

Food and Life, Pleasure and Worry, Among American College Students: Gender Differences and Regional Similarities

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Questionnaires on food attitudes and behavior were completed by 2,200 American undergraduates from 6 regionally dispersed college campuses. Results indicate that a substantial minority of women and a much smaller minority of men have major concerns about eating and food with respect to both weight and health. Overall, 14% of women reported being embarrassed to buy a chocolate bar in the store. A 6-factor structure emerged: weight concern, diet and health orientation, beliefs about the diet–health link, food negativity/importance of food as a source of pleasure in life, eating disordered behaviors, and natural/vegetarian food preferences. There were surprisingly few regional differences, virtually none if race and social class were taken into account. Gender was the strongest predictor of responses.

There is little doubt that in contemporary American society, especially among women, food and eating lead to ambivalent feelings. The pleasure and necessity of eating are opposed by concerns about appearance, the health effects of overweight, and the risks of consuming a nonoptimal diet. Whatever one's views about the importance of a healthy diet, it is clear that many Americans spend a lot of time worrying about calories and fat and that this concern, in itself, detracts from the quality of life (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999). For a small minority of the population, especially women, these concerns come to dominate life in the form of anorexia nervosa or in the various forms of bulimia. The focus of most past research in this area has been on the eating disorders rather than what Rodin, Silberstein, and Striegel-Moore (1985) called the "normative discontent" with one's body that is common among American women (p. 267). The focus of most past research has also been on calories, that is, amount consumed, and accompanying weight problems, leaving aside important worries about quality and composition of diet. The common American avoidance of high-fat foods seems to be more than just an avoidance of calories; fat seems to have assumed, even at low levels, the role of a toxin. Thus, almost a third of a sample of Americans seek a totally fat-free (and hence, actually fatal) diet (Rozin, Ashmore, & Markwith, 1996).

The normative discontent about both weight and food choice is particularly problematic because in both cases, it seems to laypeople that there should be little difficulty in changing eating

habits. However, the majority of individuals do not succeed, in the long run, in reducing weight substantially (Wadden & Foster, 2000). Therefore, concerns about diet with respect to health and weight may be nonproductive and produce worry, anxiety, and failure, with consequences in terms of mood and self-esteem (Polivy & Herman, 2002). A number of authors have noted with alarm that obesity is increasing in the United States at the same time that more and more attention seems to be devoted to weight-loss programs (Wadden, Brownell, & Foster, 2002).

This article addresses the food and eating concerns of Americans in a broader context than is typically done in the literature. It is modeled after a prior study of food and life in four cultures (United States, France, Flemish Belgium, and Japan; Rozin et al., 1999). This broader context has been expressed outside of psychology, as in the literatures in sociology (e.g., Fischler, 1990) and in more humanistic and historical approaches (e.g., Kass, 1994; Stearns, 1997; for a general discussion of American food ambivalence, see Rozin, 1998).

We are particularly motivated to explore what we may term an ambivalence about food and eating in many Americans because this attitude seems to reduce the quality of life and to be unproductive. The French are at least as healthy as Americans and have a much lower incidence of heart disease (Renaud & de Lorgeril, 1989), yet consume a diet somewhat higher in fat (Drewnowski et al., 1996) and have a much more relaxed attitude to eating (Rozin et al., 1999). The French seem to focus on the experience of eating, whereas Americans focus more on the consequences of eating (Rozin et al., 1999). The French probably eat somewhat less than Americans but get more food experience because they pay more attention to the food they are eating (Rozin, Kabnick, Pete, Fischler, & Shields, in press).

Unlike the European nations, the United States has minimal language barriers and is influenced as a whole by substantially the same films, magazines, television, papers and legislation. These features may reduce regionalization. On the other hand, the United States spans a wide range of climates. Climate influences clothing, with the clothing in warmer climes more likely to reveal body shape. Climate also influences degree of exercise and the availability of foods such as fruits. There are also substantial American

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regional differences in cultural and ethnic backgrounds. People who derive from ancestors in Europe, Asia, Mexico or further south in the Americas, and Africa are distributed very unequally around the country. Any discovered regional differences would have to be analyzed to determine whether the difference was based on region or ethnic-racial makeup.

The literature in psychology on eating disorders and food and eating in general has focused on undergraduate students. Although this subsample of Americans is atypical in many ways, particularly with respect to food choice, it has the virtue of being a focal group for the appearance of eating disorders. Along with obesity, eating disorders are responsible for motivating almost all of the research on food in psychology. The research on undergraduates has been surprisingly inattentive to variables other than gender that might differentiate undergraduates. Location of a study (e.g., region of the United States); region of origin of the sample; and religion, religiosity, and social class of respondents are rarely mentioned, and race-ethnic origin receives relatively little attention. In summarizing the literature, especially in experimental studies, results tend to be considered as equivalent if derived from any American (or Canadian) undergraduate samples.

In this study, we attempted to address and fill some of the gaps in the literature that we have identified above:

1. We explored, via questionnaire, a wide range of attitudes and behaviors toward food, including issues such as default thinking about food, beliefs about diet and health, and concerns about amount and quality of food eaten. We built upon and modified another attempt to survey the role of food in life (Rozin et al., 1999).

2. For the first time, we addressed the justification for pooling results across American regions: We compared undergraduate introductory psychology samples from six universities spread across the United States.

3. We analyzed results in terms of gender, race, religion, and self-reported social class as well as region of the United States.

Our study on regional differences was prompted by a pilot study by Bauer and Catanese (1996), which suggested much greater body concerns and dieting and diet-health concerns among undergraduate women at the University of Pennsylvania who were from the West coast as opposed to those from the East coast.

Method

Participants were 2,200 college students. We eliminated the data from 38 participants because these had more than 6 missing values across the relevant 58 questionnaire items that were subject to analysis. For purposes of subsequent analysis, the missing values of the remaining participants were assigned the modal value for the whole sample of the item in question. Of the remaining 2,162 participants, 59% were women. Participants were distributed across six geographically dispersed large universities: Universities of Pennsylvania, Texas at Houston, Wisconsin, and California at Santa Barbara; Pennsylvania State University; and Arizona State University. Five of the six schools are state universities (the University of Pennsylvania, in spite of its name, being the exception). State universities have the advantages that they draw students disproportionately from the region that they are in and that because of low tuition, there are smaller barriers to entry by students from lower socioeconomic backgrounds. The six universities are widely dispersed in the United States: two from the Northeast and one each from the South, Midwest, Southwest, and California.

The mean age of the participants was 19.3 years. Self-reported socioeconomic class (5-point scale) yielded 10% lower or lower middle class,

42% middle class, and 48% upper middle or upper class. The predominant race was Caucasian (72%), and the predominant religions were Catholic (38%) and Protestant (37%). (See Table 1 for full sample distribution by race and religion.)

The one-page, two-sided anonymous questionnaires received a very high return rate because student questionnaires were filled out in introductory psychology classes or during required periods for filling out questionnaires associated with some introductory psychology courses. Feedback on results was made available to the instructors of the classes that contributed results, when requested, within 1 month of data collection.

The questionnaire consisted of a range of demographic items plus 69 food-relevant items. These were primarily from the food-life questionnaire in Rozin et al. (1999). Some of the questions were modified or improved on the basis of problems encountered in prior analyses. A small number of items were open ended, but these are not included in this analysis. The questions used in the present analysis, except for self-reported weight and height, are true-false, frequency measures (e.g., never, rarely, sometimes, often, almost always), or choices between two specific alternatives. A few items represent what we consider "default" ways of thinking about food-related matters (Rozin et al., 1999). These items, like free associations, probe the most salient way that one thinks about relevant issues. For example, Rozin et al. (1999) reported that although Americans tend to think of food in terms of its health or nutritional properties, the French tend to think in terms of the experience of eating foods. One default item is "Circle the word that you most readily associate with the word at the left"; the word is *heavy cream*, and the choices are *whipped* and *unhealthy*. On the actual questionnaire, items are organized by format of question (true-false, frequency, default, etc.).

Results

Factor Analysis: The Structure of Food Attitudes and Behaviors

All variables were rescaled to vary from 0 to 1. Thus, an item on a 5-point scale was converted to scores of 0, .25, .50, .75, and 1.00.

Examination of the factor analysis (PCA, Varimax rotation, SYSTAT9 [SPSS, 1999]) of 58 items suggested that a six-factor solution might be optimal, given the scree plot, and so a six-factor solution was forced (accounting for 35% of the variance). Assignment of items to factors was extremely clear; only four of the 58 items did not load at least .30 on any factor, and only two items loaded at .40 or more on more than one factor. Table 2 organizes the items by factor (and the residual four items) and indicates the name of the factor and the items that loaded at least .40 on that factor (with the value dropped to greater than .30 if this was the highest loading that this item had on any factor).

Factor scores were created by combining items in accordance with their loading on each factor (Table 2). Only the items listed in Table 2 were used to compose each factor. Loadings less than .30 were not included in the factor score, nor were loadings less than .40 unless they were the highest loading on any factor. Scores on individual items were reversed, as appropriate, so that high scores on each item "pointed" in the direction of concern about food. The factors extracted from this database are similar to, but not identical to, those derived from a similar questionnaire used on college students and adults from four countries (Rozin et al., 1999).

We now consider the individual factors, beginning in each case with a brief interpretation of the meaning of the factor followed by a discussion of gender, school, race, religion, and social class effects. For each of the factors, mean values for factor scores

Table 1
Participant Demographics

Demographic	ASU	PSU	UTEX	UCSB	UPENN	UWIS	Total
No.	206	285	297	372	276	726	2,162
Age (<i>M</i>) ^a	19.9	20.4	19.3	18.8	19.2	18.9	19.3
Men							
<i>n</i>	94	54	112	129	117	371	877
%	46	19	38	35	42	51	41
Socioeconomic class							
Lower/lower middle							
<i>n</i>	19	29	56	35	25	47	211
%	9	11	19	10	9	7	10
Middle							
<i>n</i>	108	132	147	150	75	276	888
%	53	48	50	41	28	38	42
Upper middle/upper							
<i>n</i>	77	115	92	180	172	394	1,030
%	38	42	31	49	63	55	48
Religion							
Atheist/agnostic							
<i>n</i>	19	15	9	57	45	77	222
%	9	5	3	16	16	11	11
Buddhist							
<i>n</i>	5	2	28	10	6	6	57
%	3	1	10	3	2	1	3
Catholic							
<i>n</i>	76	133	112	116	71	295	803
%	39	48	38	33	26	42	38
Hindu							
<i>n</i>	0	0	12	0	16	3	31
%	0	0	4	0	6	1	1
Jewish							
<i>n</i>	6	18	4	29	69	52	176
%	3	6	1	8	25	7	8
Muslim							
<i>n</i>	2	2	18	3	10	9	44
%	1	1	6	1	4	1	2
Protestant ^b							
<i>n</i>	89	109	111	139	56	264	768
%	45	39	38	39	21	37	37
Race							
African American							
<i>n</i>	8	14	39	9	8	7	85
%	4	5	13	2	3	1	4
East/Southeast Asian, Pacific Islander							
<i>n</i>	14	4	71	55	43	30	217
%	7	1	24	15	16	4	10
Hispanic, Native American							
<i>n</i>	22	7	64	44	17	12	166
%	11	2	22	12	6	2	8
South Asian, Indian							
<i>n</i>	2	3	29	2	25	8	69
%	1	1	10	1	9	1	3
Caucasian							
<i>n</i>	152	251	82	231	176	646	1,538
%	75	89	28	64	64	90	72
Other							
<i>n</i>	4	3	9	19	5	15	55
%	2	1	3	5	2	2	3

Note. ASU = Arizona State University; PSU = Pennsylvania State University; UTEX = University of Texas; UCSB = University of California, Santa Barbara; UPENN = University of Pennsylvania; UWIS = University of Wisconsin.

^a Mean of male and female mean ages, for each campus. ^b Includes all sects of Christianity other than Catholicism.

by school and gender are shown in Table 3, and results of the analyses of variance (ANOVAs) by gender, school–region, race (Black, East/Southeast Asian, Hispanic, American Indian, South Asian, White, and other), and religion (atheist/agnostic, Buddhist, Catholic, Jewish, Hindu, Muslim, and Protestant) and correlations with self-reported social class are shown in Table 4. In discussion of results, we adopt the .01 level as a criterion for significance.

Factor 1: Weight concern. The items with highest loadings on this factor deal with concerns regarding weight and appearance and specific weight-concern-related behaviors (e.g., dieting; see Table 2). This factor accounted for more variance than any other.

Overall, there is a great deal of concern about weight in American undergraduates: 20% of the sample of over 2,000 was currently on a diet, a full 28% would willingly exchange eating for an inexpensive nutrient pill, 43% were concerned about their weight often or almost always, and 47% thought their thighs were too fat.

Of all factors, weight concern shows the largest difference in factor scores across gender, with a mean female factor score of .43 compared with a male score of $-.63$. Women were more concerned with appearance and diet in each of the six schools: 58% of men responded “never” to “How often do you diet?” in comparison with 33% of women; 72% of women reported that their “thighs were too fat” in comparison with 11% of men; 34% of women were happy with their present weight as opposed to 58% of men; 34% of women claimed a willingness to give up eating if it could be replaced by an inexpensive nutrient pill as opposed to 21% of men.

In one-way ANOVAs, there was a highly significant effect of gender, $F(1, 2160) = 797.75, p < .001$; the only other significant effect was a much more modest effect of religion, $F(6, 2096) = 4.77, p < .001$ (Table 4). The principal outlier group on religion was Hindus, who had a particularly low score. Factor scores by gender and school varied considerably (range of z scores = 1.34), anchored by $-.73$ for Pennsylvania State University men and $.61$ for University of Wisconsin women.

A two-way school and gender analysis of covariance (ANCOVA), with race, social class, and religion as covariates, yields a still massive gender effect, $F(1, 2140) = 580.24, p < .001$, and much more modest significant effects of school, $F(1, 2140) = 3.08, p < .01$, and a Gender \times School interaction, $F(1, 2140) = 3.17, p < .01$.

Factor 2: Diet–health orientation. This factor focuses on concerns about diet and health: modification of food choice to reduce fat and salt, and emphasis in choice and thought on nutrition and health as opposed to taste or culinary properties. In the food choice literature, taste has emerged as the dominant factor in food choice, but 35% of the sample said nutrition was more important in their food choice than taste, 24% of the sample ate foods from which fat had been removed at least a few times a week, and 60% associated heavy cream more with *unhealthy* than *whipped*. More generally, many in the sample viewed food more in nutritional terms than in taste–pleasure terms.

The major effect for this variable is gender, $F(1, 2160) = 171.91, p < .001$, with women higher on diet–health concern. For example, whereas 39% of women ate low-fat (fat-removed) foods at least daily, only 15% of men did. Whereas 68% of women associated heavy cream with *unhealthy* as opposed to the culinary choice, *whipped*, only 49% of men made this choice. On the other

hand, 48% of women and 74% of men said they consumed fast food on at least a weekly basis.

The major gender effects translate into a difference between a mean factor score of .22 for women and $-.33$ for men, a very substantial .56 z -unit difference, but notably less than the difference for Factor 1. The range of factor scores across schools and gender is substantial (0.92 z units), with University of Texas men lowest ($-.44$) and University of Wisconsin women highest (.48).

This variable shows the broadest range of significant effects of variables other than gender. By far the most significant school effect, $F(5, 2155) = 15.52, p < .001$, occurs for this variable. It is accounted for, principally, by the anomalous results from the University of Texas women. Their factor score on this variable ($-.41$) is among the most negative of the male scores and different in sign from all of the other female scores (Table 3). Post hoc tests indicate that the female University of Texas Factor 2 score differs significantly from that of the women at each other school by at least $p < .01$. A consequence of this anomaly is that in a two-way ANOVA, there is a substantial and significant Gender \times School interaction term, $F(1, 2149) = 6.44, p < .001$. We devote a subsequent section of this article to the explanation of this most anomalous result.

Significant effects of race, $F(6, 2123) = 17.96, p < .001$, and religion, $F(6, 2096) = 5.45, p < .001$, both derive principally from the fact that Hindus and South Asians showed by far the lowest score on diet–health concern. The significant link to social class ($r = .12$) confirms the belief that diet–health concerns become greater as social class increases.

A two-way ANCOVA for Gender \times School, with race, religion, and class as covariates, produces a still massive, $F(1, 2040) = 127.05, p < .001$, effect of gender and a still significant, $F(1, 2040) = 6.04, p < .001$, effect of school as well as a significant interaction of school and gender, $F(1, 2040) = 5.05, p < .001$. Hence, on this variable, there seem to be some substantial regional differences.

Factor 3: Belief in a diet–health linkage. These four items ask for beliefs about the diet–health link in general and for obesity, cancer, and heart disease. The four items form a distinctive factor, with the lowest factor loading of the four items at .65 (and the next highest item loading only .21). Overall, the American undergraduates seemed convinced that diet has a substantial effect on health. For example, 61% of all participants believed diet has a “strong effect” (the highest of four choices) on heart disease.

There is a substantial gender effect for this variable, $F(1, 2160) = 53.63, p < .001$. The gender effect occurs because women tend to believe in a stronger diet–health link (mean factor score for women is .13 compared with $-.19$ for men), but the major finding on this factor is that the great majority of our participants believed in a strong diet–health link. The range of scores on this variable, across school and gender (Table 3) is modest, covering .52 z units, from $-.24$ for University of Texas men to .28 for Pennsylvania State University women.

There are modest, but significant effects of race and school (Table 4). A Gender \times School two-factor ANCOVA, with race, religion, and class as covariates, reveals a remaining substantial effect of gender, $F(1, 2040) = 32.42, p < .001$, and no other significant effects.

Table 2
Questionnaire Items, Conceptually Arranged, in Terms of the Scores Derived From the Six-Factor Analysis

Item name	Factor loading ^b	Item	Score ^a	
			Female	Male
Factor 1: Weight concern				
CONCWGT	.80R	I am concerned about being overweight. ^c	.65	.33
GUILT	.76R	I feel guilty when I overeat. ^c	.62	.26
DIET	.67R	I am currently on a diet. ^c	.41	.18
THIGH	.66	My thighs are too fat.	.72	.11
HOLDBACK	.64R	I consciously hold back at meal time, so as not to gain weight. ^c	.38	.19
SELFWGT	.64	Relative to your same sex peers, how do you perceive yourself? ^d	.44	.36
BUTT	.61	My butt is too fat.	.44	.10
HAPWGT	.60R	Are you happy with your present weight?	.65	.42
ARMS	.58	My arms are too fat.	.29	.03
CURRDIET	.51	I am currently on a diet to lose weight.	.27	.10
APPEAR	.49	I am concerned about what I eat and how it will affect my appearance.	.78	.51
BELLY	.48	My belly is too fat.	.65	.64
OBSWGT	.48	I am obsessively preoccupied with my weight. ^e	.29	.10
FACE	.47	My face is too fat.	.18	.08
CHOCCKAKE	.46R	Circle the word that you most readily associate with the word at the left: <u>chocolate cake</u> guilt celebration	.32	.12
PILL	.41	If I could eliminate eating by satisfying nutritional needs, safely, cheaply, and without hunger, with a pill, I would.	.34	.21
ICECREAM	.37	Circle the word that you most readily associate with the word at the left: <u>ice cream</u> delicious fattening	.32	.14
EXERFUWO	.32	Circle the word that you most readily associate with the word at the left: <u>exercise</u> fun work	.67	.49
Factor 2: Diet–health orientation				
LOWFAT	.65R	Frequency with which you eat low-fat food in which some of the fat has been removed or substituted for high fat food. ^f	.72	.50
HEALTHREAT	.64	I am a healthy eater.	.64	.54
FASTFOOD	.59R	Frequency with which you eat fast food. ^f	.64	.47
NUTTASTE	.58R	Which is more important in food choice: nutrition or taste?	.40	.24
CONTCAL	.50	Do you control your caloric intake?	.38	.21
BREAD	.49R	Circle the word that you most readily associate with the word at the left: <u>bread</u> carbohydrate butter	.75	.64
EXERCISE	.48R	Frequency with which you exercise? ^f	.64	.68
LONGTERM	.48R	I rarely think about the long term effects of my diet on health.	.69	.53
EDUCNUTR	.43	I am educated about nutrition.	.79	.75
HVCREAM	.41	Circle the word that you most readily associate with the word at the left: <u>heavy cream</u> whipped unhealthy	.68	.49
WALKTV	.41R	Do you prefer to walk or watch TV?	.56	.36
FOODHEPL ^g	.41R	Circle the word that you most readily associate with the word at the left: <u>food</u> health pleasure	.48	.37
LOWSALT	.40R	Frequency with which you eat reduced salt [food from which salt is removed] products? ^f	.35	.27
MILK	.38	Circle the word that you most readily associate with the word at the left: <u>milk</u> cookies calcium	.76	.63
BROCCOLI	.36	Circle the word that you most readily associate with the word at the left: <u>broccoli</u> butter vitamins	.84	.75
SACCHAR	.34R	Use no, or very-low calorie sweeteners. ^f	.30	.15
FREGG	.33	Circle the word that you most readily associate with the word at the left: <u>fried egg</u> breakfast cholesterol	.57	.32
VITAMIN	.32R	Take vitamins. ^f	.43	.40
Factor 3: Diet–health link				
HEART	.80	How much of an effect does diet have on heart disease? ^h	.83	.80
GOODHEALTH	.70	How much of an effect does diet have on good health? ^h	.88	.84
OBESITY	.68	How much of an effect does diet have on obesity? ^h	.87	.80
CANCER	.64	How much of an effect does diet have on cancer? ^h	.60	.48
Factor 4: Food negativity				
ENJOYED	.67R	Enjoying food is one of the most important pleasures in my life.	.42	.37
FONDMEM	.57R	I have fond memories of family food occasions.	.35	.38
THINKPOS	.53R	I think about food in a positive anticipatory way.	.31	.18

Table 2 (continued)

Item name	Factor loading ^b	Item	Score ^a	
			Female	Male
Factor 4: Food negativity (continued)				
MONEY	.48	Money spent on food is well spent.	.38	.20
FOODHEPL	.45R ^g	Circle the world that you most readily associate with the word at the left: <u>food</u> health pleasure	.48	.37
HOTEL	.42	For the same price, would you rather vacation at an average hotel with the best food or a luxurious hotel with average food?	.84	.73
Factor 5: Eating-disordered characteristics				
OBSEXER	.58	I am obsessively preoccupied with my exercise habits.	.19	.21
OBSWGT	.45 ^c	I am obsessively preoccupied with my weight.	.29	.10
PURGE	.44R	How often have you purged (vomited) intentionally after eating for the purpose of weight reduction? ⁱ	.06	.02
BINGE	.40	Frequency with which you binge? ^f	.12	.16
EMBCHOC	.38	I am embarrassed to buy a chocolate bar in the store.	.14	.04
Factor 6: Natural/vegetarian				
DATESALAD	.59	I would rather date someone who eats lots of fruits and veggies rather than lots of meats.	.17	.22
NATTASTE	.58	I think natural/organic foods are better tasting than commercially grown/processed foods.	.35	.33
NATHEALTH	.54	I think natural/organic foods are healthier than commercially grown/processed foods.	.77	.74
VEGETAR	.40R	Are you a vegetarian? ^j	.14	.04
CNDYNICE	.37	People who eat lots of candy aren't as nice as people who eat lots of fruits and vegetables.	.03	.06
Items that load < .30 on any factor				
FRNDHLTH		I am concerned with the health of a friend/family member who eats poorly.	.74	.66
SUGAR	R	Circle the word that you most readily associate with the word at the left: <u>sugar</u> cavities pleasure	.40	.48
HOLIDAY	R	Circle the word that you most readily associate with the word at the left: <u>holiday</u> dinner overeat happiness	.41	.31
PASTA	R	Circle the word that you most readily associate with the word at the left: <u>pasta</u> bread sauce	.32	.24

Note. Response alternatives to items are true–false or yes–no unless otherwise indicated or footnoted. All items loading at least .40 on any factor are listed under that factor, in order of decreasing loading, with two items listed twice. Items loading greater than .30 are also included if there was no loading greater than or equal to .40 on any factor, and they represent the highest loading of the item on any factor. The items listed under each factor are exactly those that contributed to the factor score, weighted by their loadings. 1.00 = the most food-concerned response; 0 = the most food-positive response. R = reverse scored. Items are adapted from Rozin et al. (1999).

^a Percentage of females and males giving the more food-concerned response (cut-off set at some intermediate value for items with more than two response alternatives). ^b Mean score on a 0–1 scale, with 1 = the most health/worry-oriented alternative. Exercise scored as if it was food. ^c 1 = *almost always*, 2 = *often*, 3 = *sometimes*, 4 = *rarely*, 5 = *never*. ^d 1 = *underweight* to 5 = *overweight*. ^e Listed under both Factor 1 (WGTCONCERN) and Factor 5 (EATDIS). ^f 1 = *every day*, 2 = *a few times a week*, 3 = *once a week*, 4 = *once or twice a month*, 5 = *rarely/never*. ^g Listed under both Factor 2 (HEALTHCONCERN) and Factor 4 (FOODNEGATIVE). ^h 1 = *no effect*, 2 = *little effect*, 3 = *some effect*, 4 = *strong effect*. ⁱ *Never, Once/ Twice, Occasionally, Often, Almost daily*. ^j *Vegan, No meat or fish, Partial, Not at all*.

Factor 4: Food negativity (food importance; positive–negative). This distinct factor is principally composed of seven items and has to do with the degree to which feelings about food are negative (or inversely, the positivity and importance of food in life). Overall, 60% of respondents claimed that enjoying food was one of the greatest pleasures in their lives, but only 21% chose a hotel with gourmet food and average accommodations over a hotel, at the same price, with average food and luxurious accommodations, and 28% would prefer a nutrient pill to eating. A total of 44% associated food more with health than with pleasure.

This factor shows the expected major effect of gender, by far the most significant variable, $F(1, 2160) = 51.24, p < .001$. The highest loaded item, ENJOYED (cited in the previous paragraph)

showed a 58% female and 63% male endorsement, whereas 38% of women as opposed to 20% of men disagreed that “money spent on food is well spent.” The highest (most food-negative) factor score was from Arizona State University women (.33), and the lowest was from University of Pennsylvania men (–.32), yielding a range of .65 *z* units.

There are modest effects of other demographic variables, the most substantial being race, $F(6, 2123) = 3.98, p < .001$; the most striking racial difference is the highest positive reaction to food among East and Southeast Asians. The gender effect remains substantial, $F(1, 2040) = 42.89, p < .001$, in the two-way Gender \times School ANCOVA, with the other demographic variables as covariates. There is no significant effect of school or the interaction in this ANCOVA.

Table 3
Factor Summary of Data on Selected Variables by School and Gender

Item	ASU	PSU	UTEX	UCSB	UPENN	UWIS
<i>n</i>						
M	94	54	112	129	117	371
F	112	231	185	243	159	355
Factors						
1. Weight concern						
M	-64	-73	-54	-71	-63	-61
F	40	36	19	40	46	61
2. Health orientation						
M	-39	-32	-44	-40	-20	-30
F	12	30	-41 ^a	19	41	48
3. Diet-health beliefs						
M	-24	4	-22	-20	-23	-18
F	2	28	3	3	11	19
4. Food negativity						
M	-16	-18	-10	-24	-32	-15
F	33	1	8	8	10	18
5. Eating disorder						
M	-16	-22	6 ^a	-10	-28	-17
F	24	4	0	9	17	12
6. Natural/vegetarian						
M	-12	-3	27 ^a	12	0	-16
F	-2	-19	9	8	16	4
Mean of Factors 1-5						
M	-28	-24	-16	-26	-28	-26
F	18	13	0	14	24	27
BMI						
M	24.0	24.3	23.5	23.4	23.1	23.7
F	22.0	22.2	21.8	21.6	21.3	22.2

Note. Scores on each factor are multiplied by 100. Positive scores indicate greater concern/worry about food and eating. ASU = Arizona State University; PSU = Pennsylvania State University; UTEX = University of Texas; UCSB = University of California, Santa Barbara; UPENN = University of Pennsylvania; UWIS = University of Wisconsin; M = male; F = female; BMI = body mass index (weight kg/height m²).

^a Most anomalous UTEX findings.

Factor 5: Eating disorders. This factor groups five items that ask specifically about disordered eating behaviors such as the frequency of purging and bingeing and obsessions about eating and exercising. The sample shows substantial presence of strong concern about food: Overall, 20% of the sample claimed to obsess about exercise and 21% to obsess about eating; 89% had never purged, and 67% had never bingeed.

The principal predictor on this factor is gender, $F(1, 2160) = 31.88, p < .001$, with women showing higher (more disordered) scores. Most strikingly, the incidence of embarrassment about buying a chocolate bar in the store was higher in women (14% for women, 4% for men). Incidences of bingeing, purging, and dieting were higher among women; 15% of women admitted to having purged on at least one occasion, which con-

Table 4
One-Way Analyses of Variance or Correlations Between Factors or Body Mass Index (BMI) and Demographic Variables

Item	Gender	School	Religion	Race	Class (Pearson <i>r</i>)
Factor					
1. Weight concern	797.75**	2.15	4.77**	1.67	.02
2. Health orientation	171.91**	15.52**	5.45**	17.96**	.12**
3. Diet-health link	53.63**	4.00**	2.65	4.19**	.02
4. Food negativity	51.24**	0.84	2.97*	3.98**	-.01
5. Eating disorder	31.88**	0.34	2.11	0.94	.03
6. Natural/vegetarian	1.47	4.71**	7.64**	2.76	.01
Factor average	328.43**	1.78	2.89*	5.76**	.05
BMI	131.14**	3.73*	4.03**	12.35**	-.06

Note. *n*: gender, school = 2,162; BMI = 2,120; race = 2,130; religion = 2,103; class = 2,087.

* $p < .01$. ** $p < .001$.

trasts with the 4% of men who had purged on at least one occasion. Whereas 28% of females classified themselves as obsessed with their weight, only 11% of men did. The highest factor score on eating disorders is Arizona State University women (.24), and the lowest is University of Pennsylvania men (-.28). Gender is the only significant effect revealed on this factor (Table 4).

Factor 6: Natural/vegetarian. This factor contains a number of items reflecting preference for natural foods, moral and other implications of natural food preferences, and vegetarian status. It is the only factor that does not show a significant gender effect, even though it includes a vegetarian item that confirms the higher incidence of vegetarianism in women (including rejection of red meat: 34% of women vs. 10% of men). Overall, and without major gender differences, 76% thought natural foods are healthier, 34% thought they taste better, 19% agreed that they "would rather date someone who eats lots of fruits and veggies rather than lots of meats," and 4% agreed that "people who eat lots of candy aren't as nice as people who eat lots of fruits and vegetables."

School and religion are the only variables that show significant effects (Table 4), and these are very modest compared with the gender effects described for the other factors. University of Texas men, very surprisingly, are highest on the natural/vegetarian factor, as are Hindus (and to a lesser extent, South Asians). It is no accident that Hindus are highly represented in the University of Texas sample. University of Texas men scored higher than men at other schools across the board on the items loading on natural/vegetarian.

Overall negative/ambivalent reaction to food: Combined factor score. We created a mean of the six factor scores for each participant, as a general measure of negative-positive attitudes to food (Tables 3 and 4). For each of the component factor scores, a positive value indicates food concern and worries and a greater food-health and natural orientation, and a negative score indicates a more food-weight positive attitude, with a greater focus on the pleasure of eating. As would be expected from the component results, by far the biggest effect is for gender, $F(1, 2160) = 328.43$, $p < .001$, but with much smaller but significant effects for race, religion and school (Table 4). The gender effect is large (.17 z units for women, -.25 for men, for a total difference of .42 z units). For school, the maximum difference is between the University of Texas (-.06) and Pennsylvania State University (.07), but the latter results in large part from the fact that the proportion of men is lowest at Pennsylvania State. For religion (not confounded by gender), the maximum spread is -.07 for Buddhists and .06 for Jews. Men from all six schools had negative factor scores, and women from five had positive scores, with the University of Texas at zero. The extreme scores were .27 for University of Wisconsin women and -.28 for Arizona State University men (Table 3). Notably, the California women were not the most extreme female group.

Anomalous Results in the University of Texas Sample

There were only two substantial violations of a general gender pattern in the results. One concerns the very low (male range) factor score for University of Texas women on health orientation. The other is the very high score for Texas men on the natural/vegetarian factor. Because the University of Texas sample is most different from the others in racial composition and social class, at

least some of this difference could result from these variables as opposed to region. Using the University of Wisconsin data as representative of the rest of the sample, we recalculated the factor scores using only respondents who were White and at least middle class. This substantial narrowing of the sample, along the two most promising demographic characteristics, reduced the University of Texas anomaly by about 50%; that is, on health concerns, University of Texas women move from negative to about neutral, and on natural/vegetarian, University of Texas men move close to neutral, but still on the "female," pronatural side. Examination of the scores of the University of Texas sample on the individual items that make up these factors reveals that the anomalies appear rather uniformly, across the relevant items. It seems likely that there is a genuine regional difference here.

Body Mass Index (BMI)

The standard measure of "heaviness," BMI (weight in kilograms divided by height in meters squared) is known to vary by gender, and not surprisingly, it does in this sample (see Tables 3 and 4). The lowest mean BMI was in University of Pennsylvania women (21.3) and the highest in Pennsylvania State men (24.3). There is a modest school effect, $F(5, 2113) = 3.73$, $p < .01$, with the University of Pennsylvania lowest and University of Wisconsin highest. There is a more substantial religion effect, $F(6, 2056) = 4.03$, $p < .001$, with Hindus lowest, a yet more substantial race effect, $F(6, 2081) = 12.35$, $p < .001$, with South Asians lowest and African Americans highest. Surprisingly, given the indications in the literature that fatness decreases as one moves to higher classes, the correlation between self-reported social class and BMI was only -.09 ($p < .01$), for women and -.05 (*ns*) for men.

Discussion

Our findings confirm and refine many prior indications that American women are very concerned about diet and their body appearance (e.g. Rodin, 1992; Rodin et al., 1985; Rozin & Fallon, 1988; Schwartz, 1986). Our findings also extend this, in keeping with a much smaller literature, to great concern about diet and health over and above issues of calories and weight (Rozin et al., 1999). As has been noted (Rozin, 1998; Rozin et al., 1999), the greater concern about health does not follow directly from anything we know about women's weight concerns. The longer life expectancy and lower rate of cardiovascular disease in women as compared with men in developed countries indicate that a relatively greater concern about health in men would be warranted. As it happens, there is direct overlap between reducing calories and eating a healthy diet, given the link between body weight and mortality. Furthermore, the most calorically dense foods, fats, are also most implicated in heart disease independent of their caloric contribution. However, at least three of the items loading on the diet-health concern factor (NUTTASTE, LONGTERM, and BREAD; see Table 2) do not bear directly on weight control. In addition to the confound between healthy and weight-reducing foods, there may be a link between the two motivations in the minds of some women. Adopting a healthy diet may be more acceptable in some circles than weight reduction, especially when

a woman's weight does not seem to require dieting. Thus, a woman might disguise a weight-loss diet as a health diet.

Our findings help to define the nature of concern about food and diet among American college students, indicating that gender differences are very substantial on all factors except the food negativity (importance of food in a positive context and the positive-negative framing of food). It seems that the main male-female difference has to do not with the positive potential of food as a source of pleasure (given very similar scores on the food importance positive-negative factor) but the degree of negative feelings that conflict with the positive feelings. The male-female difference extends across behaviors, attitudes, and modes of thinking.

The results provide, after the fact, a justification for the common practice of generalizing from a student sample at one university to all American students. Previous data, which compared a range of American adults with American college students (Rozin et al., 1999; Rozin & Fallon, 1988), have provided some justification for a generalization from a particular student sample to Americans more generally. However, there are severe limits to generalization from American college students to people in general (Rozin et al., 1999). Furthermore, though regional differences in the United States are rather small, among college students, regional generalization can only be countenanced with some equalization of or compensation for racial and socioeconomic differences.

In general, the factor structure that we extracted from our questionnaire is very similar to the only other parallel structure, from the Rozin et al. (1999) study of food in life in four countries. The first four factors are about the same, but the eating disorder and natural/vegetarian factors are not distinct in the four-country sample. Rather, there is a factor suggesting culinary versus nutrition-health thinking about food.

The present study was motivated, in part, by our impression and some pilot data suggesting much greater concern about diet-health issues in Californians than in people in other geographical areas of the United States. There is some modest evidence for healthier habits among Californians. Female California high school students have a relative mean weight 96.8% of the entire national standard (Mellin, Irwin, & Scully, 1992). This slight support for a California stereotype is weakly confirmed by data we obtained from the marketing department at McDonald's (personal communication). We determined the number of McDonald's outlets in each of the five states covered by our study and divided this into the population for each state, yielding a people per McDonald's measure. We proposed that a greater health orientation in California might lead to a higher ratio in California because McDonald's might be less popular there. (Note that the issue here is not whether eating at McDonald's is good for health, but rather that people perceive that fast food is not as healthy as other forms of food.) The ratios we obtained were as follows, in order of increasing people per McDonald's: Wisconsin, 23,290; Texas, 23,405; Arizona, 23,433; Pennsylvania, 24,994; and California, 27,600. The density is lowest, by a modest margin, in California. A survey on food intake covering various regions of the United States in the 1989-1991 period showed that people from the West Coast consumed 4.8 servings of meat per day compared with 5.3 in the Northeast and 5.2 in both the South and Midwest, as well as increased consumption of fruits and vegetables on the West Coast (Cleveland, Cook, Krebs-Smith, & Friday, 1997). In the present study, the

BMI for the California students, both the men and women, was the second lowest of the six schools, with the University of Pennsylvania lowest for both genders. Because the University of Pennsylvania is a private school, it differs from the others in being somewhat more upper middle and upper class and in drawing students from a wider range of locations. Among the five state schools, in accordance with the data we have cited, the California sample is somewhat thinner.

Other than the BMI results, our data show no trace of a greater weight or health-diet concern among California undergraduates. The University of California at Santa Barbara would seem to be a reasonable choice for coastal California populations. Our pilot data showing a difference on a much smaller sample may reflect a substantial difference between California undergraduates in general and those Californians who come East for their education to a selective private university. It is possible that the West Coast diet-health stereotype is incorrect, perhaps promoted by a very small but very visible segment of the West Coast population that is devoted to exercise, diet, and health foods.

In contrast to the minimal regional differences within the United States, the contrast of the United States with France is sharp and highly significant for all of the types of measures except the effect of diet on health. The French are less likely to diet or make food choices dominated by concerns about health; find the pleasure of eating relatively uncontaminated by worries and guilt; and tend to think of food as a sensory and social experience rather than as a source of nutrients, toxins, and calories (Rozin et al., 1999). The French-American difference appears for both men and women; as with Americans, it is the French women who are relatively more concerned about weight, diet, and health than are the men (Rozin et al., 1999). We do not fully understand the origin of the French-American differences in relationships to food. Possible accounts include the valuation of moderation in France versus excess in the United States and religious differences, with Catholicism prominent in France and Protestantism in the United States (Rozin, 1998; Rozin et al., 1999; Stearns, 1997). Whatever the origins of the difference, the environment established by French culture seems to encourage less food consumption (mediated at least in part by smaller portion size; Rozin et al., in press), a more varied diet (Drewnowski et al., 1996), perhaps more time spent eating (Rozin et al., in press), and perhaps more exercise integrated with the daily routine.

The findings we report here have implications for the understanding of eating disorders. The small minority of the female college population that is diagnosed with eating disorders might be considered the top of a large pyramid of degrees of concern about weight and diet. The normative female concern seems to involve issues of both intake and food choice and to extend across behaviors, attitudes, and modes of thought.

We believe it is profitable, from the point of view of understanding the obsessions with food of many American women, to extend our understanding of relationships to food beyond the narrow domains of dieting and weight concern. We have made a beginning in creating the broader canvas in our prior cross-cultural work (Rozin et al., 1999) and in the current study. Our emphasis on default thinking (see also analysis of free associations to *food* in Rozin, Kurzer, & Cohen, 2002) introduces a dimension of potential interest. However, there is much work to be done in expanding our vision of the many ways in which food functions and in

refining the measures we have developed. Also, we have much to learn about the development of the American female pattern of relations to food. Most of the male–female difference seems to emerge at puberty, so this would seem to be a natural transition for scholarly attention.

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