

Macho Nachos

The Implicit Effects of Gendered Food Packaging on Preferences for Healthy and Unhealthy Foods

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Abstract. The present studies examine how culturally held stereotypes about gender (that women eat more healthfully than men) implicitly influence food preferences. In Study 1, priming masculinity led both male and female participants to prefer unhealthy foods, while priming femininity led both male and female participants to prefer healthy foods. Study 2 extended these effects to gendered food packaging. When the packaging and healthiness of the food were gender schema congruent (i.e., feminine packaging for a healthy food, masculine packaging for an unhealthy food) both male and female participants rated the product as more attractive, said that they would be more likely to purchase it, and even rated it as tasting better compared to when the product was stereotype incongruent. In Study 3, packaging that *explicitly* appealed to gender stereotypes (“The muffin for real men”) reversed the schema congruity effect, but only among participants who scored high in psychological reactance.

Keywords: gender stereotypes, food preferences, implicit cognition, schema congruity, reactance

Two weeks prior to President Obama’s 2009 inauguration, President Bush hosted a lunch that brought together all five living current, former, and future Presidents. Former White House chef Walter Scheib was asked about what he might serve these men with different tastes:

“I think the key word there is *men*. There isn’t blue state food and red state food. Food at the White House has a tendency to delineate along gender lines as opposed to political lines. Both first ladies that I worked with were... very much into nutrition. Both Presidents that I worked with, if we had opened up a BBQ pit or rib joint, they’d be just as happy” (National Public Radio, 2009).

Although former Presidents and their families are not necessarily representative of the population at large, the idea that food is gendered – that healthy and unhealthy eating can be associated with femininity or masculinity – is intriguing. However, to date, surprisingly little attention has been paid to the potential effects of gender beliefs on food preferences.

People choose to eat healthy or unhealthy foods for many reasons. At a basic level, human beings have an innate preference for sweet, salty, and fatty foods (Brownell & Battle-Horgen, 2004). In addition to inborn preferences, however, cultural, and social factors play a critical role in

shaping people’s food preferences (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999). Many food researchers believe that these sociocultural influences are among the most important factors in explaining individuals’ food preferences (Allen, Gupta, & Monnier, 2008; Fieldhouse, 1995; Q1 Rozin, 1996). As Rozin (1996, p. 235) explains,

“(s)uppose one wishes to know as much as possible about the foods another person likes and eats and can ask that person only one question... There is no doubt about it, the question should be, what is your culture or ethnic group? There is no other single question that would even approach the informativeness of the answer to this question.”

Not only do people tend to eat what others in their culture eat, but what people eat communicates something about the kind of person they are (Allen et al., 2008). For example, in some cultures people do not eat meat or animal products because they believe it is morally wrong to harm animals or because it contradicts their religious beliefs (e.g., Hindus in India; Keene, 2002). And proponents of the newly-formed “slow food” movement, which originated in Europe as a rejection of “fast food,” advocate for organic, sustainable agriculture for environmental and political reasons (Petrini & Padovani, 2006). Thus, eating is not only a fundamental biological necessity, but is

74 strongly imbued with cultural meaning. Such cultural influences are known to shape preferences not only explicitly
 75 (i.e., consciously and deliberatively), but also implicitly
 76 (i.e., intuitively and automatically; Greenwald & Banaji,
 77 1995; Haidt, Koller, & Dias, 1993; Nisbett, Peng, Choi,
 78 & Norenzayan, 2001).

80 In this vein, the present studies investigate how cultural
 81 stereotypes about gender influence Americans' food preferences.
 82 Americans, in particular, strongly associate healthy
 83 or light foods, such as salad, chicken, and yogurt with
 84 women, and unhealthy or heavy foods, such as beef, pota-
 85 toes, and beer with men (Counihan, 1999; Millman,
 86 1980). To date, however, no empirical studies have directly
 87 examined how subtly activating these cultural stereotypes
 88 subsequently influences people's food preferences.

89 Other research has also found that men and women do,
 90 in fact, consume different types of food and express differ-
 91 ent desires with respect to dieting and healthy eating.
 92 Specifically, men are less concerned than women about eat-
 93 ing healthfully (Rozin, Bauer, & Catanese, 2003). More-
 94 over, men report that they prefer more unhealthy foods,
 95 such as red meat, compared to women, while women report
 96 preferring more healthy foods, such as fruits and vegeta-
 97 bles, compared to men (Cline, Allen, Patrick, & Hunt,
 98 1998; Colihan, 2008; Rozin et al., 2003).

99 Women are also more likely than men to consume
 100 "diet" or low-calorie foods (Rozin et al., 2003), and are
 101 perceived as more feminine when they eat smaller quanti-
 102 ties of food (Basow & Kobrynowicz, 1993). Given that
 103 men and women differ in their baseline preference for
 104 healthful eating, it is unclear whether men and women
 105 would respond differently when the concepts of masculinity
 106 and femininity are subtly activated – that is, can stereotype
 107 activation occur regardless of baseline preferences, such
 108 that priming femininity leads both men and women to eat
 109 more healthfully and priming masculinity leads both men
 110 and women to eat less healthfully?

111 Allen et al. (2008) draw an important distinction
 112 between personal values and cultural values in shaping food
 113 preferences. They propose that people evaluate the taste of
 114 a food or beverage by comparing the values symbolized by
 115 the product (cultural values) to their own personal value
 116 preferences. When these are in alignment, people will rate
 117 the product as tasting better and will express intentions to
 118 consume the product in the future. For example, individuals
 119 who want to appear powerful (personal value preference)
 120 are more likely to choose a name brand (Pepsi) over a value
 121 brand (Woolworths Homebrand), even when no differences
 122 in taste or quality are detected between the two products
 123 (Allen et al., 2008). This suggests that men and women
 124 may respond very differently when gender stereotypes are
 125 activated – specifically that female consumers will respond
 126 more to femininity primes and male consumers to mas-
 127 cculinity primes.

128 However, research and theory on implicit social cognition
 129 leads to very different predictions regarding the effects
 130 of subtly activating gender stereotypes. From this theoretical
 131 perspective, widespread cultural beliefs are reflected

132 in automatic mental associations that can implicitly influ-
 133 ence judgments and behaviors outside a person's awareness
 134 (Greenwald & Banaji, 1995). Importantly, the implicit-
 135 explicit dimension is continuous rather than dichotomous,
 136 and many if not most psychological phenomena have both
 137 implicit and explicit components to them. For instance,
 138 although people are typically aware of common cultural
 139 associations (e.g., between "female" and "healthy eating"),
 140 they are frequently unaware of the consequences such asso-
 141 ciations hold for their own actions (i.e., they are aware of
 142 the association, but unaware of its influence; Bargh,
 143 1992; Uhlmann, Pizarro, & Bloom, 2008). A considerable
 144 body of empirical evidence is consistent with the idea that
 145 subtly activating such cultural values and stereotypes can
 146 implicitly influence judgments and behaviors (Aarts &
 147 Dijksterhuis, 2003; Bargh & Chartrand, 1999; Bargh, Chen,
 148 & Burrows, 1996; Bargh, Gollwitzer, Lee-Chai, Barndollar,
 149 & Troetschel, 2001; Bargh, Schwader, Hailey, Dyer, &
 150 Boothby, 2012; Chartrand & Bargh, 2002; DeMarree,
 151 Wheeler, & Petty, 2005; Shah, 2003).

152 Remarkably, individuals even behave in accordance
 153 with primed concepts related to cultural groups of which
 154 they are not personally a member (Aarts et al., 2005; Bargh
 155 et al., 1996, 2012; Wheeler & Petty, 2001). For instance,
 156 priming the faces of Black Americans led White college
 157 students to respond with greater hostility to a computer
 158 failure, consistent with the cultural stereotype of Black
 159 Americans as aggressive and hostile (Bargh et al., 1996).
 160 Similarly, American students primed with the first-person
 161 plural pronoun "we" made more collectivistic judgments,
 162 while students from Hong Kong primed with the first-
 163 person singular pronoun "I" made more individualistic
 164 judgments, going against well-established tendencies for
 165 Westerners to express individualistic beliefs and Easterners
 166 to express more collectivistic ones (Gardner, Gabriel, &
 167 Lee, 1999; see also Oyserman & Lee, 2008). Thus, schemas
 168 about a social group's characteristics (e.g., Black = hostile)
 169 appear sufficient to activate relevant associations, implicitly
 170 influencing individuals to act or think similarly to members
 171 of the primed group.

172 Based on these findings, one would arrive at a different
 173 set of predictions than the self-congruity hypothesis that
 174 follows from Allen et al. (2008). Specifically, although
 175 women and men may differ in baseline preferences for
 176 healthy versus unhealthy foods, at an implicit level, *both*
 177 men and women should have a culturally learned associa-
 178 tion between gender and healthy versus unhealthy eating.
 179 The widespread cultural belief that men eat less healthfully
 180 than women should lead to a schema of "female" that
 181 includes the characteristic "eats healthy foods," and a
 182 schema of "male" that includes the characteristic "eats
 183 unhealthy foods." Therefore, activation of the concept
 184 "female" should activate the characteristic "healthy eating"
 185 and activation of "male" should activate the characteristic
 186 "unhealthy eating." Consistent with prior work on stereo-
 187 type priming (Aarts et al., 2005; Bargh et al., 1996, 2012;
 188 Wheeler & Petty, 2001), implicitly priming femininity
 189 and masculinity should therefore have similar effects for

190 both men and women: Activating the concept of femininity
 191 should lead both male and female participants to exhibit
 192 more healthy food preferences, while activating the concept
 193 of masculinity should lead both male and female
 194 participants to exhibit less healthy food preferences.
 195 Since both men and women have been conditioned with
 196 the relevant cultural stereotype, they should both be
 197 affected in the same way by its implicit activation (Bargh
 198 & Chartrand, 1999; Bargh et al., 1996, 2012; Greenwald
 199 & Banaji, 1995).

200 Schema Congruity and Product Packaging

201 Although establishing that gender schemas can implicitly
 202 influence individuals' preferences for healthy or unhealthy
 203 foods is interesting in-and-of-itself, an additional goal of
 204 the present work was to explore the applications of these
 205 findings. To this end, we draw upon related research on
 206 the effects of schema congruity on consumer preferences
 207 (Aggarwal & McGill, 2007; Meyers-Levy & Tybout,
 208 1989; Peracchio & Tybout, 1996). Schemas are cognitive
 209 frameworks that contain information about a topic or con-
 210 cept, including its attributes and the relations among these
 211 attributes (Fiske & Linville, 1980). Previous research has
 212 demonstrated that individuals' appraisals of a new product
 213 may be dependent on the degree to which the product's
 214 features and the activated category schema are congruent
 215 (Aggarwal & McGill, 2007; Meyers-Levy & Tybout,
 216 1989). In general, objects that are schema congruent are
 217 evaluated more favorably than objects that are schema
 218 incongruent. Proposed theoretical mechanisms for schema
 219 congruity effects include greater liking for objects that con-
 220 form to expectations, transfer of positive affect about the fit
 221 between the product's features and beliefs about the cate-
 222 gory to the object itself (Fiske, 1982), and the greater ease
 223 or fluency of processing schema congruent information
 224 (Alter & Oppenheimer, 2009; Labroo, Dhar, & Schwarz,
 225 2009). Notably, these processes may operate in tandem
 226 and complement one another; people may like stimuli con-
 227 sistent with expectations in part because they are easier to
 228 process, and transfer some of that positive affect to the
 229 product.

230 For the present purposes, the interesting question is
 231 whether schema congruity influences consumer behavior
 232 *implicitly*. We examined whether it was possible to subtly
 233 influence individuals' preferences for certain foods if the
 234 packaging was altered in a manner that was either consis-
 235 tent or inconsistent with relevant gender schemas (i.e., fem-
 236 inine and healthy or masculine and unhealthy). Consistent
 237 with the findings of previous research, we hypothesized that
 238 people would be more likely to prefer foods that were
 239 schema congruent compared to foods that were schema
 240 incongruent (i.e., femininely-packaged unhealthy foods
 241 and masculinely-packaged healthy foods).

242 Of further interest was whether the effects of
 243 gender schema congruity even extend to behavioral mea-
 244 sures, such as the perceived taste of the product. Prior work

245 indicates that the labeling of a food can influence its taste
 246 (Raghunathan, Naylor, & Hoyer, 2006; Wansink & Park,
 247 2002; Wansink, Park, Sonka, & Morganosky, 2000). For
 248 example, consumers who were inaccurately told
 249 that a nutrition bar contained soy rated it as tasting
 250 worse than the same nutrition bar without a soy label
 251 (Wansink et al., 2000). We therefore expected that more
 252 positive evaluations of foods with stereotype congruent
 253 packaging would extend to perceived taste; consumers
 254 should rate an unhealthy product as tasting better when it
 255 is contained in a masculine package than when the same
 256 unhealthy product is contained in a feminine package.

257 If the effects of schema congruent packaging on
 258 consumer evaluations are implicit, packaging consistent with
 259 gender stereotypes should influence male and female con-
 260 sumers in the same way, just as activation of cultural stereo-
 261 types through priming influences people's behavior
 262 independent of their personal group memberships (Aarts
 263 et al., 2005; Bargh et al., 1996, 2012; Wheeler & Petty,
 264 2001). Further, we expected that a careful debriefing (Bargh
 265 & Chartrand, 2000) would reveal no evidence that partic-
 266 ipants were aware that stereotype-consistent packaging had
 267 influenced their evaluations, much as consumers have been
 268 repeatedly shown to be unaware of the influence of primed
 269 associations (Bargh, 2002; Berger & Fitzsimons, 2008;
 270 Chartrand, 2005; Fitzsimons et al., 2002; Winkielman
 271 et al., 2005). Again, as in much prior work on implicit
 272 social cognition, the argument is not that people are una-
 273 ware of cultural stereotypes or unaware of whether food
 274 packaging is consistent with such stereotypes, but rather
 275 that they are unaware of the *influence* of stereotype congruent
 276 packaging on their evaluations (Bargh, 1992; Uhlmann
 277 et al., 2008).

278 Another approach to demonstrating the implicitness of
 279 schema congruity effects is to show that when the activation
 280 of gender stereotypes is more explicit, it tends to backfire.
 281 Such an effect is anticipated by theories of psychological
 282 reactance, which argue that people have a need for self-
 283 determination and react against external influences when
 284 they become aware of them (Brehm, 1966; Brehm &
 285 Brehm, 1981). Indeed, conceptually related work on
 286 prime-to-behavior effects finds that when the priming
 287 manipulation is blatant rather than subtle, contrast effects
 288 are observed such that participants do the opposite of what
 289 the primes would seemingly indicate (Erb, Bioy, & Hilton,
 290 2002; Lombardi, Higgins, & Bargh, 1987; Newman &
 291 Uleman, 1990; Strack, Schwarz, Bless, Kübler, & Wänke,
 292 1993). We therefore hypothesized that food packaging that
 293 directly invoked gender stereotypes would lead to a reversal
 294 of the typically observed schema congruity effect. More-
 295 over if such reversals are, as hypothesized, based on con-
 296 scious psychological reactance, then they should be
 297 strongest among consumers who score high in individual
 298 differences in reactance (Hong & Faedda, 1996; Hong &
 299 Page, 1989). More broadly, if increasing the explicitness
 300 with which the packaging appeals to gender stereotypes
 301 reverses the typically observed schema congruity effects,
 302 this suggests that the influence of comparatively more

303	subtle packaging occurs implicitly (Lombardi et al., 1987;	360
304	Strack et al., 1993).	361
305	Overview	
306	The current studies empirically tested these hypotheses	
307	about the effects of cultural gender stereotypes on food	
308	preferences using two methods. Study 1 primed either the	
309	concept of masculinity, the concept of femininity, or neutral	
310	concepts and then assessed participants' food preferences.	
311	Thus, using a manipulation common in research on implicit	
312	social cognition (Bargh & Chartrand, 1999; Bargh et al.,	
313	1996, 2012; Chartrand & Bargh, 2002), this experiment	
314	provided a direct test of whether activating cultural gender	
315	stereotypes changes subsequent food preferences.	
316	Study 2 employed a different logic, inspired by research	
317	on the subtle effects of schema congruity on preferences	
318	(Aggarwal & McGill, 2007; Fiske, 1982; Meyers-Levy &	
319	Tybout, 1989; Peracchio & Tybout, 1996). This study pre-	
320	sented participants with either "healthy" or "unhealthy"	
321	food products as part of an ostensible taste test. The product	
322	(a muffin) was either contained in masculine, feminine, or	
323	gender-neutral packaging. We hypothesized that when	
324	packaging is gendered (either masculine or feminine) both	
325	male and female participants' preferences should shift such	
326	that stereotype-congruent products (i.e., the masculine-	
327	unhealthy muffin and the feminine-healthy muffin) are	
328	judged more favorably than the stereotype-incongruent	
329	products. Consistent with the idea that both priming and	
330	schema congruity effects represent implicit influences on	
331	consumer evaluations, we expected that funneled debrief-	
332	ings (Bargh & Chartrand, 2000) would reveal no evidence	
333	participants were aware that the primes (Study 1) or pack-	
334	aging (Study 2) had influenced them.	
335	Study 3 used a different approach to test the hypothe-	
336	sized implicit nature of schema congruity effects. Specific-	
337	ally, we added a condition in which the packaging	
338	contained a slogan <i>explicitly</i> appealing to gender stereo-	
339	types ("The muffin for real men"). We hypothesized that	
340	a blatant appeal to stereotypes would reverse the typically	
341	observed schema congruity effect, such that an unhealthy	
342	muffin in masculine packing <i>and</i> with a blatantly gendered	
343	slogan would be rejected. Further, this reversal effect should	
344	be strongest among consumers high in individual differ-	
345	ences in psychological reactance (Brehm, 1966; Brehm &	
346	Brehm, 1981; Hong & Faedda, 1996; Hong & Page, 1989).	
347	Together, these experiments serve to inform our under-	
348	standing of how gender stereotypes shape food preferences	
349	and more broadly, how widely shared cultural beliefs may	
350	implicitly influence behavior in surprising and unexpected	
351	ways. This research contributes to the special issue on	
352	masculinity by suggesting that cultural stereotypes about	
353	masculinity and femininity are so pervasive and psycholog-	
354	ically ingrained that their implicit activation can lead men	
355	and women alike to behave consistently with such common	
356	beliefs. Thus, the influence of gender stereotypes can be	
357	contingent on basic social-cognitive processes rather	
358	than a person's own gender. Our findings further illustrate	
359	how prevailing beliefs about men and masculinity can	
	nonconsciously influence consumers to make food choices	
	that are detrimental to their physical health.	
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	Study 1: Priming Gender Concepts	362
	Participants	363
	Ninety-three adults (29 male, 64 female; $M_{age} = 35.47$,	
	$SD = 16.65$) were randomly assigned to either the mascu-	
	line, femininity, or neutral prime condition. In order to	
	recruit a sample of lay adults and thus increase the general-	
	izability of our findings (Sears, 1986), we set up a tent at	
	public park in Connecticut and offered passersby a small	
	cash payment (\$2) in return for participating in the study.	
	92.6% of our participants self-identified as White, 2.1%	
	as Asian, 2.1% as Latino, 0% as Black, and 2.1% indicated	
	"other" ethnic groups.	
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	Materials and Procedure	374
	Participants were given a "word puzzle task" (the priming	
	manipulation) and then a "consumer survey" (the depen-	
	dent measures related to food preferences), which were pre-	
	sented as unrelated tasks. They completed the study in a	
	designated sitting area, in some cases alone and in some	
	cases with other participants sitting nearby. Participants	
	were not allowed to speak to one another while completing	
	the study.	
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	Gender Priming Manipulation	383
	Participants were randomly assigned to unscramble ten	
	short sentences with either masculine, feminine, or neutral	
	words embedded in seven of the sentences (Cohen &	
	Garcia, 2005; Srull & Wyer, 1979). To develop these words,	
	a separate group of 35 participants completed a pretest to	
	identify words that were equated in terms of their active	
	focus and the strength of their association with the concepts	
	of masculinity and femininity. The goal of this pretesting	
	was to generate seven masculine and seven feminine words	
	that were parallel with one another (e.g., "cologne" and	
	"perfume") but also were not confounded with activity or	
	passivity. Additionally, the masculine words had to be seen,	
	on average, as either "very masculine" or "extremely mas-	
	culine" while the feminine words had to be rated, on aver-	
	age, as either "very feminine" or "extremely feminine."	
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Preferences for Unhealthy Over Healthy Versions of the Same Foods

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Participants were then asked their preferences for unhealthy over healthy versions of four different foods. Each item presented the same food but varied how healthy it was. Participants in Study 1 rated each pair of foods using a single seven-point scale where higher numbers indicated preferences for less healthy versions of the foods.

To establish the reliability of these items we pretested a list of 65 individual foods with a separate group of participants. Our goal was to develop a list of foods for the main study that could be either healthy or unhealthy but simultaneously the healthy versions were not associated with femininity and the unhealthy versions with masculinity. The four pairs of foods that met these criteria were: baked chicken versus fried chicken, baked potato versus French fries, light (or reduced-fat) potato chips versus regular potato chips, and baked fish versus fried fish. In the pretest, each of the 65 foods was evaluated individually, and pairs of foods were selected that differed in their healthiness ratings but not in their masculinity-femininity. In the main study, participants were asked the question "Please indicate which of the following foods you would prefer, if given the choice" and then presented with each of the four pairs (e.g., baked chicken vs. fried chicken) on a single seven-point scale, with one indicating *strongly prefer the healthy version* and seven indicating *strongly prefer the unhealthy version* of the food.

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Healthy and Unhealthy Foods

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Participants were then presented with a list of 10 foods that varied in their healthiness but were rated as neither masculine nor feminine in pretesting. From this list, participants were asked to rate the likelihood that they would eat each food item using a seven-point Likert-type scale ("In the next month, how likely are you to eat each of these foods?" 1 = *not at all likely*, to 7 = *extremely likely*). Using the pre-testing data as a guide and selecting healthy and unhealthy foods rated as similarly extreme in healthiness or unhealthiness, we divided the 10 items into two subscales: healthy foods (banana, oatmeal, spinach, orange) ($\alpha = .65$) and unhealthy foods (soda, fried chicken, movie theater popcorn, donuts, potato chips, French fries) ($\alpha = .74$).

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Healthy Eating Intentions

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Using an 11-point scale (1 = *completely disagree*, 11 = *completely agree*), participants then reported their intentions to engage in a series of five healthy eating behaviors over the next month: "I am going to try to eat healthier," "I will try to eat more fruits," "I will try to eat more vegetables," "I am going to go on a healthier diet," and "I am going to try to eat less junk food" ($\alpha = .96$).

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Background Information and Funneled Debriefing

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Participants reported their ethnicity, their age, their gender, and any general dietary restrictions. Two participants reported dietary restrictions specific to the foods we measured (e.g., being vegetarian made some participants unable to answer questions about their preferences for chicken). Excluding versus including these two participants did not change the results in any way. We also included a funneled debriefing (Bargh & Chartrand, 2000) asking participants whether they had (1) been influenced by the priming manipulation and if so, (2) in what specific way. No participants were able to identify the purpose of the sentence unscrambling task.

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Results

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Preferences for Unhealthy Over Healthy Versions of the Same Foods

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A one-way ANOVA revealed a significant effect of priming condition on preferences for unhealthy versus healthy versions of the same foods, $F(2, 90) = 9.81, p < .001$. Participants exposed to the masculinity prime ($M = 4.42, SD = 1.30$) were significantly more likely to prefer unhealthy versions of the food compared to participants in the femininity prime condition ($M = 2.88, SD = 1.63$), $t(60) = -4.12, p < .001, d = -1.06$, but not significantly more likely to do so than participants in the neutral prime condition ($M = 3.91, SD = 1.23$), $t(60) = 1.57, p = .12, d = .41$. In addition, participants exposed to the femininity prime were significantly less likely to prefer unhealthy versions of the foods than participants in the neutral prime condition, $t(60) = -2.82, p < .01, d = -.73$.

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Separate Groups of Healthy and Unhealthy Foods

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Preferences for the unhealthy and healthy foods were analyzed separately. A one-way ANOVA revealed a significant difference among the three priming conditions for the unhealthy foods, $F(2, 91) = 5.75, p < .01$. Participants in the masculinity prime condition ($M = 4.91, SD = 1.41$) were significantly more likely to report a preference for unhealthy foods than participants in the femininity prime condition ($M = 3.61, SD = 1.74$), $t(61) = -3.27, p < .01, d = -.84$, and marginally more likely to do so than participants in the neutral prime condition ($M = 4.17, SD = 1.42$), $t(61) = 2.09, p < .05, d = .53$. However, participants' preference for unhealthy foods did not differ significantly between the femininity and neutral prime conditions, $t(60) = -1.38, p = .17, d = -.36$.

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A second ANOVA revealed a significant effect of priming condition on preferences for healthy foods, $F(2, 91) = 4.89, p < .01$. Participants in the femininity prime condition ($M = 4.87, SD = 1.33$) were significantly more likely to report that they would like to eat healthy

509 foods compared to participants in the masculinity prime
 510 condition ($M = 3.70$, $SD = 1.59$), $t(61) = 3.17$, $p < .01$,
 511 $d = .81$, and marginally more likely to do so than participants
 512 in the neutral prime condition ($M = 4.22$, $SD = 1.53$),
 513 $t(60) = 1.80$, $p = .08$, $d = .47$. However, participants
 514 exposed to the masculinity prime were not significantly less
 515 likely to prefer healthy foods than participants in the neutral
 516 prime condition, $t(61) = -1.31$, $p = .20$, $d = -.34$.

517 Healthy Eating Intentions

518 A one-way ANOVA revealed a significant effect of priming
 519 condition on participants' self-reported intentions to eat
 520 healthy, $F(2, 91) = 7.48$, $p < .01$. Specifically, participants
 521 in the femininity prime condition ($M = 8.70$, $SD = 2.49$)
 522 were more likely to report intentions to eat healthfully in
 523 the next month than participants in the masculinity prime
 524 condition ($M = 6.19$, $SD = 2.76$), $t(61) = 3.79$, $p < .001$,
 525 $d = .97$, and marginally more likely to do so than participants
 526 in the neutral prime condition ($M = 7.45$, $SD = 2.48$),
 527 $t(60) = 1.98$, $p = .05$, $d = .51$. Additionally, participants in
 528 the masculinity prime condition were marginally less likely
 529 to report healthy eating intentions than participants in the
 530 neutral prime condition, $t(61) = -1.91$, $p = .06$, $d = -.49$.

531 Thus, across all of our dependent variables we observed
 532 a significant main effect of the priming manipulation, with
 533 the means in the masculinity prime, neutral prime, and fem-
 534 ininity prime conditions patterning in the expected manner.
 535 Scores in the masculinity and femininity prime conditions
 536 were always significantly different from each other, with
 537 means in the neutral prime condition generally falling in
 538 between but not always significantly different from the
 539 other two conditions.

Participant Gender

540 Further analyses revealed no evidence that participant gen-
 541 der moderated the observed effects. Several unsurprising
 542 main effects of participant gender did emerge, such that
 543 male participants were more likely to prefer unhealthy ver-
 544 sions of the same food than women ($M = 4.38$, $SD = 1.47$
 545 vs. $M = 3.46$, $SD = 1.48$), $F(1, 86) = 4.58$, $p < .05$,
 546 $d = .59$, and marginally more likely to prefer unhealthy
 547 foods than women ($M = 4.78$, $SD = 1.39$ vs. $M = 3.98$,
 548 $SD = 1.66$), $F(1, 87) = 3.17$, $p = .08$, $d = .48$. However,
 549 the main effects of participant gender on preference for
 550 healthy foods ($M = 3.84$, $SD = 1.56$ vs. $M = 4.45$,
 551 $SD = 1.53$), $F(1, 87) = 1.09$, $p = .30$, $d = -.37$, and
 552 healthy eating intentions ($M = 6.58$, $SD = 2.92$ vs.
 553 $M = 7.94$, $SD = 2.47$), $F(1, 87) = 2.16$, $p = .15$, $d = -.49$,
 554 were not significant. Further, and much more interestingly,
 555 participant gender did not interact with the priming manip-
 556 ulation to predict preferences for unhealthy over healthy
 557 versions of the same foods, $F(2, 86) = .36$, $p = .70$, prefer-
 558 ences for healthy foods, $F(2, 87) = 1.41$, $p = .25$, prefer-
 559 ences for unhealthy foods, $F(2, 87) = .14$, $p = .87$, or
 560 healthy eating intentions $F(2, 87) = 1.81$, $p = .17$. This
 561 suggests that, even if they often expressed different prefer-
 562 ences overall, men and women were equally affected by the
 563 masculinity and femininity primes. Table 1 displays the
 564 means and standard deviations for the dependent variables
 565 by participant gender and experimental condition.

Discussion

567 Implicitly priming concepts associated with masculinity led
 568 participants to prefer less healthy foods, while implicitly
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Table 1. Means and standard deviations for each dependent measure (preference for unhealthy over healthy versions of the same foods, preferences for different healthy and unhealthy foods, and healthy eating intentions) by participant gender and experimental condition (Study 1). The study employed a between-subjects design (femininity prime vs. masculinity prime vs. neutral prime)

	Preference for unhealthy over healthy versions of the same foods	Preference for healthy foods	Preference for unhealthy foods	Healthy eating intentions
Male participants				
Femininity prime	3.17 ($SD = 2.05$) $N = 6$	5.21 ($SD = 1.51$) $N = 6$	3.92 ($SD = 1.85$) $N = 6$	9.58 ($SD = 1.08$) $N = 6$
Masculinity prime	4.86 ($SD = 1.03$) $N = 12$	3.42 ($SD = 1.26$) $N = 12$	5.27 ($SD = .98$) $N = 12$	5.25 ($SD = 3.21$) $N = 12$
Neutral prime	4.54 ($SD = 1.24$) $N = 12$	3.58 ($SD = 1.58$) $N = 12$	4.71 ($SD = 1.39$) $N = 12$	6.40 ($SD = 2.19$) $N = 12$
Female participants				
Femininity prime	2.82 ($SD = 1.58$) $N = 24$	4.78 ($SD = 1.33$) $N = 24$	3.49 ($SD = 1.76$) $N = 24$	8.80 ($SD = 2.25$) $N = 24$
Masculinity prime	4.18 ($SD = 1.39$) $N = 20$	3.88 ($SD = 1.77$) $N = 20$	4.70 ($SD = 1.60$) $N = 20$	6.75 ($SD = 2.35$) $N = 20$
Neutral prime	3.52 ($SD = 1.07$) $N = 19$	4.62 ($SD = 1.39$) $N = 19$	3.83 ($SD = 1.37$) $N = 19$	8.12 ($SD = 2.47$) $N = 19$

570 priming femininity led participants to prefer more healthy
 571 foods. Moreover, these effects were observed among both
 572 male and female participants and across a variety of out-
 573 come measures. As outlined earlier, this result argues in
 574 favor of cultural stereotypes implicitly affecting food pref-
 575 erences (Bargh et al., 1996, 2012; Greenwald & Banaji,
 576 1995) and against a framework that relies on the congruence
 577 between personal identity and the activated schema
 578 (Allen et al., 2008).¹

579 Study 2: Gendered Food Packaging

580 To extend these findings, Study 2 varied the nature of the
 581 packaging with which food was presented. The same food
 582 (a muffin) was used in all conditions, but was either
 583 described as low-fat or full-fat. The muffin was either con-
 584 tained in masculine, feminine, or gender-neutral packaging
 585 (thus totaling six different conditions). We then obtained
 586 several different evaluative measures of the product includ-
 587 ing appeal of the product's packaging, intent to purchase the
 588 product, willingness to pay for the product, and evaluations
 589 of the product's taste. We predicted that across all of these
 590 measures, the stereotype-congruent products (i.e., feminine-
 591 healthy muffins and masculine-unhealthy muffins) would
 592 be rated more favorably than the stereotype-incongruent
 593 products (i.e., the feminine-unhealthy and masculine-
 594 healthy muffins) or the gender neutral healthy and
 595 unhealthy products. We further expected that a funneled
 596 debriefing (Bargh & Chartrand, 2000) would reveal no evi-
 597 dence that participants were aware the product packaging
 598 had influenced their judgments.

599 Participants and Design

600 One hundred forty adults (58 men, 82 women;
 601 $M_{age} = 35.98$, $SD = 14.99$) were randomly assigned to
 602 one of six conditions in a 3 (masculine vs. feminine vs. neu-
 603 tral packaging) \times 2 (healthy vs. unhealthy product)
 604 between-subjects design. As in Study 1, we sought to
 605 increase the generalizability of our findings by recruiting
 606 lay adults rather than college students. We therefore rented
 607 a booth at a local fair in Connecticut and offered attendees a
 608 small cash payment in return for participating in the study.
 609 90.8% of our participants self-identified as White, 0% as
 610 Asian, 3.5% as Latino, 3.5% as Black, and 2.1% indicated
 611 they were members of "other" ethnic groups. 23.9% of our

participants were politically liberal, 44.9% moderate, and
 612 31.2% as politically conservative. 613

614 Materials and Procedure

Participants were told that they were participating in a taste
 615 test for a new product and that they would first evaluate the
 616 aesthetic appearance of a box of muffins and then taste one
 617 of the same muffins. To control for the actual muffin used,
 618 all participants actually tasted an Entenmann's® individu-
 619 ally-wrapped miniature blueberry muffin. The muffin was
 620 presented to subjects in a small, clear, zip-locked bag to
 621 prevent any influence of familiarity of the actual muffin
 622 brand. We chose blueberry muffins for three reasons:
 623 (1) blueberry muffins were pretested to be gender neutral,
 624 (2) blueberry muffins were also rated as being possibly
 625 healthy or unhealthy depending on their preparation (e.g.,
 626 a muffin can be either low-fat, low-sugar, and high-fiber,
 627 or high-fat, high-sugar, and devoid of fiber), and (3) almost
 628 no one reported being allergic to the ingredients in blue-
 629 berry muffins. 630

Participants were first presented with one of the six
 631 blueberry muffin boxes. An artist created mock-ups of
 632 the muffin boxes to ensure that participants were unaware
 633 that the boxes were fictional. To manipulate the perceived
 634 healthiness of the muffins, in the unhealthy conditions,
 635 the muffins were labeled "*Mega Muffin*" and in the healthy
 636 conditions, the muffins were labeled "*Health Muffin*." The
 637 adjective "Mega" was always used to describe the
 638 unhealthy muffin and "Health" the healthy muffin, thus
 639 the product name and product attributes were part of the
 640 same healthiness manipulation. To manipulate how
 641 gendered the muffins were perceived to be, in the masculine
 642 conditions the box cover had a background of men playing
 643 football, in the feminine conditions the box cover had a
 644 woman dancing ballet in the background, and in the
 645 neutral conditions there was a picture of a field. This
 646 yielded six different boxes: a masculine-healthy muffin, a
 647 masculine-unhealthy muffin, a feminine-healthy muffin, a
 648 feminine-unhealthy muffin, a neutral healthy muffin, and
 649 a neutral unhealthy muffin. 650

651 Stimulus Pretesting

To ensure that these fictional boxes were perceived accu-
 652 rately (as either healthy/unhealthy and either masculine/
 653 feminine/neutral), as well as that the masculine box was
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¹ A supplemental study using the same subject population replicated all the major findings of Study 1. The only methodological difference between the two studies is that in the supplementary study, the word stimuli used as primes were not pretested for their active focus and strength of association with masculinity and femininity. Results of one-way ANOVAs revealed a significant effect of the priming manipulation (masculine, neutral, feminine) on participants' preference for unhealthy over healthy versions of the same food, $F(2, 101) = 7.15$, $p < .01$, preference for healthy foods, $F(2, 100) = 7.73$, $p < .01$, and unhealthy foods, $F(2, 100) = 4.70$, $p < .05$, as well as their healthy eating intentions, $F(2, 101) = 4.86$, $p < .05$. The masculine and feminine prime conditions were significantly different in the expected direction for all dependent measures, with the neutral condition always in between but not always significantly different from the other two conditions. Further replicating Study 1, participant gender did not interact with the priming manipulation to predict preferences for unhealthy over healthy versions of the same foods, $F(2, 98) = .16$, $p = .86$, preference for healthy foods, $F(2, 97) = 1.21$, $p = .30$, and unhealthy foods, $F(2, 97) = .40$, $p = .67$, or healthy eating intentions $F(2, 98) = .40$, $p = .67$.

not more strongly associated with unhealthiness and the feminine box with healthiness, we conducted a pretest with a separate group of 140 adults. Pretest participants were randomly assigned to evaluate one of the six muffin boxes. After viewing one of the muffin boxes, they rated how masculine or feminine the box appeared and how healthy or unhealthy they perceived the muffin to be. As predicted, the feminine boxes were rated as significantly more feminine than the masculine boxes, $p < .001$, and the neutral boxes were rated in between the masculine and feminine boxes (both $p < .001$). Additionally, the boxes with healthy information were seen as significantly more healthy than the boxes with unhealthy information, $p < .001$. More importantly, there was no significant interaction between the masculinity/femininity of the packaging and healthiness/unhealthiness of the muffin, either for judgments of masculinity-femininity or for ratings of healthiness/unhealthiness. Thus, the pretest confirmed that our boxes were significantly different on the dimensions of interest and critically, that the healthiness/unhealthiness and femininity/masculinity of the muffin boxes were not confounded.

Product Evaluation

Participants in the main study were given a color reproduction of the muffin box and an individually-wrapped miniature blueberry muffin (contained in a clear plastic bag). They were asked to evaluate the muffin box on four dimensions using a nine-point semantic differential scale: *unattractive-attractive*, *unappealing-appealing*, *bad-good*, and *unappetizing-appetizing* ($\alpha = .93$). After evaluating the muffin box, participants were asked to taste the muffin. They were instructed to eat as much or as little of it as they would like and then rate their impression of the muffin along six dimensions using a nine-point semantic differential scale: *bland-flavorful*, *bitter-sweet*, *stale-fresh*, *tasteless-delicious*, *unappetizing-appetizing*, and *bad-good* ($\alpha = .91$). After evaluating the taste of the muffin, participants then indicated how much they would be willing to pay for a box containing two dozen of these miniature muffins and their likelihood of purchasing these muffins on a nine-point scale (1 = *extremely unlikely*, 9 = *extremely likely*).

Background Information and Debriefing

Participants reported their ethnicity, age, gender, and political orientation. Finally, participants were administered a funneled debriefing (Bargh & Chartrand, 2000) assessing whether they believed that the packaging had influenced their evaluations of the muffin. Participants were further asked, "Did the packaging influence your evaluations of the muffin in any way?" (1 = *definitely not*, 5 = *not sure*, 9 = *definitely yes*). If they responded affirmatively, they were then asked to explain how they thought the packaging may have influenced their evaluations. No participant responded above a five ("not sure").

Five individuals indicated that they could not, or did not want to taste the muffin and did not take part in the study.

Results

Taste Test Evaluation

Ratings of the product's taste were submitted to a 2×3 ANOVA, which revealed a significant interaction between healthiness of the muffin and the gendered nature of the packaging, $F(2, 135) = 18.49, p < .001$. We unpacked this interaction by comparing the effects of the type of packaging separately within the healthy muffin and unhealthy muffin conditions. Participants rated the actual taste of the "healthy" muffins in the feminine packaging ($M = 7.65, SD = 1.17$) as better than the same muffins in masculine packaging ($M = 4.92, SD = 2.78$), $t(45) = -4.42, p < .001, d = -1.32$, but not significantly better than the same muffins in neutral packaging ($M = 6.95, SD = 1.75$), $t(45) = 1.61, p = .11, d = .48$. Further, participants rated the taste of "healthy" muffins in masculine packaging as worse than the same muffins in neutral packaging, $t(135) = -2.96, p < .01, d = -.89$.

Strikingly, this pattern completely reversed in the "unhealthy" muffin condition. Participants rated the "unhealthy" muffins in the masculine packaging ($M = 7.65, SD = 0.96$) as tasting better than the same muffins in feminine packaging ($M = 5.62, SD = 2.27$), $t(48) = 3.84, p < .001, d = 1.11$, and neutral packaging ($M = 6.39, SD = 1.93$), $t(40) = 2.68, p < .05, d = .85$. The taste ratings of "unhealthy" muffins did not differ significantly between the neutral packaging and the feminine packaging conditions, $t(48) = -1.25, p = .22, d = -.36$.

Purchase Intentions

We also observed a significant interaction between the healthiness of the muffin and the gender of the packaging on purchase intentions, $F(2, 136) = 21.27, p < .001$. As before, we unpacked this interaction by comparing the effects of the packaging separately within the healthy muffin and unhealthy muffin conditions. Participants said that they would be more likely to purchase the healthy muffins in the feminine packaging ($M = 6.21, SD = 2.43$) compared to the healthy muffins in the masculine packaging ($M = 3.78, SD = 2.33$), $t(45) = -3.49, p < .01, d = -1.04$, or neutral packaging ($M = 4.87, SD = 2.46$), $t(45) = 1.88, p = .07, d = .56$. However, purchase intentions for the healthy muffins in masculine packaging did not differ significantly from the neutral packaging condition, $t(44) = -1.54, p = .13, d = -.46$.

As before, the reverse pattern emerged in the unhealthy muffins condition. Participants said that they were more likely to purchase the unhealthy muffins in the masculine packaging ($M = 6.87, SD = 2.06$) compared to the unhealthy muffins in the feminine packaging ($M = 3.23, d = .55$).

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$SD = 2.19$, $t(49) = 5.96$, $p < .001$, $d = 1.70$, or neutral packaging ($M = 4.71$, $SD = 2.15$), $t(40) = 3.30$, $p < .01$, $d = 1.04$. Finally, participants were significantly less likely to purchase the unhealthy muffins in feminine packaging than the same muffins in neutral packaging, $t(49) = -2.39$, $p < .05$, $d = -.68$.

766 Willingness to Pay

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We then analyzed how much participants were willing to pay (WTP) for a box of muffins, and again found a significant interaction between the healthiness of the muffin and the gendered nature of the packaging, $F(2, 135) = 19.54$, $p < .001$. Participants were willing to pay significantly more money for the healthy muffins in the feminine packaging ($M = \$5.73$, $SD = \$3.38$) compared to the healthy muffins in the masculine packaging ($M = \$2.72$, $SD = \$1.76$), $t(44) = -3.80$, $p < .001$, $d = -1.15$, or neutral packaging ($M = \$3.30$, $SD = \$1.26$), $t(44) = 3.24$, $p < .01$, $d = .98$. However, the price participants would pay for the healthy muffins did not differ significantly between the masculine packaging and the neutral packaging conditions, $t(44) = -1.30$, $p = .20$, $d = -.39$.

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Conversely, participants said that they would pay significantly more for the unhealthy muffins in the masculine packaging ($M = \$5.38$, $SD = \$2.72$) compared to the unhealthy muffins in the feminine packaging ($M = \$2.84$, $SD = \$1.78$), $t(49) = 4.02$, $p < .001$, $d = 1.15$, or neutral packaging ($M = \$2.72$, $SD = \$1.44$), $t(40) = 3.95$, $p < .001$, $d = 1.25$. The price participants would pay for the unhealthy muffins did not differ significantly between the feminine packaging and the neutral packaging conditions, $t(49) = .26$, $p = .80$, $d = .07$.

791 Evaluation of Packaging

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A similar interaction was also observed with regard to ratings of the packaging itself, $F(2, 136) = 12$, $p < .001$. For the “healthy” muffins, the feminine packaging ($M = 7.02$, $SD = 1.38$) was evaluated as significantly more appealing than the masculine packaging ($M = 4.40$, $SD = 2.64$), $t(45) = -4.29$, $p < .001$, $d = -1.28$, or the neutral packaging ($M = 5.11$, $SD = 2.19$), $t(45) = 3.60$, $p < .001$, $d = 1.07$. However, for the healthy muffins, ratings of the masculine packaging did not differ significantly from ratings of the neutral packaging, $t(44) = -.99$, $p = .33$, $d = -.30$.

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In contrast, for the “unhealthy” muffins, the masculine packaging ($M = 6.69$, $SD = 1.60$) was seen as significantly more appealing than the feminine packaging ($M = 5.45$, $SD = 2.17$), $t(49) = 2.23$, $p < .05$, $d = .64$, but not the neutral packaging ($M = 5.60$, $SD = 1.06$), $t(40) = 2.62$, $p < .05$, $d = .83$. For the unhealthy muffins, ratings of the packaging did not differ significantly between the feminine and the neutral packaging conditions, $t(49) = -.28$, $p = .78$, $d = -.08$.

Thus, across all dependent variables we observed the hypothesized interaction between the type of packaging

and the healthiness of the muffin, as well as the expected main effects of packaging within each healthiness condition. Further, within both the healthy and unhealthy muffin conditions the means in the masculine, neutral, and feminine packaging conditions generally patterned as expected, although means in the neutral packaging condition did not always differ significantly from the other two conditions.

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821 Participant Gender

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Not surprisingly, female participants generally expressed healthier food preferences than male participants. Participant gender significantly interacted with the healthy muffin manipulation to predict taste test evaluations, $F(1, 127) = 5.04$, $p < .05$, and willingness to pay, $F(1, 127) = 5.98$, $p < .05$, and marginally interacted with the healthiness manipulation to predict purchase intentions, $F(1, 128) = 3.01$, $p = .09$. Female participants had significantly higher taste ratings than male participants for muffins labeled as healthy ($M = 7.07$, $SD = 1.76$ vs. $M = 5.71$, $SD = 2.80$), $F(1, 67) = 6.17$, $p < .05$, $d = -.61$, although the parallel mean differences were nonsignificant for purchase intentions ($M = 5.21$, $SD = 2.30$ vs. $M = 4.67$, $SD = 2.99$), $F(1, 67) = .74$, $p = .39$, $d = -.21$, and willingness to pay ($M = 4.23$, $SD = 2.72$ vs. $M = 3.38$, $SD = 2.49$), $F(1, 67) = 1.67$, $p = .20$, $d = -.32$. In contrast, men had nonsignificantly higher taste ratings ($M = 6.60$, $SD = 2.15$ vs. $M = 6.27$, $SD = 1.93$), $F(1, 68) = .45$, $p = .50$, $d = .16$, nonsignificantly stronger purchase intentions ($M = 5.32$, $SD = 2.63$ vs. $M = 4.35$, $SD = 2.49$), $F(1, 69) = 2.55$, $p = .12$, $d = .38$, and were willing to pay marginally more money ($M = 4.11$, $SD = 2.80$ vs. $M = 3.17$, $SD = 1.78$), $F(1, 69) = 2.93$, $p = .09$, $d = .41$, than women for unhealthy muffins.

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Of much greater theoretical interest, participant gender did not moderate the effects of our experimental manipulations on taste test evaluations, $F(2, 127) = 1.11$, $p = .33$, purchase intentions, $F(2, 128) = 2.18$, $p = .12$, or willingness to pay, $F(2, 127) = .09$, $p = .92$. Table 2 displays the means and standard deviations for the dependent measures by participant gender and experimental condition.

853 Discussion

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In sum, across all four dependent measures we observed the predicted interaction between the healthiness of the muffin and the gendered nature of the packaging. When the packaging was stereotype congruent (i.e., feminine packaging for the healthy muffin and masculine packaging for the unhealthy muffin) participants rated the product as more attractive, reported stronger purchase intentions, and were willing to pay more money for it compared to when the product was stereotype incongruent (i.e., feminine-packaged unhealthy muffin or masculine-packaged healthy muffin). Moreover, whether the product was stereotype congruent or incongruent even impacted judgments of the product’s taste; participants rated the product as actually tasting better when the healthiness and the “gender”

Table 2. Means and standard deviations for each dependent variable by participant gender and experimental condition (Study 2). The study employed a 2 (healthy vs. unhealthy product) \times 3 (feminine, masculine, or neutral packaging) between-subjects design

	Taste test evaluation	Purchase intentions	Willingness to pay	Evaluation of packaging
Healthy packaging				
Male participants				
Feminine packaging	7.44 ($SD = 1.35$) <i>N</i> = 12	6.50 ($SD = 2.28$) <i>N</i> = 12	5.13 ($SD = 2.67$) <i>N</i> = 12	7.29 ($SD = 1.51$) <i>N</i> = 12
Masculine packaging	3.97 ($SD = 2.86$) <i>N</i> = 11	2.91 ($SD = 2.47$) <i>N</i> = 11	1.86 ($SD = 1.27$) <i>N</i> = 11	3.50 ($SD = 2.59$) <i>N</i> = 11
Neutral packaging	5.29 ($SD = 3.23$) <i>N</i> = 4	4.00 ($SD = 3.56$) <i>N</i> = 4	2.72 ($SD = 1.51$) <i>N</i> = 4	5.56 ($SD = 2.59$) <i>N</i> = 4
Female participants				
Feminine packaging	7.85 ($SD = .97$) <i>N</i> = 12	5.92 ($SD = 2.64$) <i>N</i> = 12	6.29 ($SD = 3.96$) <i>N</i> = 12	6.75 ($SD = 1.23$) <i>N</i> = 12
Masculine packaging	5.83 ($SD = 2.63$) <i>N</i> = 11	4.73 ($SD = 2.01$) <i>N</i> = 11	3.36 ($SD = 1.84$) <i>N</i> = 11	5.32 ($SD = 2.60$) <i>N</i> = 11
Neutral packaging	7.30 ($SD = 1.13$) <i>N</i> = 19	5.05 ($SD = 2.25$) <i>N</i> = 19	3.42 ($SD = 1.21$) <i>N</i> = 19	5.01 ($SD = 2.16$) <i>N</i> = 19
Unhealthy packaging				
Male participants				
Feminine packaging	5.82 ($SD = 2.79$) <i>N</i> = 11	4.27 ($SD = 2.80$) <i>N</i> = 11	3.68 ($SD = 2.12$) <i>N</i> = 11	6.32 ($SD = 2.30$) <i>N</i> = 11
Masculine packaging	7.70 ($SD = .95$) <i>N</i> = 10	7.00 ($SD = 2.40$) <i>N</i> = 10	5.84 ($SD = 3.45$) <i>N</i> = 10	6.88 ($SD = 1.61$) <i>N</i> = 10
Neutral packaging	6.28 ($SD = 2.01$) <i>N</i> = 10	4.80 ($SD = 1.93$) <i>N</i> = 10	2.84 ($SD = 1.95$) <i>N</i> = 10	5.68 ($SD = .96$) <i>N</i> = 10
Female participants				
Feminine packaging	5.32 ($SD = 1.89$) <i>N</i> = 18	2.72 ($SD = 1.53$) <i>N</i> = 18	2.43 ($SD = 1.38$) <i>N</i> = 18	4.72 ($SD = 1.77$) <i>N</i> = 18
Masculine packaging	7.61 ($SD = 1.02$) <i>N</i> = 11	6.73 ($SD = 1.79$) <i>N</i> = 11	4.95 ($SD = 1.91$) <i>N</i> = 11	6.52 ($SD = 1.64$) <i>N</i> = 11
Neutral packaging	6.48 ($SD = 1.95$) <i>N</i> = 11	4.64 ($SD = 2.42$) <i>N</i> = 11	2.61 ($SD = .83$) <i>N</i> = 11	5.52 ($SD = 1.18$) <i>N</i> = 11

868 matched compared to when they did not match.
 869 As expected, a funneled debriefing (Bargh & Chartrand,
 870 2000) revealed no evidence that participants were aware
 871 their evaluations had been influenced by the product
 872 packaging.

873 Study 3: Reactance Against Explicit 874 Appeals to Gender

875 Our final study examined the idea that consumers would
 876 react against comparatively more explicit appeals to gender
 877 stereotypes (Brehm, 1966; Brehm & Brehm, 1981). To test
 878 this hypothesis, we added a condition in which the packaging
 879 contained a blatantly gendered slogan (“The muffin for
 880 real men”). We hypothesized that an explicit gender appeal
 881 would reverse the schema congruity effect, especially
 882 among participants high in psychological reactance (Hong
 883 & Faedda, 1996; Hong & Page, 1989). Of further interest
 884 was whether male and female consumers would respond
 885 differently to an explicitly gendered slogan.

Participants and Design

One hundred fifty-seven adults (58 men, 97 women, and 2 participants who failed to report their gender; $M_{age} = 39.90$, $SD = 15.72$) were recruited from an online subject pool maintained by an East Coast university and assigned to one of four conditions in a 2 (healthy product vs. unhealthy product) \times 2 (implicit masculine appeal vs. explicit masculine appeal) between-subjects design. Eighty-one percent of our participants self-identified as White, 9% as Asian, 4% as Latino, 5% as Black, and 1% indicated “other.” Thirty-six percent of participants had a high school degree or less, 37% a college degree, 22% a master’s degree, and 5% doctoral degree. The average annual income for our sample was \$32,165 per year.

Materials and Procedure

Participants were told that they were participating in an online consumer survey and were presented with images of muffin boxes based on those from Study 2. As before, in the *unhealthy muffin condition* the brand label was

“Mega Muffin” and in the *healthy muffin condition* the brand label was “Health Muffin.” In the *implicit masculine appeal condition*, the packaging depicted men playing football in the background, just as in Study 2. In the *explicit masculine appeal condition*, the same football image was used but with the additional slogan “The Muffin for Real Men” included.

Next, all participants indicated how much they would be willing to pay for a box containing two dozen of the miniature muffins, and completed a 14-item individual-differences scale of psychological reactance (Hong & Faedda, 1996; Hong & Page, 1989). Participants responded to the scale by indicating their agreement with statements such as “Regulations trigger a sense of resistance in me,” “I find contradicting others stimulating,” and “I consider advice from others to be an intrusion,” on five-point Likert scales (1 = *strongly disagree*, 5 = *strongly agree*) ($\alpha = .87$).

Further included were self-report measures of participants’ goals to eat healthfully, limit caloric intake, and maintain an attractive appearance. The healthy eating measure consisted of three items: “I try my best to include only healthy ingredients in my meals,” “I eat healthy food whenever possible,” and “It is my goal to eat healthfully on a regularly basis” ($\alpha = .90$). The low-calorie measure consisted of the items: “I try to consume as little calories as possible,” “I strive to minimize my calorie intake every day,” and “I buy foods that are low in calories whenever possible” ($\alpha = .92$). Finally, the attractive appearance measure consisted of the items: “Maintaining an attractive appearance is an important goal of mine,” “I am willing to do anything to maintain an attractive appearance,” and “The idea of maintaining an attractive appearance is always in my mind” ($\alpha = .83$). Participants indicated their agreement or disagreement with all scale items on seven-point Likert scales (1 = *strongly disagree*, 7 = *strongly agree*).

Finally, participants reported demographic information including their age, ethnicity, education, income, and gender.

Results

Because our design included a continuous variable (individual differences in psychological reactance), we regressed willingness to pay on the implicitness manipulation, healthiness manipulation, reactance, the two-way interaction between the implicitness manipulation and the healthiness manipulation, the two-way interaction between the implicitness manipulation and reactance, the two-way interaction between healthiness manipulation and reactance, and finally the three-way interaction between the implicitness manipulation, the healthiness manipulation, and reactance. Results revealed a significant main effect of the implicitness manipulation (dummy coded: 1 = implicit, 0 = explicit), $\beta = 3.46$, $p = .02$, $\eta^2 = .03$, indicating that overall, participants were willing to pay more for a dozen muffins in the implicit appeal condition than in the explicit appeal condition. A marginally significant main effect of dispositional reactance also emerged ($\beta = -4.16$,

$p = .06$, $\eta^2 = .02$), suggesting that willingness to pay was negatively related to reactance. Furthermore, all three two-way interactions between the implicitness manipulation and the healthiness manipulation ($\beta = -4.12$, $p = .07$, $\eta^2 = .02$), between the implicitness manipulation and reactance ($\beta = 7.67$, $p < .01$, $\eta^2 = .05$), and between the healthiness manipulation and reactance ($\beta = 5.65$, $p = .05$, $\eta^2 = .02$) emerged as significant or marginally significant. However, all of these effects were further qualified by the hypothesized three-way interaction between the implicitness manipulation, healthiness manipulation (dummy coded: 1 = healthy, 0 = unhealthy), and individual differences in reactance ($\beta = -9.80$, $p = .02$, $\eta^2 = .04$).

We further decomposed this significant three-way interaction by whether the appeal to gender stereotypes in the packaging was comparatively implicit or explicit. In the implicit condition, a significant main effect of the healthiness manipulation emerged ($\beta = -4.80$, $p < .01$, $\eta^2 = .09$), indicating that participants in the implicit condition were willing to pay higher price for the unhealthy muffin than for the healthy muffin. This replicates the schema congruity pattern observed in Study 2: consumers were willing to pay more for an unhealthy muffin in masculine packaging (stereotype consistent) than a healthy muffin in masculine packaging (stereotype inconsistent). In addition, a significant main effect of reactance on price also emerged in the implicit condition ($\beta = 3.51$, $p = .04$, $\eta^2 = .05$), indicating that when the packaging implicitly appealed to gender stereotypes, consumers high in reactance were actually willing to pay *more* for the product.

In the explicit condition, a significant main effect of reactance on price likewise emerged ($\beta = -4.16$, $p = .04$, $\eta^2 = .06$), but in the opposite direction: consumers high in reactance were willing to pay *less* for the product when its packaging contained a blatant gender appeal. This main effect was qualified by the hypothesized two-way interaction between reactance and the healthiness manipulation ($\beta = 5.65$, $p = .03$, $\eta^2 = .06$), such that reactance was marginally negatively related to price in the unhealthy muffin condition ($\beta = -4.16$, $p = .07$, $\eta^2 = .08$) but not in the healthy muffin condition ($\beta = 1.48$, $p = .26$, $\eta^2 = .04$). This is effectively the reverse of the schema congruity pattern observed in Study 2 and in the implicit appeal condition of Study 3. Consumers high in psychological reactance responded negatively to masculine packaging for an unhealthy product that further included the explicit slogan “The muffin for real men.”

Participant Gender

There were no gender differences in reactance ($M_{male} = 3.11$, $SD = 0.62$, $M_{female} = 3.01$, $SD = 0.57$, on a seven-point scale), $F(1, 153) = 1.01$, $p = .32$, $d = .16$. In addition, participant gender did not interact with either the implicitness manipulation ($\beta = -4.71$, $p = .13$, $\eta^2 = .01$) or the healthiness manipulation ($\beta = -5.03$, $p = .15$, $\eta^2 = .01$), and there was no three-way interaction between gender and the two experimental manipulations

Table 3. Means and standard deviations for willingness to pay (WTP) by participant gender and experimental condition (Study 3). The study employed a 2 (healthy muffin vs. unhealthy muffin) \times 2 (implicitly vs. explicitly gendered packaging) between-subjects design

	Healthy packaging		Unhealthy packaging	
	Implicit appeal	Explicit appeal	Implicit appeal	Explicit appeal
Male participants	7.37 (<i>SD</i> = 3.90) <i>N</i> = 15	9.43 (<i>SD</i> = 6.23) <i>N</i> = 10	12.14 (<i>SD</i> = 10.33) <i>N</i> = 19	6.21 (<i>SD</i> = 6.51) <i>N</i> = 14
Female participants	6.05 (<i>SD</i> = 4.98) <i>N</i> = 20	6.41 (<i>SD</i> = 4.03) <i>N</i> = 22	9.88 (<i>SD</i> = 8.30) <i>N</i> = 27	8.73 (<i>SD</i> = 7.62) <i>N</i> = 28

($\beta = 5.85$, $p = .22$, $\eta^2 = .01$), or four-way interaction between participant gender, the experimental manipulations, and psychological reactance ($\beta = 7.60$, $p = .51$, $\eta^2 = .002$). Table 3 displays the means and standard deviations for willingness to pay by participant gender and experimental condition.

Self-Reported Goals

Correlational analyses revealed modest correlations between the goals to eat healthfully and consume few calories ($r = .30$, $p < .001$), between eating healthfully and maintaining an attractive appearance ($r = .33$, $p < .001$), and between consuming few calories and maintaining an attractive appearance ($r = .51$, $p < .001$). Therefore these were treated as distinct variables for our moderator analyses.

Regression analyses revealed that participants' goals to eat healthfully did not have a significant main effect on the dependent variable of willingness to pay ($\beta = .31$, $p = .73$, $\eta^2 = .001$), and further did not interact with either the implicitness manipulation ($\beta = -.30$, $p = .78$, $\eta^2 = .0005$) or the healthiness manipulation ($\beta = -.59$, $p = .60$, $\eta^2 = .002$). Further, there was no three-way interaction between the goal to eat healthfully and the experimental manipulations ($\beta = -.20$, $p = .89$, $\eta^2 = .0001$), or four-way interaction between the goal to eat healthfully, the experimental manipulations, and psychological reactance ($\beta = -2.02$, $p = .46$, $\eta^2 = .003$).

Similar regression analyses were conducted to examine the effects of the goal to eat fewer calories on willingness to pay for the muffins. Results suggested that the goal to eat fewer calories did not have a significant main effect on the dependent variable ($\beta = .55$, $p = .28$, $\eta^2 = .01$), nor did it interact with the implicitness ($\beta = -.74$, $p = .35$, $\eta^2 = .01$) or healthiness manipulations ($\beta = .07$, $p = .93$, $\eta^2 = 0$). Further, the three-way interaction between the experimental manipulations and the goal to eat fewer calories ($\beta = -.59$, $p = .59$, $\eta^2 = .002$) and the four-way interaction between the experimental manipulations, the goal to eat fewer calories, and psychological reactance ($\beta = -1.00$, $p = .61$, $\eta^2 = .002$) were not significant.

Finally, we examined potential effects of the goal to maintain attractive appearance. Results suggested that the goal to maintain attractive appearance did not have a

significant main effect on willingness to pay for the muffins ($\beta = .43$, $p = .51$, $\eta^2 = .003$), and did not interact with the implicitness manipulation ($\beta = -1.18$, $p = .17$, $\eta^2 = .01$) or the healthiness manipulation ($\beta = -.03$, $p = .97$, $\eta^2 = 0$). In addition, the three-way interaction between the experimental manipulations and the goal to maintain an attractive appearance was not significant ($\beta = .40$, $p = .75$, $\eta^2 = .0006$), and neither was the four-way interaction between the experimental manipulations, the goal to maintain attractive appearance, and psychological reactance ($\beta = .69$, $p = .77$, $\eta^2 = .0005$).

Discussion

As expected, packaging that explicitly appealed to gender ("The muffin for real men") reversed the schema congruity effect observed when comparatively more subtle packaging was employed. Further, this reversal effect in the explicit gender appeal condition was driven by participants who scored high on a scale of psychological reactance (Hong & Faadda, 1996; Hong & Page, 1989), and high-reactance participants did *not* respond negatively to a comparatively more implicit gender appeal which paralleled that in Study 2. This is consistent with the idea that the influence of schema congruent packaging on consumer evaluations found in Study 2 and in the parallel conditions in Study 3 occurs implicitly. Finally, although psychological reactance emerged as a theoretically predicted moderator, self-report measures of participants' goals to eat healthfully, consume few calories, and maintain attractive appearance did not moderate the effects of the experimental manipulations, and (as in Studies 1 and 2) neither did participant gender.

Some prior work has found that reactance can occur implicitly as well as explicitly (Chartrand, Dalton, & Fitzsimons, 2007). In one especially fascinating study, Chartrand et al. found that subtly priming the name of a significant other who nagged them to work hard led participants to put significantly *less* effort into an academic task. Importantly, however, the present Study 3 used an explicit manipulation to elicit reactance, specifically a blatantly gendered advertising appeal ("The muffin for real men"), and further demonstrated moderation by consciously self-reported reactance. This is consistent with the idea that our study's blatant gender appeal activated explicit reactance in participants.

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General Discussion

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The goal of the present studies was to examine the effects of experimentally activating gender stereotypes on food preferences. Results indicated that subtly activated gender stereotypes do in fact influence food choices, both through people's stated preferences (Study 1) as well as behavioral outcomes (Study 2). In Study 1, priming masculinity caused both men and women to prefer less healthy foods, while priming femininity caused both men and women to prefer more healthy foods. Although previous work has established that people believe that women are more likely to prefer healthy foods than men and vice versa, the present studies are (to our knowledge) the first to demonstrate that merely activating the concepts of femininity or masculinity (via an unobtrusive priming task) can cause both men and women to report a preference for either unhealthy or healthy foods.

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Study 2 further demonstrated that food products whose packaging is consistent with gender stereotypes are preferred to food products that are inconsistent with those stereotypes. Drawing on past research on schema congruity, we used a method high in ecological validity (an ostensible taste test for a new product) and found that food products whose packaging was stereotype consistent (masculinity and unhealthiness, femininity and healthiness) were preferred to food products that were stereotype inconsistent. In fact, both male and female participants preferred stereotype-congruent products to stereotype-incongruent products; they rated the identical product as more appealing, said that they would be more likely to purchase it, said that they would pay money for it, and even rated the product as tasting better when the healthiness and the "gender" of the packaging matched compared to when they did not match. Such a result is particularly striking given that the exact same muffin was evaluated in all conditions – all that differed was the packaging.

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Notably, even though men and women tended to show different food preferences on average, activating stereotypes related to masculinity and femininity had similar effects for both male and female participants. Men were just as likely as women to report an increase in their preference for healthy foods when primed with femininity and women were just as likely as men to report an increase in their preference for unhealthy foods when primed with masculinity (Study 1 and the supplementary replication study). Further, both men and women preferred unhealthy foods with masculine packaging and healthy foods with feminine packaging (Study 2). This is consistent with the hypothesis that cultural stereotypes implicitly shape food preferences regardless of the person's own gender, and inconsistent with a framework that relies on the alignment between personal identity and values and the activated schema (Allen et al., 2008). Further consistent with an implicit social cognition account, funneled debriefings revealed no evidence participants were aware of the influence of either the gender primes (Study 1) or the gendered packaging (Study 2), and increasing the explicitness with which the packaging appealed to gender stereotypes reversed the schema

congruity effect among consumers high in self-reported psychological reactance (Study 3).

One important avenue for future research is potential cross-cultural differences in the observed effects. Both gender stereotypes (Glick et al., 2000, 2004; Nosek et al., 2009) and norms and attitudes related to obesity (Anderson-Fye, 2004; Becker, 1995; Brewis, Wutich, Falletta-Cowden, & Rodriguez-Soto, 2011; Marini et al., 2012; Popenoe, 2004; Sobo, 1994) exhibit a great deal of cultural variability. Thus, what is stereotype-consistent or schema-congruent may be very different in a society where malnutrition is more common or gender roles less differentiated than in the United States. At the same time, people from cultures or subcultures that place less emphasis on individual self-determination (Henrich, Heine, & Norenzayan, 2010; Markus & Kitayama, 1991; Snibbe & Markus, 2005) may not consciously react against product packaging that explicitly appeals to common social stereotypes.

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Conclusion

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These effects highlight the power of cultural stereotypes to implicitly shape food preferences. Even though men tend to exhibit a preference for relatively unhealthy foods and women for healthy foods, here we demonstrate that unobtrusively activating gender concepts (masculinity or femininity) via either a subtle priming manipulation (Study 1) or a food's packaging (Study 2) leads both male and female participants to express food preferences that are in accordance with those cultural stereotypes. Illustrating that subtle influence attempts can sometimes be more powerful than blatant ones, adding an explicitly gendered slogan reversed the effects of stereotype-consistent packaging, an effect driven by participants high in individual differences in psychological reactance (Study 3). These findings have a number of important implications for policy in highlighting the ways in which appealing to cultural beliefs can shape food choices.

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