


**ORIGINAL RESEARCH**

# Healthful eating as a manhood threat

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**Abstract**

Two studies test the hypotheses that men's dietary choices are guided by the perceived genderedness of foods, men avoid feminine (but healthy) foods as a result, and that endorsing a healthy but feminine diet can be a masculinity threat. Study 1A established gendered associations about a wide range of foods and diet types by having a college student population rate the masculinity and femininity of a wide variety of foods and diet types. Study 1B surveyed university students and found that the perceived genderedness of foods predicted men's but not women's food preferences, even when controlling for traditional gender role endorsement and foods' perceived healthiness. In Study 2, we experimentally tested whether a healthy but feminine diet represents a masculinity threat for men. Using a sample of college students, men and women were assigned to publicly endorse a feminine (vegetarian) or masculine (meat-based) diet. Men (but not women) who endorsed the vegetarian diet compensated by reporting stronger identification with their gender and more liking for masculine activities, and they reported being less offended by jokes that targeted feminine groups that symbolically threaten manhood (women and gay men). Collectively, these results suggest that men may compromise healthy eating habits because of manhood concerns, and endorsing healthy but feminine diets can create motivations to compensate for threatened masculinity.

**Keywords**

Masculinity; Precarious manhood; Dietary health; Food

## 1. Introduction

Marketers have long wrestled with the challenge of getting men to eat healthful or low-calorie foods. In 2011, with men making up only 10% of its client base, diet food company WeightWatchers launched a media campaign aimed at increasing the number of men who use their products, recruiting professional athletes like former NBA basketball star Charles Barkley [1]. That same year, soft drink manufacturer Dr. Pepper launched a diet soda product, Dr. Pepper 10 ("all 23 flavors, just 10 manly calories"), intended to appeal to men. The company ran an ad campaign with the slogan "not for women" and featured commercials playfully skewering hypermasculine action movie stereotypes [2]. Marketers of plant-based food products similarly struggle with how to market their products to men because of strong associations of meat with masculinity [3]. Even products as seemingly gender-neutral as water are marketed as masculine to reach men consumers. Liquid Death, a water brand, combines black packaging and violent marketing (their slogan is "Murder Your Thirst") to target young men [4]. Seeking to attract male consumers to products traditionally avoided by men (e.g., yogurt), marketers sometimes employ strategies such as using black packaging or adding words like "Ultimate" to the labels [5]. These sometimes clumsy and stereotypical attempts to market

foods to men not only demonstrate men's avoidance of healthy (but feminine-perceived) food, but often simply reinforce the connection between masculinity and dietary choices (positively associating it with red meat and grilling, and negatively associating it with diet foods and vegetables), which can negatively impact men's health and perpetuate caricatured versions of masculinity [6, 7]. These efforts highlight a long-standing dietary health challenge: Men are generally less receptive than women to healthy, "diet" and "light" food options. Here, we propose and test the idea that men avoid healthful and low-calorie foods because these dietary choices are perceived as stereotypically feminine, and thus, men who consume them risk challenges to their manhood status. Encouraging men to eat healthier is important, because men suffer at higher rates than women from diet-linked diseases from heart disease to some cancers to diabetes [8, 9]. In addition, healthy diets are linked to better moods and mental health, for which men lag behind women in seeking treatment [10].

In general, men's diets are not as healthy as women's. Women are more likely than men to eat fruits, vegetables and fiber, and to limit salt, whereas men relative to women eat more meat, fast foods, and high-fat foods and drink more alcohol [11–14]. Women also tend to be more concerned than men with the health and fat content of foods [15]. Perhaps unsurprisingly, men the world over tend to die younger and

suffer from more chronic health conditions than women [16].

Given the costs of unhealthy diets, why do men risk their health by eating unhealthy foods and avoiding healthy ones? We propose that healthy eating may itself pose a risk for men, in that it challenges their gendered social status. In the research described here, we examined connections between the perceived genderedness (*i.e.*, masculinity and femininity) of foods and people's food preferences and eating behaviors. Our guiding assumption is that food and eating have implications for people's gender identity—their beliefs about themselves as members of their gender group [17]—which poses a problem for men in particular. Whereas eating “feminine” foods can represent a gender threat for men, eating “masculine” foods is less threatening to women's gender status [18]. Moreover, given the precariousness of men's gender status [19], many men are motivated to avoid behaviors—such as eating healthy, feminine foods—that will challenge their manhood in the eyes of others. (For reviews of Precarious Manhood Theory, see [47, 48, 50]). Thus, men avoid foods and diets associated with femininity more than women avoid foods and diets associated with masculinity because such foods represent a larger gender identity threat for men than for women.

To investigate these ideas, we first measured the gendered associations of various foods and diet types and asked whether these associations predict the food choices of men and women (Studies 1A and 1B). We next tested our assumption that gender counter-stereotypical food constitutes a greater gender threat for men than women. A long history of research demonstrates that because masculinity is both more easily threatened and socially valued than femininity, men will enact extreme compensatory behavior when their manhood is challenged [20–22]. This is especially the case when men fail to enact the hegemonic masculine ideal [23]. Diet may be one avenue through which men enact or fail to enact masculine ideals. To this end, in the second study, we examined whether endorsement of a counter-stereotypical diet motivated men, more than women, to enact compensatory behaviors that affirm their gender status (Study 2). In what follows, we summarize ideas from the social identity and gender roles literature on which our theorizing is founded.

### 1.1 Food as gendered social identity

Food and eating carry enormous social and cultural symbolic meaning [24–26]. The symbolic meaning of foods changes across different cultural milieus, but gendered associations with foods appear to be fairly robust across cultures. Nonetheless, we note that our focus is on the Western diet, and specific gendered associations may be stronger in some cultures than others. Like most objects, foods are gendered, with some being seen as masculine and others as feminine. For example, meat (especially red meat) and alcohol are typically associated with masculinity (though of course these associations are likely stronger in cultures where drinking alcohol or eating meat are more common practices) [27–29], whereas fruits and vegetables, fish, sour milk products (*e.g.*, yogurt, cottage cheese), and vegetarianism are associated with femininity [30–32]. Foods consumed by children, such as sweets, are also seen as feminine [33]. Moreover, the qualities associated with cakes,

cookies, puddings and chocolates include “soft”, “delicate” and “sweet”, which are traits stereotypically associated with girls and women rather than boys and men. In contrast, foods avoided by children, such as bitter and spicy foods and alcohol, are often perceived as masculine [34, 35].

Furthermore, both fat content and meal size are perceived as gendered, with consumption of high-fat foods seen as masculine [36], and smaller meals and portion sizes seen as feminine [37, 38]. Large portions are associated with strength and masculinity, and men (especially working-class men) resist attempts to restrict portion sizes or make foods “lighter” [39]. Similarly, low-fat and low-calorie foods are particularly feminized [38]. More generally, “healthy” eating is associated with femininity while unhealthy eating is associated with masculinity [40, 41]. Eating unhealthy junk foods and fast foods may also appeal to men because these behaviors suggest a willingness to take health risks, which is a marker of masculinity. While our focus is on the American diet and our studies employ young American samples, the above gendered food stereotypes are widespread across cultures. That being said, our studies were limited in scope, and we caution against drawing conclusion beyond the context of Americans. While masculinity concerns are widespread around the world, the specific gendered associations of foods likely differ from culture to culture.

Not only are food classes and diet types gendered, but individuals' food choices reflect and project their social identities to observers [42, 43]. Eating is a heavily identity-infused behavior [44], such that eating behaviors and food preferences communicate aspects of eaters' valued social identities. For example, when Asian Americans' identity as “American” was challenged, they subsequently consumed more “American” foods (which are higher in calories and fat content), presumably affirming their American identity [45]. More germane to the current investigation, food choices convey something about the gender identities of the individuals who eat them. Just as smaller meals are seen as more feminine, women who eat smaller meals are also perceived as more feminine than those who eat larger meals [38]. Conversely, meat-eating men are rated as more masculine and attractive to women than vegetarian men [46].

To summarize, classes of foods and diet types have historically carried gendered meanings, and these meanings infuse eating behavior with identity-relevant importance. People are aware, moreover, that their eating choices communicate their gender identity to observers, a fact that raises concerns for men in particular.

### 1.2 Food as a gender threat for men

Manhood is precarious, meaning that boys and men must continually validate and publicly display masculine competence in order to successfully earn and maintain the label of being a “real man” [47]. That is, manhood is an achieved social status because it is earned through convincing demonstrations of competence or agency. Conversely, cultures around the world conceptualize womanhood as more of an ascribed (*i.e.*, assigned, involuntary) than an achieved social status; women become “real women” *via* a series of (largely) inevitable bi-

ological changes and, once earned, womanhood need not be proven or demonstrated actively [48]. As a result of occupying a relatively precarious gender status, boys and men are prone to taking risks with their health, as risky behaviors are male identity-infused [16, 49, 50]. Such behaviors include unhealthy eating patterns [13], binge drinking [51], concealing pain and illness, and eschewing health services [49, 52]. Men's documented relative unconcern with eating healthy foods may thus reflect an impression management tactic aimed at portraying oneself as unemotional, cool and stoic, all of which are considered manly virtues. With respect to food and eating, we argue that men's food choices communicate their gendered social identity to others. Thus, "feminine" foods may represent a gender threat for men, and eating or endorsing such foods may call one's manhood status into question and accordingly motivate manhood-restorative behaviors.

Of course, manhood concerns may be more or less salient among different populations, and the specific way in which men prove and defend manhood likely differs across cultural milieus. A fuller intersectional analysis of food as a manhood threat was beyond the scope of the studies presented in this paper, which were limited to American college undergraduates. We caution against generalizing beyond this group, but see it as a starting point for future studies to explore populations for which manhood concerns may differ (*e.g.*, working class men, older men, sexual minority men, non-Western men).

### 1.3 Overview and hypotheses

The studies to follow explore the gendered connotations carried by various foods and the implications of these associations for men's and women's eating choices and behaviors. We began by examining genderedness of foods common to the typical American diet. Previous studies of gendered associations of foods examined broad categories of foods (*e.g.*, meat) and diet types (*e.g.*, vegetarianism); we are unaware of any studies that examine the gendered associations of a large set of specific foods. Consequently, we began the current project by compiling a diverse list of common American foods and types of eaters, and we asked a sample of respondents to rate them along masculine and feminine dimensions. Having ratings of a larger range of foods allowed broader themes to emerge (meat/proteins, sweets/spicy, junk foods/healthy foods, *etc.*) and allowed us to examine gendered associations within food categories (for instance, are less healthy versions of the same foods seen as more masculine?). We predicted that lower-fat, lower-calorie, and plant-based foods and diets would be perceived as more feminine and higher fat, higher calorie, and meat-based foods and diets as more masculine (Study 1A). We then used the masculinity and femininity ratings generated in Study 1A to test the associations between foods' perceived genderedness and men's and women's eating preferences (Study 1B). We expected the perceived genderedness of foods to predict men's but not women's eating preferences, over and above the food's perceived healthiness and people's traditional gender role endorsement. That is, we expected men to avoid relatively feminine, healthy foods and approach masculine, unhealthy foods.

Because Study 1 is correlational, we sought more direct

evidence that men may avoid feminine diets because such diets constitute a threat to their masculinity. Just as eating the "right" foods can bolster a desired social identity, eating the "wrong" foods, can threaten that identity. In Study 2, we asked men and women to publicly endorse either a masculine (meat and protein) or feminine (organic, plant-based) diet, the latter of which was assumed to create a gender threat for men. We predicted that men—but not women—would respond to the threat of endorsing a gender-atypical diet by asserting their masculine identity *via* alternate means. Specifically, we expected experimentally threatened men to express more interest in masculine activities, to report stronger identification with their gender group, and to derogate groups that are perceived as feminine (women and gay men) through disparaging humor endorsement.

## 2. Study 1A: genderedness of common foods

As a starting point, we sought to establish the gendered associations of a variety of foods. We began by compiling a list of foods representing several different food categories: Meats and proteins, grains, fruits, vegetables, dairy and eggs, fast food, snacks and junk food, alcoholic and non-alcoholic drinks and condiments. Our goal was to create a comprehensive, but by no means exhaustive, list of foods representative of the typical American diet. The final list, derived from discussions with our research lab and examinations of published studies, consisted of 91 foods. In addition, we included twelve types of eaters (*e.g.*, Vegetarian, Meat and Potatoes Eater). Participants rated the masculinity and femininity of all foods and eater types.

Based on past work, our hypotheses for specific foods were as follows: Meat in general is viewed as more masculine than feminine, although this tendency may be weaker with non-red meats such as fish and poultry [53]. Alcohol is rated higher in masculinity than femininity. Fruits and vegetables, sour milk foods, vegetarian proteins (*e.g.*, tofu), low-calorie and diet foods, and sweet dessert-type foods are viewed as more feminine than masculine. Moreover, within broad categories of food types (*e.g.*, chicken), we expected lower-calorie versions (*e.g.*, grilled chicken) are perceived as more feminine than higher-calorie versions (*e.g.*, fried chicken). For eater types, we predicted that meat- and protein-based, high-fat/high-calorie, and unrestricted eaters (*e.g.*, Hearty Eater) are rated as more masculine than feminine, whereas vegetarian, low-fat/low-calorie, and restricted eaters (*e.g.*, Picky Eater) is rated as more feminine than masculine. Note that because our goal of this study was not only to test these hypotheses but to generate a list of foods and eater types that varied in genderedness for use in subsequent studies, we did not include all of the foods and eater types in tests of hypotheses.

### 2.1 Method: participants and procedure

Forty-seven students (63% women; 46% White;  $M_{age} = 19.6$ ) from an introductory psychology course completed an online questionnaire in exchange for optional course credit. Participants rated the 91 foods using two questions: "To what extent

do you perceive this food as feminine?” and “To what extent do you perceive this food as masculine?” For the twelve types of eaters, participants answered: “To what extent do you perceive this type of eater to be feminine?” and “To what extent do you perceive this type of eater to be masculine?” All questions were answered on a scale from 1 (not at all) to 5 (very). Items were presented in random order, and we counterbalanced the order in which participants rated masculinity and femininity. Finally, respondents answered several demographic questions.

## 2.2 Results

Because masculinity and femininity ratings of the foods were almost perfectly negatively correlated ( $r(103) = -0.94$ ,  $p < 0.001$ ), we created a single gender score (by subtracting femininity ratings from masculinity ratings) for display in Table 1; higher scores indicate that foods are perceived as more masculine and less feminine. Men and women tended to agree on most ratings. Because there was no systematic tendency for participants of one gender to make higher ratings than the other, we collapsed ratings across participant genders in tests of hypotheses.

We created composites representing the different categories of foods and eater types to use in analyses (in cases with more than two foods representing a given category). In cases where these composite analyses raised additional questions, we conducted paired-sample  $t$ -tests comparing masculine versus feminine ratings of individual foods. Superscripts in Tables 1 and 2 indicate which foods/eaters were included in each analysis. Table 3 presents a summary of analyses.

### 2.3 Meat and alcohol

We expected meat (particularly red meat) and alcohol to be perceived as more masculine than feminine. To test this, we first submitted composite ratings of masculinity and femininity of 11 different red meats ( $\alpha > 0.93$ ) and seven non-red meats ( $\alpha > 0.79$ ) to a 2 (Genderedness: masculine vs. feminine)  $\times$  2 (Meat Type: red vs. non-red) repeated-measures Analysis of Variance. This yielded a significant main effect of Genderedness, that was qualified by a Genderedness  $\times$  Meat Type interaction (see Table 3). Overall, both types of meat were rated as more masculine than feminine, although this effect was much larger for red meat than for non-red meat. Next, we conducted a repeated-measures ANOVA comparing composite ratings of masculinity ( $\alpha = 0.53$ ) versus femininity ( $\alpha = 0.66$ ) of five alcohol types. Overall, alcohol was not rated as more masculine than feminine. Paired samples  $t$ -tests of individual drinks shed light on this weak effect: Whereas beer and whiskey-and-cola were rated as more masculine than feminine, wine and daiquiris were rated as more feminine than masculine, and light beer was viewed as neither masculine nor feminine.

### 2.4 Fruits/vegetables, sour milk foods, vegetarian proteins, diet foods and sweets

We expected fruits, vegetables, sour milk foods, vegetarian proteins, diet foods, and sweets to be perceived as more feminine than masculine. Results of a repeated-measures ANOVA

on composite masculine and feminine ratings of 14 fruits and vegetables ( $\alpha > 0.87$ ) revealed that these foods were perceived as more feminine than masculine. Paired-samples  $t$ -tests revealed that both low-fat yogurt and cottage cheese were perceived as more feminine than masculine, as were stir-fried tofu and veggie burgers. A repeated-measures ANOVA comparing composite ratings of masculinity ( $\alpha = 0.63$ ) versus femininity ( $\alpha = 0.85$ ) of five diet foods revealed that this group of foods was rated as much more feminine than masculine. Similarly, a repeated-measures ANOVA on composite masculine ( $\alpha = 0.75$ ) and feminine ( $\alpha = 0.84$ ) ratings of ten sweets revealed that this class of foods was perceived as more feminine than masculine.

### 2.5 Higher vs. lower calorie foods

Our list of foods contained eight pairs (*e.g.*, whole milk, skim milk) of which both represented the same category (*e.g.*, milk), but one was lower in calories than the other. We expected the lower-calorie foods within these categories to be rated as more feminine than the higher-calorie foods, regardless of how the broad food category was gender-typed. To test this, we submitted composite feminine ratings of the lower ( $\alpha = 0.84$ ) and higher ( $\alpha = 0.85$ ) calorie foods to a repeated-measures ANOVA. As predicted, lower-calorie versions of foods were rated higher in femininity than higher-calorie versions.

### 2.6 Eater types

For eater types, we predicted that meat- and protein-based, high-fat/high-calorie, and unrestricted (*e.g.*, Hearty Eater) eaters should be rated as more masculine than feminine. A repeated-measures ANOVA on composite masculine ( $\alpha = 0.77$ ) and feminine ( $\alpha = 0.67$ ) ratings of five eater types provided strong support for this hypothesis. Next, we expected vegetarian, low-fat/low-calorie, and restricted eaters (*e.g.*, Picky Eater) to be rated as more feminine than masculine. A repeated-measures ANOVA on composite masculine ( $\alpha = 0.72$ ) and feminine ( $\alpha = 0.85$ ) ratings of five eater types provided strong support for this prediction.

### 2.7 Summary

We found evidence of reliable genderedness about foods and eaters. Meats (and especially red meats), foods high in calories and fat content, and unrestricted diets are associated with masculinity; fruits and vegetables, low-fat and low-calorie foods, sour milk foods, sweets, and restricted diets (*e.g.*, picky eaters, vegetarians) are perceived as relatively feminine. These gendered associations are strong, as reflected in large effect sizes (average  $\eta^2_p = 0.61$ ). Contrary to one hypothesis, we did not find that alcohol was seen overall as more masculine than feminine; beer and liquor are seen as more masculine, but wine and sweet cocktails are seen as more feminine. These findings generally support other authors' claims regarding the genderedness of broad classes of foods, but they also illustrate the importance of measuring genderedness at the level of individual food items, as some food items (*e.g.*, sweet drinks) may be perceived as feminine despite belonging to a relatively masculine food category (*e.g.*, alcohol). In addition,

**TABLE 1. Gendered ratings of foods. Scores greater than zero reflect foods that are more masculine than feminine, and scores less than zero represent foods that are more feminine than masculine.**

Food Item Score	Difference Score	Food Item	Difference
BBQ Ribs <sup>1</sup>	2.82	Tortilla Chips	0.26
Beer <sup>3,9</sup>	2.73	Macaroni and Cheese	0.18
Beef Jerky <sup>1</sup>	2.71	Turkey Sandwich <sup>2</sup>	0.17
Bacon <sup>1,9</sup>	2.69	Spinach <sup>4</sup>	0.05
Whiskey and Cola <sup>3</sup>	2.69	Grilled Chicken Breast <sup>2,10</sup>	0.00
Sausage <sup>1</sup>	2.51	Butter	0.00
Hamburger <sup>1</sup>	2.45	Light Beer <sup>3,9</sup>	-0.02
Burritos	2.36	White Bread	-0.08
Grilled Steak <sup>1</sup>	2.22	Buttered Popcorn	-0.18
Sports/Energy Drink	2.16	Ranch Dressing <sup>9</sup>	-0.22
Cheesesteak <sup>1</sup>	2.14	Pretzels	-0.23
Tobasco Sauce	2.13	Sugary Cereal <sup>8</sup>	-0.34
Fried Chicken <sup>2,9</sup>	2.08	Brown Rice	-0.41
Hot Dogs <sup>1</sup>	2.02	Fried Zucchini <sup>4</sup>	-0.55
Baked Beans	1.83	Whole Grain Bread	-0.59
Pepperoni Pizza <sup>1</sup>	1.66	Bagel	-0.66
Nachos with Cheese	1.57	Almonds	-0.67
Potato Chips	1.56	Sugar <sup>8,9</sup>	-0.68
Black Coffee	1.53	Steamed Fish <sup>2</sup>	-0.69
Bologna <sup>1</sup>	1.50	Cream Cheese	-0.70
Sub Sandwich/Hoagie <sup>2</sup>	1.50	Orange <sup>4</sup>	-0.73
Tacos	1.49	Watermelon <sup>4</sup>	-0.77
French Fries	1.48	Bottled Water	-0.77
Spaghetti with Meatballs	1.33	Whole Grain Cereal	-0.81
Fried Eggs	1.30	Orange Juice	-0.82
Ham Sandwich <sup>1,10</sup>	1.21	Oatmeal	-0.85
Whole Milk <sup>9</sup>	1.18	Milkshake <sup>8,9</sup>	-0.86
Cola <sup>9</sup>	0.88	Banana <sup>4</sup>	-0.94
Peanut Butter	0.73	Asparagus <sup>4</sup>	-0.95
Ramen Noodles	0.63	Squash <sup>4</sup>	-0.95
Mashed Potatoes <sup>4</sup>	0.62	Ice Cream <sup>8</sup>	-1.03
Doughnuts <sup>8</sup>	0.61	Apple <sup>4</sup>	-1.03
Chicken Nuggets <sup>2</sup>	0.42	Avocado <sup>4</sup>	-1.14
Salsa	0.30	Sushi <sup>2</sup>	-1.14
Mayonnaise	0.27	Chocolate Candy Bar <sup>8</sup>	-1.18
Steamed Broccoli <sup>4</sup>	-1.18	Fruit Smoothie <sup>8,10</sup>	-2.04
Iced Tea	-1.33	Honey <sup>8</sup>	-2.09
Quiche	-1.34	Skim Milk <sup>7,10</sup>	-2.15
Cottage Cheese <sup>5</sup>	-1.50	Lettuce Salad <sup>4</sup>	-2.32
Artificial Sweetener <sup>7,8,10</sup>	-1.82	Frappuccino <sup>8</sup>	-2.41
Wine <sup>3</sup>	-1.83	Veggie Burger <sup>6</sup>	-2.45
Rice Cakes <sup>7</sup>	-1.84	Soy Milk	-2.47
Stir-Fried Tofu <sup>6</sup>	-1.89	Daiquiri <sup>3</sup>	-2.47
Diet Soda <sup>7,10</sup>	-1.93	Lowfat Vinaigrette <sup>7,10</sup>	-2.64
Strawberries <sup>4</sup>	-1.93	Lowfat Yogurt <sup>5</sup>	-2.83
Baby Carrots <sup>4</sup>	-1.97		

*Note. Difference Score: Masculinity rating minus femininity rating. Superscripts indicate foods used in analyses in Study 1A as follows: 1: red meat; 2: non-red meat; 3: alcohol; 4: fruits/vegetables; 5: sour milk foods; 6: vegetarian proteins; 7: diet foods; 8: sweets; 9: higher calorie in category; 10: lower calorie in category.*

**TABLE 2. Gendered ratings of types of eaters. Scores greater than zero reflect eater types that are more masculine than feminine, and scores less than zero represent eater types that are more feminine than masculine.**

Eater Type	Difference Score
High Protein Eater <sup>1</sup>	2.79
Meat and Potatoes Eater <sup>1</sup>	2.66
Fast Food Eater <sup>1</sup>	1.78
Junk Food Junkie <sup>1</sup>	1.54
Hearty Eater <sup>1</sup>	1.39
Kosher Eater	-0.72
Gourmet Food Eater	-0.74
Organic Food Eater <sup>2</sup>	-1.63
Low Carbs Eater <sup>2</sup>	-1.76
Dieter/ Low Calorie Eater <sup>2</sup>	-1.87
Picky Eater <sup>2</sup>	-2.01
Vegetarian <sup>2</sup>	-2.04

*Note.* Difference Score: Masculinity rating minus femininity rating. Superscripts indicate diet types that were predicted to be seen as masculine (1) or feminine (2) in Study 1A.

by rating large groups of diverse foods, we can see themes emerge (e.g., sweet foods are more feminine), and we can see nuance within food categories, in which less healthful or lower calorie versions of foods are consistently rated as more masculine than more healthful or higher calorie versions (e.g., fried chicken vs. grilled chicken breast; beer vs. light beer; white bread versus whole grain bread). These food ratings can be valuable to future researchers in selecting gendered foods as stimuli materials. Importantly, they also set up the next study examining people's approach and avoidance tendencies regarding various foods.

### 3. Study 1B: genderedness of foods and food preferences

Having established the genderedness of foods, we next tested whether men in particular respond to food as if it is an identity-infused behavior that conveys information about their gender status. That is, we tested the hypothesis that men's—more strongly than women's—food preferences are predicted by the foods' perceived genderedness. Given the relatively tenuous status of manhood, we expected men to express greater interest in masculine foods and greater aversion to feminine foods, regardless of the foods' perceived nutritional features. However, we did not want to make salient the gendered aspects of food in this study, for fear of creating demand characteristics. Therefore, we did not have people rate the foods in terms of masculinity or femininity but instead used mean masculinity and femininity ratings derived from the Study 1A sample. While we cannot be certain that any individual's perceptions of a food's masculinity or femininity correspond with mean

ratings, the clear consensus about genderedness that emerged in Study 1A gave us confidence in using these mean ratings. As a secondary goal of Study 1B, we asked people to rate a subset of foods from Study 1A in terms of their perceived healthiness as well as their protein and calorie content. We expected the perceived healthiness of food to correlate negatively with the foods' masculinity ratings and positively with the foods' femininity ratings. Further, we expected foods higher in masculinity and lower in femininity to be perceived as higher in protein and calories. Finally, we measured and controlled for people's gender role ideology (using a measure of traditional versus egalitarian gender role endorsement) in analyses to ensure that our findings did not merely reflect people's beliefs about the importance of adhering to traditional gender role norms.

### 3.1 Method: participants and procedure

One hundred and eighteen participants were recruited from a voluntary psychology participant pool at a southwestern U.S. university. They completed an online questionnaire at the time and place of their choosing in exchange for partial course credit. Data from two participants were excluded because of random responding leaving 116 participants (52% women; 61.2% White;  $M_{age} = 21.7$ ). After reading a consent statement, participants rated forty foods on seven dimensions and then completed the Traditional Egalitarian Sex Role Scale (Larsen & Long, 1988). Finally, respondents answered several demographic questions. We did not exclude participants from Study 1A from participating in Study 1B, though it is likely that few, if any, participants overlapped across the studies, as they were completed in consecutive semesters.

### 3.2 Materials

From the list of foods examined in Study 1A, we selected forty foods that represented a variety of subcategories and ranged from masculine (e.g., BBQ ribs) to feminine (e.g., lettuce salad). For each food, participants answered six questions. Three questions measured approach motivations toward the foods: *How much do you like this food?* *How likely are you to eat this food?* *How often do you eat this food?* These questions were answered on five-point scales with endpoint labels of *not at all/very much*, *not at all likely/very likely*, and *never/quite frequently*; we averaged these three items to form an "approach composite" variable (Men:  $\alpha = 0.98$ ; Women:  $\alpha = 0.97$ ). Three items focused on the perceived health characteristics of the foods: *How healthy/nutritious do you perceive this food to be overall?* *How many calories does a typical serving of this food contain?* *How much protein does this food contain?* Each of these questions was answered on a five-point scale with labels of *not at all/very much* and *hardly any/quite a bit*.

The Traditional Egalitarian Sex Roles Scale [54] measures attitudes toward traditional versus egalitarian sex role ideology. The original scale comprised twenty items. We used a shortened 15-item version of the scale; All questions were answered on a scale from 0 (not at all) to 5 (very) ( $\alpha = 0.88$ ).

TABLE 3. Comparing masculinity and femininity ratings of foods and diet types.

Category		Masculinity	Femininity	Difference test
		Foods		
	Foods predicted to be perceived as relatively masculine:			
	(18-item composite)	3.81	2.35	$F(1, 45) = 168.73, p < 0.001, \eta^2_p = 0.79$
Meat	red meats (11 items)	4.16	1.99	$F(1, 45) = 251.35, p < 0.001, \eta^2_p = 0.85$
	non-red meats (7 items)	3.27	2.92	$F(1, 45) = 7.74, p = 0.008, \eta^2_p = 0.15$
	gender by red vs. non-red meat interaction			$F(1, 45) = 167.96, p < 0.001$
	(5-item composite)	3.18	2.95	$F(1, 45) = 3.59, p = 0.065, \eta^2_p = 0.07$
Alcohol	beer	4.61	1.89	$t(45) = 13.08, p < 0.001$
	whiskey-and-cola	4.48	1.80	$t(45) = 13.95, p < 0.001$
	wine	2.35	4.15	$t(45) = -7.58, p < 0.001$
	daiquiri	1.67	4.13	$t(45) = -10.69, p < 0.001$
	light beer	2.80	2.73	$t(44) = 0.25, p = 0.80$
	Foods predicted to be perceived as relatively feminine:			
Fruits/Vegetables	(14-item composite)	2.37	3.34	$F(1, 45) = 40.22, p < 0.001, \eta^2_p = 0.47$
Sour Milk Foods	low-fat yogurt	1.46	4.28	$t(45) = -15.09, p < 0.001$
	cottage cheese	1.98	3.46	$t(45) = -6.21, p < 0.001$
Plant-based proteins	stir-fried tofu	1.82	3.64	$t(45) = -8.50, p < 0.001$
	veggie burgers	1.71	4.18	$t(45) = -11.62, p < 0.001$
Diet foods	(5-item composite)	1.75	3.81	$F(1, 45) = 154.58, p < 0.001, \eta^2_p = 0.78$
Sweets	(10-item composite)	2.27	3.47	$F(1, 46) = 27.90, p < 0.001, \eta^2_p = 0.37$
	Higher- vs. Lower-Calorie Versions of Same Foods (8-item composite)			
		High-cal	Low-cal	
	Masculinity	3.52	2.31	$F(1, 45) = 199.53, p < 0.001, \eta^2_p = 0.81$
	Femininity	2.56	3.48	$F(1, 45) = 93.13, p < 0.001, \eta^2_p = 0.67$
Eater types		Masculinity Femininity		
Masculine eaters	(5-item composite)	4.13	2.11	$F(1, 45) = 203.47, p < 0.001, \eta^2_p = 0.82$
Feminine eaters	(5-item composite)	2.02	3.89	$F(1, 45) = -137.57, p < 0.001, \eta^2_p = 0.75$

### 3.3 Results

We examined the data in two ways. First, we treated participants as the unit of analysis ( $N = 116$ ) in models predicting approach motivations toward the foods, and second, we treated food as the unit of analysis ( $N = 40$ ) to examine associations of genderedness with various indicators of perceived health and appeal to men and women. For both types of analyses, we used the masculinity and femininity ratings of the foods obtained in Study 1A.

### 3.4 Individual-level analyses

We expected the gendered nature of food to be a better predictor of food preferences for men than women. To test this hypothesis, we used a hierarchical linear modeling approach (HLM 6.08) [55], with ratings of the 40 food items nested within individuals. We tested separate models for masculinity ratings and femininity ratings. In each model, the approach motivation composite was the outcome variable, and the gen-

dered ratings from Study 1 (masculinity or femininity) were entered as a level one predictor. We entered participant gender (coded 0 = women, 1 = men) as a level two predictor of both the intercept and the slope for the gendered ratings. To control for gender role ideology, we also entered the Traditional Egalitarian Sex Role (TESR) composite as a level two predictor of the intercept. The formulas for these models are as follows:

Level-1 Model:

$$Y = \pi_0 + \pi_1 \times (\text{Gendered Ratings}) + e$$

Level-2 Model:

$$\pi_0 = \beta_{00} + \beta_{01} \times (\text{Participant Gender}) + \beta_{02} \times (\text{TESR}) + r_0$$

$$\pi_1 = \beta_{10} + \beta_{11} \times (\text{Participant Gender}) + r_1$$

In the model using masculinity ratings, the TESR was not a significant covariate ( $\beta = -0.03$ ,  $p = 0.48$ ), but participant gender was significant ( $\beta = 0.17$ ,  $p < 0.05$ ). More importantly, the expected interaction of participant gender and masculinity ratings was significant ( $\beta = 0.23$ ,  $p < 0.001$ ), and the interaction pattern (displayed in Fig. 1, left) conformed to our predictions: Among men, masculinity of foods was statistically significantly correlated with approach motivation ( $\beta = 0.33$ ,  $p < 0.001$ ), whereas among women, masculinity of foods was not correlated with approach motivation ( $\beta = 0.09$ ,  $p = 0.065$ ). Thus, men's food preferences were more strongly positively correlated with the foods' masculinity than were women's food preferences.

A similar pattern emerged in the model using femininity ratings. The TESR was not a significant covariate ( $\beta = -0.03$ ,  $p = 0.49$ ), and gender correlated significantly with approach motivation ( $\beta = 0.17$ ,  $p < 0.05$ ). Importantly, the interaction of participant gender and femininity ratings was significant ( $\beta = -0.31$ ,  $p < 0.001$ ). As shown in Fig. 1 (right), the perceived femininity of foods strongly, negatively predicted approach motivation among men ( $\beta = -0.36$ ,  $p < 0.001$ ), but it was unrelated to approach motivation among women ( $\beta = -0.05$ ,  $p = 0.42$ ). Again, men's food preferences were strongly (negatively) predicted by the foods' femininity.

We hypothesized that these effects would emerge even when controlling for the healthiness and other nutrition-relevant aspects of the food items. To test this, we ran models with measures of perceived healthiness, calorie content, and protein content as Level 1 covariates. In the masculinity model, both perceived healthiness ( $\beta = 0.39$ ,  $p < 0.001$ ) and calorie content ( $\beta = 0.31$ ,  $p < 0.001$ ) were significant covariates, but protein content was not ( $\beta = 0.04$ ,  $p = 0.13$ ). Importantly, however, the interaction of participant gender by masculinity ratings remained significant when controlling for healthiness and nutrition value of foods ( $\beta = 0.13$ ,  $p < 0.02$ ). Masculinity of foods was a strong predictor of men's food preferences ( $\beta = 0.23$ ,  $p < 0.001$ ), and it was a substantially weaker (though still significant) predictor of women's food preferences ( $\beta = 0.10$ ,  $p < 0.02$ ). Likewise, both perceived healthiness ( $\beta = 0.40$ ,  $p < 0.001$ ) and calorie content ( $\beta = 0.31$ ,  $p < 0.001$ ) were significant covariates in the femininity model, while protein was not a significant covariate ( $\beta = 0.05$ ,  $p < 0.06$ ). More importantly, the interaction of participant gender by femininity ratings was significant when controlling for these health and nutrition indices ( $\beta = -0.16$ ,  $p = 0.015$ ). Femininity ratings of food negatively predicted men's preferences for food ( $\beta = -0.27$ ,  $p < 0.001$ ) more strongly than they predicted women's preferences for food ( $\beta = -0.11$ ,  $p < 0.02$ ).

### 3.5 Food-level analyses

We expected the perceived healthiness of the 40 foods to correlate negatively with their masculinity ratings and positively with their femininity ratings. As predicted, the mean masculinity minus femininity difference score (higher scores

indicating greater masculinity) was negatively associated with perceived healthiness,  $r(38) = -0.31$ ,  $p = 0.05$ , although the pattern only reached statistical significance among women ( $r = -0.37$ ,  $p < 0.05$ ) and not among men ( $r = -0.22$ ,  $p = 0.16$ ). Mean masculinity of the foods was also correlated with their perceived protein content (men:  $r(38) = 0.51$ ,  $p < 0.01$ ; women:  $r(38) = 0.37$ ,  $p < 0.05$ ), and perceived calorie content (men:  $r(38) = 0.75$ ,  $p < 0.001$ ; women:  $r(38) = 0.58$ ,  $p < 0.001$ ). Finally, similar to the results presented in the previous section, the masculinity of foods was strongly associated with men's approach motivation ( $r(38) = 0.54$ ,  $p < 0.001$ ), but it was unrelated to women's approach motivation ( $r(38) = 0.10$ ,  $p = 0.55$ ).

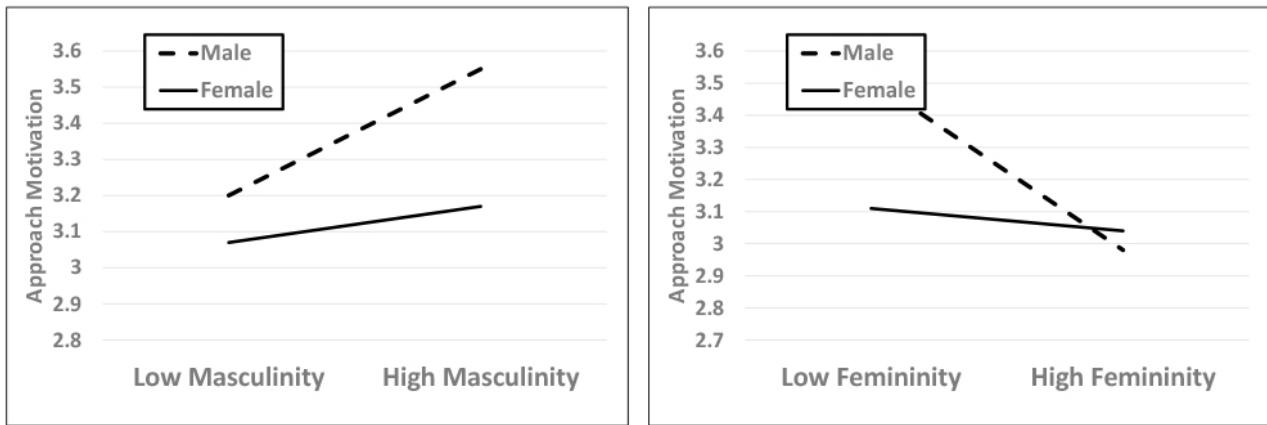
### 3.6 Summary

Men's, but not women's, eating preferences were reliably correlated with the genderedness of foods. Men reported liking and being more likely to eat foods to the extent that those foods were perceived as higher in masculinity and lower in femininity, and these effects held when controlling for men's endorsement of traditional gender roles (the TESR) and the perceived healthiness, calorie content, and protein content of the foods. Conversely, the correlations between the genderedness of foods and approach motivation were much weaker among women. Further, foods perceived as more masculine were seen as less healthy and higher in protein and calories than were foods perceived as more feminine. Although we did not mention gender in this study, it is still possible that asking about perceived health of foods may have indirectly cued gender. However, the relations for men still suggest an avoidance of feminine foods, whether or not gender was salient for participants. Thus, Studies 1A and 1B provide evidence that foods are reliably gendered, and that men make eating choices that align with genderedness of the food, despite these choices being self-perceived as less healthy.

## 4. Study 2: feminine diet endorsement and masculine compensation

Study 1B showed that men's self-reported food preferences are predicted more strongly than women's by the foods' gender-typed associations. Thus, men may avoid potentially healthy foods because of these foods' stereotyped associations as feminine. Although this correlational evidence is compelling, we wished to test more directly the idea that eating feminine foods constitutes a gender threat for men. In Study 2, we experimentally manipulated whether people publicly endorsed a masculine or feminine diet. Participants prepared and recited, on videotape, an essay endorsing either a stereotypically masculine (meat and protein-based) or feminine (organic, plant-based) diet, ostensibly for educational use with high school students. We anticipated that publicly endorsing a gender-atypical diet would constitute a gender threat for men (but not women) and would thus motivate men to express compensatory masculinity (measured several ways). Several past experiments demonstrate that men whose masculinity is threatened show increases in compensatory behavior to re-establish masculinity [11, 56, 57].





**FIGURE 1.** Men’s and women’s approach motivation toward foods predicted by foods’ masculinity (left) and femininity (right), Study 1B.

We measured compensatory masculinity in several ways. First, participants rated their enjoyment of stereotypically masculine and feminine activities, and second, they rated the strength of their identification with their gender group. We predicted that men who endorsed the feminine diet would show greater compensatory behaviors by expressing more interest in gender-typed activities, less interest in gender-atypical activities, and stronger gender identification than men who endorsed the masculine diet and women in either diet condition. Women appear relatively unaffected by gender threats [47], and we therefore did not expect them to react to such threats with increased gender role conformity. Third, we measured participants’ derogation of gender-relevant outgroups (women and gay men for male participants; men and lesbians for female participants) by asking them to rate the offensiveness of jokes that ridiculed members of these social groups. We reasoned that women and gay men constitute gender outgroups for men because both are perceived as feminine [58, 59]; alternatively, men and lesbians are perceived as masculine and thus should constitute gender outgroups for women. Following threats to gender group status, men may attempt to prove or restore their masculine credentials by eschewing that which is perceived as feminine [60]. This may manifest as negative evaluations or treatment of women [61] and non-prototypical men [62] including gay men [63]. In the current study, we expected men who endorsed the feminine diet to rate jokes targeting women and gay men as less offensive.

#### 4.1 Method: participants and design

Eighty-seven self-identified heterosexual participants (52% women; 49% White;  $M_{age} = 21$ ) participated in the study in exchange for credit in their psychology courses. One participant was dropped because of maximal suspicion (the participant had knowledge of the study prior to participation), leaving 86 participants (44 women and 42 men). Participants were randomly assigned to diet conditions in a 2 (Participant gender: men, women)  $\times$  2 (Diet Type: plant-based, meat-based) design.

#### 4.2 Materials

We included three measures of compensatory behaviors. The first questionnaire asked people to rate how much they would enjoy doing eleven activities. In pilot testing, four of these activities were rated as stereotypically masculine (watch football, play video games, drink beer, do a strength workout), four activities were rated as stereotypically feminine (shop for clothes with friends, read a gossip magazine, hold a baby in your arms, take a yoga class), and three activities were rated as gender-neutral (go to the beach, eat some popcorn, read a book). Activities were rated on a scale from 1 (not at all) to 6 (a great deal) and we aggregated enjoyment ratings across the four masculine activities ( $\alpha = 0.68$ ) and four feminine activities ( $\alpha = 0.63$ ).

A second questionnaire measured gender identification using nine items adapted from Luhtanen and Crocker [64] and Schmitt and Branscombe [62]. Sample items included: “Being a man (or woman) is an important part of my self-image” and “I value being a man (a woman)”. All items were rated on a scale from 1 (strongly disagree) to 7 (strongly agree) and we aggregated them to form a composite measure of gender identification ( $\alpha = 0.77$  for women and 0.90 for men).

The third questionnaire measured participants’ willingness to derogate gender-relevant outgroups by downplaying the offensiveness of insulting jokes about these groups [57, 65]. Participants read eight gender-themed jokes, two of which targeted each of the following groups: women, men, gay men and lesbians. After each joke, participants rated how offensive they found it and, to disguise our purposes, how funny and clever the joke was. Lower ratings of offensiveness signaled a greater willingness to derogate a gender outgroup. All jokes were rated on a scale from 1 (not at all) to 7 (extremely). We created composites by averaging offensiveness ratings across the four jokes targeting “feminine” groups (women and gay men;  $\alpha = 0.67$ ) and the four jokes targeting “masculine” groups (men and lesbians;  $\alpha = 0.81$ ).

### 4.3 Procedure

Upon arriving at the lab, participants learned that they would take part in a project in collaboration with area high schools to create educational video materials promoting healthy diets. Participants were randomly assigned to write an essay promoting either a meat and protein-based diet or a plant-based, organic diet. These diets were chosen based on the findings from Study 1, which indicated that they represent diets that were perceived as masculine and feminine, respectively. Participants learned that they would have five minutes to prepare an essay that they would then recite in front of a video camera; the experimenter explained that some videos would later be viewed by local high school students as part of a health education program. To help participants prepare their essays, the experimenter provided a sheet with diet “talking points” to incorporate if they wished (e.g., “Meat-based diets increase energy levels and build strong muscles and a healthy body”; “Plant-based diets that include lots of salads and organic whole grains have been linked to improved immune functioning and a healthy body”). No mention was made of gender or genderedness of food.

After participants wrote and recited their essays in front of a video camera, the experimenter informed them that they would take part in a second unrelated study examining the “correlates of humor”. The experimenter distributed a questionnaire packet containing the eight gender-themed jokes, the activities form, the gender identification scale, and a demographics questionnaire. Upon completion of the questionnaires, participants were debriefed, probed for suspicion and dismissed.

### 4.4 Results: manipulation check

To ensure that participants followed instructions during the essay task, we asked a research assistant to read and code the essays for whether or not participants wrote about the assigned topic. Because all participants wrote about the assigned topic, we did not consider this variable further. To rule out the possibility that participants may have distanced themselves from the gender threat or claimed a favored identity in their essays (e.g., a man writing “I don’t personally like salad” in the feminine diet condition or “I eat lots of protein” in the masculine diet condition), the assistant coded for whether or not the participant used any self-references (0 = no, 1 = yes). Finally, the assistant recorded the total word count to control for possible differences in effort across conditions.

We submitted the total word count in the essays to a 2 (Participant Gender: men, women)  $\times$  2 (Diet Type: plant-based, meat-based) ANOVA. This yielded a main effect of diet,  $F(1, 82) = 4.50, p < 0.04$ , and no other effects,  $F_s(1, 82) < 1$ . Participants wrote more in the meat condition ( $M = 88.80, SE = 3.31$ ) than they did in the plant condition ( $M = 78.76, SE = 3.39$ ). We therefore controlled for word count in primary analyses, to rule out the possibility that simply saying less about a plant-based diet may have been a strategy to distance oneself from the diet. A similar ANOVA on self-reference scores produced no significant effects, all  $F_s(1, 82) < 1$ , so we did not control for self-references.

### 4.5 Enjoyment of gender-typed activities

We predicted that following endorsement of the feminine diet, men would report greater liking for masculine activities and less liking for feminine activities compared to men who endorsed a masculine diet, and compared to women regardless of diet endorsement. To test this, we first submitted ratings of enjoyment of gendered activities to a 2 (Participant Gender)  $\times$  2 (Diet Type)  $\times$  2 (Activity Type: feminine, masculine) ANOVA with repeated measures on the last factor. The three-way interaction was significant,  $F(1, 82) = 6.18, p < 0.02, \eta^2_p = 0.07$ , and it remained significant when we controlled for word count,  $F(1, 81) = 6.39, p < 0.02, \eta^2_p = 0.07$ . To interpret this interaction pattern, we conducted separate Gender-by-Diet ANOVAs on ratings of the masculine and feminine activities. As shown in Fig. 2, the Gender-by-Diet interaction reached significance on ratings of masculine activities,  $F(1, 82) = 3.82, p = 0.05, \eta^2_p = 0.04$ , although this interaction was not significant when we controlled for word count,  $F(1, 81) = 3.73, p < 0.06, \eta^2_p = 0.04$ . Simple effects tests revealed the predicted pattern: Men in the plant-based diet condition reported greater enjoyment of masculine activities than men in the meat-based diet condition,  $F(1, 82) = 4.36, p < 0.05, \eta^2_p = 0.05$ , but diet condition had no effect on women’s enjoyment of masculine activities,  $F < 1$ . Unexpectedly, the Gender-by-Diet ANOVA on enjoyment of feminine activities was not significant,  $F < 1.32, p > 0.25$ . Thus, we found no evidence that men in the plant-based diet condition expressed distaste for feminine activities relative to men in the meat-based diet condition. As this was not what we expected, we can only speculate that men found it more effective to express liking for stereotypical masculine activities than lack of interest in feminine activities as a way to restore masculinity.

### 4.6 Gender identification

We predicted that following the endorsement of the plant-based diet, men would identify more strongly with the male gender than following the endorsement of the meat-based diet; women should be relatively unaffected by the diet endorsement manipulation. To test this, we submitted ratings of gender identification to a 2 (Participant Gender)  $\times$  2 (Diet Type) ANOVA. The Gender-by-Diet interaction was significant,  $F(1, 82) = 5.28, p < 0.03, \eta^2_p = 0.06$ , and it remained significant when we controlled for word count,  $F(1, 81) = 5.26, p < 0.03, \eta^2_p = 0.06$ . Simple effects tests indicated that whereas men in the plant-based diet condition identified more strongly with their gender than men in the meat-based diet condition,  $F(1, 82) = 4.64, p < 0.04, \eta^2_p = 0.05$ , women showed no such effect,  $F < 1.18, p > 0.27$  (see Fig. 3).

### 4.7 Offensiveness of jokes

We predicted that following endorsement of the feminine relative to the masculine diet, men would rate jokes targeting “feminine” gender outgroups (women and gay men) as less offensive; women’s ratings of “masculine” gender outgroups (men and lesbians) should be relatively unaffected by the diet endorsement manipulation. We did not anticipate any effect of diet type on people’s ratings of gender-consistent groups (mas-

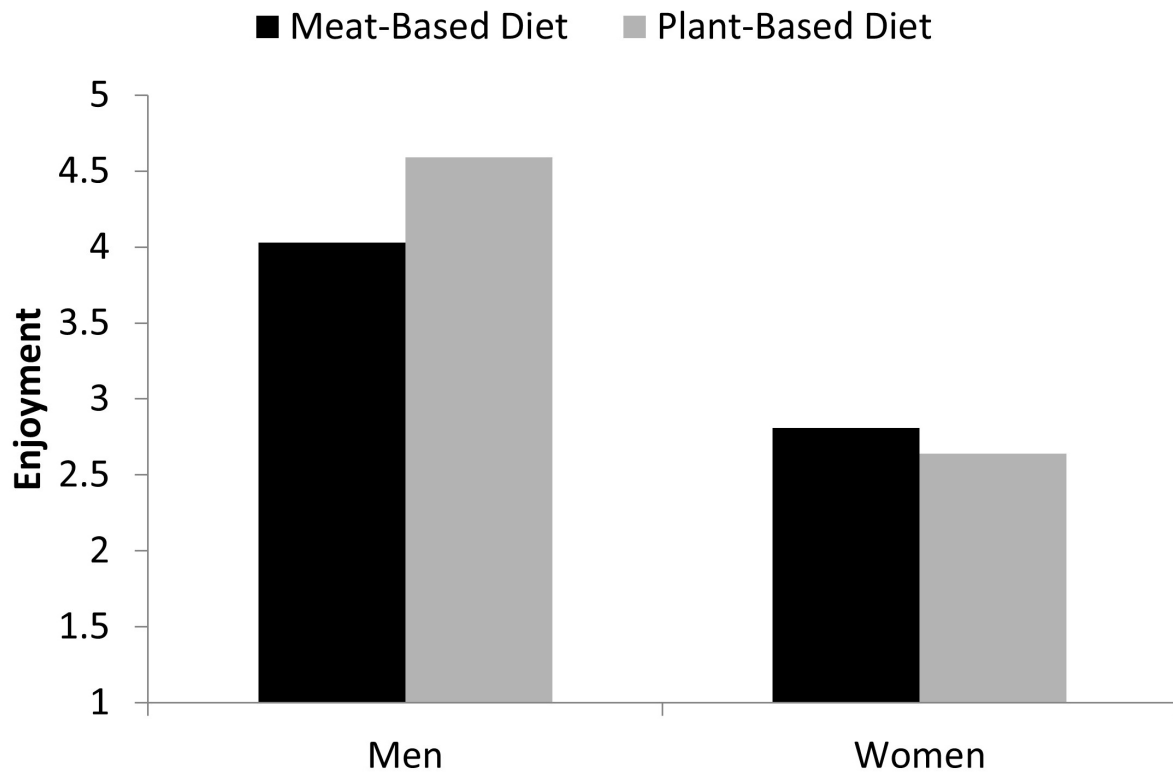


FIGURE 2. Reported enjoyment of stereotypically masculine activities as a function of participant gender and diet endorsement, Study 2.

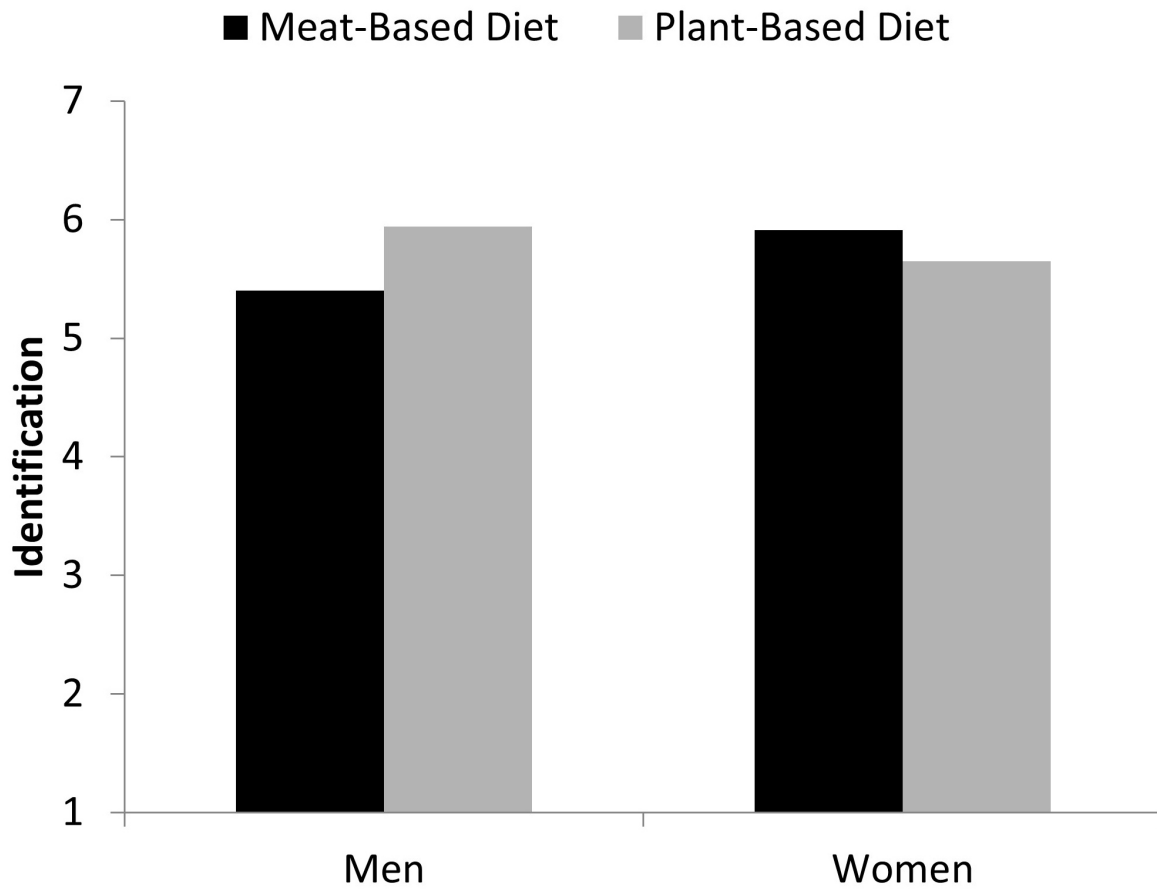


FIGURE 3. Identification with gender group as a function of participant gender and diet endorsement, Study 2.

culine groups (men and lesbians) for men, feminine groups (women and gay men) for women). To test this, we submitted offensiveness ratings of the jokes to a 2 (Participant Gender)  $\times$  2 (Diet Type)  $\times$  2 (Genderedness of Group: feminine, masculine) ANOVA with repeated measures on the last factor. The predicted three-way interaction was significant,  $F(1, 82) = 3.92, p = 0.05, \eta^2_p = 0.046$ , and it remained significant when we controlled for word count,  $F(1, 81) = 4.81, p < 0.04, \eta^2_p = 0.056$ . We interpreted the three-way interaction by first conducting a Gender-by-Diet ANOVA on offensiveness ratings of jokes targeting feminine groups. This yielded a significant interaction,  $F(1, 82) = 10.21, p < 0.01, \eta^2_p = 0.11$ . The interaction remained significant when we controlled for word count,  $F(1, 81) = 10.50, p < 0.01, \eta^2_p = 0.12$ , as well as ratings of how funny and clever people found the jokes targeting feminine groups,  $F(1, 80) = 9.95, p < 0.01, \eta^2_p = 0.11$ . As shown in Fig. 4, men who endorsed a plant-based as compared to a meat-based diet rated the offensiveness of jokes about women and gay men as less offensive,  $F(1, 82) = 15.40, p < 0.001, \eta^2_p = 0.16$ , whereas women's perceptions of jokes about these groups were relatively unaffected by the manipulation,  $F < 1$ . The Gender-by-Diet ANOVA on the offensiveness of jokes targeting masculine groups was not significant,  $F < 1.45, p > 0.23$ .

To summarize, men who endorsed a healthy plant-based, organic diet subsequently affirmed their masculinity by derogating groups that are stereotypically viewed as feminine (women and gay men), reported greater liking for stereotypically masculine activities, and a stronger identification with their gender group. These findings suggest that associating oneself with a feminine diet represents a gender threat for men, one that motivates compensatory behaviors to restore masculinity. Conversely, women showed no such pattern following endorsement of a meat-based, masculine diet.

## 5. General discussion

Food choices and eating behaviors are central ways in which people enact gender. Although dietary recommendations evolve continually, most contemporary health professionals recommend decreasing the consumption of foods with masculine genderedness and increasing consumption of foods with feminine genderedness [14]. The present studies suggest that such recommendations will be a tough sell for men because of the significant gender-symbolic meaning attached to food and the consequent implications for men's precarious gender status. In short, admonishments to eat more healthfully may conflict with men's identities as "real men". This is consistent with recent research findings, for instance, that priming masculinity leads both men and women to prefer unhealthy foods [41] or that men will choose masculine foods (forgoing intrinsic preferences) when they have time to think about their choices [66].

In Study 1, we found that foods were reliably gendered, such that meats (particularly red meats) were rated as masculine, whereas vegetables and fruits, dairy products, low-calorie and diet foods, vegetarian proteins (tofu, veggie burgers), and sweets (frappuccinos, ice cream) were rated as feminine. Beer and whiskey were rated as highly masculine, though wine was

rated as feminine. While past research has established gender stereotypes associated with limited categories of foods, Study 1A provides the most comprehensive set of gender ratings of foods of which we are aware. Importantly, the genderedness of foods is a predictor of approach motivations toward those foods, but for men more than women. Study 1B demonstrated that men state an aversion to foods perceived as feminine, even though feminine foods were rated as healthier.

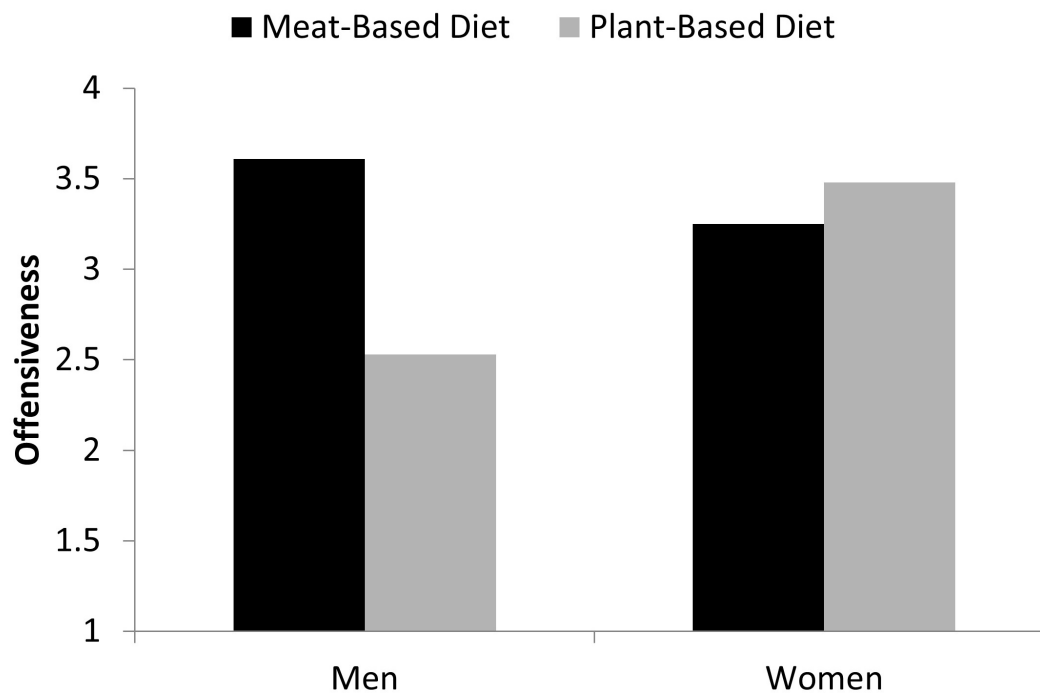
Men's avoidance of perceived feminine foods suggests that such foods threaten men's gender status. Our experimental study tested this idea more directly. In Study 2, men publicly endorsed either an organic, vegetarian diet or a meat and protein-based diet (rated as highly feminine and masculine, respectively, in Study 1A). Men asked to endorse a diet constituting of feminine gendered foods (*i.e.*, vegetarian) diet reacted as if this threatened their sense of manhood by later compensating by reporting a greater interest in stereotypically masculine activities, identifying more strongly with their gender ingroup, and demonstrating less offense by sexist and anti-gay jokes, compared to men who endorsed a meat and protein diet (a gender-typical diet constituting of masculine gendered foods). Notably, women in this experiment were unaffected by the diet endorsement manipulation, suggesting that gender-atypical food does not serve as a gender threat for women.

Collectively, these studies extend past research that examined the connections between gender stereotypes and food. While previous research identified stereotypes associated with specific subcategories of foods, the present research provides a broad picture of the gendered associations of an array of foods. Further, these studies suggest potential behavioral consequences of foods' gendered associations. Men at least claim to make eating decisions based on the perceived masculinity and femininity of foods, and this can undercut healthy dietary choices.

## 6. Limitations

While the present studies offer consistent evidence for the influence of gendered associations on men's food choices, several limitations are worth noting. First, because Study 1 is correlational, caution is warranted in drawing causal conclusions about the influence of gendered associations on eating behaviors. We suggest here that men avoid eating certain foods because of the foods' femininity, but some unmeasured quality of the foods may account for the relationship. For instance, masculine foods may simply be seen as tastier than feminine foods, and tastiness may predict men's approach motivations. Note that our approach composite included an item measuring how much respondents liked various foods, which is not the same as how tasty the foods are. While this is a plausible alternative explanation, it does not fully account for why men were much more strongly drawn to masculine foods (and driven away from feminine foods) than women were, assuming men and women agree on the tastiness of foods.

The experimental study helps address the limitation of the correlational design of Study 1 by directly manipulating diet and measuring gender-related outcomes. One limitation of Study 2, however, is that we confounded the genderedness of diets with the contents of those diets. Participants wrote essays



**FIGURE 4. Offensiveness of jokes about feminine groups as a function of participant gender and diet endorsement, Study 2.**

about either meat and protein-based diets or plant-based, vegetarian diets. Again, as with Study 1, it is possible that some feature(s) of the two diets other than their perceived femininity versus masculinity accounted for participants' reactions to the diet manipulation. For instance, if men found the thought of a plant-based diet unpalatable, they may have experienced a subsequent need for pleasant stimulation, which drove their reactions to the jokes, activities and gender identification scales. We view this alternative as unlikely, given that men's reactions to our dependent measures clearly fell along gender lines. For example, if the thought of an unappealing diet increased men's desire for entertaining stimulation, then presumably they would have rated all the offensive jokes as less offensive, not just the jokes lampooning feminine targets. As well, Study 1 provided evidence that men's avoidance of healthy, feminine diets is motivated specifically by the degree to which these diets are seen as feminine.

An additional methodological limitation of Study 2 was that the evidence that the vegetarian, organic diet is a gender threat for men is indirect—we inferred it from the masculine compensatory behaviors rather than asking directly if they felt threatened. We deemed this approach necessary, however, as men are usually reluctant to directly admit that their masculinity can be threatened.

The studies are further limited by our reliance on a binary view of gender—foods were framed as either masculine or feminine, for instance. Many people, of course, do not identify themselves in starkly binary terms, and it is unclear if the same pressure for gender conformity in food and diet would apply to them. On the one hand, people and particularly young people, increasingly reject strictly binary notions of gender and may thus reject overly rigid associations of gender with food

moving into the future. On the other hand, even people who do not identify along the traditional binary may feel cultural pressure to uphold ideals of masculinity, to the extent that these ideals are rewarded. We note also that our stimulus materials were framed around a binary view of foods as masculine or feminine. We feel that this was a justifiable approach as foods often do carry stereotypically gender associations as either masculine (*e.g.*, steak) or feminine (*e.g.*, salad), but not both. This was borne out in participants' ratings in Study 1A, in which the masculinity and femininity ratings of foods and diet types were almost perfectly negatively correlated.

A final limitation of each of our studies concerns the relatively young, educated college student samples on which we relied. Although these studies showed consistent evidence that food is highly gendered and gender concerns can influence men's eating behaviors, we cannot say for certain whether these concerns would extend to younger or older populations, or working-class, non-student populations. Similarly, the studies all took place in the United States, and different cultures may have gendered associations with food that may differ from those of our samples. These are important directions for future research.

## 7. Conclusions

The present studies suggest that for men to eat healthier foods, how food and diet genderedness can be targeted. One approach is to somehow make stereotypically “feminine” foods less threatening to men by reframing them in masculine terms. For instance, despite the benefits of vegetarian and plant-based diets [67], men are much less likely than women to self-identify as vegetarians [68]. To counter the stereotype that

vegetarians are twee and effeminate, health campaigns might feature vegetarian high-performance athletes or action movie stars.

Another approach might be to de-emphasize the gendered aspects of food by emphasizing other moral qualities. For instance, although meat is strongly associated with masculinity and vegetarianism with femininity, vegetarians are also rated as virtuous [30], empathic and intelligent [69]. Policy interventions targeted at men could emphasize these benefits or tie healthy eating to traditional masculine virtues like physical strength, stamina, personal integrity, or even sexual prowess. Regardless of the approach, it is clear that dietary choices are critical to healthy lives, and men currently lag well behind women in long-term health and longevity [16, 50]. Confronting this challenge will require an awareness that men's food choices are socially determined, identity-infused behaviors.

## AVAILABILITY OF DATA AND MATERIALS

All data and materials available upon request from the first author.

## AUTHOR CONTRIBUTIONS

JAV and JKB—conceptualized and designed the studies. JAV—wrote the manuscript. JAV, JKB, TAC and JRK—contributed to the data collection, analyses and writing of the paper, contributed editorial changes to the manuscript, approved the final manuscript.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All studies were approved by the Institutional Review Board of the University of South Florida, approval # Pro00005047. All participants consented to participate in the studies.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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