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# Is Meat Male? A Quantitative Multimethod Framework to Establish Metaphoric Relationships

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Metaphors are increasingly recognized as influencing cognition and consumption. While these linkages typically have been qualitatively generated, this article presents a framework of convergent quantitative methodologies that can further document the validity of a metaphor. To illustrate this multimethod framework, the authors explore whether there is a metaphoric link between meat and maleness in Western cultures. The authors address this in six quantifiable studies that involve (1) implicit associations, (2) free associations, (3) indirect-scenario-based inferences, (4) direct measurement profiling, (5) preference and choice, and (6) linguistic analysis and conclude that there is a metaphoric relationship between mammal muscle meat and maleness.

The importance of metaphors in human thought, language, and function is undeniable (Belk, Ger, and Askegaard 2003; Glucksberg 2003; Lakoff and Johnson 1980a, 1980b; McQuarrie and Mick 2003; Thompson, Pollio, and Locander 1994). Uncovering the different metaphors that could potentially explain differences in preference has largely been the domain of qualitative research (Arnould and Price 1993; Belk, Wallendorf, and Sherry 1989; Cotte 2004). This article presents a range of often overlooked quantitative methodologies that can help convincingly establish metaphoric linkages.

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Our approach is multimethod and multidisciplinary: an attempt to build a case by indirect and direct evidence from language, ethnography, and psychological measurements of attitudes and beliefs. This approach is also inspired by the seminal work of Nisbett and Cohen (1996) in which they mobilize observations from literature, politics, the law, attitude psychology, and observational and experimental psychological measures to make a strong case for the operation of a culture of honor in white American males from the South. We know of no parallel treatment of this methodological breadth of a metaphoric linkage, and we attempt the beginning of such an analysis here. When referring to these linkages, we will be using the terms “metaphors” and “symbols” interchangeably.

Systematically testing metaphoric relationships has three major benefits. First, metaphors and symbols are fundamental aspects of human cognition, and we need a richer and more convincing way to establish their existence (Deighton 1992; Lakoff and Johnson 1980a, 1980b). Second, for researchers in consumer behavior, it can accelerate the understanding and acceptance of hidden mediating factors that underlie basic product preference differences across different demographics. Third, to managers, it provides a tool to determine whether there are key differences between the metaphors that brand champions have of their products that brand switchers do not.

The article is structured as follows. A multimethod framework is described in a way that illustrates a range of quan-

titative studies that can be conducted to show convergent and divergent validity for different metaphors. Following this description, a detailed illustration of a convergent approach is conducted with six studies, each using a different methodology to examine whether meat stands as a metaphor for maleness, for at least some individuals in some cultures. To conclude, there is a general discussion of how the future of metaphor research can be effectively guided in a more coordinated and productive manner.

### TOWARD A MULTIMETHOD INVESTIGATION OF METAPHORS

Regardless of the depth of an insight, if the ethnographic or qualitative methods used to generate the insight are unfamiliar to researchers outside that field, or if the evidence is not compelling to a skeptic, the insight will struggle for adoption. Consider two excellent culturally specific efforts to establish such linkages on the basis of ethnographic data. Hershman (1974) argues cogently for the sexual meanings of human hair in Hindu India, particularly among the Punjabis. He marshals a wide range of evidence, including that male hair can only be dealt with by barbers or women, that a wife grooming her husband's hair is an act of great intimacy done in private, that brothers and sisters do not do each other's hair (incest!), and that hair is rarely mentioned in speaking (as is the case with sex organs). In a second example, Meigs (1984) argues for the female sexual meaning of fruits, particularly those that are soft and red, as vaginal and feminizing entities among the Hua of Papua New Guinea. The Hua isolate prepubescent and adolescent males from any contact with fertile females, in order to encourage the development of their maleness. They prohibit ingestion of any foods grown or prepared by fertile females and prohibit a group of foods that are considered feminizing. In an exhaustive listing and analysis of the prohibited foods, a major category is soft, reddish fruits, which on both intuitive grounds and the reports of Hua respondents are female related and therefore considered feminizing during the formative years of a male.

What is missing in both of these important studies is the type of quantitative evidence that psychologists would bring to bear, including free associations, memory organization, attributions, and accessibility of thoughts, attitudes, and so on. It is wrong to believe that metaphor research is necessarily nonfalsifiable. What is needed is an illustrative framework about how to use convergent methods, from different disciplines, to fully explore the relationship between a metaphor and what it supposedly stands for (Bergman 2010; Feilzer 2010). We seek to accomplish this in the studies presented here by applying multiple measures from different disciplines in the service of establishing a link between maleness and meat.

#### A Convergence Framework for Investigating Metaphor-Product Relationships

In their classic work on measurement, Campbell and Fiske (1959) emphasize the concepts of convergence and diver-

gence. We can be most certain of a relationship when multiple methods converge on the same general finding. Although no study can prove a hypothesis, multiple studies that use multiple methods and have converging findings make a hypothesis increasingly compelling (Wettersten 2007). Furthermore, given that all methods have their strengths and their disadvantages, the use of multiple methods in multiple studies usefully redirects the focus from the nuances of each method to their general converging conclusion (Wilk 2001).

The counterpart of this notion of convergent validity is that of divergent validity. Aside from selecting methods that provide the opportunity for converging hypothesized conclusions, care should be taken to show that they provide the opportunity for a divergence in terms of support for what is not hypothesized (Mertens 2011). For instance, suppose multiple studies converged on the hypothesis that meat is more male than female. This hypothesis would be further supported if there were diverging findings that meat alternatives—perhaps eggs or milk—are found to be more female. Building the potential for divergent findings of the counterhypothesis is a useful consideration when selecting studies to investigate metaphors.

There is a wide variety of studies that could be conducted to triangulate on metaphoric linkages (Castro, Kellison, and Boyd 2010). It is important that they offer both convergent and divergent validity and that they span a wide range of methods and response categories.

Much of the formative work on metaphors involved an analysis of language (Lakoff and Johnson 1980a). Here we will focus on primary data collection methods that directly involve individuals. The six methods that will be described and demonstrated are not an exhaustive or definitive collection (cf. Onwuegbuzie, Bustamante, and Nelson 2010; Reio and Hesse-Biber 2009). Some methodologies examine unstated associations, some directly assess attitudes, and others examine behavior (Alise and Teddlie 2010). They represent samples of general methods that are flexible to be used to test a variety of metaphor-product links. To contextualize them, we will examine the link between maleness and meat, as illustrated in table 1.

Table 1 provides a menu of useful methods that offer a combination of convergent and divergent validity across a variety of response categories. Of these seven methods, six are illustrated in the empirical portion of this article. For any given metaphoric linkage being tested, there are certain of these methods that will be more relevant, convenient, or sensible than others. What follows is an illustration of how they can be used to examine a metaphoric linkage. In this case, it is the metaphor of maleness and meat. After a brief ethnographic description of how this hypothesis was developed, the relationship will be quantitatively examined using six of these methods.

#### Investigating Metaphor: The Case of Meat and Maleness

Meat is a major commodity and a very important aspect of human existence. In many ways, meat is the preferred

**TABLE 1**  
SELECTED METHODS TO INVESTIGATE METAPHOR-PRODUCT RELATIONSHIPS

| Method  | Illustration: Maleness and meat  | Methodological considerations   |
|---|--|---|
| Implicit association tests                          | The more congruent the relationship between maleness and meat, the shorter one's affirmative reaction time would be when "meat" and "male" are paired (along with "vegetables" and "female") than when the opposite pairings are presented.    | While there is debate whether implicit association test results measure individual beliefs or societal norms, they do represent a robust measure of some relationships that exist in the mind.  |
| Free associations                                   | These are spontaneous thoughts about meat. Key variations in how individuals think of meat can be investigated by asking people to write down the first words that come to mind when they think of beef. Answers can then be content analyzed. | A classic technique measuring what comes to mind. It is extremely easy to elicit but very context sensitive. It is an exploration of mental associations.   |
| Indirect-scenario-based inferencing                 | Investigate gender-related attributions for meat preference by using scenarios that vary one's gender and one's food preferences (meat vs. vegetables) and then measuring the masculinity of the target subject of the scenario.               | An effective scenario tool is the Asch impressions technique.   |
| Direct measurement profiling                        | This is more of a direct hypothesis test. Participants rate a wide range of foods on the extent to which they are perceived as male or female.   | The most straightforward and direct measurement of the link between a food and gender. More extreme versions of the product (e.g., rare vs. cooked steak) can examine degrees of differentiation.   |
| Preference and choice                               | If meat is associated with maleness, males should prefer meat more than females do, and females should avoid eating meat more than males do.   | Study can examine past reported behavior, stated preferences, or actual choice.   |
| Linguistic analysis                                 | A number of languages (e.g., Spanish, German, Hebrew, and Russian) use gendered nouns. If meat is more associated with the male gender than the female gender in these languages, it would offer a form of cross-cultural support.             | Explores the gender status of critical (meat) words, including gendered nouns but also contexts in which the words are used. Divergent validity can be investigated by assessing whether opposite words (e.g., fruits) are female gendered. |
| Metaphor priming or threat with consumption measure | If a metaphor—such as maleness or masculinity—is central to one's self-identity, threatening one's masculinity could lead people to overcompensate by consuming more meat.   | Unvalidated. The metaphor has to be strongly linked to self-identity and threatened when one also has the opportunity of consumption.   |

food of humans, as well as a fundamental source of energy and nutrients. The average American consumes 195 pounds of meat per year, with men, on average, consuming more than women (USDA 2002). Perhaps more than any other food, meat is laden with meanings because of its association with higher status and the killing of animals (Fiddes 1991; Rozin 2004; Twigg 1979). The ability to obtain meat also plays a major role in human evolution. Meat has a great deal to do with human sociality since the hunt often involves complex social coordination. The hunt, the kill, and the sharing of meat with family and nonfamily members have all been highly regulated.

There are several arguments in favor of attempting to systematically establish a link between maleness and meat that motivate the studies presented here (Fiddes 1991; Sobal 2005; Twigg 1979). Meat, as the product of the hunt, falls into the male domain since cross-culturally and historically, hunting has been an almost exclusively male domain (this is truer with large game animals than with smaller animals and fish). Meat seems associated with strength and power, two features generally attributed to males. In a traditionally male-dominated world, with meat as a highly preferred and limited resource, meat has generally been considered to be a particularly appropriate food for males, one that promotes manliness. Meat is often made selectively available to males, and more specifically, preferred cuts of meat (e.g., muscle

as opposed to viscera) are reserved for males in some cultures. It is also commonly understood that physical strength, an attribute more characteristic of males, requires optimal nutrition, and meat is often seen as the most nutritive and strength (i.e., muscle) inducing of foods.

The male-meat linkage has been noted by a number of scholars in the social sciences. Twigg (1979), in her analysis of vegetarianism, suggests a meat hierarchy ranging from strong to weak, from human meat to mammalian carnivore meat to uncastrated mammal meat through castrated mammals to fowl and fish. She relates meat to animal strength, building of muscles, and the stimulation of lust and notes the existence of regimens designed to restrict sexuality (masturbation) in pubescent males by limiting meat. Fiddes (1991) also discusses the meat-strength linkage and the related male-meat linkage. With respect to power, he notes that "meat has long stood for man's proverbial 'muscle' over the natural world" (65). Sobal (2005) observes that "men and women 'do gender' by consuming gender-appropriate foods. Meat, and especially red meat, is an archetypical masculine food. Men often emphasize meat, and women often minimize meat, in displaying gender as individuals" (135).

The male-meat linkage has been promoted most explicitly by Carol Adams (1991). Writing from a feminist perspective, Adams proposes that "what, or more precisely *who*, we eat

is determined by the patriarchal politics of our culture, and that the meanings attached to meat eating include meanings clustered around virility." What Adams argues is that the way gender politics is structured into our world is related to how we view animals, especially animals that are consumed. "Patriarchy is a gender system that is implicit in human/animal relationships" (16–17).

Adams makes a second important point about meat and femininity: "*The Sexual Politics of Meat* proposes a specific conceptual term to recognize the exploitation of the reproductive process of female animals: milk and eggs should be called feminized protein, that is, protein that was produced by a female body. The majority of animals eaten are adult females or children. Female animals are doubly exploited: both when they are alive and when they are dead" (1991, 21). This raises the idea that much of the animal product that serves as food for humans can arguably be conceived as representing femininity, perhaps as a female symbol.

On the basis of these observations, we will explore the following hypotheses:

- H1:** Maleness and meat are linked in thought.
- H2:** It is specifically mammal muscle that has male implications.
- H3:** Feminized protein (milk and dairy products, eggs, and meats that come from explicitly female organs—e.g., placenta, ovaries) will be psychologically linked to femaleness.
- H4:** Foods that have received more culinary treatment, that is, are more distant from raw, as a result of being traditionally processed more by females, will have more psychological femaleness.
- H5:** In the service of gender identity maintenance, females will prefer lesser involvement with meat.
- H6:** Measures of the maleness of meat will be more pronounced in individuals with feminist affiliations.

Using six of the menu of options noted in table 1, we test these hypotheses in six studies: one linguistic, one demographic, and four based on the psychology of beliefs, attitudes, and choice. As in table 1, the hypotheses are organized from the most implicit to those that are most structural (linguistic) or behavioral (consumption).

## STUDY 1: IMPLICIT ASSOCIATION TESTS—MALENESS AND MEAT

The implicit associations test (IAT) has become a major research tool in social psychology (Greenwald 1998; Greenwald and Banaji 1995). This is because it provides indications of associations or attitudes that differ from the attitudes obtained through the traditional method of explicit questions.

There is controversy about how to interpret IAT scores, particularly when they depart from explicit measures (Ga-

wronski, LeBel, and Peters 2007). One possibility is that they represent individually relevant attitudes or associations that indicate the persons' underlying implicit beliefs that may contradict their explicitly stated beliefs. Another is that they represent associations or attitudes reflecting societal norms that may not actually be subscribed to by the individuals in question. We are inclined to the latter, but whatever the interpretation, and whether the IAT results support or contradict explicit attitudes, IAT results represent a robust measure of some relationships that exist in the head of the respondent. Any of these relationships bear on the male-meat link. In the current study, we obtain IAT results related to maleness and meat in addition to explicit measures of attitudes/behaviors with respect to meat. In accordance with hypothesis 1, we predict shorter reaction times when "meat" and "male" are paired than when the opposite pairings are presented (i.e., male and vegetable, and female and meat).

## Method

The IAT was completed by volunteer participants as part of an introductory psychology course. The IAT was administered using INQUISIT software (version 1.33, Millisecond Software, Seattle) and a modified version of an existing script for the IAT. For the practice trial, a word appeared, and students classified it with a key press as quickly as possible as "flower" or "insect." After a set of such words, a second set of practice trials was carried out using classification of clearly good or bad words on the single good-bad dimension. For the critical IAT tasks, participants saw one word at a time and had to classify it as to membership in one of two disjunctive categories. Thus, for the case of relevance to this study, the two categories were (1) meat or male or (2) vegetable or female. A word would appear, such as "beef," and the participant had to place it in one of these two categories. In another set, the same words were presented but with the opposite disjunctive categories (meat-female and vegetable-male). Participants were exposed to eight different IAT tasks: flower-insect paired with good-bad, black-white (referring to race) paired with good-bad, meat-vegetable paired with good-bad, and meat-vegetable paired with male-female. All participants received both pairings in a set. For each set, half of the participants, chosen randomly, were presented with one pairing first (e.g., meat-male, vegetable-female), and the other half were presented with the other pairing first (e.g., meat-female, vegetable-male). One key was used to assign a word to one pairing, and another was used for the second pairing, and target words were presented in the center of the screen. If a participant misclassified a word, "incorrect" was signaled, and the word was presented again.

Each IAT exercise involved presentation of 20 words, randomly ordered for each participant, from a set of three words corresponding to each of the four categories. We describe here only the results from the final meat-vegetable versus male-female pairings. The three words for meat were beef, pork, and hamburger, and the three words for vegetables, matched on number of syllables, were corn, peas,

and broccoli. The gender words were typical male or female first names, again matched on number of letters—for female, Joan, Claire, and Mary and, for male, John, Robert, and Paul. The statistic we examine is the mean reaction time for each participant for each of the two pairings (meat-male vs. vegetable-female and meat-female vs. vegetable-male).

## Results and Discussion

Altogether, 308 participants completed the task. We eliminated data for any participant if either of the reaction time scores was below .4 or above 3 seconds, resulting in 12 participants being eliminated. The mean reaction time per item for 296 participants who completed the IAT sequence was 1.02 (SD = .40) seconds for meat-male and 1.13 (SD = .35) for meat-female. The mean difference of .11 seconds was significant ( $t(295) = 4.41, p < .001, d = .26$ ).

The results of this IAT study strongly support the hypothesis of an implicit link at some level between maleness and meat. At what level one thinks this occurs—an individual level versus a social/cultural level—depends on how one interprets the results of the IAT.

### STUDY 2: FREE ASSOCIATIONS—WHAT WORDS RELATE TO MEAT

The IAT study established that there is an implicit link between mammal muscle food and maleness. A more verbal link to meaning can be assessed by analyzing free associations. It is quite possible that there is a definite link between A and B but that A is much more strongly linked to C and D. We allow the strength of the association, in competition with others, to assert itself in this study of free associations.

Free associations have face validity as indicators of meaning and were, of course, used by Freud to explore deep meanings. Previous research indicates that three-word free associations to the word “food” provide information about the semantics of food (Rozin, Kurzer, and Cohen 2002). In accordance with the hypothesis 1, we predict more male-related than female-related words as free associates to the words “meat,” “beef,” and “steak.”

## Method

Free associations were solicited at the very beginning of the questionnaires to minimize any priming or context effects. The question soliciting the free associations was always the same: “Write down the first three words [number of words solicited varied from one to three, almost always three] that come to mind when you think of: (word).” After the respondent generated a set of words, the instructions continued: “Go back and put a +, – or 0 next to your words, to indicate whether they have positive, negative, or neutral meaning to you.”

All studies were carried out using hard copy questionnaires, with the exception of free associations to “beef,” which were collected via an online questionnaire. We examined all the words offered in response to “meat” and

counted the number that could be construed as masculine by independent observers and those that could be construed as feminine. The great majority of these gendered words explicitly referred to gender or sexualized body parts or were the first names of either males or females. The very few words of questionable gender were recorded and discussed by both people tabulating the words to determine a classification. For example, the word “virile” was classified as male. Free associations gathered in French and German were scored by a person fluent in the relevant language.

We examine free associations to “meat” in two large databases. One is a sample of over 2,000 American undergraduates from six schools in different areas of the United States described in more detail elsewhere (Rozin, Bauer, and Catanese 2003). The second database consisted of a stratified sample of about 170 adults (one-third teachers, one-third physicians, and one-third lay people) from each of six countries: France, Germany, Italy, French Switzerland, the United Kingdom, and the United States. The results in Italian were not coded and are not included in the analysis. This study was the preliminary phase of the larger telephone survey described in study 5. The free associations were solicited as part of a 45-minute telephone interview, in the native language of the respondent. Free associations were solicited for both “meat” and “milk.” More details about the sample are available in other publications (Fischler and Masson 2008; Rozin et al. 2006).

We supplement these findings with data from a few questionnaires given to University of Pennsylvania undergraduates that included free associations to the word “steak” and the results from the large six-school American sample for free associations to “chocolate.” Finally, in 2009, using an online questionnaire hosted on SurveyMonkey.com, we initiated a general purpose questionnaire with three free associations to the word “beef.” Although the associations are not truly independent, since each participant provided three responses, we treat the entire corpus as one large collection of words.

## Results and Discussion

Gendered words (total rated as male or female) were very uncommon as free associates of “meat,” with a total of 25 out of 6,196 associations (0.4%) for the American college students and three out of 2,566 (0.12%) for adults from five countries. The 25 masculine-feminine words offered by Americans were principally eight names of individual females or males, seven examples of words with the root man/male or woman/female, instances of “mom” or “dad,” and of the word “penis.”

For “meat,” the American college students produced 19 male and six female words ( $z = 2.60$ , normal approximation to binomial,  $p < .01$ ), and in the adults from five countries, there were three male and zero female words (NS). There is a weak suggestion of a higher incidence of male as opposed to female words, suggesting a possible male-meat associative linkage. For comparative purposes, free associations to “chocolate” in the American six-school sample

produced 37 female words and only two male words ( $p < .001$ , binomial).

The sample of 466 University of Pennsylvania introductory psychology students included three associations to the word "steak." Here there was a stronger gender effect (27 out of 1,359 associations, or 2.0%, were gendered words) and a clearer male dominance (25 male, two female;  $p < .001$ ).

Finally, in an initial anonymous survey in a large introductory psychology class dealing primarily with background knowledge of psychology, the first item asked for three free associations to the word "beef." Of a total of 1,543 associations (from 516 first associations to 513 third associations), 13 were clearly male, and zero were female ( $p < .001$ , binomial). Eight of the 13 free associations contained the root "man" (man, men, manliness), and two others explicitly referred to the male gender (boy, guys). Consistent with our other measures, a very small number of associations were gender relevant, with a significant dominance of male over female.

We also obtained free associations to "milk," which allows for a test of the female protein hypothesis described earlier. A total of 439 University of Pennsylvania undergraduates generated a single-word free association to "milk." Only seven of the associations were gendered, but all seven of these were female words ( $p < .02$ , binomial). In the five-country sample, 15 of 2,572 (0.68%) "milk" free associations were gendered. Of these, 14 were female (primarily references to motherhood: e.g., mama, maternal, maternity), and only one was male ( $p < .001$ , binomial).

Overall, the free association results suggest that there is a weak link between maleness and mammal muscle meat and a very weak link between the more generic word "meat" and maleness. In comparison to the results for "chocolate" and "milk," which suggest a weak link with femaleness, it seems that although gender is a part of the spontaneous meanings of "meat" or more certainly "steak" or "beef," maleness is not one of the most salient meaning links to meat. In moving one step closer to showing an inferred association between maleness and meat, we next use indirect scenarios.

### STUDY 3: INDIRECT-SCENARIO-BASED INFERRING—GENDER ATTRIBUTIONS FROM MEAT PREFERENCE

Insofar as meat is thought to symbolize maleness, information that an individual either consumes or likes meat can be hypothesized to increase the amount of maleness attributed to that person. The Asch impressions technique allows us to test this assumption. We provide college student participants with a paragraph description of a male or female undergraduate. The paragraph comes in eight forms, identical except for the gender of the person described and the sentence discussing his or her favorite foods. After reading the paragraph, we ask participants to rate the person described on a number of dimensions, including masculinity.

In accordance with hypothesis 1, we predict that in either female or male target individuals, more liking for meat will increase masculinity ratings.

### Method

Participants were 569 (59.4% female) students at the University of Pennsylvania enrolled in an introductory psychology course. Data collection was carried out in spring 2006. The brief questionnaire was anonymous and completed during class time. Eight different versions were distributed at random. The impressions paragraph was the first item on the questionnaire. The paragraph was as follows (italicized sections separated by a slash are alternatives in different forms):

*John/Lisa* is a 19 year old sophomore at the University of Pennsylvania. *He/she* is a Political Science major from the suburbs of Washington, DC. *John/Lisa* has many friends of both genders, and loves to go out with them on weekends. *John's/Lisa's* favorite foods are *steak and other kinds of beef/chicken in any form/sushi and other kinds of fish/vegetable stir fry and other vegetable dishes*, and *his/her* favorite sport to watch is basketball. *He/She* likes all kinds of music. *John/Lisa* hopes to work in a political campaign after graduation, and perhaps to run for a political office.

Participants were asked to rate the person described in the paragraph on 16 attributes, using 0–8 unipolar scales. These attributes, in the order presented, were unattractive, attractive, active, passive, obese, thin, liberal, conservative, masculine, feminine, cold, affectionate, kind, unkind, strong, and weak.

### Results and Discussion

Our analysis here is limited to the ratings of masculinity and femininity. Two two-way ANCOVAs were carried out, with masculine and feminine ratings as the dependent variable, gender of target and type of food as independent factors, and gender of the respondent as the covariate. The gender of the respondent did not have a significant effect on ratings of femininity or masculinity, and both John and Lisa predictably varied on masculinity/femininity ratings ( $F(1, 556) = 318.14$ ,  $p < .001$ ,  $\eta_p^2 = .36$  for ratings of femininity, and  $F(1, 556) = 229.02$ ,  $p < .001$ ,  $\eta_p^2 = .29$  for masculinity).

The critical issue was the influence on responses of the type of diet preferred by the person described, for which there was also a significant effect for ratings of both femininity ( $F(3, 556) = 6.95$ ,  $p < .001$ ,  $\eta_p^2 = .04$ ) and masculinity ( $F(3, 556) = 9.37$ ,  $p < .001$ ,  $\eta_p^2 = .05$ ). Post hoc analyses (Tukey's Honestly Significant Difference test) suggested that a person consuming the beef diet was rated as significantly less feminine ( $M = 3.89$ ,  $SD = 2.38$ ) than someone consuming the vegetable ( $M = 4.62$ ,  $SD = 2.26$ ,  $p = .04$ ) or fish diets ( $M = 4.76$ ,  $SD = 2.08$ ,  $p = .01$ ). Similarly, a person eating the beef diet was also judged to be significantly more masculine ( $M = 5.99$ ,  $SD = 1.99$ ) than someone eating the vegetable ( $M = 4.96$ ,  $SD = 2.14$ ,

$p < .001$ ) or fish diets ( $M = 5.09$ ,  $SD = 2.35$ ,  $p = .002$ ). As figure 1 indicates, there was also a significant interaction effect of the protagonist's gender and diet consumed on ratings of masculinity ( $F(3, 556) = 3.71$ ,  $p = .01$ ,  $\eta_p^2 = .02$ ). Findings suggest a significant effect of preference for a diet heavy in meat on perceived masculinity. (As this article was going to press, we discovered an article by Ruby and Heine [2011] that uses the Asch impressions technique to make a point similar to that made in this study, with results congruent with ours.)

#### STUDY 4: DIRECT MEASUREMENT PROFILING—MALENESS/FEMALENESS PROFILES OF MEAT/NONMEAT

This study was carried out after completion of the first three studies, and it involves the most direct approach to testing all six hypotheses. Respondents were asked to indicate directly how "male" and "female" different foods were.

#### Method

An anonymous questionnaire was created with the cooperation of the students in an undergraduate multidisciplinary course on food taught in spring 2006. The questionnaire was completed by other students in two large introductory psychology courses at the University of Pennsylvania, during the same semester at the end of class.

A total of 384 students completed the questionnaire. The questionnaire obtained basic demographic information and information on meat rejections and included the following item—"Use the following scale for all of the remaining items: 0 means 'not at all' and 10 means 'extremely'"—to respond to the question, "How supportive are you of the feminist movement?" Meat acceptance was assessed according to the following item: "What is your relationship to eating meat? (CHECK ONE) [ ] I eat virtually all kinds of

meat that are normally consumed; [ ] I don't eat some animals, such as red meat; [ ] I don't eat any animal meat (vegetarian); [ ] I don't eat any animal meat or animal products (e.g., milk, eggs: Vegan)."

The bulk of the questionnaire was in the form of a table, with foods listed in the left column and the next five columns headed by the words "good," "male," "bad," "female," and "disgusting." The instructions to participants were as follows: "Please rate the following food items on the scales provided, where 0 means 'not at all' and 10 means 'extremely.' . . . GO ACROSS FOR EACH FOOD. DO NOT GO DOWN THE COLUMNS. DO NOT TRY TO BE CONSISTENT. JUST PUT IN THE FIRST NUMBER THAT COMES TO MIND FOR EACH CELL. REMEMBER, GO ACROSS EACH ROW." The foods listed were, in order, "well done steak, milk, blood (as food), chili (ground meat, beans), charcoal broiled hamburger, beef placenta, beef kidney, beef liver, a peach, chocolate, chicken salad, charcoal broiled chicken, scrambled egg, hard-boiled egg, raw egg (as food), medium-rare steak, raw beef (e.g., steak tartar), sushi, fish (as food), rabbit meat (as food), pork (as food), veal (as food), chicken (as food)."

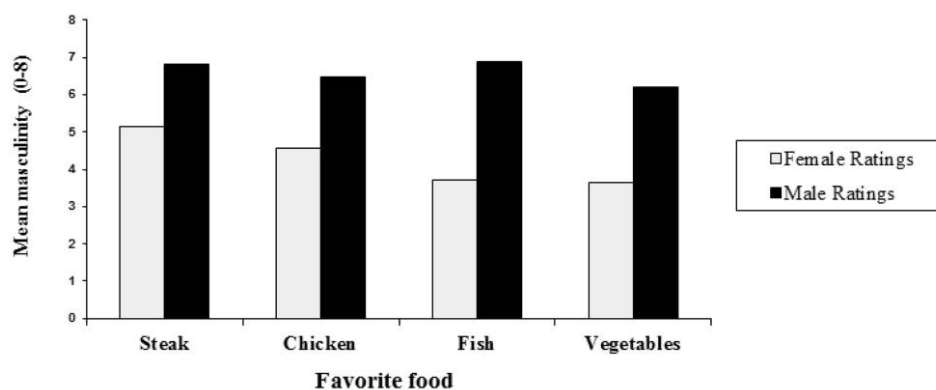
Half of the participants received the items in the order indicated. The other half received the items in reverse order, except that this second version began with the same two initial items (well-done steak and then milk). The remaining items were reversed, so that the third item was chicken (from the end of the initial list) and the last item was blood (as food).

#### Results and Discussion

In the absence of significant impact of the order in which words were presented, all responses were combined in the following analyses. Of 378 respondents who reported on their meat acceptance, 297 (78.6%) consumed all meats, 52 (13.8%) limited meat consumption to some types of meats, and 29 (7.7%) were vegetarians. There were no vegans. We

FIGURE 1

ASCH IMPRESSIONS OF MASCULINITY BASED ON FAVORED FOOD





combined the limited and full vegetarian categories for a total of 81 (21.4%) "meat restricting" individuals.

The mean rankings for all respondents' ratings of "male" and "female" for each food are displayed in table 2. The table shows, in column 1, the mean difference between the mean male and female ratings for all respondents. The 23 food items in the table are ordered with the largest male-female difference (3.33) first and the smallest (-2.57) last. Columns 2 and 3 present the difference ratings, but separately for females and males. Columns 4 and 5 provide the maleness ratings for the whole sample and the ranking of foods in maleness, respectively. Columns 6 and 7 provide the same information for femaleness. Column 8 provides the summed male and female means, what might be considered a measure of the total sexuality of a food, and column 9 is the rank ordering of the sexuality scores.

*Gender of Participant.* As indicated in table 2, gender differences were quite small overall. A MANOVA indicated a significant impact of gender on maleness ( $F(23, 321) = 2.19, p = .002$ ; Wilks's lambda = 0.87,  $\eta_p^2 = 0.14$ ) but not femaleness ratings of foods ( $F(23, 323) = 1.28, p = .18$ ; Wilks's lambda = 0.92,  $\eta_p^2 = 0.08$ ). In the case of maleness, the only differences to reach statistical significance using a Bonferroni-adjusted  $p$ -value of .002 were ratings of the maleness of "rabbit," which was judged to be greater by men than women.

Respondent gender had a significant impact on male-female difference in ratings ( $F(23, 314) = 2.19, p = .002$ ;

Wilks's lambda = 0.86,  $\eta_p^2 = 0.71$ ): males scored higher on the male-female difference in 16 of 23 cases; however, no comparison reached statistical significance using a Bonferroni-adjusted  $p$ -value of .002. For the subsequent analyses, we therefore combine the data from male and female participants.

*General Description of Results.* The male-female difference in ratings was greatest for raw beef (3.33), medium-rare steak (3.33), and charcoal-broiled hamburger (3.23). The smallest differences were for peach (-2.57), chicken salad (-2.32), and chocolate (-2.25). For maleness, the highest scores were for medium-rare steak, hamburger, and well-done steak, and the lowest were for blood, beef placenta, and beef kidney (table 2). For femaleness, the highest scores were for chocolate, peach, and chicken salad; lowest scores were for blood, raw egg, and beef kidney. Total sexuality (i.e., the sum of male and female means; table 2, col. 8) was highest for chocolate (12.76), chicken, and medium-rare steak, with many foods showing similar high scores. The low sexuality scores stood apart from most other scores, with the lowest values being for blood (3.85), beef kidney (5.30), and beef placenta (5.72). Many of the mammal meats had high sexuality scores, but notably, raw beef (8.14) was among the lower of these.

The highest correlations between maleness and femaleness were for chicken (.44), scrambled egg (.40), and pork (.38), and the lowest were for well-done steak (-.20), raw egg (-.07), and chocolate (-.03). There was no obvious

TABLE 2

RATINGS OF THE MALENESS AND FEMALENESS FOR 23 FOODS

|                   | Male - female |            |          | Maleness | Rank male | Femaleness | Rank female | Sum male + female | Rank |
|-------------------|---------------|------------|----------|----------|-----------|------------|-------------|-------------------|------|
|                   | All (1)       | Female (2) | Male (3) |          |           |            |             |                   |      |
| Raw beef          | 3.33          | 3.08       | 3.64     | 5.74     | 9         | 2.41       | 18          | 8.14              | 17   |
| Medium-rare steak | 3.33          | 3.11       | 3.63     | 7.58     | 1         | 4.25       | 13          | 11.82             | 3    |
| Hamburger         | 3.23          | 3.38       | 3.04     | 7.50     | 2         | 4.27       | 12          | 11.76             | 4    |
| Well-done steak   | 2.97          | 2.94       | 3.00     | 6.93     | 3         | 3.96       | 16          | 10.88             | 10   |
| Beef chili        | 2.71          | 2.54       | 2.96     | 6.73     | 4         | 4.03       | 15          | 10.79             | 11   |
| Raw egg           | 2.47          | 2.48       | 2.46     | 4.51     | 16        | 2.03       | 22          | 6.54              | 19   |
| Pork              | 2.07          | 1.87       | 2.36     | 6.26     | 6         | 4.19       | 14          | 10.44             | 14   |
| Veal              | 1.43          | 1.10       | 1.85     | 5.79     | 8         | 4.36       | 11          | 10.15             | 15   |
| Rabbit            | 1.43          | 1.16       | 1.75     | 4.25     | 17        | 2.82       | 17          | 7.07              | 18   |
| Beef liver        | 1.30          | 1.21       | 1.39     | 3.69     | 20        | 2.38       | 19          | 6.06              | 20   |
| Beef kidney       | 1.19          | 1.40       | .87      | 3.25     | 21        | 2.06       | 21          | 5.30              | 22   |
| Blood             | 1.15          | .69        | 1.73     | 2.50     | 23        | 1.36       | 23          | 3.85              | 23   |
| Broiled chicken   | .63           | .37        | .97      | 5.91     | 7         | 5.28       | 8           | 11.19             | 6    |
| Beef placenta     | .53           | .59        | .41      | 2.63     | 22        | 2.10       | 20          | 5.72              | 21   |
| Hardboiled egg    | .44           | .29        | .60      | 5.17     | 14        | 4.73       | 10          | 9.90              | 16   |
| Scrambled egg     | .32           | -.02       | .76      | 5.41     | 11        | 5.09       | 9           | 10.49             | 13   |
| Chicken           | .27           | -.02       | .68      | 6.36     | 5         | 6.09       | 5           | 12.45             | 2    |
| Milk              | -.16          | -.48       | .27      | 5.48     | 10        | 5.63       | 7           | 11.11             | 7    |
| Fish              | -.61          | -.83       | -.83     | 5.33     | 12        | 5.94       | 6           | 11.26             | 5    |
| Sushi             | -1.285        | -1.55      | -.89     | 4.83     | 15        | 6.10       | 4           | 10.92             | 9    |
| Chocolate         | -2.247        | -2.54      | -1.84    | 5.26     | 13        | 7.50       | 1           | 12.76             | 1    |
| Chicken salad     | -2.32         | -2.28      | -2.40    | 4.14     | 19        | 6.46       | 3           | 10.60             | 12   |
| Peach             | -2.57         | -2.83      | -2.21    | 4.23     | 18        | 6.81       | 2           | 11.04             | 8    |

NOTE.—Foods are arranged in order from largest to smallest male-female difference; 0 means "not at all" and 10 means "extremely" (male or female).

pattern to these correlations. The correlation of the mean maleness and femaleness across the 23 foods was .41, which suggests that general sexuality of foods is a more potent determinant than specific male-female imbalance.

## Discussion

The results as displayed in table 2 are extremely clear. We conclude that there is a definite link between maleness and meat, judged by maleness-femaleness differences, but it concerns primarily mammal muscle. Considering the ratings of maleness alone, we reach a similar conclusion: the average of the eight mammal muscle foods for maleness was 6.35, in comparison to a femaleness rating of 3.58 for these same eight foods. The divergent validation of these results, however, was less clear. We included in our list five foods that derive from female animals: milk, raw eggs, hard-boiled eggs, scrambled eggs, and beef placenta. In contrast to what we believed, the data provided no evidence that these foods are symbolically linked to femaleness.

We also hypothesized that more processed animal foods would be judged as less male and more female. This was fully supported by one example (chicken salad vs. broiled chicken), with partial support from four of the other five pairings. Mean maleness for the average of the six raw foods was 5.94, while mean maleness for the culinary processed foods was 5.68, which is in the predicted direction. There was also a major difference between raw and processed foods in the femaleness score, which was 3.39 for the raw foods and 4.85 for the processed foods. Thus, overall, there is support for the hypothesis that more culinary processing of foods yields greater perceived femaleness and lowered maleness.

Feminist sympathy was rated on an 11-point (0–10) scale, with high values indicating a more feminist position. We computed Pearson correlations between this measure and the four summary measures of average maleness and femaleness of mammal meats and female-origin products used to test hypothesis 4. For men, none of these correlations were statistically significant (correlation coefficients between  $-.10$  and  $.10$ ). For women, both maleness ( $r = .14, p = .04$ ) and femaleness ( $r = .16, p = .02$ ) of mammal meats was significantly and positively correlated with support for the feminist movement.

Independent samples' *t*-tests revealed that meat restrictors rated the eight mammal meats significantly less male ( $M = 5.81, SD = 2.06$  vs.  $M = 6.48, SD = 1.64$  in meat eaters;  $t(355) = 2.62, p = .01, d = .36$ ), with no significant differences in female ratings. Meat restrictors also rated the five female-origin foods as significantly less male than did meat eaters ( $M = 4.23, SD = 1.86$  vs.  $M = 4.75, SD = 1.93$ ;  $t(360) = 2.15, p = .04, d = .27$ ), with no differences in ratings of femaleness.

In general, the results indicate that there is a relation between maleness and meat, but only when meat is defined as mammal muscle. Distinctively female animal products are not rated as higher in femaleness than maleness, while there is evidence that the more culinary treatment a food experiences, the more female it becomes. There was evi-

dence to suggest increased perception of overall sexuality of meat in women as a function of their feminist inclinations. There were minimal respondent gender effects, and there is some evidence that meat restrictors consider both meat and female-origin foods less male, with no differences in their perception of these foods as female.

## STUDY 5: PREFERENCE OR CHOICE STUDY—GENDERED ASPECTS OF MEAT AND VEGETARIANISM

If meat represents maleness as a means of reinforcing gender, we hypothesize that females will reject meat more than males will. This would be a direct form of examining the divergent validity of the maleness-meat hypothesis. The prior literature (Amato and Partridge 1989; Beardsworth and Keil 1997; Realeat 1990) indicates a higher incidence of vegetarianism in females in Anglo-American countries (about 1.4 to about 3.0 times higher). Preference studies on Americans also indicate a lower preference for red meat and a higher preference for most fruits and vegetables by females (Logue and Smith 1986; Logue et al. 1988). We extend these earlier studies with results from a large sample of American college students, a smaller sample of University of Pennsylvania undergraduates, and a six-country random sample of European and American adults.

## Method

The main set of American student data comes from a large sample of introductory psychology students at six universities (Arizona State University, Pennsylvania State University, the University of California at Santa Barbara, and the Universities of Houston, Pennsylvania, and Wisconsin). There were 1,285 female respondents and 877 male respondents. Many of the results of this questionnaire, which focused on attitudes to food, have been published previously (Rozin et al. 2003), but not the analyses presented here. The remaining student data (on food preferences) come from University of Pennsylvania undergraduates, as part of an anonymous questionnaire on food habits administered to introductory psychology students in 2005.

The six country's data come from the third phase of a large study on food attitudes. A random telephone sample was carried out by a professional polling company. The questionnaire was administered in the native language of the interviewer and respondent and lasted for 15 minutes. It covered a wide range of items having to do with attitudes to food and health. The six countries were France, Germany, Italy, Switzerland, the United Kingdom, and the United States. There were approximately 900 respondents from each country, except for the United States, which had 1,500. More information about the sample is available in Fischler and Masson (2008) and Rozin et al. (2006).

The relevant questions asked in the large American student survey were about the respondents' gender and their meat-eating habits ("Circle the best answer: Are you a vegetarian?: Vegan No meat or fish Partial Not at all").

In the six-country study, there were three consecutive questions, presented here in English:

Please respond yes or no to the following statements.

I avoid eating red meat

I avoid eating meat

I am vegan: I avoid eating any product that comes from an animal

In the data collected on food preferences from an American student sample, in addition to gender, the relevant questions all involved the rating of food preferences on a standard 9-point scale, varying from 1 = dislike extremely to 5 = neither like nor dislike to 9 = like extremely. Respondents indicated their preference for a wide range of foods, including meat and beef, listed in table 3.

## Results

Consistent results were found in the six-country sample of 6,023 (52.3%,  $n = 3,148$  female) participants, with a significantly higher percentage of females avoiding red meat (partial vegetarians: 30.8%,  $n = 970$  females vs. 22.3%,  $n = 641$  males;  $\chi^2 = 55.28$ ,  $p < .001$ ) and avoiding all meat (vegetarians: 18.1%,  $n = 507$  females vs. 11.3%,  $n = 286$  males;  $\chi^2 = 48.76$ ,  $p < .001$ ). There was a low overall incidence of veganism, with no significant differences in prevalence by gender (4.1%,  $n = 112$  females vs. 3.7%,  $n = 91$  males;  $\chi^2 = 0.70$ ,  $p = .43$ ).

In the six-school American undergraduate sample of 2,162 (1,285 female) participants, there was a significantly higher percentage of females than males who classified themselves as partial vegetarians (27.5%,  $n = 353$  vs. 8.0%,  $n = 70$ ;  $\chi^2 = 125.81$ ,  $p < .001$ ), vegetarians (4.9%,  $n = 63$  vs. 0.8%,  $n = 7$ ;  $\chi^2 = 28.03$ ,  $p < .001$ ), and vegans (1.6%,  $n = 20$  vs. 0.6%,  $n = 5$ ;  $\chi^2 = 4.44$ ,  $p = .04$ ). Note that the vegetarian question was different for the two samples: the six-country sample was asked about avoiding different types of meat, which is consistent with eating small amounts, whereas the American college sample was asked to self-classify as partial vegetarian, full vegetarian, vegan, or not at all vegetarian.

Results on food preferences from American undergraduates support the claim for higher meat liking in males (table 3). Of 13 foods or food categories probed, there were three in which the male liking was significantly higher ( $p < .01$  or better) than the female liking: beef, meat, and orange juice. Although statistically nonsignificant, male liking exceeded female liking in six of the 13 categories of food that were assessed, and these included all five animal or animal-product foods along with orange juice. Female liking was significantly higher than males' ( $p < .01$  or better) for salad and vegetables.

## Discussion

The results across three samples consistently indicate more favoring of meat by males. Meat avoidance in women can be motivated by some combination of moral, health, and weight concerns. Given the much greater concern about

TABLE 3

UNDERGRADUATE FOOD PREFERENCES BY GENDER

|              | Female |      | Male |      | <i>t</i> (235) | Cohen's <i>d</i> |
|--------------|--------|------|------|------|----------------|------------------|
|              | Mean   | SD   | Mean | SD   |                |                  |
| Beef         | 5.62   | 2.84 | 7.45 | 2.07 | 5.359***       | .74              |
| Meat         | 6.45   | 2.37 | 7.72 | 1.66 | 4.433***       | .62              |
| Orange juice | 6.67   | 2.30 | 7.54 | 1.55 | 3.211**        | .44              |
| Fish         | 6.11   | 2.80 | 6.46 | 2.49 | .984           | .13              |
| Dairy        | 7.01   | 1.74 | 7.28 | 1.42 | 1.231          | .17              |
| Ice cream    | 7.51   | 1.91 | 7.61 | 1.60 | .414           | .05              |
| Chocolate    | 7.49   | 2.32 | 7.18 | 1.85 | 1.061          | .15              |
| Grain        | 7.38   | 1.59 | 7.02 | 1.44 | 1.768          | .24              |
| Broccoli     | 6.45   | 2.44 | 6.08 | 2.00 | 1.243          | .17              |
| Tomato       | 6.31   | 2.65 | 5.83 | 2.56 | 1.373          | .18              |
| Fruit        | 8.14   | 1.23 | 7.75 | 1.27 | 2.331*         | .31              |
| Vegetables   | 7.39   | 2.02 | 6.60 | 1.66 | 3.131**        | .43              |
| Salad        | 7.27   | 1.90 | 6.47 | 1.75 | 3.251***       | .44              |

NOTE.—Arranged in order from largest to smallest male-female difference; 1 = dislike extremely; 9 = like extremely. Significance data are two-tailed independent sample *t*-tests.

\* $p < .05$ .

\*\* $p < .01$ .

\*\*\* $p < .001$ .

weight in American females (Rozin et al. 2003), at least part of this gender difference could result from causes that have nothing to do with avoiding meat because of its maleness. However, weight concern about eating meat would normally be handled by reduced consumption of meat, rather than elimination of meat from the diet, as is the case for other calorically dense foods, such as ice cream. Overall, the findings we report are predicted by a meat-maleness hypothesis and, hence, are at least weak evidence for it.

Furthermore, the supporting data on lower liking for meat and beef by females are not easily interpreted as a result of concern about weight. The absence of a significant gender difference in liking for ice cream, chocolate, dairy, and fish argues against weight concern as the major account for liking. Liking is not the same as consumption; women may like a variety of calorically dense foods but choose to limit their intake of them. It is also notable that females do not like fish less than males do, and since fish falls under the generic category of meat, this finding suggests that meat/male might be better described as red-meat/male. Finally, there is no evidence in the liking data to suggest that females prefer female protein (milk, dairy) more than males do.

## STUDY 6: GENDERED LANGUAGES— ARE MEAT WORDS GENERALLY MARKED AS MALE?

Results from the studies presented above suggest a substantial link between mammal muscle meat and maleness but a weaker link with the more generic term "meat." Although there is a statistically significant link between "meat" and "male" as measured in a number of ways, one study (study 2) suggests that maleness is not one of the most salient features of the generic term "meat" among undergraduates. In this final study, we examine—across languages that gen-

der mark nouns—the degree to which exemplars of meat are male gendered.

A minority of the languages of the world mark the gender of nouns. Although there are disputes as to the significance of a noun being designated as male or female (or neuter, as a third option in some languages, such as German), the male versus female gender designation could have some implications for perceived masculinity/femininity. Boroditsky, Schmidt, and Phillips (2003) used a multimethod approach to demonstrate that nouns with a masculine gender in German or Spanish were associated with and implied masculine attributes (and the opposite for feminine nouns). The beauty of this work is that it is based on comparisons of the same noun that is masculine in one language and feminine in another. Of course, this important work is most easily accounted for by the idea that arbitrarily assigned gender influences the way people think about a noun. In the present case, we are exploring the opposite line of causation: that nouns that refer to entities with masculine versus feminine attributes are inclined to be assigned an appropriate gender. Boroditsky and Schmidt (2000) have some data directly bearing on this point, showing that “English speakers’ intuitions about the genders of animals (but not artifacts) were found to correlate with the grammatical genders assigned to the names of these objects in Spanish and German” (42).

The meat-male hypothesis predicts at least a tendency for words such as “meat” and specific exemplars of meat (e.g., beef, steak, or hamburger) to assume the male gender. We first attempt to demonstrate that gendering of nouns is non-arbitrary, by examining words such as “man” or “sister” of obvious gender, and then to extend this to words referring to anatomical aspects of gender (e.g., “vagina”). After this, we examine the gendering of meat words and words representing foods of female origin. We were able to get the appropriate information on word gendering from 20 languages.

## Method

We obtained a list of the minority of world languages, 43 in total, that gender words from Campbell (1995). These are, of course, not 43 independent samples since groups of languages (e.g., the European romance languages included in the list) have a common origin.

We gathered information on as many of these 43 languages as we could, through a combination of consultation of dictionaries on the Internet that converted English words into words of the target language and questionnaires to native speakers. Investigations of each of the 43 languages indicated that some on the list did not actually gender nouns. After eliminating highly similar languages and languages where we could not collect adequate data, we retained 20 languages. These were (in alphabetical order) Albanian, Arabic, Bulgarian, Czech, Dutch, Filipino, French, German, Hebrew, Hindi, Italian, Polish, Portuguese, Romanian, Russian, Serbian, Slovakian, Spanish, Thai, and Ukrainian.

In order to assess the extent to which the gendering of nouns has actual gender significance, before consulting any

native speakers or dictionaries, we selected 10 words for which the gendered feature is direct and explicit (e.g., “man” or “sister”) and determined the gender marking of these words. We then determined the gender of a set of six nouns referring to sexual anatomy (e.g., “vagina” or “testicle”), meat and five specific exemplars of it (beef, steak, hamburger, frankfurter, sausage), and four words of foods of female origin (milk, cheese, egg, and fruit).

For each language, we first consulted an English target language dictionary in which we could look up each word in English and find its equivalent in the language in question, with the gender marking usually provided. In cases where it was not or if the script used in writing the language was other than the Roman alphabet, we interviewed one native speaker of the language. We always took the first word offered in the dictionary and by the informant, unless the informant claimed that there were two words of equal status, in which case we took the average gender of the score for those two words. For purposes of creating summary statistics for each English word, we scored each word as 1 for masculine, 0.5 for neuter (or one male and one female word of equal status), and 0 for feminine (in occasional cases in which there were two words offered, e.g., one masculine and the other neuter, we scored the word as .75). Thus, with 20 languages, a totally masculine word would score 20, and a totally feminine word would score 0. If a language used the same word to describe two of our English words, we only counted the first use (defined by either its being first on our list of words or information from the informant). The most common case of this was use of the word for meat, appropriately modified, to describe a type of meat, as with *carne de rez* (meat of cow) as the word for beef in Spanish. This word automatically takes on the gender of the noun (meat), so in cases of this sort, we excluded a contribution to the maleness score from such a modified word since it was already “counted” under meat.

## Results

There is strong evidence that patently male or female nouns are assigned the appropriate gender. Of the 100 cases of gendering five male-person words, 98.5% were assigned a male gender, whereas only 3% of the 100 female-person words were assigned “male.” The case is also strong for gendered anatomy; 76% of words referring to male anatomy (penis, testicles, sperm) were treated as male, while only 35% of female anatomy words (vagina, ovary, placenta) were treated as male. Although this difference is substantial, the gendering of these words is clearly variable.

These preliminary findings justify examining the gendering of meat words. The six words we selected (meat, beef, steak, hamburger, frankfurter, and sausage) were assigned a male gender in 66% of cases (we cannot use probabilities to assess significance because the languages are not independent). All words but “sausage” were more than 50% male, with “hamburger” highest (93.4%). Of course, “hamburger” is often the English word borrowed into the target language, but nonetheless, it is assigned a gender. “Sausage”

and "frankfurter" might have a tendency to be assigned "male" because of their phallic shape, but they do not receive a greater male assignment than the other meat exemplars. The four female food source words (milk, cheese, egg, and fruit) were assigned "male" 60.6% of the time, with all at least 50% male (table 4). We do not know the base rate of male noun assignment in any of these languages, but it is clear that in comparison to explicitly female words, these female source words do not present a female assignment.

Our results are not strong, but the method is entirely appropriate for testing our hypothesis, and the direction of effects indicates a tendency for meats to be male and no indication that a female source of a food is represented with female gender assignment.

## GENERAL DISCUSSION

### Maleness and Meat: Studies 1–6

Taken together, these studies present consistent, converging evidence that mammal muscle meat stands in some positive relation to maleness, although maleness is likely not one of the most salient properties of meat. The male-meat link is supported by data on meat preferences and vegetarianism incidence, attributions of maleness based on meat preference, implicit associations, and gendering of meat-relevant words and most clearly by direct maleness and femaleness ratings of foods.

Our first hypothesis, that maleness and meat are linked in thought, is strongly supported with multiple sources of evidence. Our second hypothesis, that it is specifically mammal muscle that has male implications, is also strongly supported, specifically by results from study 4. Our third hypothesis about feminized protein being psychologically linked to femaleness, which was designed to supply divergent evidence, was disconfirmed. There is not even a tendency in this direction, in the relevant results, although there is weak supporting evidence for milk from free associations. Although all of the dairy, egg, and fruit products consumed by humans are of female origin, it appears that origin is not a source of a link with gender. In the case of meat, it more likely derives from factors such as the relation between males and hunting and the link between muscle-meat and strength.

Our fourth hypothesis, postulating that culinary processing will result in increased psychological femaleness, receives some support from the results of study 4. After constructing this hypothesis, we encountered an excellent article by Ortner (1972) arguing persuasively that cross-culturally, human females are devalued relative to males at least partly because females are seen as closer to nature and, hence, less civilized or cultured creatures than males. Under this framing, more processed foods, being further from nature, should be more male. As it happens, there was a good argument for a meat-raw-male complex and another for meat-cooked-male. We note that, somewhat to our surprise, blood is not rated as particularly male. There is a reasonable case that can be made for a male-hard, female-soft association, which could partly explain the lack of a male association with blood

**TABLE 4**  
GENDERED ASSOCIATIONS AND FOOD IN 20 LANGUAGES

| Word or category           | No. male | Total | % male |
|----------------------------|----------|-------|--------|
| Male foods: <sup>a</sup>   | 73.25    | 111   | 66.0   |
| Meat                       | 11       | 20    | 55.0   |
| Beef                       | 9        | 17    | 52.9   |
| Steak                      | 14.5     | 19    | 76.3   |
| Hamburger                  | 18.5     | 19    | 93.4   |
| Frankfurter                | 11.5     | 16    | 71.9   |
| Sausage                    | 8.75     | 20    | 43.8   |
| Female foods: <sup>a</sup> | 48.5     | 80    | 60.6   |
| Milk                       | 12       | 20    | 60.0   |
| Cheese                     | 15       | 20    | 75.0   |
| Egg                        | 11.5     | 20    | 57.0   |
| Fruit                      | 10       | 20    | 50.0   |

<sup>a</sup>Results for combined data from the exemplars of the category.

and might generally support a female-cooked link. Overall, our four comparisons of relatively more cooked/processed and less cooked/processed argue for our original hypothesis.

The fifth hypothesis about lower preference for meat in women, who seek to maintain their gender identity, is directly supported by the results from study 5 showing greater avoidance of meat by females. The sixth hypothesis, that measures of the maleness of meat will be more extreme in individuals with feminist affiliations, was only relevant to study 4, which had one question about feminist inclinations. The results weakly support the hypothesized positive correlation, in women, between feminist attitudes and beliefs about the maleness of meat.

One of the most surprising findings in this study is that what might, a priori, be thought to be two of the most male products, raw beef and blood, are not. Raw beef ranks ninth in maleness and seventeenth in femaleness. It is ranked as less male than medium-rare or well-done steak, counter to the general trend we report that more culinary processing increases femaleness. Note, however (table 2), that raw beef tied for first in male-female difference because it rates even lower in femaleness than maleness. Raw beef, then, is in some contradiction to the male-raw, female-cooked opposition. Blood is rated particularly low in total sexuality (maleness and femaleness combined, study 4). Blood ranked last (twenty-third) in both maleness and femaleness. It is the lowest of all foods in total sexuality (table 2), a surprising finding given its association with meat, hunting, and violence on the male side and menstruation on the female side.

It is possible that the male-meat link is indirect, mediated by masculine features like strength and power. Strength and power emerge as attributes associated with meat preference (results not reported here from study 3) and in unpublished results that we have showing that strength is rated high in meat foods, while weakness is low. So it is possible that the male-meat link is actually a meat-strength/power-male link. Given the greater preference for meat in males (study 5) and the male attributions from meat preference (study 3), it is also possible that the male-meat link derives from the higher male preference for meat. Of course, it is also possible

that the higher male preference for meat is caused by the perceived greater maleness of mammal muscle meats. Another possible account of some differences in maleness and femaleness ratings has to do with higher disgust sensitivity in females (Haidt, McCauley, and Rozin 1994).

In general, this exploration supports the claim that there is a male-meat link. This link, as indicated in the introduction, is also supported by anthropological evidence and has been proposed by a number of authors (Adams 1991; Fiddes 1991; Twigg 1979). We have added to these claims a different type of evidence, coming from paradigms developed by psychologists. Our evidence is more quantitative than prior studies. We acknowledge that it is extremely difficult to definitively distinguish metaphors or symbols from mere associations. We have reviewed evidence for meaningful links between meat and maleness, a form of evidence for a metaphoric or symbolic link. Furthermore, if there is a real-world associative contingency between "meat" and "male," as there might well be, we would have to explain why that was true and thus revert to metaphors.

Although much of our evidence comes from American undergraduates, two of the studies include results from a six-country sample of adults, and the language study (study 6) includes non-Western languages. Further extension of our measures to other age groups and cultures would be desirable, as would development of other measures of metaphoric links.

In using maleness and meat as an illustration, we underscore how metaphoric and symbolic research can have general implications for boundary-spanning research and for interpretations of consumer behavior. In this case, a general decline in meat consumption in the United States over recent decades cannot be explained on economic grounds since meat has become relatively less expensive and healthier (less fatty). Instead, there appear to be psychological reasons (health concerns, moral concerns, and perhaps gender associations) that incline Americans to reduce meat intake. With respect to marketing, the current results map onto the more general area of gendered consumption, given that there are substantial differences in food intake and food attitudes between males and females (e.g., Rozin et al. 2003). For instance, a soy and steak study showed that because men saw soy as feminine and steak as masculine, the solution was to manufacture soy patties to look like cuts of meat and to put artificial grill marks on them (Wansink 2006).

### Methodological Implications for Quantitative Metaphor Research

This article describes a multimethod framework to more comprehensively examine whether an object or product has rich metaphoric or symbolic value. There is no doubt that many products, including foods, have both broad and deep meanings (Levy 1981) and that these features could influence purchase and consumption. Meaning can be approached with psychological methodologies but can only be fully analyzed using methods and approaches from different disciplines and

perspectives. Convergent findings, like those reported here, are part and parcel of the establishment of claims in the sciences, in general. For the case of metaphors and symbols, however, there is more need to spread across disciplines and use very different methods.

Consider the general metaphors that are associated with characteristics of products: big, high, white, warm (cf. Landau, Meier, and Keefer 2009). Although past studies have shown that they exist and can influence judgments, their impact is not strong with all people. It would appear that these metaphors are more strongly believed by and more strongly drive behavior for some than others. It may be that the differing extent to which someone believes a metaphor could also explain differences in brand loyalty or key differences between a heavy versus a light user of a category or brand.

The six types of studies illustrated here are a subset of all the lines of investigation that could be brought to bear on the meat-male link or any other hypothesized metaphoric or symbolic link. For example, for exploring meat-male, it would be possible to carry out a study in which the masculinity of males was threatened, with the prediction that they would then be more likely to choose mammal meat and eat more of it, in a subsequent meal (see table 1). This study would have the advantage of linking a metaphor to actual consumption. Linguistic analysis of the contexts in which the word for meat in a particular language is used might be enlightening and is practical given the availability of very large language databases.

### Implications for Marketing Researchers

In a field in which positioning and brand identity often determine the difference between a market leader and a follower, understanding the metaphor a consumer might have for a brand could move the art of positioning toward more of a science. Be it athletic shoes, luxury cars, or soft drinks, one key differentiator might be the metaphors or symbols a consumer associates with one brand versus another. Whereas basic positioning studies might suggest some differences in perceptions, a deeper study of metaphors would enrich this understanding.

Indeed, ethnographic studies focused on metaphors have been commercially used to successfully better understand brand differences and category preferences (Wansink 2000). What may have limited the impact and range of that work has been the exploratory way—the storytelling manner—that is the typical format. For managers and marketing researchers trained in a more quantitative tradition, the framework and methods discussed here show how a further step can be taken toward quantitative confirmation. For researchers making metaphoric discoveries through ethnography, combining these discoveries with converging quantitative methodologies could advance their acceptance and influence. Apart from using metaphors to understand what might differentiate their brand's customers from a competing brand, there is the potential to use this type of research to profile the differences between heavy versus light users of their brand (or category) or to profile the differences between

extreme product champions and those who are less committed to the brand.

Being able to identify the people who most strongly believe in the relevant metaphor-product link might provide promising targeting opportunities (1) to target current consumers who subscribe to the metaphor in order to make them more loyal and (2) to target nonusers of the product who subscribe to the metaphor and who are likely to be predisposed toward the product. Focusing a marketing or advertising campaign on these metaphors or on reinforcing them in the minds of consumers to bolster one's brand or category loyalty may be a productive strategy. This may be what Apple has been able to do in its campaigns of "Think Different," which may have tapped into an existing metaphor.

The research framework outlined here provides a means to more actively explore the power of metaphors in more detail. It might provide the key to better understanding both a brand's heavy users and its brand champions. With such insights, the right psychographic target can be sought with the right metaphor to replicate and expand the number of heavy users and brand champions.

## Conclusion

The studies reported here in the context of maleness and meat are not meant to represent the gold standard in different forms of metaphor research; all have their pluses and minuses. Together, however, they illustrate how studies can be conducted to overlap on a single theme and provide empirical richness to the understanding of metaphors.

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