



## Too picky for my taste? The effect of the gluten-free dietary restriction on impressions of romantic partners

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### ABSTRACT

Millions of individuals world-wide adhere to a gluten-free diet and this dietary trend is on the rise. The present research identified a consumption stereotype of those following a gluten-free diet and tested whether this stereotype influenced impressions and interest in a potential romantic partner. We also assessed whether being gluten-free differentially impacted impressions of males compared to females. In Study 1, participants ( $N = 161$ ) responded to a survey containing both qualitative and quantitative components in which they evaluated gluten-free individuals and indicated their interest in dating them. In Study 2 ( $N = 132$ ), we manipulated the dietary restriction (gluten-free vs. no dietary restriction) of a target within the context of a mock online dating paradigm and measured participants' evaluations of the target. In both studies, gluten-free individuals were perceived as having positive and negative attributes such as being high-maintenance, picky, demanding, complaining and judgmental, yet healthy, self-disciplined, understanding and energetic. The gluten-free diet was associated with ratings of femininity and lead to more negative judgments of males than females. Whereas in Study 1 participants expressed some hesitation about dating a gluten-free individual, no effects on romantic interest were obtained in Study 2. These data are the first to delineate the gluten-free stereotype and provide a useful platform for future study.

### 1. Introduction

Dating often involves eating. It has been amply documented that the sharing of a meal is a common and well-scripted dating activity (Bartoli & Clark, 2006). Men and women tend to have specific and culturally-derived expectations regarding the sharing of a meal, such as where it is appropriate to eat in different stages of a relationship (Amiraiian & Sobal, 2009a) and what is and is not appropriate to consume (Amiraiian & Sobal, 2009b). Critical to the present research, what people consume can have important implications for the impression they convey to their partner (Vartanian, 2015). In the current studies, we sought to investigate whether adhering to a gluten-free diet has negative implications for impression formation and dating. This research builds on prior work documenting the existence of consumption stereotypes, which are preconceptions about people's characteristics based on the foods they consume (Vartanian, Herman, & Polivy, 2007).

The first goal of the present research was to identify whether or not a gluten-free consumption stereotype exists and to identify the components of the stereotype in general and within the context of dating.

Second, we sought to examine whether being gluten-free influences people's desirability as romantic partners in situations where the perceiver does not have a gluten-free dietary restriction. Third, given that gender stereotypes exist regarding food consumption, and dating is a context where both men and women tend to adhere to traditional gender role scripts (Eaton & Rose, 2011; Serewicz & Gale, 2008), we sought to examine whether being gluten-free differentially impacts males compared to females within this context.

### 2. Gluten-free diet

A gluten-free diet excludes the protein gluten, which is found in grains such as wheat, barley, rye and triticale (a cross between wheat and rye; Mayo Clinic, 2017). The best way to adhere to the diet is to consume products that naturally do not contain gluten such as fruits, vegetables, meat, poultry, seafood, dairy, beans, legumes and nuts (Celiac Disease Foundation, n.d.). People on a gluten-free diet avoid products containing wheat such as pastas, beer, cookies as well as products which may contain gluten due to cross contamination such as

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soy and snack foods, unless these products are specifically labeled as gluten-free (Johanson, 2015). In a broad sense, the gluten-free diet can be an extension of existing dietary trends, such as found in the Atkin's diet and the Paleo diet, which similarly focus on a reduction of carbohydrates (Applegate & Grivetti, 1997).

It is estimated that about 0.69% of the U.S. population, about 1.76 million individuals, adhere to a gluten-free diet due to Celiac disease (Kim et al., 2016). Celiac disease is a condition whereby ingestion of gluten triggers an autoimmune response which can damage the digestive system over time (Mayo Clinic, 2017). However, an even greater number of people, estimated at 1.08%, or about 2.7 million individuals, adhere to the diet without a diagnosis of Celiac disease (Kim et al., 2016). Additionally, whereas the number of individuals who adhere to a gluten-free diet due to Celiac disease remained stable between the years 2009–2014, the number of people who adhere to the diet without a diagnosis has tripled between those years (Kim et al., 2016). People report adhering to the diet for various reasons including gluten-sensitivities and a belief in the diet's health benefits (The Hartman Group, 2015; The Nielsen Company, 2015). Although many individuals follow the diet because of their belief in its health benefits, research finds that gluten avoidance does not yield benefits for non-gluten sensitive individuals and may even be associated with adverse health outcomes, including impaired immune function and increased cardiovascular risk (e.g., De Palma, Nadal, Collado, & Sanz, 2009; Lebwohl et al., 2017; Niland & Cash, 2018). As described next, individuals adhering to a gluten-free diet, like individuals who follow other non-standard dietary strategies, may also be subject to consumption stereotypes.

### 3. Consumption stereotypes

Consumption stereotypes are stereotypes about people's characteristics based on *what* and *how much* they eat. Many studies have shown that what and how much people eat is associated with judgements of social appeal (such as being moral and fun), physical attractiveness, judgments of health and weight as well as ratings of femininity and masculinity (Vartanian et al., 2007).

Studies focusing on the healthiness of the diet have shown that people's stereotypes of others who consume healthy and unhealthy diets consist of both positive and negative attributes (Fries & Croyle, 1993). On the one hand, people judge those eating a low-fat diet as more physically attractive, healthy, fit, conscientious, intelligent and moral (Barker, Tandy, & Stookey, 1999; Mooney, DeTore, & Malloy, 1994; Stein & Nemeroff, 1995; Yantcheva & Brindal, 2013). On the other hand, those consuming a low-fat diet are perceived to be more picky and self-centered (Fries & Croyle, 1993), as well as less happy, less fun, more boring and serious and high-strung than those consuming a high-fat diet (Barker et al., 1999). Those following a “clean eating” diet, a diet devoid of anything considered impure such as dairy and gluten, have similarly been evaluated more negatively than those not following a clean diet (Nevin & Vartanian, 2017). Healthy foods and low-fat diets have also been associated with ratings of femininity, and unhealthy foods and high-fat diets with ratings of masculinity (Barker et al., 1999; Stein & Nemeroff, 1995; Zhu, Brescoll, Newman, & Uhlmann, 2015).

The gluten-free diet has been advocated as a healthy diet by health professionals in popular books such as “Grain Brain” (Perlmutter, 2013), “Wheat Belly” (Davis, 2011), as well as in magazine articles (Greenblatt, 2011; O'Brien, 2011) and testimonials by celebrities (Mazziotta, 2016; Tucker, 2016). Thus, it is conceivable that perceptions of gluten-free individuals would be similar to perceptions of consumers of low-fat/healthy meals. As such, we anticipated that the gluten-free stereotype will be associated with high ratings of femininity and low ratings of masculinity. In addition, we predicted that the stereotype will include positive qualities such as being healthy and physically attractive as well as negative qualities such as being high-strung, picky, self-centered, and difficult to please. Given our interest in the content of the gluten-free stereotype within the context of dating, we

examined whether the stereotype was associated with interpersonally relevant qualities for dating and relationships such as being kind and affectionate and critical and judgmental (Murray, Holmes, & Griffin, 1996).

#### 3.1. Would a picky eater be a picky romantic partner?

In the initial stages of dating, having a gluten-free dietary restriction might serve as a heuristic to the amount of investment a romantic partner would require in a relationship. Someone who is picky with food choices might be seen as someone who would be high-maintenance in other aspects of their life. Therefore, we have extended the scope of the negative qualities we examined to include qualities tapping the concept of “high-maintenance” - defined as “requiring a large amount of care” (Merriam Webster, n.d.). We conceptualize the quality of high-maintenance to include related qualities such as difficult to please, selfish, entitled, concerned about appearance, picky, and demanding. Given the interdependent nature of relationships (Kelley & Thibaut, 1978; Van Lange & Rusbult, 2012), perceptions of high-maintenance have a negative connotation in this context as such perceptions imply that a romantic partner would require excessive care and attention.

According to prominent theories of relationships, perceptions of equity (a balance between one's contributions to the relationship and relationship outcomes) is associated with relationship satisfaction (for reviews see: Clark & Chrisman, 1994; Sprecher & Schwartz, 1994), whereas perceptions of inequity (such as if one's contributions exceed one's outcomes) are associated with feelings of distress and dissatisfaction (Hatfield, Utne, & Traupmann, 1979; Hatfield, Walster, & Berscheid, 1978; Utne, Hatfield, Traupmann, & Greenberger, 1984). Concerns with fairness and equity are particularly important in the initial stages of relationships (Lloyd, Cate, & Henton, 1982), since couples at this stage have not yet established feelings of trust that a partner would be there for them during times of need (Holmes & Rempel, 1989). Drawing from these established theories, we predicted that participants would evaluate a gluten-free date as high-maintenance and, as a result, would be less interested in dating someone who was gluten-free for fear of entering into an imbalanced relationship.

#### 3.2. Gender differences

Would being gluten-free differentially impact males and females within the context of dating? From an evolutionary perspective, health and physical attractiveness are especially desirable for women as these qualities signal fertility (Buss, 1989). Research has shown that women are judged to be more physically attractive and overall more positively when they consume low-fat or healthy meals compared to high-fat or unhealthy meals (Mooney et al., 1994; Oakes & Slotterback, 2004). Based on this prior work, we expected that the gluten-free diet would be associated with more positive impressions of women.

Furthermore, as previously described, we anticipated that the gluten-free diet would be associated with heightened perceptions of femininity and lower masculinity. Given gender stereotypes (Levant & Rankin, 2014; Reid, Cooper, & Banks, 2008), we anticipated that being gluten-free could disproportionately negatively impact people's impressions of males but positively impact impressions of females. Past research has shown that females are judged more positively when they consume “feminine” foods or small portions than when they consume “masculine” foods or larger portions (Basow & Kobrynowicz, 1993; Bock & Kanarek, 1995; Chaiken & Pliner, 1987). Males, on the other hand, are judged to be less masculine when they adhere to a vegetarian diet which is inconsistent with the stereotype for males to consume meat (Ruby & Heine, 2011). Both men and women experience backlash when engaging in stereotype-inconsistent behaviors (Rudman, 1998; Rudman & Fairchild, 2004). Men are especially susceptible to negative judgment when they engage in feminine behaviors (Vandello & Bosson,

2012). Thus, we predicted that being gluten-free would be more desirable for females than males as it is consistent with social gender stereotypes.

#### 4. Research overview

We conducted two studies in order to determine whether a consumption stereotype exists towards those adhering to a gluten-free diet in general and within the context of dating. We also sought to identify the elements of such a stereotype and whether it influenced people's interest in dating. To this end, Study 1 was a survey which contained qualitative and quantitative components. We conducted a thematic analysis on participants' open-ended responses to identify the elements of the stereotype. In addition, we asked participants to evaluate gluten-free individuals on a series of traits as well as answer questions pertaining to their expectations about dating others with such a dietary restriction. In Study 2, we manipulated the gender and dietary restriction of a target within the context of a mock online dating paradigm and measured participants' impressions of and interest in dating the target.

We hypothesized that participants would attribute both positive and negative qualities to those adhering to a gluten-free diet. In particular, we expected gluten-free individuals to be perceived as high-maintenance including qualities such as difficult to please, selfish, entitled, concerned about appearance, picky and demanding. Given that these qualities have negative ramifications in the context of dating, we expected participants to be less interested in dating such individuals. We further surmised that interest in dating would be statistically mediated by high-maintenance perceptions. Finally, we anticipated that adhering to a gluten-free diet would be associated with higher ratings of femininity and lower ratings of masculinity and, as such, would lead to negative impressions of males but not females.

#### 5. Study 1

##### 5.1. Method

**Participants and procedure.** One hundred and ninety-four undergraduates from Western Connecticut State University (WCSU) participated in a study entitled "Impressions of Others and the Self" which was administered online through the survey software Qualtrics. The study was advertised through email solicitations and flyers posted across campus. Participants were offered either Introductory Psychology course credit, extra credit (if offered by their instructor) or entry into a lottery for one of three chances to win a \$15 Amazon gift card for completing the study. Eleven participants were excluded from analyses because of incomplete data. Twelve participants were excluded because they were gluten-free, seven participants were excluded because they were vegan and an additional three participants were excluded because they were either gluten-free or vegan in the past.<sup>1</sup> This resulted in a sample of 161 participants (50 males, 111 females). The age of participants ranged from 18 to 52 ( $M_{\text{age}} = 21.95$ ,  $SD = 6.19$ ,  $Mo = 18.00$ ). Ninety participants indicated that their ethnicity was European American, 34 Latino or Latin American, 15 African American, 8 Asian, 2 Arab or Arab-American and 12 as "Other". Fifty-three participants indicated that they were not in a relationship but have been in the past, 17 have never been in a relationship, 14 casually dating, 64

<sup>1</sup> The vegan participants were excluded because the study materials also assessed stereotypes of those adhering to a vegan diet for a separate project (only the section of the study pertaining to the gluten-free diet is reported here). The gluten-free and vegan questions were similar and presented in counterbalanced order. Therefore, we excluded both the gluten-free and vegan participants to ensure that participants' own dietary restrictions did not influence their perceptions of others with similar dietary restrictions.

exclusively dating, 3 engaged and 10 married. The majority of the sample reported having no dietary restriction (121 no dietary restriction, 7 vegetarian, 14 dairy-free, 5 nut-free, 9 avoid seafood, 9 "other").<sup>2</sup>

Participants first completed screening questions to ensure they had not completed the study previously and that they were completing the study on a computer (not a cell phone or tablet). Participants then answered a series of questions regarding their impressions of others who adhere to a gluten-free and vegan diet in counterbalanced order (only the section of the study pertaining to the gluten-free diet is reported here). They then completed a series of personality, background measures and a gluten-free knowledge quiz. At the conclusion of the study they were debriefed and thanked.

##### 5.2. Measures

**Gluten-free stereotype.** This open-ended question was modified from a measure used by Lepore and Brown (1997) regarding the stereotype of Black individuals and asked participants to describe the general expectation people have of those adhering to a gluten-free diet. Specifically, the instructions were: "We would like to learn more about people's impressions of individuals who adhere to a gluten free diet. A gluten-free diet is a diet which excludes the protein gluten. Gluten is found in grains such as wheat, barley, rye, etc. Please write below what you think people expect those on a gluten-free diet to be like. We are not necessarily interested in your personal beliefs but rather what you think people expect of those on a gluten-free diet to be like in general and how they are expected to behave."

**Expectations of a gluten-free date.** This open-ended question asked participants to describe their expectations of a gluten-free dating partner. The prompt was: "Imagine going on a first date with an individual who discloses adhering to a gluten-free diet. Please use the space below to describe the type of behaviors you could expect from this individual."

**Interpersonal qualities.** In this questionnaire (adapted from Murray et al., 1996), participants were asked to rate someone who adhered to a gluten-free diet relative to the average person on a series of qualities used to create measures of positive qualities, negative qualities, high-maintenance qualities, femininity, and masculinity. Participants rated the qualities on a nine-point scale (1 = way below average, 9 = way above average).

**Positive qualities.** The measure included a series of positive attributes (i.e., kind and affectionate, confident, sociable; extroverted, intelligent, open and disclosing, witty and humorous, loving, self-disciplined, healthy, likeable, tolerant and accepting, patient, rational, understanding, responsive, physically attractive, sexy, warm, moral) that were averaged to form a positive qualities scale ( $\alpha = 0.88$ ).

**Negative qualities.** The measure included a series of negative attributes (i.e., critical and judgmental, lazy, controlling and dominant, moody, immature, rude, thoughtless, distant, complaining, hard to get along with, cold, harsh) that were averaged to form a negative qualities scale ( $\alpha = 0.87$ ).

**High-maintenance.** We generated a series of qualities which tapped the construct of high-maintenance (i.e., high maintenance, picky, difficulty to please, selfish, entitled, concerned about appearance and demanding,  $\alpha = 0.81$ ).

**Femininity and masculinity.** Additionally, on two separate items, participants rated the relative femininity and masculinity of a gluten-free individual compared to the average person (i.e., feminine, masculine). These items, generated for this study, were also rated on a 1 (way below average) to 9 (way above average) scale. Consistent with the view that perceptions of masculinity and femininity are separate dimensions (Bem, 1974; Hoffman & Borders, 2001), the two items were

<sup>2</sup> Four participants had more than one dietary restriction.

uncorrelated ( $r = 0.02$ ).

**Hesitation to date.** This four-item measure tapped the extent to which participants would be hesitant about dating someone who was gluten-free (e.g., “How hesitant would you be about entering into a relationship with a person who adheres to a gluten-free diet?”). Participants responded on a scale ranging from 0 (*not at all*) to 8 (*extremely*). Responses were averaged and higher ratings indicate more hesitation ( $\alpha = 0.83$ ).

**Gluten-free attitudes.** Four items, adapted from Sainsbury and Mullan (2011), were averaged to assess perceptions of a gluten-free diet (i.e. “Generally, I believe a gluten-free diet is”; 1 = *useless*, 9 = *useful*; 1 = *harmful*, 9 = *beneficial*; 1 = *foolish*, 9 = *wise*; 1 = *negative*, 9 = *positive*). Higher scores reflect more positive attitudes towards the gluten-free diet ( $\alpha = 0.92$ ).

**Exposure to gluten-free individuals.** Two items gauged people's exposure to others who adhere to a gluten-free diet (i.e., “How many friends do you have who are gluten-free?”; 1 = *none*, 2 = *one*, 3 = *two to five*, 4 = *five to ten*, 5 = *over ten*; “How often do you spend time with people who adhere to a gluten-free diet?”; 1 = *never*, 5 = *all the time*). These items, derived from earlier research on out-group contact (Turner, Hewstone, Voci, & Vonofakou, 2008), were moderately associated ( $r = 0.56, p < 0.001$ ), and were averaged to assess exposure to gluten-free individuals.

**Gluten-free diet knowledge quiz.** Participants completed a shortened version of a Gluten-Free Knowledge Quiz developed by Leffler et al. (2008). Participants were first asked whether wheat-free is the same as gluten-free (1 = *true*, 2 = *false*). Participants were then given a list of grains/flours and asked whether each was gluten-free in the U.S. (e.g., *Buckwheat, Spelt, Teff, Amaranth, Kamut, Rice pilaf, Wild rice, Chickpea flour, Triticale, Quinoa*, 1 = *Yes*, 2 = *No*). Participants earned one point for each correct response such that a perfect score on the quiz equaled 11.

### 5.3. Results

Scores on the exposure to gluten-free individuals scale revealed that the majority of the sample mentioned having at least one gluten-free friend (none = 28%; one = 26.7%; two to five = 41%; five to ten = 1.9%; over ten = 2.5%), and the majority reported interacting with others who, at least occasionally, followed a gluten-free diet (never = 27.3%; occasionally = 24.8%; sometimes = 28%; quite a lot = 13%, all the time = 11%). This is consistent with the statistics showing that the gluten-free diet is relatively common (Kim et al., 2016). Interestingly, results of the Gluten-Free Knowledge Quiz revealed that participants were fairly knowledgeable of the gluten-free diet ( $M = 6.57, SD = 1.81, 59.73\%$ ), with scores ranging from 3.00 to 11.00.

A one sample *t*-test comparing the composite measure of attitudes towards the gluten-free diet to the scale's average ( $M_{scale} = 5$ ) revealed that participants' views of the gluten-free diet were more positive

( $M = 5.73, SD = 1.78$ ) than the scale average,  $t(160) = 5.21, p < 0.001, d = 0.41$ . Table 1 depicts correlations among all variables. Positive attitudes towards the gluten-free diet were correlated with exposure to gluten-free individuals and knowledge of the diet.

**Coding of open-ended responses.** Two coders conducted a thematic content analysis on participants' open-ended responses to the questions pertaining to the gluten-free stereotype and expectations of a gluten-free date. The coders conducted the analysis in several stages (Braun & Clarke, 2006). In the first stage, they read through all of the responses and identified themes which were driven by the data. In the second stage, the coders coded the phrases in each response for the presence (coded as 1) or absence (coded as 0) of the themes. Each response was coded for as many phrases as applied. Each phrase could only be coded into one theme. An average Cohen's Kappa agreement of 0.86 for the gluten-free stereotype question and of 0.83 for the gluten-free date question reflects good agreement in coding the themes. In the final stage, coders resolved any discrepancies (Table 2).

**Gluten-free stereotype.** Participants were most likely to describe gluten-free individuals as high-maintenance (44.1%). This broader theme included two sub-themes: picky/cautious about what they put in their body which included asking questions about food (31.7%), as well as describing them as selfish, entitled, demanding, arrogant, difficult to please or concerned about their appearance (14.3%). A large number of participants also described them as healthy or concerned about their health (31.7%). Some participants described gluten-free individuals as normal or no different from others (18%). They were also described as easily annoyed, especially in reaction to not getting their needs met (5.6%). Some participants ridiculed the gluten-free person or the diet (15.5%). Others focused on the motivation for the diet and mentioned a gluten allergy or medical issues (26.1%), weight loss (6.8%) or a motivation to follow trends (8.1%). Some described gluten-free individuals as thin (6.8%).

**Expectations of a gluten-free date.** Gluten-free dates were most commonly described as high-maintenance (51.6%) which included the sub-themes of picky/cautious (44.7%), as well as indications of them being selfish, entitled, demanding, arrogant, difficult to please or concerned about their appearance (14.3%). A large number of participants also described them as normal/no-different from others (23.6%). Participants also described them as judgmental of the participant and especially what he/she chooses to eat (9.9%), healthy/concerned about their health (8.7%) and easily annoyed (8.1%). Participants again mentioned a gluten allergy or medical issues as a reason for the diet (7.5%). Some participants ridiculed the gluten-free person or the diet (3.7%), whereas others described them as understanding (6.2%), happy/energetic (3.7%) and self-disciplined (3.1%).

**Interpersonal qualities.** Consistent with participants' open-ended responses, gluten-free individuals were ascribed a mixture of high-maintenance, positive and negative qualities (see Table 3). Specifically, gluten-free individuals were ascribed qualities related to high-maintenance such as being picky, high-maintenance, difficult to please,

**Table 1**  
Study 1 zero-order correlations among variables.

	M	SD	1	2	3	4	5	6	7	8	9
1. High-Maintenance Qualities	5.72	1.12	–								
2. Negative Qualities	4.92	0.98	0.80**	–							
3. Positive Qualities	5.23	0.72	0.05	0.07	–						
4. Femininity	5.12	1.54	0.47**	0.46**	0.12	–					
5. Masculinity	4.46	1.50	0.01	0.09	0.31**	0.02	–				
6. Hesitation to Date	2.48	1.99	0.20**	0.14	–0.17*	0.05	–0.03	–			
7. GF Attitudes	5.73	1.77	–0.17*	–0.19*	0.43**	–0.15	0.16*	–0.37**	–		
8. Exposure to GF individuals	2.36	0.96	–0.11	–0.06	0.12	–0.08	0.03	–0.12	0.23**	–	
9. GF Knowledge	6.57	1.81	–0.04	–0.10	0.14	0.02	0.07	–0.24**	0.16*	0.23**	–

Note.  $N = 161$  (except GF Knowledge  $N = 160$ ). GF = Gluten-Free.  
\* $p < 0.05$ . \*\* $p < 0.01$ .

**Table 2**  
Themes from open-ended questions in Study 1.

Theme	Gluten-free Stereotype		Gluten-free Date		Example
	n (%)	$\kappa$	n (%)	$\kappa$	
High-maintenance	71 (44.1)	0.86	83 (51.6)	0.75	
Picky/Cautious	51 (31.7)	0.84	72 (44.7)	0.78	“I think they would be picky and questioning the menu”
Selfish/Entitled/Demanding	23 (14.3)	0.98	23 (14.3)	0.82	“people expect them to be very stuck-up and judgmental because they are refusing to eat something that everyone else eats for aesthetic purposes”
Healthy/Health conscious	51 (31.7)	0.82	14 (8.7)	0.77	“they are very health conscious and they probably work out a lot”
Gluten allergy/Medical issues	42 (26.1)	0.79	12 (7.5)	0.85	“most people either have to go gluten free because of Crohn's disease or digestive issues, yet I think that gluten free isn't too bad”
Normal	29 (18.0)	0.91	38 (23.6)	0.87	“they are expected to behave just as any other person but are restricted to what they can and can't eat”
Ridiculed diet/person	25 (15.5)	0.87	6 (3.7)	0.72	“there is a serious problem with someone who cannot eat regular bread or pasta”
Easily Annoyed	9 (5.6)	0.65	13 (8.1)	0.78	“if they can't find anything gluten free they'd get really annoyed by it”
Weight loss	11 (6.8)	0.79	–	–	“I would guess that people on gluten free diets either do so for medical reasons or just want to lose weight”
Trend follower	13 (8.1)	0.92	–	–	“I think gluten free diets are ridiculous and people who do not have the allergy like to do it because it's trendy”
Thin	11 (6.8)	1.00	–	–	“those on a gluten free diet may be very thin, and skinny”
Judgmental	–	–	16 (9.9)	0.89	“they would probably tell me how much gluten my food has and would always make comments about everything I eat”
Understanding	–	–	10 (6.2)	0.83	“I expect them to be understanding and patient because it is hard to go to a restaurant and have a whole menu for gluten free people”
Happy/Energetic	–	–	6 (3.7)	0.91	“I would find this individual to be carefree and ready for adventure”
Self-disciplined	–	–	5 (3.1)	0.89	“I would expect them to be very self-disciplined”

Note.  $N = 161$ , coded by two independent coders. Themes displayed are limited to those with 5 or more instances.

Participants who mentioned both of the sub-themes of high-maintenance were counted as one instance in the calculation of the total number of instances in the broader high-maintenance theme.

demanding, concerned about appearance and entitled. In terms of interpersonally negative qualities, they were most likely to be described as complaining, critical and judgmental, controlling and dominant and moody. At the same time, they were ascribed positive qualities such as being self-disciplined, healthy, intelligent, confident, moral, responsive and physically attractive.

Interestingly, as can be seen in Table 3, gluten-free individuals were especially likely to be rated highly on the high-maintenance qualities. For example, five of the seven high-maintenance qualities were in the top ten most endorsed qualities. To examine this question empirically, we compared participants' ratings of the high-maintenance qualities to their ratings of the positive and negative qualities. A paired sample  $t$ -test revealed that participants rated gluten-free individuals significantly higher on the high-maintenance qualities ( $M = 5.72$ ,  $SD = 1.12$ ), than the negative qualities ( $M = 4.92$ ,  $SD = 0.98$ ),  $t(160) = 14.93$ ,  $p < 0.001$ ,  $d = 1.18$ . They also rated them higher on the high-maintenance qualities than the positive qualities ( $M = 5.23$ ,  $SD = 0.72$ ),  $t(160) = 4.72$ ,  $p < 0.001$ ,  $d = 0.37$ .

As displayed in Table 1, the high-maintenance qualities were significantly correlated with the negative qualities but not correlated with positive qualities. The positive and negative qualities were not correlated.

**Femininity and masculinity.** We next examined whether gluten-free individuals were perceived to be more feminine than masculine. A paired sample  $t$ -test revealed that, as expected, gluten-free individuals were rated as more feminine ( $M = 5.12$ ,  $SD = 1.54$ ) than masculine ( $M = 4.46$ ,  $SD = 1.50$ ),  $t(160) = 3.95$ ,  $p < 0.001$ ,  $d = 0.31$ . As shown in Table 1, perceptions of femininity were also significantly correlated with perceptions of high-maintenance and negative qualities. In contrast, masculinity was not correlated with the high-maintenance or the negative qualities but was correlated with positive qualities.

**Hesitation to date.** Did participants report any hesitation about dating gluten-free individuals? We conducted a one sample  $t$ -test comparing the average of the composite measure of hesitation ( $M = 2.48$ ,  $SD = 1.99$ ) to 0, the score representing no hesitation on this scale. Participants expressed some hesitation about dating a gluten-free individual,  $t(160) = 15.79$ ,  $p < 0.001$ ,  $d = 1.25$ .

As can be seen in Table 1, perceptions of high-maintenance were significantly correlated with hesitation, whereas perceptions of positive qualities were negatively correlated with hesitation. Not surprisingly, positive attitudes towards the gluten-free diet and knowledge of the gluten-free diet were negatively correlated with hesitation.<sup>3,4</sup>

#### 5.4. Discussion

Study 1 examined the components of the gluten-free stereotype and people's reactions towards gluten-free individuals within the context of dating. The results suggest that the stereotype of gluten-free individuals consists of a mixture of both positive and negative qualities, which is consistent with past research of those consuming a healthy diet (Barker et al., 1999; Fries & Croyle, 1993). Gluten-free individuals were especially likely to be portrayed as picky, high-maintenance, difficult to please, demanding, concerned about appearance, and entitled in both the quantitative and open-ended responses. They were rated higher on the high-maintenance qualities than all other qualities. The high-maintenance qualities were associated more strongly with the negative qualities than the positive qualities, suggesting that being high-maintenance was seen unfavorably by participants. It is also noteworthy that the quality “picky” was the highest rated quality used to portray gluten-free individuals in the quantitative responses and it was one of the most common descriptors in the open-ended responses, suggesting that being picky is an important component of high-maintenance. Gluten-free individuals were also ascribed negative qualities such as complaining, critical and judgmental, and controlling and dominant. These ratings were consistent with the open-ended responses in which they were described as easily annoyed, and judgmental. Participants also

<sup>3</sup> We also conducted a series of independent sample  $t$ -tests comparing male to female participants on the criterion measures reported in Table 1. There were no significant sex differences on any of these variables.

<sup>4</sup> We conducted additional analyses excluding all participants with any type of dietary restriction ( $N = 121$ ). The results with this sample showed the same pattern of results reported here and can be found in Table 1 in the online supplementary materials.

**Table 3**  
Study 1 means and standard deviations of the interpersonal qualities in descending order.

Interpersonal Qualities	High-Maintenance		Negative		Positive	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Picky	6.55	1.85				
Self-disciplined					6.32	1.66
High-maintenance	6.23	1.59				
Healthy					6.18	1.75
Difficult to please	5.77	1.63				
Complaining			5.71	1.72		
Demanding	5.66	1.75				
Critical and judgmental			5.63	1.65		
Concerned about appearance	5.58	1.63				
Controlling and dominant			5.50	1.59		
Intelligent					5.50	1.12
Confident					5.47	1.25
Entitled	5.45	1.52				
Moral					5.37	1.32
Responsive					5.26	0.96
Physically attractive					5.24	1.20
Moody			5.20	1.58		
Sociable; extroverted					5.19	1.27
Understanding					5.16	1.32
Loving					5.14	1.09
Open and disclosing					5.08	1.21
Kind and affectionate					5.06	1.13
Hard to get along with			5.02	1.45		
Likeable					5.01	1.22
Tolerant and accepting					4.99	1.46
Warm					4.96	1.14
Rational					4.93	1.18
Harsh			4.93	1.50		
Patient					4.88	1.43
Witty and humorous					4.87	1.26
Rude			4.84	1.57		
Sexy					4.83	1.24
Selfish	4.78	1.50				
Cold			4.77	1.47		
Distant			4.69	1.33		
Immature			4.34	1.40		
Thoughtless			4.34	1.66		
Lazy			4.09	1.45		

Note.  $N = 161$ , All items were measured on a 1(*way below average*) to 9(*way above average*) scale with higher scores indicating more of the construct.

expressed some hesitation about dating gluten-free individuals and these hesitations were correlated with perceptions of high-maintenance and negative qualities but not with positive qualities. Thus, participants were more hesitant about dating a gluten-free individual to the extent that they perceived him/her as high-maintenance and as likely to possess negative qualities.

Nevertheless, in both the quantitative and open-ended responses participants portrayed gluten-free individuals with positive characteristics such as being self-disciplined and healthy/health conscious. In the open-ended responses they also described them as happy/energetic and understanding. Participants also mentioned various reasons for following the diet such as due to an allergy or medical condition, in order to lose weight or in order to follow trends. Overall, participants had positive attitudes towards the gluten-free diet and were fairly knowledgeable about the diet, although some participants ridiculed the diet in their open-ended responses.

Individuals on a gluten-free diet were evaluated as having more feminine than masculine qualities. This result is consistent with prior research on other dietary restrictions that are perceived as healthy (e.g., Barker, et al., 1999; Stein & Nemeroff, 1995). It is notable, however, that these evaluations were made in reference to the average person, without the consideration of gender. Consequently, it may be that a gluten-free diet is related to greater perceptions of femininity than masculinity for both males and females, or it may influence perceptions

of femininity and masculinity only for males or females. Data relevant to the role of gender is provided in Study 2.

One limitation of Study 1 is that it relied on self-report data from a non-experimental design. As such, participants' self-reports may not reflect their actual perceptions of a gluten-free individual when placed in a realistic dating context. Study 2 was conducted to extend Study 1 to a realistic dating context as well as to measure participants' impressions of dating a gluten-free individual in a less direct manner. The study employed an experimental design to examine participants' reactions towards a specific target rather than the entire class of gluten-free individuals.

## 6. Study 2

The goal of Study 2 was to use an experimental design to examine stereotypes of gluten-free romantic partners. Participants were presented with a target dating profile of a person who was either gluten-free or not. The gender of the target was set to match participants' dating preferences. Subsequently, participants were asked to evaluate the target on a series of traits. We hypothesized that participants would evaluate a gluten-free target as more high-maintenance than a control target. We also anticipated that participants would be less interested in dating a gluten-free target. Further, it was anticipated that the effect of gluten-free status on interest in dating the target would be statistically mediated by high-maintenance evaluations. As in Study 1, we again anticipated that a gluten-free target would be judged as more feminine and less masculine than a control target. Finally, Study 2 also provided an opportunity to explore the possibility that gender would moderate the influence of gluten-free status on our dependent variables. Specifically, we hypothesized that being gluten-free would impact impressions of males more than females (Vandello & Bosson, 2012).

### 6.1. Method

**Participants.** One hundred and fifty-two single WCSU undergraduates between the ages of 18–22 participated in exchange for Introductory Psychology course credit or entry into a lottery for a chance to win one of two \$25 Amazon gift cards. The study was advertised through email-solicitations and flyers posted around campus. Fourteen participants were excluded from analyses because they have indicated at the end of the study that they were in a committed relationship. An additional 4 participants were excluded because they have previously participated in Study 1 and were not blind to the experimental hypothesis. One person was excluded because of incomplete data and another person was excluded because she heard about the manipulation before participating. This resulted in a sample of 132 participants (48 males, 84 females;  $M_{age} = 19.27$ ,  $SD = 1.42$ ). Eighty-six participants indicated that their ethnicity was European American, 18 African American, 19 Latino or Latin American, 3 Asian, 1 Native American/American Indian and 5 as "Other". One hundred and nine participants indicated that they were not in a romantic relationship and 23 were casually dating but not in a committed relationship (115 heterosexual, 2 homosexual, 4 lesbian, 11 bisexual). The majority of the sample reported having no dietary restriction (102 no dietary restriction, 6 vegetarian, 5 dairy-free, 3 nut-free, 9 avoid seafood, 11 "other").<sup>5,6</sup> None of the participants were gluten-free or vegan.

**Procedure.** Participants were invited to take part in a study entitled "Online Dating and Personality," which was administered online through the data collection program Qualtrics. Participants first

<sup>5</sup> Four participants had more than 1 dietary restriction.

<sup>6</sup> We conducted additional analyses excluding all participants with any type of dietary restriction ( $N = 102$ ). The results with this sample showed the same pattern of results reported here and can be found in Tables 2 and 3 in the online supplementary materials.



Fig. 1. Study 2 dating profile of the gluten-free male.

completed screening questions to ensure that they met the 18–22 age requirement, were not in a committed relationship, had not previously completed this study or related studies, and that they were completing the study on a computer (not a cell phone or tablet). Participants then answered two questions regarding their gender and sexual orientation.

Participants were then presented with a dating profile of a target which was designed to appear similar to profiles used by online dating websites such as “OkCupid”, “Jdate” and “Plenty of Fish” (Fig. 1) with the following cover story:

We are interested in devising an online matchmaking service for undergraduates at WCSU. Last semester we collected personal information from undergraduates at WCSU who were interested in our matchmaking service. These students agreed to share their information at this preliminary stage but in order to protect their privacy we will not reveal their picture or personal identity. You will be presented with a profile of one of these students which will be randomly selected from our dating pool. If you are interested you will have the option to learn more about this person and the option of meeting them in person. Also, you will have the option to learn more about and meet another person from our service. In order to increase this person's chances of meeting someone we will also ask you to evaluate their profile so that we can give them feedback to help them find someone.

We manipulated the *dietary restriction* of the target as well as matched the target's *gender* to participants' dating preference based on their response to the sexual orientation question in the beginning of the study. Bisexual participants were randomly assigned to view either a male or female profile. The target was always described as 20 years of age and of average height and weight (the female was 5'4" and the male was 5'10", as in Bock & Kanarek, 1995; Ruby & Heine, 2011).

The target profiles were designed to be as neutral as possible and included an avatar of a male or female target rather than a picture. We

chose to present an avatar rather than a real image of the target because we wanted to avoid a situation whereby participants anchored on the target's appearance and ignored the manipulation of dietary restriction (Vartanian et al., 2007). We manipulated the dietary restriction of the target in their description of their favorite books, movies, TV shows and food: “I enjoy reading *Gluten-Free Cook-books* (vs. “*cook-books*”) and trying new recipes as I hope to become a Chef one day”; “I tend to enjoy going out to restaurants which have some *Gluten-Free options* (vs. “*interesting options*”).”

Participants then completed the dependent measures which included the same interpersonal qualities measure which was used in Study 1, a measure of their interest in dating the target, a manipulation check, the same measures of attitudes towards the gluten-free diet and exposure to gluten-free individuals which were used in Study 1, background measures and the Gluten-Free Knowledge Quiz. Participants were then debriefed and thanked.

## 6.2. Measures

**Interpersonal qualities.** Participants were asked to rate the target on the same series of qualities used in Study 1 with the exception that the trait “*selfish*” was replaced with the trait “*self-centered*” and two additional traits tapping high-maintenance were added: “*trendy*” and “*arrogant*”. We created three composite scores by averaging participant's ratings of the high-maintenance traits ( $\alpha = 0.91$ ), negative ( $\alpha = 0.94$ ) and positive ( $\alpha = 0.92$ ) traits. As in Study 1, participants also rated the target's femininity and masculinity.

**Dating interest.** This eight-item measure tapped participants' interest in dating the target in the profile (e.g., “How interested are you in going on a date with this person?”). Participants made their ratings on a 1 (*not at all*) to 9 (*extremely*) scale. An additional question asked participants about their dating interest (e.g. “Are you more interested in:” 1 = *Meeting someone else from the service*, 5 = *Neutral*, 9 = *Meeting this*

person). We averaged responses to these questions to create a composite measure of dating interest ( $\alpha = 0.93$ ). Higher scores indicate greater dating interest.

**Gluten-free attitudes.** We used the same gluten-free attitudes measure from Study 1 ( $\alpha = 0.92$ ).

**Exposure to gluten-free individuals.** We used the same two-item measure of exposure to gluten-free individuals used in Study 1 ( $r = 0.61, p < 0.001$ ).

**Gluten-free diet knowledge quiz.** We used the same Gluten-Free Knowledge Quiz which was utilized in Study 1.

**Manipulation check.** Participants were asked to identify the exact sentence that was presented in the profile (1 = *I tend to enjoy going out to restaurants which have some interesting options*, 2 = *I tend to enjoy going out to restaurants which have some gluten-free options*, 3 = *Unsure*).

### 6.3. Results

Similar to Study 1, the majority of the sample had indicated that they have at least one gluten-free friend (none = 34.8%; one = 33.3%; two to five = 28.8%; five to ten = 3%; over ten = 0%), and the majority also reported interacting with others who, at least occasionally, adhered to a gluten-free diet (never = 31.8%; occasionally = 34.1%; sometimes = 22.7%; quite a lot = 7.6%, all the time = 3.8%). Like Study 1, participants were fairly knowledgeable of the gluten-free diet ( $M = 6.34, SD = 1.71, 57.63\%$ ) with quiz scores ranging from 2.00 to 10.00.<sup>7</sup>

A one sample *t*-test comparing the composite measure of attitudes towards the gluten-free diet to the scale's average ( $M_{\text{scale}} = 5.00$ ) revealed that participants' views towards the gluten-free diet were more positive ( $M = 5.35, SD = 1.82$ ) than the scale average,  $t(131) = 2.23, p = 0.03, d = 0.39$ . A two-way Analysis of Variance (ANOVA) with condition (gluten-free vs. control) and target gender (male vs. female) as between-subject factors revealed that these perceptions did not differ by condition,  $F(1, 128) = 0.01, p = 0.93$ , partial  $\eta^2 < 0.01$ . We did obtain a significant main effect of target gender, such that those evaluating the male targets ( $M = 5.64, SD = 1.68$ ) had more positive views towards the gluten-free diet than those evaluating the female targets ( $M = 4.94, SD = 1.93$ ),  $F(1, 128) = 4.76, p = 0.03$ , partial  $\eta^2 = 0.04$ .

**Manipulation check.** Overall, participants identified the correct sentence in their profile at a greater level than chance,  $X^2(2, N = 132) = 95.04, p < 0.001$ . Eighty-three percent of participants in the gluten-free condition correctly identify the gluten-free statement in the profile and 77.05% of participants in the control condition correctly identified the control statement.<sup>8</sup>

**Dependent measures.** We conducted a series of two-way ANOVAs with condition (gluten-free vs. control) and target gender (male vs. female) as the between-subject factors on each of the dependent measures. Table 4 provides the descriptive statistics across condition and target gender and Table 5 provides the results of the  $2 \times 2$  ANOVAs. Here we focus on the significant effects observed on the primary dependent measures.

<sup>7</sup> Additional statistical analyses showed that exposure to gluten-free individuals and knowledge of the gluten-free diet did not moderate the effects of condition and target gender on the dependent variables.

<sup>8</sup> Fourteen participants in the control condition and 7 participants in the experimental condition were unsure about what statement they read in the profile. An additional 5 participants in the experimental condition incorrectly identified the control sentence in the profile. We conducted additional analyses excluding all participants who did not provide the correct answer on the manipulation check. The results using this sub-sample showed the same effects as the full sample and are reported in Tables 2 and 3 in the online supplementary materials.

**Table 4**

Study 2 means and standard deviations on dependent measures as a function of experimental condition and target gender.

Dependent Measures	Control Condition				Gluten-Free Condition			
	Female Target (n = 25)		Male Target (n = 36)		Female Target (n = 30)		Male Target (n = 41)	
	M	SD	M	SD	M	SD	M	SD
High-Maintenance Qualities	4.01	1.10	2.94	1.18	4.19	1.11	3.90	1.40
Negative Qualities	3.64	1.29	2.56	1.26	3.67	1.02	3.36	1.21
Positive Qualities	5.38	0.60	5.06	1.04	5.11	0.65	4.95	0.93
Femininity	5.44	1.08	2.72	2.04	5.37	1.03	3.98	1.57
Masculinity	3.80	1.96	4.97	1.75	3.23	1.59	4.37	1.11
Dating Interest	4.34	1.76	4.24	1.75	4.65	1.40	4.20	1.67
Gluten-free Attitudes	4.96	2.21	5.66	1.74	4.93	1.70	5.63	1.65

Note. Participants ( $N = 132$ ) rated the dating target on each scale. All scales ranged from 1 to 9, items were worded such that higher scores indicate more of the construct.

### 6.4. Interpersonal qualities

**High-maintenance.** The ANOVA with the composite measure of high-maintenance as the dependent measure revealed that there was a significant main effect of condition,  $F(1, 128) = 6.84, p = 0.01$ , partial  $\eta^2 = 0.05$ . Participants rated the gluten-free targets as more high-maintenance ( $M = 4.02, SD = 1.29$ ) than the control targets ( $M = 3.38, SD = 1.26$ ). There was also a main effect of target gender,  $F(1, 128) = 9.64, p = 0.002$ , partial  $\eta^2 = 0.07$ . The female targets were judged to be more high-maintenance ( $M = 4.11, SD = 1.10$ ) than the male targets ( $M = 3.45, SD = 1.38$ ). The condition by target gender interaction was marginally significant,  $F(1, 128) = 3.20, p = 0.08$ , partial  $\eta^2 = 0.02$ . A goal of this study was to test the hypothesis that being gluten-free would negatively influence perceptions of males more than females. Because this interaction was only marginally significant, and because we had unequal samples of males and females, we took a conservative approach and probed for gender differences within condition using Tukey-Kramer post-hoc tests (Kramer, 1956; Tukey, 1953). A Tukey-Kramer post-hoc test revealed that the gluten-free male ( $M = 3.90, SD = 1.40$ ) was judged to be significantly more high-maintenance than the control male ( $M = 2.94, SD = 1.18$ ),  $p = 0.005, d = 0.60$ . Ratings of the gluten-free female ( $M = 4.19, SD = 1.11$ ) did not significantly differ from ratings of the control female ( $M = 4.01, SD = 1.10$ ),  $p = 0.95, d = 0.09$ .

**Negative qualities.** The ANOVA with the composite measure of negative qualities as the dependent measure revealed that there was a significant main effect of condition,  $F(1, 128) = 3.90, p = 0.05$ , partial  $\eta^2 = 0.03$ . Participants attributed more negative qualities to the gluten-free ( $M = 3.50, SD = 1.14$ ) than the control ( $M = 3.00, SD = 1.37$ ) targets. There was also a main effect of target gender,  $F(1, 128) = 10.64, p = 0.001$ , partial  $\eta^2 = 0.08$ . The female targets were judged to have more negative qualities ( $M = 3.66, SD = 1.14$ ) than the male targets ( $M = 2.99, SD = 1.30$ ). The condition by target gender interaction was marginally significant,  $F(1, 128) = 3.33, p = 0.07$ , partial  $\eta^2 = 0.02$ . Tukey-Kramer post-hoc tests were again conducted and revealed that the gluten-free male ( $M = 3.36, SD = 1.21$ ) was judged to have more negative qualities than the control male ( $M = 2.56, SD = 1.26$ ),  $p = 0.02, d = 0.52$ . Ratings of the gluten-free female ( $M = 3.67, SD = 1.02$ ) did not significantly differ from the ratings of the control female ( $M = 3.64, SD = 1.29$ ),  $p = 0.99, d = 0.02$ .

**Positive qualities.** The ANOVA with the composite measure of positive qualities as the dependent measure did not reveal a significant main effect of condition,  $F(1, 128) = 1.57, p = 0.21$ , partial  $\eta^2 = 0.01$ ,



**Table 5**  
Summary of ANOVAs in study 2.

Dependent Measures	Condition			Target Gender			Condition by Target Gender		
	MS	F	Partial $\eta^2$	MS	F	Partial $\eta^2$	MS	F	Partial $\eta^2$
High Maintenance Qualities	10.32	6.84**	0.05	14.54	9.64**	0.07	4.82	3.20 <sup>+</sup>	0.02
Negative Qualities	5.66	3.90*	0.03	15.41	10.64**	0.08	4.82	3.33 <sup>+</sup>	0.02
Positive Qualities	1.14	1.57	0.01	1.88	2.59	0.02	0.20	0.28	0.002
Femininity	11.10	4.68*	0.04	134.52	56.77***	0.31	14.02	5.92*	0.04
Masculinity	10.96	4.36*	0.03	42.32	16.83***	0.12	0.02	0.01	0.00
Dating Interest	0.56	0.21	0.002	2.39	0.88	0.007	0.94	0.34	0.003
Gluten-free Attitudes	0.03	0.01	0.00	15.49	4.76*	0.04	0.001	0.001	0.00

<sup>+</sup>  $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Degrees of freedom: Error (128), Total (132).

nor a main effect of target gender,  $F(1, 128) = 2.59$ ,  $p = 0.11$ , partial  $\eta^2 = 0.02$ . The interaction was also not significant,  $F(1, 128) = 0.28$ ,  $p = 0.60$ , partial  $\eta^2 = 0.002$ .

**Femininity and masculinity.** The ANOVA with the rating of femininity as the dependent measure revealed that there was a significant main effect of condition,  $F(1, 128) = 4.68$ ,  $p = 0.03$ , partial  $\eta^2 = 0.04$ . Participants rated the gluten-free targets as more feminine ( $M = 4.56$ ,  $SD = 1.53$ ) than the control targets ( $M = 3.84$ ,  $SD = 2.17$ ). There was also a main effect of target gender,  $F(1, 128) = 56.77$ ,  $p < 0.001$ , partial  $\eta^2 = 0.31$ . The female targets were judged to be more feminine ( $M = 5.40$ ,  $SD = 1.05$ ) than the male targets ( $M = 3.39$ ,  $SD = 1.90$ ). The condition by target gender interaction was also significant,  $F(1, 128) = 5.92$ ,  $p = 0.02$ , partial  $\eta^2 = 0.04$ . Tukey-Kramer post-hoc tests revealed that the gluten-free male ( $M = 3.98$ ,  $SD = 1.57$ ) was judged to be more feminine than the control male ( $M = 2.72$ ,  $SD = 2.04$ ),  $p = 0.003$ ,  $d = 0.63$ . Femininity ratings of the gluten-free female ( $M = 5.37$ ,  $SD = 1.03$ ) did not significantly differ from ratings of the control female ( $M = 5.44$ ,  $SD = 1.08$ ),  $p = 0.99$ ,  $d = 0.03$ .

Consistent with these findings, the ANOVA with the rating of masculinity as the dependent measure revealed that there was a significant main effect of condition,  $F(1, 128) = 4.36$ ,  $p = 0.04$ , partial  $\eta^2 = 0.03$ . Participants evaluated the gluten-free targets as less masculine ( $M = 3.89$ ,  $SD = 1.44$ ) than the control targets ( $M = 4.49$ ,  $SD = 1.91$ ). There was also a main effect of target gender,  $F(1, 128) = 16.83$ ,  $p < 0.001$ , partial  $\eta^2 = 0.12$ . The male targets were judged to be more masculine ( $M = 4.65$ ,  $SD = 1.47$ ) than the female targets, ( $M = 3.49$ ,  $SD = 1.77$ ). The interaction was not significant,  $F(1, 128) = 0.01$ ,  $p = 0.94$ , partial  $\eta^2 < 0.01$ .

**Dating interest.** We did not obtain significant results for the measure of dating interest. Neither the main effect of condition,  $F(1, 128) = 0.21$ ,  $p = 0.65$ , partial  $\eta^2 = 0.002$ , the main effect of target gender,  $F(1, 128) = 0.88$ ,  $p = 0.35$ , partial  $\eta^2 = 0.007$ , nor the condition by target gender interaction,  $F(1, 128) = 0.34$ ,  $p = 0.56$ , partial  $\eta^2 = 0.003$  were significant. A one-sample  $t$ -test revealed that, overall, participants were less interested in dating the targets ( $M = 4.34$ ,  $SD = 1.64$ ) than the scale average ( $M_{\text{scale}} = 5.00$ ), a point which reflects a moderate level of interest,  $t(131) = -4.60$ ,  $p < 0.001$ ,  $d = 0.40$ .

**Mediation analysis.** It was hypothesized that the influence of gluten-free status on dating interest would be statistically mediated by high-maintenance evaluations. A mediation analysis was performed (Preacher & Hayes, 2008) using the Process macro for SPSS (Hayes, 2017). As would be expected based on the lack of condition effect on the dating interest variable, an accelerated-biased-corrected bootstrapping analysis (with 5000 resamples) showed that the mediation by high-maintenance was not statistically significant (95% CI:  $-0.21$ ,  $0.13$ ).

## 6.5. Discussion

Study 2 provides further support for the hypothesis that gluten-free

individuals are evaluated as more high-maintenance and more negatively than individuals with no dietary restrictions within the context of online dating. Participants evaluated the gluten-free targets as being more high-maintenance and as possessing more negative qualities than the control targets. Gluten-free targets were also evaluated as more feminine and less masculine than control targets. The study also provided preliminary evidence that being gluten-free is more likely to shift perceptions of males as the ratings of the gluten-free male on these qualities was significantly higher than ratings of the control male.

Interestingly the targets' dietary restriction or gender had no effect on dating interest. In fact, participants were not very interested in dating the targets overall as indicated by interest ratings below the scale's midpoint, a score that could be considered moderate interest. One possibility is that due to the fact that we purposefully did not display a picture associated with the dating profile that participants' interest diminished. After all, people are much more likely to view online dating profiles which contain at least one photo (Hitsch, Hortaçsu, & Ariely, 2010). In addition, for both men and women (although more so for males) physical attractiveness ranks as one of the top qualities they seek in a mate (Buss, 1989; Eastwick & Finkel, 2008). In addition, we kept all dating profiles as neutral as possible in our attempt to only manipulate the dietary restriction of the targets. This may have resulted in the targets being less interesting overall to participants.

## 7. General discussion

The gluten-free diet has become increasingly popular, especially among individuals who adhere to the diet because of a belief in its health benefits (Kim et al., 2016). The present research is the first to examine whether a consumption stereotype of those adhering to a gluten-free diet exists, and whether there are negative social outcomes that may result from adhering to the diet. Specifically, two studies were conducted to provide an initial exploration into the gluten-free consumption stereotype and its consequences within the context of dating.

In Study 1 participants completed open-ended questions about the attributes of gluten-free individuals and about dating someone who adhered to a gluten-free diet. They also rated gluten-free individuals on a series of interpersonal qualities. Overall, participants attributed to gluten-free individuals both positive and negative qualities. In terms of positive attributes, gluten-free individuals were viewed as health conscious, self-disciplined, understanding and happy/energetic. In terms of negative attributes, they were perceived as complaining, critical and judgmental, controlling and dominant. It is not unusual for stereotypes to consist of both positive and negative attributes. For example, considerable research finds that the African American stereotype in the United States consists of both positive (e.g. athletic) and negative (e.g., lazy) qualities (Devine, 1989; Lepore & Brown, 1997). Similarly, the stereotype of those consuming a healthy low-fat diet consists of both positive (e.g. intelligent) and negative (e.g. high-strung) qualities (Barker et al., 1999; Stein & Nemeroff, 1995).

Importantly, gluten-free individuals were most likely to be portrayed as high-maintenance and were rated higher on the high-maintenance qualities (i.e. picky, high-maintenance, difficult to please, demanding, concerned about appearance and entitled) than all other qualities. Participants also expressed some hesitation about dating gluten-free individuals and this hesitation was positively correlated with perceptions of high-maintenance and negative qualities. Consistent with prior literature on the association between consumption of a healthy diet and ratings of femininity (Barker et al., 1999; Stein & Nemeroff, 1995), those with a gluten-free diet were also rated as more feminine than masculine.

Building from the findings of Study 1, Study 2 used an experimental design to examine the impact of the gluten-free stereotype on the evaluation of a specific individual within the context of an online dating paradigm. Further, as the study involved a realistic dating context, it provided a more realistic examination of the influence of the gluten-free stereotype on dating interest. Consistent with the findings of Study 1, the gluten-free dating targets were rated as more high-maintenance than the control targets with no dietary restriction. Further, and in line with the results of Study 1, the gluten-free targets were rated as more feminine and less masculine than the control targets.

### 7.1. Gender differences

The results of Study 2 suggest that adherence to a gluten-free diet can have more negative social ramifications for men than women. Specifically, the gluten-free male target was viewed as more high-maintenance, having more negative interpersonal qualities and as more feminine than the control male target. In contrast, the gluten-free female did not differ from the control female on these qualities. These results are consistent with research on precarious manhood, according to which gender expectations are stricter for men than for women (Kierski & Blazina, 2009; Norton, 1997; Vandello & Bosson, 2012). Relatedly, research on the backlash effect has documented negative social repercussions for men and women who do not adhere to gender norm expectations (Rudman & Fairchild, 2004). Men are especially likely to experience backlash when engaging in “feminine behaviors” such as requesting a family leave from work (Rudman & Mescher, 2013) or working in “feminine” professions (Cherry & Deaux, 1978). Since we found that the gluten-free diet is associated with femininity, it is likely more consistent with cultural expectations of women to consume healthy and feminine foods, but violates cultural expectations of men to consume unhealthy masculine foods. Our findings are also consistent with the findings of Ruby and Heine (2011) who found that being vegetarian negatively influenced perceptions of male targets but not females as it is inconsistent with the cultural norm for men to consume meat. That said, it is important to note that there were fewer men in Study 2 ( $n = 48$ ) than women ( $n = 84$ ) and, as a consequence, it will be important for future studies to follow-up these findings by using larger samples with equal numbers of men and women.

In Study 1 perceptions of high-maintenance and negative qualities were correlated with femininity but not masculinity. In Study 2, both female targets were evaluated as more high-maintenance, as having more negative qualities, and as more feminine, than the control male target. Stated differently, the male control target was evaluated the most positively but the “advantage” of being male diminished when the male adhered to a gluten-free diet and engaged in stereotype inconsistent behavior. However, as mentioned earlier, the design of Study 2 was such that the gender of the target was matched to the participant's gender dating preferences, and since the majority of participants were heterosexual, most participants rated opposite sex targets. Thus, the main effects of gender in this study (and in real-world heterosexual dating interactions) may reflect target gender differences or perceiver gender differences. Future research could manipulate the gender of the target and gender of participant and examine whether females are evaluated more negatively than males overall or whether the main

effects in our study simply reflect men's tendency to evaluate females more negatively than females tend to evaluate males.

### 7.2. Dating interest

We predicted that participants would be less interested in dating gluten-free individuals than individuals with no dietary restrictions. We also predicted that interest in dating gluten-free individuals would be mediated by high-maintenance perceptions. Although we found some support for this hypothesis in Study 1 as hesitation was correlated with perceptions of high-maintenance, we did not find support for this hypothesis in Study 2. Unexpectedly, in Study 2 the target's gluten-free diet did not influence romantic interest and we did not find evidence of the hypothesized mediation.

One explanation for these results is that because this stereotype includes a mixture of positive and negative elements, evaluations of gluten-free individuals will not always negatively impact variables, such as impressions and dating interest. Rather, these outcomes could depend on the specific features of a context that facilitates the accessibility of the positive or the negative qualities in perceivers. Future research could examine the contexts which make the positive or negative aspects of the stereotype more accessible to perceivers.

Second, it is possible that the motive for people's dietary restriction plays an important role in romantic interest. In the open-ended responses in Study 1, some participants mentioned that they would be more understanding if the dietary restriction was due to an allergy than they would be if it was due to a trend. Unfortunately, as can be seen in Table 2, we did not have enough responses from participants to test this hypothesis empirically. A recent study has shown that people had more negative evaluations of those following a “clean diet” when they blamed the target for their condition (Nevin & Vartanian, 2017). It might be easier to blame an individual for following a gluten-free diet due to a trend than it would be due to an allergy. Future research can examine whether such motivations factor into people's first impressions of others and better predict romantic interest than simply adhering to a gluten-free diet.

Third, it is possible that we did not find that the gluten-free dietary restriction influenced dating interest because the manipulation we used in Study 2 was too subtle; the target simply mentioned enjoying eating in restaurants with gluten-free options and reading gluten-free cookbooks. It is possible that had the participant been directly affected by the target's dietary restriction that we would have obtained differences in dating interest. For example, both partners would be affected by one person's dietary restriction if the dietary restriction altered where the couple could eat. Future research could examine whether dietary restrictions are more likely to influence relationship evaluations when people are made aware of possible sacrifices they would need to make to accommodate a person's dietary restriction. In addition, future research could further examine whether people are aware of others' impressions of them as high-maintenance and if it would lead them to compromise their diet in an effort to appear less demanding. This decision could have negative consequences for their health in situations where it is medically necessary for them to follow the diet.

## 8. Conclusion

In two studies we found evidence that a gluten-free consumption stereotype exists and includes both positive and negative attributes. Gluten-free individuals were especially likely to be portrayed as high-maintenance, picky and demanding as well as complaining/easily annoyed and judgmental. At the same time, they were portrayed as healthy, self-disciplined, understanding and energetic. The gluten-free dietary restriction was also strongly associated with judgements of femininity. As a result, it was particularly likely to lead to negative judgements of males, particularly on negative interpersonal qualities. However, we obtained mixed evidence about whether or not gluten-free

individuals are too picky for people's taste: whereas in Study 1 participants expressed hesitation about dating gluten-free individuals which was positively correlated with perceptions of high-maintenance, in Study 2 the target's dietary restriction did not influence dating interest. Future research could examine the conditions that would lead these judgements to be expressed in behavior, and could extend the study of gluten-free diets to a wider array of sample (e.g., non-student populations) and contexts (in-person interactions).

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appet.2018.09.012>.

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