Do Students' Attitudes and Information Sources about the Gluten-Free Diet Differ Based on their Personal Experience with Gluten?

The vast difference in total number of respondents that have personal experience with going on the gluten free diet for medical reasons ($n = 25, 7.1\%$) and the respondents who don't have any personal experience ($n = 326, 92.9\%$) called for the Mann-Whitney U test (a non-parametric test robust to data violations of the normal distribution assumption) to analyze differences.

Attitude and Personal Experience with Gluten. A Mann-Whitney U test revealed a significant difference in the attitude levels of respondents with experience with the gluten-free diet for celiac or gluten sensitivity reasons ($Md = 1.60, n = 25$), and respondents without experience ($Md = 1.80, n = 325$), $U = 2102, z = -4.064, p = .00$. However, the effect size of the significance was small ($r = .22$). Those with no experience with the gluten-free diet were associated with favorable attitudes toward the gluten-free diet as broadly healthier for everyone.

Media Information Sources and Experience with Gluten. A Chi-square test for independence indicated a significant association between gluten-free diet experience and seeing gluten-free information on a followed blog or website, $\chi^2(1) = 7.72, p < .01$, as well as magazine articles $\chi^2(1) = 5.02, p < .05$ and search engine results $\chi^2(1) = 3.90, p < .05$. More respondents with gluten-free diet experience (68.0%) saw gluten-free diet information on search engine results than respondents without gluten-free experience (47.5%). Additionally, respondents with gluten-free diet experience were more likely to see information on a followed blog/website (54.2%) and in magazine articles (64.0%) than respondents without gluten-free diet experience (27.4% and 41.0%, respectively). See Table 5 below for further information on each media source.

Table 5

Comparison of Experience with the Gluten-Free Diet and Media Sources with Gluten-Free Information

Media Source	Experience ^a		No Experience ^b		Total		χ^2
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Social Media	10	40.0%	142	43.7%	152	43.4%	.129
Search Engine Results	17	68.0%	154	47.5%	171	49.0%	3.90*
TV	10	40.0%	155	47.8%	165	47.3%	.572
Newspaper	9	36.0%	117	36.4%	126	36.4%	.002
Radio	6	24.0%	84	26.0%	90	25.8%	.049
One-Topic Media Organization	3	12.0%	72	22.3%	75	21.6%	1.453
Online Aggregator	12	48.0%	133	41.0%	145	41.5%	.462
Online-Only Publisher	13	52.0%	150	46.3%	163	46.7%	.303
Followed Blog or Website	13	54.2%	88	27.4%	101	29.3%	7.72**
Magazine	16	64.0%	132	41.0%	148	42.7%	5.02*

^a: Refers to experience with the gluten-free diet because the respondent has celiac disease or gluten sensitivity

^b: Refers to respondents who do not have experience with the gluten-free diet because of celiac disease or gluten sensitivity

* $p < .05$ ** $p < .01$

Interpersonal Information Sources and Experience with Gluten. A Chi-square test for independence indicated a significant association between gluten-free diet experience and discussing the gluten-free diet with family, $\chi^2 (1) = 27.5, p < .01$, as well as health care professionals $\chi^2 (1) = 37.0, p < .01$ and friends/significant others $\chi^2 (1) = 4.16, p < .05$. Respondents with gluten-free diet experience were more likely to talk to friends/significant others

(100%) than respondents without gluten-free experience (85.6%). Experienced respondents were also more likely to talk to family (100%) and health care professionals (75.0%) than respondents without gluten-free diet experience (52.2% and 20.1%, respectively). The breakdown of gluten sensitivity and interpersonal sources is illustrated in Table 6 below.

Table 6

Comparison of Experience with the Gluten-Free Diet and Discussing the Gluten-Free Diet with Interpersonal Sources

Interpersonal Sources	Experience ^a		No Experience ^b		Total		χ^2
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Family	25	100%	168	52.2%	193	55.6%	27.5**
Friends/Significant Others	25	100%	279	85.6%	304	86.6%	4.16*
Instructor/Professor	6	25.0%	79	24.9%	85	24.9%	.000
Health Care Professionals	18	75.0%	64	20.1%	82	23.9%	37.0**

^a: Refers to experience with the gluten-free diet because the respondent has celiac disease or gluten sensitivity

^b: Refers to respondents who do not have experience with the gluten-free diet because of celiac disease or gluten sensitivity

p* <.05 *p* <.01

Chapter 5: Discussion and Conclusion

Discussion

The results indicated high awareness of the gluten-free diet among both male and female students, with only 15 respondents unfamiliar with the diet who were then removed from the study. The majority of the respondents did not have personal experience with the gluten-free diet stemming from celiac disease or a gluten sensitivity. This high awareness without experience with the diet, combined with respondents reporting gluten-free diet information across multiple media sources, could indicate agenda-setting effects. The media have been discussing the gluten-free diet for a long time (Hellmich, 2013; McCarthy, 2014; O'Brien, 2011), and effects could have come from exposure to the topic over time (Conway, 2013; J. D. Jensen et al., 2011; McCombs & Shaw, 1972). Multiple media sources covering the diet could have also contributed to awareness, as agenda-setting focused on how more coverage of a topic can increase audience belief that the topic is important (McCombs, 1997; McCombs & Shaw, 1972; D. A. Scheufele & Tewksbury, 2007). Agenda-setting effects also depend on the audience belief that the topic is relevant to them; in general, dieting is common (De Ridder et al., 2014) and college students in particular are susceptible to dieting (Ackard et al., 2002; Davy et al., 2006). Respondents may have paid more attention to coverage of the gluten-free diet because of the attention they pay to dieting overall; this attention could then lead to a stronger belief that the amount of coverage means the respondents should pay attention to gluten-free messages.

The report of experience with the gluten-free diet because of celiac disease or a gluten sensitivity (7%) was higher than the national average of 1% for people with celiac disease ("Celiac Disease: Fast Facts," 2015). However, this higher number could also stem from self-diagnosis of those with gluten-sensitivity, as symptoms for celiac disease can sometimes be

difficult to diagnosis (Copelton & Valle, 2009). Almost 70% of the respondents overall identified the purpose of the diet as a way to treat celiac disease or gluten sensitivity. Respondents' own beliefs matched this purpose; 74% believed the diet was for medical reasons.

However, the respondents' beliefs and conceptualization of the diet as a treatment for celiac disease or a gluten sensitivity stood in opposition to the other attitudes present in their responses. If respondents were fully aware of the purpose of the diet, then they should have known the diet is not meant for the general public. The overall attitude of the respondents tended slightly toward a view of the diet as broadly healthy for everyone. Respondents with no experience with the diet were more likely to believe the diet was generally healthy for everyone, but the actual effect size of that attitude was relatively small. If the effect size stemmed from media effects on the respondents' attitudes, the small effect size was to be expected (McQuail, 1979). Additionally, due to the long-term coverage of the gluten-free diet ("Gluten-free diet fad: Are celiac disease rates actually rising?," 2012, "Gluten-free foods market to hit \$4.2 billion this year: Report," 2012, "Pedestrian Question - What is Gluten?," 2014; O'Brien, 2011; Wahba, 2015), effects were expected to happen over time, both for general awareness about the topic from agenda setting (Conway, 2013; J. D. Jensen et al., 2011; McCombs & Shaw, 1972), and attitudes about the diet from framing (Conlin & Bissell, 2014).

This "healthy for everyone" attitude was supported by the nearly 40% of respondents who believed the purpose of the diet was to be generally healthier and the 24% of respondents who reported a healthier belief about the diet. Over half of the respondents also believed that others thought the diet was healthier, too. This healthy attitude finding supported the worries of several researchers (Cross, 2013; Rubio-Tapia et al., 2012) about people thinking the diet was healthy without awareness of health consequences. Indeed, only 7% of respondents reported the

purpose of the diet as one most people should avoid, 27% believed the diet was not meant for everyone, and only 10% of respondents believed others' thought the diet was unhealthy.

There are several possible explanations for this split in knowledge about the gluten-free diet. First, since public knowledge about a topic is constructed with the help of media messaging about the subject (Philo, 2008), this healthy attitude could hint at information left out when media sources report about the diet. Media sources such as magazines and newspapers have been shown to leave certain information out when reporting on a health topic (Bazzini et al., 2015; Conlin & Bissell, 2014; Kelly et al., 2009; Nagler, 2014; Nagler & Hornik, 2012). While this practice is understandable given space and time limitations of reporting, it shows the consequences it can have on the key messages people take away. Health frames in general have been found guilty of frame omissions in the past that left out vital information about the health topic (Entman, 1993; Stefanik-Sidener, 2013). It is possible that media messages about the gluten-free diet omitted information about the nutritional problems with the diet, contributing to beliefs that the diet is generally healthy.

Second, the way media sources and messaging framed the gluten-free diet could also be at fault. Successful frames tap into culturally relevant cues and schemata (Gamson, 1985; Gamson et al., 1992; Goffman, 1974), and media sources could be focusing on preexisting frames surrounding fad dieting. Respondents were mostly likely already attentive to information on dieting (Davy et al., 2006; Downes, 2015), and any frames linking the gluten-free diet to past fad diets such as the Atkins diet, could have triggered cues previously held for fad diet schemas (B. Scheufele, 2004). Third, the location of the messages about the gluten-free diet could have also impacted how respondents processed diet information. Health type media sources were favored by 60% of the respondents for gluten-free diet information; seeing repeated, continuous

coverage in health sources could have lent the gluten-free diet a healthy slant, too, by nature of the media source type that presented the information (McCombs, 2005). The high usage of health type sources and the prevalent belief in the healthiness of the diet could lend credence to claims by scholars (Else, 2013; Gaesser & Angadi, 2012; Marcason, 2011; Moore, 2014) that media messages are contributed to incorrect diet attitudes.

Fad dieting beliefs were present in respondents' answers. While only 10% of the respondents listed a purpose of the diet to be trendy and make companies more money, over a quarter of respondents believed the diet was a money-producing fad. A possible explanation could be the respondents reacting exposure to the large amount of advertising and marketing of gluten-free products (Wahba, 2015) and the high sale numbers of companies selling gluten-free foods (Strom, 2014). Fad diet beliefs could also stem from the respondents' use of lifestyle (36.5), celebrity (18.2%), and fashion (9.5%) media type sources, especially if the sources are containing messages with celebrities who endorse the diet for its' healthy or appearance benefits, such as Miley Cyrus or Gwyneth Paltrow ("Miley Cyrus: Gluten-free diet is responsible for weight-loss," 2012; Rousseau, 2015). Repeated exposure from these sources could have led to an agenda-setting effect tinted by the general type of media source (fashion, celebrity, lifestyle), where respondent awareness about the gluten-free diet includes the type of source the messages are coming from. Respondents' fad diet attitude also supported the worries of scholars (Cross, 2013; Rubio-Tapia et al., 2012) that people were going on the gluten-free diet without knowing about the diet's nutritional deficits.

Also, fad diet attitudes could stem from the link media messages have made between the gluten-free diet and weight loss. While weight loss attitudes were not nearly as common as predicted by Marcason (2011), this attitude was still present in respondents' answers. One-third

of the respondents believed a purpose of the gluten-free diet was to help people lose weight, but only 12% of respondents expressed a weight-loss attitude in their beliefs and less than 10% of respondents believed others' thought the diet helped with weight loss. An explanation of the weight loss attitude could be the influence of the health media source type used by a majority of the respondents. Health source types in particular have been linked to health frames focused on appearance, often with an emphasis on dieting (Aubrey, 2010; Bazzini et al., 2015; Wills et al., 2013). Health source types could have produced gluten-free diet messaging that linked the diet to a culturally bound frame of fad dieting and weight loss. Culturally bound frames are more salient (Entman, 1993; Gamson et al., 1992; Goffman, 1974), which could have contributed to the respondents' weight loss attitude and overall fad diet attitude.

Additional negative respondent attitudes supported gluten-free diet backlash concerns (Moore, 2014). A small group of respondents (10%) expressed concern that fad dieting was actually hurting those on the gluten-free diet because of celiac disease or a gluten sensitivity. This same group also expressed disdain towards fad dieters who inconvenienced the respondents with the diet restrictions. In fact, a small group of respondents (13%) described fad dieters with negative characteristics, and 7% believed others' felt negatively about these fad dieters, too. Since celiac disease is not a visible illness, backlash from fad dieters eating gluten-free could extend to celiac patients also eating gluten-free.

Backlash toward those with celiac disease and gluten sensitivity could also stem from beliefs the diet was stupid or fake. A quarter of the respondents believed the diet itself was fake, or questioned the use of the diet for those with a gluten sensitivity. A small number of respondents (12%) also believed others' thought the diet was a hoax. Perhaps most disturbingly, a combined 47% of respondents believed others' either thought the diet was stupid or the diet

was completely unnecessary. Celiac disease patients have expressed worries before that others do not take the diet seriously, which could impact food preparation and service at restaurants (Sainsbury & Mullan, 2011; Zarkadas et al., 2013). These negative beliefs could be influenced by continued media messages with negative diet frames (Campbell, 2012; McCarthy, 2014), and the presence of the diet in media source types that could influence how respondents are viewing the diet.

The other factor possibly influencing all attitudes could have stemmed from the respondents' choice of media sources. Respondents seeing gluten-free diet information across multiple media sources supports the tendency for health information to be available in multiple media sources (Lovejoy et al., 2015). The media source with the most gluten-free diet information according to respondents was search engine results (49% of respondents). This amount of usage of the internet in general was supported by past studies of college students (American Press Institute, 2015; Roberts et al., 2014). The use of the internet for information on the gluten-free diet also supported findings by Lis et al. (2015), and supported research (Ruppel & Rains, 2012) that the internet is a common source for health information. However, many non-government websites have been found to contain incorrect or confusing information (Wills et al., 2013).

Additionally, search results for "the gluten-free diet" can yield a variety of results on a search engine such as Google or Bing. See Table 7 below for the website, type of media source, and whether the first page of the website included information about the unhealthiness of the gluten-free diet. See Appendix H for the first page of results for a search of "the gluten-free diet" on Google and Bing. As evidenced in the search results for both search engines, a variety of media sources are available for people interested in the diet. The motive of the respondents

could very well have played a part in what search engine results they used and how lengthy the search was conducted. A casual investigator into the gluten-free diet might have seen the advertisements and generally concluded the diet was healthy; similarly, a respondent who was searching about the diet because of health symptoms might have investigated deeper, and learned more about the diet for medical reasons. The majority of the search engine results did not include information about the unhealthiness of the diet on the first page of the website, which could have further contributed to any inaccurate respondents attitudes.

Table 7

Search-Engine Results for “Gluten-Free Diet” and Presence of Information on Healthiness of the Diet

Search Engine	Website	Type of Media Source	Gluten-Free Diet Unhealthy?
Google	Slimdownsmart.com	Ad	No
Google	Leancuisine.com	Ad	No
Google	About.com	Ad	No
Google	Mayo.com	Health	Yes
Google	Celiac.org	Health	Yes
Google	Glutenfreeliving.com	Health	No
Google	Wikipedia.org	Reference	Yes
Google	Gicare.com	Health	No
Google	Drperlmutter.com	Health	No
Google	Drperlmutter.com	Health	No
Google	Glutenfree.com	Health	No
Bing	Slimdownsmart.com	Ad	No

Bing	Leancuisine.com	Ad	No
Bing	Beyonddiet.com	Ad	No
Bing	DailyNaturalRemedies.com	Ad	Yes
Bing	Mayo.com	Health	Yes
Bing	Webmd.com	Health	No
Bing	Wikipedia.org	Reference	Yes
Bing	Glutenfreeliving.com	Health	No
Bing	Celiac.com	Health	Yes
Bing	Glutenfreedietfoods.com	Health	No
Bing	Slimdownsmart.com	Ad	No
Bing	Leancuisine.com	Ad	No
Bing	Beyonddiet.com	Ad	No

Social media usage by almost 44% of the respondents was lower than the 74-80% usage reported for college students looked for food, cooking or health information on social media (American Press Institute, 2015). Previous research (Stephens et al., 2014) indicated that health information on Facebook has been linked to more positive attitudes toward that health message. Respondents that saw gluten-free diet information in newspapers and magazines is supported by past research as well (American Press Institute, 2015; Kwan et al., 2010). As previously noted earlier in the discussion, conflicting and contradictory health information can exist in media (Nagler, 2014), newspapers can leave out needed health information (Kelly et al., 2009; Nagler & Hornik, 2012), and magazines can promote fad dieting (Bazzini et al., 2015; Conlin & Bissell, 2014; Kean et al., 2014) and incorrect health information (Aubrey, 2010; Bazzini et al., 2015; Conlin & Bissell, 2014). Respondents with celiac disease or a gluten sensitivity were more

likely to find gluten-free diet information on followed blogs/websites, magazines articles, and search engine results. These were not surprising results considering food allergy components in processed foods change over time, and that the diet is a lifestyle.

Finally, the possibly influence of family and friends cannot be discounted in this study. Nearly 90% of respondents talked to their friends or significant others about the gluten-free diet, and over half of respondents had spoken with family about the diet. Not surprisingly, respondents with celiac disease or gluten sensitivity were more likely to talk to family, friends, and health care providers about the gluten-free diet. This high number of respondents using family and friends as diet information sources is supported by other general health studies. Friends have consistently been listed as influential and trusted sources about health information for college students, especially when the topic concerns dieting (Banjari et al., 2011; Davy et al., 2006; Vader et al., 2011).

College students have also viewed family health information as influential (Davy et al., 2006; Deliens et al., 2014; Ferrara et al., 2011; Kwan et al., 2010; Vader et al., 2011). As Banjari et al. (2011) explained, a high usage of family and friends for health information could mean exposure to media health messaging as well. It is quite possible that respondents' conversations with friends and family interacted with any attitudes the respondents developed through media exposures (K. O. Jones et al., 2006; Redmond et al., 2010; Seo & Matsaganis, 2013). In contrast, the general healthy diet attitude and incorrect attitudes (such as weight loss) prevalent in the respondents' answers could have been impacted by lack of communication about the gluten-free diet with health care professionals. Less than a quarter of respondents spoke to a health care provider about the gluten-free diet, which repeated the results of Lis et al. (2015) and

supported general research (Kwan et al., 2010; Percheski & Hargittai, 2011; Vader et al., 2011) on college students not using health care professionals for health information.

Implications

There are several important implications to the findings of this study. First, the study indicated that media messages could be impacting college student attitudes about the gluten-free diet. Scholars (Else, 2013; Gaesser & Angadi, 2012; Marcason, 2011; Moore, 2014) worried about the effects of the media on beliefs could be correct. Second, study results reveal several worrying negative attitudes, namely the diet is stupid, the diet is fake, and the diet is a fad. This supports diet backlash claims in previous studies (Copelton & Valle, 2009; Sainsbury & Mullan, 2011; Zarkadas et al., 2013), which means the well-being of patients with celiac disease or a gluten sensitivity could be negatively impacted. However, it should be noted that these negative attitudes were present in a small group of respondents and not widespread. Third, study results confirmed there is a knowledge gap between knowing that the diet is a medical treatment and that the diet is unhealthy for the general population. This is concerning as a larger number of people are on the diet for other reasons than celiac disease or gluten sensitivity (Moore, 2014). Fourth, health care professionals were the least consulted information source for respondents without celiac disease or a gluten sensitivity. This could have exacerbated the knowledge gap, and means that college students were losing valuable nutrients if they went gluten-free without a medical reason.

Fifth, the findings indicated the need for health communicators to emphasize the medical reasons for the diet, including why the diet is unhealthy for most people. Sixth, the findings suggested that possible media messaging effects do not occur in a vacuum – the diet was also highly discussed amongst peers and family. Understanding the relationship between media

source messaging and interpersonal remarks could help further research about how the interplay between the two sources contributes to attitudes about subjects such as the gluten-free diet.

Recommendations for Practitioners and Educators

The following recommendations are made for those communicating about the gluten free diet. First, celiac disease foundations and organizations need to be aware of what negative attitudes about “being gluten-free” are circulating in college student groups. Considering the normalcy of students trying out new diets, and the lack of communication with health care providers, celiac foundations and organizations should work with college health networks to develop messaging that addresses general health and weight loss attitudes. Second, these foundations and organizations should also work on outreach to the common media sources above, especially for health media sources. Talking with journalists and media creators could decrease incorrect or misleading information about the gluten-free diet.

Third, health communicators at hospitals and other health networks should incorporate the gluten-free diet into messaging on healthy (and unhealthy) diets. These health communicators should also be aware of the backlash against those on the gluten-free diet, and consider setting up support groups for celiac and gluten sensitivity patients. Fourth, health educators should ask patients and clients about use of fad diets, including the gluten-free diet, at wellness checkups. The educators should be ready to explain why the gluten-free diet is not healthy for general public use. Fifth, health educators at the university level should remind students that messaging about the gluten-free diet should attempt to combat negative attitudes (i.e., the diet is fake, people on the diet are annoying, the diet is stupid, etc.) and include clear information about who should be on the diet. Sixth, grocery store nutritionists could include information next to the gluten-free section on why the gluten-free diet could be unhealthy.

Recommendations for Future Research

The goal of this study was to provide direction for future research into specific media sources with information on the gluten-free diet. Future studies should examine health sources in particular, especially health search engine results about the diet, health TV programming, online-only publisher health articles, social media, magazines, and online aggregators. With this information, the next step would be examining health articles and posts in these media sources for framing themes to see exactly what kind of information is presented about the gluten-free diet. Additionally, it would be worthwhile for the same framing study to be done with lifestyle and news sources, as those sources were used by close to 40% of the respondents as well. Knowing the exact frames, paired with the attitude themes from this study, would provide a detailed look into possible framing effects on college students and the extent to which media sources in particular provide incorrect information. The potential relationship between the media sources used by respondents and their attitudes should also be examined. Particular media sources could be missing information or include more inaccurate information than other media sources, and knowing which media sources are problematic could assist health communicators in addressing incorrect beliefs.

An experiment with different messaging on different media sources would also help with understanding how the source itself could play a role in respondent attitudes. Because the market for gluten-free products has grown so large, marketing and advertising of these products is widespread (Wahba, 2015). So while some media sources may provide accurate and complete information about the purpose of the gluten-free diet, repeated exposure to advertising messages painting gluten-free with a broad brushstroke of healthiness may influence consumers' attitudes more strongly. A study examining how consumers reconcile different attitudinal messages about

the diet from credible or accurate information sources versus advertising sources (including sources that are a mask for advertising) could reveal useful insights explaining why some still feel the diet is healthy for everyone.

Additionally, research should further examine the role friends and family play in attitudes about the gluten-free diet, in combination with media framing of the diet. Respondents listed friends and family as significant sources of information on the gluten-free diet, and the interplay between media and interpersonal should be examined to better understand how the dynamic impacts attitude about the diet. How the gluten-free diet is discussed could be mirroring and enforcing media frames, as Banjari et al. (2011) suggests. The conceptualization of the gluten-free diet as healthy should also be explored further to understand what respondents mean by ‘healthy.’ Finally, to further explore media reporting of the gluten-free diet, health journalists at the most used media sources should be interviewed for agenda building effects. The profitable nature of gluten-free foods could be playing a role in how articles are written. Any biases the journalists may have towards “trendy” diets could also impact the content of articles. To fully understand how the media could impact attitudes about the diet requires a complete view of the entire agenda-setting and messaging process.

Limitations

Limitations to this study include the lack of generalizability across any other population than the college students used for this study. The study used a convenience sampling, which while including varying majors and age, does not represent college students or other populations anywhere else. Another limitation could be the location of the population to begin with, as Colorado is known for being health conscious (Sealover, 2014). The just-reliable attitude scale could also have limited findings, especially since the open-ended responses revealed plenty of

broadly healthy diet attitudes. Also, due to the long nature of the media source question, respondents could have mindlessly answered in order to get done quicker. Lastly, the survey could have been taken on a mobile device, thus warping the appearance of the survey and possibly influencing how well the respondents answered questions (Dillman et al., 2014).

Conclusion

The study set out to understand what attitudes college students had about the gluten-free diet, and what media sources had information about the diet. The results indicate that college students slightly believe the diet is broadly healthy for everyone, but there is a negativity that exists underneath that attitude. These college students were frustrated with non-celiac people on the diet, and just the idea in general of the gluten-free diet as a stupid fad. These attitudes could be the result of negative coverage in the media, or the overall framing of the diet as trendy. Interestingly, respondents were keenly aware of the use of the diet for the treatment of celiac disease and gluten sensitivity, but still reported general healthy attitudes about the diet. This healthy attitude, in conjunction with reporting of health-type media sources as containing the most gluten-free information, could provide evidence that media framing is impacting how the diet is viewed. Agenda-setting effects could also be noted, as most of the respondents did not have personal experience with the diet for celiac or gluten sensitivity, but most were familiar with the gluten-free diet. Effects could have occurred over time, as media reporting on the gluten-free diet has been happening for several years.

Respondents with experience with the diet used more search engine results, followed blogs/websites, and magazine articles than those respondents with no experience. Those with celiac disease and gluten sensitivity also utilized both family and health care providers more than respondents without personal experience. Unfortunately, health care providers overall were the

least utilized interpersonal source for information about the gluten-free diet for respondents without experience with the diet, which possibly contributed to the overall incorrect ideas about the gluten-free diet. The high number of respondents who reported talking to peers about the diet illustrates the need to understand more about the interplay between interpersonal and media sources about the diet. Overall, this study demonstrates that incorrect attitudes concerning the healthiness of the diet, as well as annoyance over the diet trend, are present in this student population.

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Appendix A: Prenotification Script

Hello!

I'm Annie Walker, a graduate student in the Public Communication & Technology program. For my master's thesis, I'm working on a study to examine student attitudes about the gluten-free diet.

The survey asks questions about what you believe about the diet and where you have seen information about the diet. The survey is 10 minutes long, it's confidential, and it's an opportunity to earn 5 extra credit points. I'm hoping you will be willing to provide your input!

The survey will be sent to your email tomorrow, and it's voluntary. Please email me at annie.walker@colostate.edu if you have any questions.

Thank you!

Appendix B: Invitation Email

Dear [Student Name],

I am writing to ask you for your help with a survey for a master's thesis about the gluten-free diet. You have been chosen to complete a brief questionnaire about your attitudes about the gluten-free diet, as well as information sources about the diet.

You will be rewarded with extra credit in [class name(s)] for completing the survey.

The survey will only take about 10 minutes to complete. To begin the survey, please click this link:

[LINK]

If you have any questions, comments, or difficulties with the survey, please contact me by replying to this message or calling 605-988-4955.

We sincerely appreciate your help with the survey.

If you are not interested in participating or believe you were contacted in error, click this link:
[OPT OUT LINK]

Thank you,

Annie Walker
annie.walker@colostate.edu
Graduate Student
Public Communication & Technology
Colorado State University

Appendix C: First Reminder Email

Dear [Student Name],

A week ago we sent an email invitation requesting you to complete a survey about the gluten-free diet. Thank you so much for completing the survey if you have done so. If not, we highly encourage you to fill out the survey. The survey is short, and it should only take 10 minutes of your time.

To complete the survey, please click on the link:

[LINK]

If you have any questions, please feel free to [reply](#) to this message. Thank you so much for helping us with our study.

To opt out of future emails about this survey, please click this link: [LINK]

Sincerely,

Annie Walker
annie.walker@colostate.edu
Graduate Student
Public Communication & Technology
Colorado State University

Appendix D: Second Reminder Email

Dear [Student Name],

Last week, we reached out to you requesting for your help to complete a survey about opinions about the gluten-free diet. To ensure that our survey results are accurate, we are contacting you one last time for your help and valuable input. The results of the survey will be immensely helpful in learning about student attitudes towards the gluten-free diet.

You will be rewarded with extra credit in [class name] for taking this survey and it will close on [date].

Please click on the survey link below to fill out the survey:

[LINK]

Thanks for taking the time to fill out the survey.

Sincerely,

Annie Walker
annie.walker@colostate.edu
Graduate Student
Public Communication & Technology
Colorado State University

Appendix E: IRB Exempt Letter



Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX (970) 491-2293

Date: February 3, 2016

To: Katie Abrams, Ph.D., Journalism and Media Communication
Anne Walker, Journalism and Media Communication

From: IRB Coordinator, Research Integrity & Compliance Review Office
(RICRO_IRB@mail.colostate.edu)

Re: Student Attitudes and Information Sources for the Gluten-free Diet

IRB ID: 038 -17H **Review Date:** January 4, 2016
This project is valid from three years from the review date.

The Institutional Review Board (IRB) Coordinator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations with conditions as described above and as described in [45 CFR 46.101\(b\)](#):

Category 2 - Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The IRB determination of exemption means that:

- **This project is valid for three years from the initial review.** After the three years, the file will be closed and no further research should be conducted. If the research needs to continue, please let the IRB Coordinator know before the end of the three years. You do not need to submit an application for annual continuing review.
- You must carry out the research as proposed in the Exempt application, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.
- Any modification of this research should be submitted to the IRB through an email to the IRB Coordinator, prior to implementing any changes, to determine if the project still meets the Federal criteria for exemption.
- Please notify the IRB Coordinator (RICRO_IRB@mail.colostate.edu) if any problems or complaints of the research occur.

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB or designee may make the determination of exemption**, even if you conduct a similar study in the future.

Appendix F: Consent Form

You are invited to participate in a brief survey about your opinions about the gluten-free diet and media and interpersonal sources of information about the gluten-free diet. You will be asked questions about your opinion about the gluten-free diet, media sources where information about the diet is found, and interpersonal sources for information about the gluten-free diet. Your responses will help us understand attitudes about the diet, as well as information sources for future research into messages about the diet.

It will take 10 minutes to complete the survey. You will receive extra credit in all classes you are enrolled in that is offering this survey opportunity as a thank you for your thoughtful responses. If this survey is being offered in more than one of your classes, you only need to take it once to receive the credit in all of them.

Your data will be kept anonymous. Your name will be separated from your survey data so we can ensure you receive the extra credit points. Your participation in this study is completely voluntary. There is no penalty for not participating. You have the right to withdraw from this study at any time without consequence, and you can skip any question that you would prefer not to answer.

Whom to contact if you have questions about the study: Annie Walker, Public Communication & Technology graduate student, annie.walker@colostate.edu

Whom to contact about your rights as a research participant in the study: Colorado State University Research Integrity & Compliance Review Office (RICRO), RICRO_IRB@mail.colostate.edu; 970-491-1553

If you do not wish to participate in this study, exit the browser window. If you wish to complete the alternative extra credit assignment instead, please contact your instructor.

[CHECKBOX] I have read the procedure above and agree to participate in the survey.

Appendix G: Survey Questions

Q1. Have you heard of the gluten-free diet?

Yes

No

Q2. Do you have celiac disease?

Yes

No

Q3. Do you have a gluten sensitivity but have NOT been diagnosed with celiac disease?

Yes

No

Q4. Describe the purpose of the gluten-free diet.

. Can you think of any other purpose for the gluten-free diet?

Q5.

What do you believe about the gluten-free diet? Please also include why you feel the way you do about the diet.

. What more can you tell me about your feelings about the gluten-free diet?

Q6.

If anything, describe what you have heard others, besides yourself, say about the gluten-free diet in three different words or short phrases.

The gluten-free diet is:

The gluten-free diet is:

The gluten-free diet is:

Q7. For each of the following statements, pick the answer that best describes your belief in the statement:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The gluten-free diet assists with weight loss.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The gluten-free diet is a healthy diet for most people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The gluten-free diet is only a fad diet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The gluten-free diet helps with appearance issues, such as flat hair or dull skin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8. Which, if any, of the following media sources have provided you with information about the gluten-free diet?

	Yes	No
Social media posts/tweets	<input type="radio"/>	<input type="radio"/>
Results of a diet search on a search engine (such as Google)	<input type="radio"/>	<input type="radio"/>
Reports from a local/national TV station or network, its website, or app	<input type="radio"/>	<input type="radio"/>
Reports from a local/national newspaper, its website, or app	<input type="radio"/>	<input type="radio"/>
Reports from a local/national radio station, its website, or app	<input type="radio"/>	<input type="radio"/>
Reports from a media organization that focuses on one topic (such as the Weather Channel, ESPN, or TMZ), its website, or app	<input type="radio"/>	<input type="radio"/>
Articles/video from an online aggregator, such as GoogleNews or Reddit, that combine news or information from other sources	<input type="radio"/>	<input type="radio"/>
Articles/video from an online-only publisher, such as BuzzFeed, Yahoo! News, or the Huffington Post, or its app	<input type="radio"/>	<input type="radio"/>
Articles/video from a blog or website of someone I follow	<input type="radio"/>	<input type="radio"/>
Articles from a magazine, its website, or app	<input type="radio"/>	<input type="radio"/>

Q9. Besides the media sources in the previous question, are there any other media sources that have provided you information about the gluten-free diet?

A question about interpersonal information sources is located later in the survey, so please only answer about media sources.

No

Yes (please list media sources below)

Q10. In general, when you are provided information about the gluten-free diet, which, if any, of the types of media sources are you using?

	Yes	No
Lifestyle (ex: lifestyle magazines, lifestyle blogs, lifestyle websites, lifestyle television programs)	<input type="radio"/>	<input type="radio"/>
Health (ex: health magazines, health blogs, health websites, health television programs)	<input type="radio"/>	<input type="radio"/>
News (ex: newspapers, news magazines, news blogs, news websites, news television programs)	<input type="radio"/>	<input type="radio"/>
Fashion (ex: fashion magazines, fashion blogs, fashion websites, fashion television programs)	<input type="radio"/>	<input type="radio"/>
Celebrity (ex: celebrity news magazines, celebrity blogs, celebrity websites, celebrity television programs)	<input type="radio"/>	<input type="radio"/>
Sports (ex: sports magazines, sports blogs, sports websites, sports television programs)	<input type="radio"/>	<input type="radio"/>

Q11. For each of the following interpersonal sources, with whom, if any, has the gluten-free diet been discussed or mentioned?

	Yes	No
Family	<input type="radio"/>	<input type="radio"/>
Friends/Significant other	<input type="radio"/>	<input type="radio"/>
Instructor/Professor	<input type="radio"/>	<input type="radio"/>
Health Care Provider/Nutritionist	<input type="radio"/>	<input type="radio"/>

Q12. Besides the interpersonal sources in the previous question, are there any others with whom the gluten-free diet has been discussed or mentioned?

No

Yes (please list interpersonal sources below)

Q13. In which year were you born? Please enter the complete year, for example, 1993.

Q14. Please select your gender:

Male

Female

Other

. For extra credit, please fill out the following:

First Name

Last Name

. Check the class or classes to receive extra credit in:

CO 150, Section 001, Robinson (8am)

CO 150, Section 004, Moore (8am)

CO 150, Section 006, Robinson (9am)

CO 150, Section 007, Memoli (9am)

CO 150, Section 017, Memoli (10am)


CO 150, Section 028, Memoli (11am)

JTC 300, Section 001, Blair (12pm)

JTC 300, Section 004, Zlaten (10am)

JTC 300, Section 006, Blair (11am)

Appendix H: Google and Bing Search Engine Results for “Gluten-Free Diet”

Google 

[All](#) [News](#) [Images](#) [Shopping](#) [Videos](#) [More ▾](#) [Search tools](#)

About 29,100,000 results (0.34 seconds)

Start A Gluten Free Diet - slimdownsmart.com
Ad www.slimdownsmart.com/gluten-free ▾
Eliminate Bloating And Inflammation Burn Fat And Increase Your Energy!
Gluten Free Diet Triglycerides Diet
Reduce Inflammation Sugar Free Diet

LEAN CUISINE® Meals - LeanCuisine.com
Ad www.leancuisine.com/ ▾
Our New Menu Offers Freshly Made, Simply Frozen Gluten Free Options!
New Recipes - Low Carb Meals - Comfort Dishes - Healthy Eating

Gluten Free Diet Food List - About.com
Ad about.com/Gluten+Free+Diet+Food+List ▾
Search for Gluten Free Diet Food List. Find Expert Advice on About.com.
Trusted Guide · Trending News · 100+ Topics
Gluten Free Product Lists - Gluten Free Products - Is Oatmeal Gluten Free?

Gluten-free diet - Mayo Clinic
www.mayoclinic.org/...eating/.../gluten-free-diet/art-200485... ▾ Mayo Clinic ▾
A gluten-free diet is a diet that excludes the protein gluten. Gluten is found in grains such as wheat, barley, rye, and a cross between wheat and rye called ...

What Can I Eat? - Celiac Disease Foundation
<https://celiac.org/...gluten-free/glutenfreediet/f...> ▾ Celiac Disease Foundation ▾
Cutting out gluten from your diet may seem like a difficult and limiting task. Fortunately, there are many healthy and delicious foods that are naturally **gluten-free!**
Sources of Gluten - Gluten-Free Recipes - Cdf 7 Day Gluten-free Meal Plan

The Basic Gluten-Free Diet - Gluten-Free Living
www.glutenfreeliving.com/gluten-free-foods/diet/basic-diet/ ▾
Jun 21, 2013 - Foods made from grains (and grain-like plants) that do not contain harmful **gluten**, including: Corn in all forms (corn flour, corn meal, grits, etc.). ... Annatto, glucose syrup, lecithin, maltodextrin (even when it is made from **wheat**), oat gum, plain enicee silion diivide starch

In the news



Should you really give up gluten?

Telegraph.co.uk - 2 days ago
The key is to not go on a **gluten-free diet** without ruling out coeliac disease first.

Is the booming gluten-free baby food market about to get another boost?

FoodNavigator.com - 14 hours ago

No, A Pastor Was Not Just Defrocked for Failing to Serving Gluten-Free Communion - Celiac.com

Celiac.com - 12 hours ago

[More news for gluten free diet](#)

People also ask

- Is there gluten in brown rice? ▾
- Do potatoes have gluten in them? ▾
- Are grits gluten free foods? ▾
- What can you eat on a gluten free diet? ▾

Gluten-Free Diet: Popular Gluten-Free Foods in Pictures

www.webmd.com/digestive.../celiac.../slideshow-gluten-free-diet ▾ WebMD ▾

Starting a gluten free diet? Let this slideshow help. Get the facts about gluten free foods -- with tips on what to avoid, what to enjoy, and delicious, gluten-free ...

Gluten-free diet - Wikipedia, the free encyclopedia

https://en.wikipedia.org/wiki/Gluten-free_diet ▾ Wikipedia ▾

A **gluten-free diet** (GFD) is a diet that excludes gluten, a protein composite found in wheat, barley, rye, and all their species and hybrids The inclusion of oats in ...

Gluten-Free Diet : GiCare.com

gicare.com/diets/gluten-free-diet/ ▾

What has been found is that celiac patients, in fact anyone on a **gluten-free diet**, have an altered make-up of bacteria in the colon which favors the unwanted ...

Gluten Free Food List for a Healthy Brain - Start A Gluten ...

www.drperlmutter.com/eat/list-of-gluten-free-foods/ ▾

The following items can be consumed liberally on your **Gluten Free Diet** (go organic and local with your whole- food choices wherever possible; flash frozen is ...

What Foods Contain Gluten? A Gluten Free Diet for a ...

www.drperlmutter.com/eat/foods-that-contain-gluten/ ▾

If experiencing gluten intolerance symptoms, the products on this page should be avoided. Instead, concentrate on **gluten free**, brain healthy foods. Many are ...

GlutenFree.com

<https://www.glutenfree.com/> ▾ Gluten-Free Pantry ▾

Tips for Eating Heart Healthy on a **Gluten-Free Diet**. EA Stewart; April ... The Top 4 Questions to Ask Clients Considering a **Gluten-Free Diet**. GlutenFree.com ...

Searches related to gluten free diet

- [gluten free food list](#)
- [gluten free foods](#)
- [celiac disease symptoms](#)
- [gluten free diet weight loss](#)
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gluten free diet



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1



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8,480,000 RESULTS Any time

Start A Gluten Free Diet | slimdownsmart.com

Ad - slimdownsmart.com/gluten-free-diet

Follow a simple **gluten free diet** that helps you burn fat! Wheat breads, pasta, crackers, bagels, cereal.

16K people have visited slimdownsmart.com in the last month

- Gluten Free Diet
- Burn Belly Fat
- Lose Weight Today
- Reduce Inflammation
- Sugar Free Diet
- Healthy Lifestyle

LEAN CUISINE® Meals

Ad - LeanCuisine.com

Our New Menu Offers Freshly Made, Simply Frozen **Gluten Free** Options!

- Gluten Free Options
- Healthy Eating
- Low Fat Meals
- Protein Meals
- Organic & No-GMO
- Low Sodium Meals

Gluten Free Food List: - Gluten free diet

Ad - www.beyonddiet.com - 5,700 Twitter followers

What to Eat on a **Gluten Free Diet** - Simple to Follow **Gluten Free Plan!** Gluten is a protein found in wheat and grains.

194K people have visited beyonddiet.com in the last month

Common Gluten Free Foods - Gluten free diet

Ad - www.DailyNaturalRemedies.com

Find Out The 10 Most Common **Gluten Free Foods**... You Will Love #9

317K people have visited dailynaturalremedies.com in the last month

Natural Remedies · Meditate · Appetite Loss · 10 Signs of Lyme Disease

Gluten-free diet - Mayo Clinic

www.mayoclinic.org > ... > Nutrition and healthy eating > In-Depth

A **gluten-free diet** is a **diet** that excludes the protein **gluten**. **Gluten** is found in grains such as wheat, barley, rye, and a cross between wheat and rye called **triticale**.

Gluten-free diet - Mayo Clinic

www.mayoclinic.org > ... > Nutrition and healthy eating > In-Depth

A **gluten-free diet** is a **diet** that excludes the protein **gluten**. **Gluten** is found in grains such as wheat, barley, rye, and a cross between wheat and rye called **triticale**.

Gluten-Free Diet: Popular Gluten-Free Foods in Pictures

www.webmd.com/.../celiac-disease/ss/slideshow-gluten-free-diet

Starting a **gluten free diet**? Let this slideshow help. Get the facts about **gluten free** foods -- with tips on what to avoid, what to enjoy, and delicious, **gluten-free** ...

Gluten-free diet - Wikipedia, the free encyclopedia

https://en.wikipedia.org/wiki/Gluten-free_diet

A **gluten-free diet** (GFD) is a **diet** that excludes **gluten**, a protein composite found in wheat, barley, rye, and all their species and hybrids (such as spelt, kamut, and ...

Rationale behind ... · Eating **gluten-free** · Regulation and labels

The Basic Gluten-Free Diet - Gluten-Free Living

www.glutenfreeliving.com/gluten-free-foods/diet/basic-diet

Getting the **gluten-free diet** right is easy when you know the ground rules. Follow the guidelines below and find out which foods with **gluten** to avoid.

The Gluten-Free Diet 101 - A Beginner's Guide to Going ...

www.celiac.com > Celiac Disease

Celiac.com 04/09/2010 - Receiving a celiac disease diagnosis or being told you need to be on a **gluten-free diet** can be an overwhelming experience, and it is certainly ...

Related searches for gluten-free diet

- Gluten Free Food List
- Gluten Free Diet Food
- Basic Gluten Free Food List
- Gluten Free Shopping List for Beginners
- Gluten Free Diets That Work
- Symptoms of Gluten Intolerance in Wo...

Gluten Free: Diet, Food and Recipes for Beginners

www.glutenfreedietfoods.com

About **gluten free diet** and celiac disease. Learn what to eat including recipes and **gluten free** food list.

Related searches

- Gluten Free Food List
- Basic Gluten Free Food List
- Best Gluten Free Diets
- Gluten Free Diets That Work
- Gluten Free Shopping List for Beginners
- Symptoms of Gluten Intolerance in Women
- Gluten Free Diet Food
- Gluten Free Diet Plan Menu

Related image searches



Gluten Free Foods



Gluten Free Label



Gluten Free Cookies

6 Step - Gluten Free Diet | mygfd.com

Ad - mygfd.com/Gluten-Free-Diet

Dangers of **Gluten** Intolerance - Truth About **Gluten Free Diet** What is Gluten Free Diet Plan & Why is Gluten Bad For You

Gluten Free Food Shop - Gluten-Free Store.

Ad - www.thrivemarket.com/Gluten-Free

Gluten-Free Store. Save Up To 50%. Sign Up With Thrive Market Today!

Gluten Free Food Shop - Gluten-Free Store.

Ad - www.thrivemarket.com/Gluten-Free

Gluten-Free Store. Save Up To 50%. Sign Up With Thrive Market Today!

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Ad - TopNewsPlaceOnline.com

Lose Up To 22 Pounds in 2 Weeks. Get Your Risk **Free** Trial Now.

10 Symptoms of Celiac - Gluten free diet

Ad - ActiveBeat.co/Celiac

Learn about 10 common symptoms of celiac disease & intolerance. 10 Symptoms of Celiac Disease: Do You Have It | ActiveBeat

The Truth About Gluten | health.facty.com

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Is **Gluten** Bad for Your Health?

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Start A Gluten Free Diet | slimdownsmart.com



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Follow a simple **gluten free diet** that helps you burn fat!
Wheat breads, pasta, crackers, bagels, cereal.

Gluten Free Diet · Reduce Inflammation · Burn Belly Fat · Sugar **Free Diet**

LEAN CUISINE® Meals

Ad · LeanCuisine.com

Our New Menu Offers Freshly Made, Simply Frozen **Gluten Free** Options!
Gluten Free Options · Protein Meals · Healthy Eating · Organic & No-GMO

Gluten Free Food List: - Gluten free diet

Ad · www.beyonddiet.com · 5,700 Twitter followers

What to Eat on a **Gluten Free Diet**- Simple to Follow **Gluten Free** Plan!
Gluten is a protein found in wheat and grains.

