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ORIGINAL PAPER

Determinants and Consequences of Female Attractiveness and Sexiness: Realistic Tests with Restaurant Waitresses

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Abstract Waitresses completed an on-line survey about their physical characteristics, self-perceived attractiveness and sexiness, and average tips. The waitresses' self-rated physical attractiveness increased with their breast sizes and decreased with their ages, waist-to-hip ratios, and body sizes. Similar effects were observed on self-rated sexiness, with the exception of age, which varied with self-rated sexiness in a negative, quadratic relationship rather than a linear one. Moreover, the waitresses' tips varied with age in a negative, quadratic relationship, increased with breast size, increased with having blond hair, and decreased with body size. These findings, which are discussed from an evolutionary perspective, make several contributions to the literature on female physical attractiveness. First, they replicate some previous findings regarding the determinants of female physical attractiveness using a larger, more diverse, and more ecologically valid set of stimuli than has been studied before. Second, they provide needed evidence that some of those determinants of female beauty affect interpersonal behaviors as well as attractiveness ratings. Finally, they indicate that some determinants of female physical attractiveness do not have the same effects on overt interpersonal behavior (such as tipping) that they have on attractiveness ratings. This latter contribution highlights the need for more ecologically valid tests of evolutionary theories about the determinants and consequences of female beauty.

Keywords Attractiveness · Sexiness · Tipping · Evolutionary theory

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Introduction

Evolutionary theory suggests that men should be attracted to those women whose physical characteristics signal the ability to conceive and deliver offspring (Symons, 1995). Among those physical characteristics theorized to reflect female fecundity and, therefore, to enhance women's physical attractiveness to men are age (Buss, 1989; Symons, 1995), breast size (Gallup, 1982), hair color (Cunningham, Druen, & Barbee, 1997; Jones, 1996), waist-to-hip ratio (WHR) (Singh, 1993), and body weight relative to height (Tovee, Maisey, Emery, & Cornelissen, 1999). Consistent with this theorizing, researchers have found that: (1) younger women are perceived as more attractive than older women (Jackson, 1992); (2) women with moderately large breasts are perceived as more attractive than those with either small or extremely large breasts (Jones, 1996; Tantleff-Dunn, 2001, 2002); (3) blonds are perceived by men of European descent as more attractive than brunettes (Cunningham et al., 1997; Feinman & Gill, 1978; Jones, 1996; Miller, 2006); (4) women with low WHRs of around .70 are perceived as more attractive than those with higher WHRs (Henss, 2000; Marlowe, Apicella, & Reed, 2005; Singh, 2004; Weeden & Sabini, 2005), and (5) slender women with a body mass index (BMI) around 20 are perceived as more attractive than women with smaller and larger bodies (Singh, 2004; Smith, Cornelissen, & Tovee, 2007; Swami, Capario, Tovee, & Furnham, 2006; Weeden & Sabini, 2005).

Although research on the physical features associated with female physical attractiveness has involved many different cultures and has generally been supportive of evolutionary theories (cf. Jones, 1996; Singh, 2004), this research has been criticized on methodological grounds (Henss, 2000; Voracek & Fisher, 2006; Wilson, Tripp, & Boland, 2005). First, the stimuli used in this research lack

ecological validity. Often those stimuli are line drawings or photographs that depict the women in artificial ways, i.e., with faces and other physical details obscured and in unusual poses and states of dress (Voracek & Fisher, 2006). In addition, relatively few women are depicted, which limits generalizability (Henss, 2000). Furthermore, these stimuli generally depict the female form from one perspective in two-dimensional space. Three-dimensional views of the female form are rare in this research and images of the female form in motion are even rarer (Voracek & Fisher, 2006). There is some evidence that preferences for specific aspects of female anatomy vary depending on whether front or profile views are depicted (Marlowe et al., 2005) and on whether models are depicted in still photos or moving videos (Voracek & Fisher, 2006). Thus, there is a need for research to examine the body characteristics associated with female physical attractiveness using larger numbers of women depicted in more natural, three-dimensional and dynamic ways.

Second, the dependent variables typically employed are too limited (Voracek & Fisher, 2006). Usually, researchers examine the effects of body characteristics on ratings of attractiveness, sexiness, healthiness, and other variables. These ratings are valid measures of theoretically relevant constructs, so there is nothing wrong with their use. However, it is not clear how well the effects of some physical characteristics on rated attractiveness translate to more overt courtship and mating behaviors as predicted by evolutionary theory. Researchers have found predicted effects of rated physical attractiveness, age, and body weight on men's responses to women in the context of personal ads and dating services (Campos, Otta, & Siqueira, 2002; Kurzban & Weeden, 2005; Pawlowski & Koziel, 2002), but evidence for behavioral effects of breast size, hair color, and waist-to-hip ratio is less frequent. It is possible that the effects of these physical characteristics are strong enough to impact attractiveness ratings but not more consequential, overt behaviors. For example, while researchers have found that men rate blonds as more attractive than brunettes (Cunningham et al., 1997; Feinman & Gill, 1978; Jones, 1996; Miller, 2006), other researchers have failed to find hair color effects on men's helping behavior toward women (Juni & Roth, 1985) or their responses to women's personal ads (Lynn & Shurgot, 1984). Thus, there is a need for research to examine the effects of breast size, hair color, and waist-to-hip ratio on behaviors more overt and consequential than simple ratings.

Current Study

The present study addressed the need for more ecologically valid tests of evolutionary theories about the determinants of female physical attractiveness. Specifically, it examined the effects of restaurant waitresses' age, breast size, hair color, WHR, and BMI on self-rated attractiveness and sexiness and on the average tips they received from customers. The use of tipping as a dependent variable represents a gift of resources that people bestow more generously on servers of the opposite sex (Conlin, Lynn, & O'Donahue, 2003; Lynn & McCall, 2000) and on attractive waitresses (Lynn & Simons, 2000). Since evolutionary theory on mate attraction suggests that men use resource displays and gifts to woo women (Buss, 1988), tipping is both a theoretically and empirically relevant response to female physical attractiveness.

Methods

Participants

The population for this study consisted of adult women (18 years and older) who had worked as restaurant waitresses in the United States within the past year. Members of this population were recruited for an online survey by asking a blogger popular among restaurant servers, i.e., the "waiter" at www.waiterrant.net, to post a link to the survey and ask his female readers who waited tables to complete the survey. In addition, I posted a link to the survey on my personal website and had a colleague recruit participants from among friends and students. People outside the population of interest who responded to the survey were identified with the use of several screening questions and their data were excluded from the current analysis. A total of 482 woman from the population of interest completed the survey. However, many participants gave outlying responses of questionable validity, so the number of observations retained for analysis was reduced to 432 (see below for more details about outlier identification). In addition, many participants failed to answer every question, so the number of observations in the analyses below varied.

Of the 374 observations in the largest regression analysis, 245 were from current waitresses and 129 were from former waitresses who had waited tables within the past year. The former group answered questions about their tips and jobs at their current place of employment while the latter group answered questions about their tips and jobs at their last place of employment as servers. All participants answered questions about their current appearance.

Measures

The dependent variables were self-rated attractiveness, self-rated sexiness, and percent tip. The principle independent variables were self-reported age, breast size, blond hair, WHR and BMI. The control variables were current status as a server, region of residence, restaurant expensiveness, marital status, and uniform sexiness.

Attractiveness

Participants were asked: "On a scale from 1 to 10 (with 10 being best), how would you rate your overall physical attractiveness?"

Sexiness

Participants were asked: "On a scale from 1 to 10 (with 10 being best), how would you rate your overall sexiness?"

Percent Tip

Participants were asked: "Approximately what is the average tip percentage you receive(d) from your customers at this place?" The place referred to in this question was the participant's current or most recent place of employment as a waitress.

Age

Participants were asked: "In what year were you born?" Answers to this question were used to calculate the participants' ages in years.

Breast Size

Participants were asked "What is your bra size?" Answers to this question were dummy coded A = 1, B = 2, C = 3, D = 4, and E and larger = 5. Double D cups treated as D and triple D cups were treated as E and larger.

Blond

Participants were asked: "What color is your hair?" The response options were "blond," "brown," "red," and "other." This variable was dummy coded as blond = 1 or not = 0.

WHR

Participants were asked: "How big around is your waist?" In addition, they were asked: "How big around are your hips?" They were instructed to answer these questions in inches and to use a tape measure to find the distance "around the smallest area of your waist" and "around the largest area of your hips." The answers to these questions were used to calculate the participants' waist-to-hip ratios.

BMI

Participants were asked: "How tall are you?" and "How much do you weigh?" They were instructed to answer these questions in "feet-inches" and "lbs" respectively. Answers were used to calculate body mass index.

Current Server

Participants were asked: "When were you last employed as a waitress?" The response options were "Currently (answer questions 2–9 about your CURRENT job)," "Within the past year (answer questions 2–9 about your LAST job)", "Over one year ago (please exit the survey)," and "Never (please exit the survey)." Answers to this question were dummy coded as 1 = current waitress and 0 = waitress within the past year.

Region

Participants were asked: "Where do (did) you work as a waiter or waitress?" They were instructed to answer with "the name of establishment," "city," and "state." The state information was used to code which of four census bureau designated regions (e.g., the west, the south, the midwest, and the north-east) the participant worked in and this variable was dummy coded.

Restaurant Expensiveness

Participants were asked: "Approximately what is the average check size per person at this place?"

Marital Status

Participants were asked: "Are you currently married?" Answers were dummy coded 1 = "yes" and 0 = "no."

Uniform Sexiness

"On a scale from 1 to 10 (with 10 being best), how would you rate the sexiness of the server uniform at this place?"

Results

Identification and Treatment of Outliers

An examination of the data identified many responses that were not believable. For example, one person reported having a 12-inch waist and another reported having a 12-inch hip circumference. Given our inability to control or identify who responded to this on-line survey and the likelihood that its mildly scatological nature attracted some individuals who did not take the survey seriously, we eliminated those responses that seemed illogical or otherwise far-fetched. These outliers were detected in a three step process. First, the data were examined for clearly impossible values. Two observations with values for bill size of $1.00 or less were dropped, as were six observations with values for waist circumference of 20 inches or less, two observations with

values for hip circumference of 20 inches or less, two observations with values for bra size of 76D and 2B, and one observation with a value for weight of 2,250 pounds. Second, standardized scores were obtained for percent tip, bill size, BMI, and WHR and 29 observations that exceeded three SD from the mean on one or more of these variables were dropped. Finally, in order to identify outlying combinations of weight, height, waist and hip circumference, BMI was regressed on waist and hip circumference. This analysis identified eight observations whose residuals were over three SD from the mean and these multivariate outliers were also dropped from the analyses. Note that the probability of getting a value ≥3 SD from the mean by chance alone is .0027. With 469 observations on four variables and 440 observations on one residual, there should have been only 6.25 outliers in the variables examined. In fact, 39 outliers were identified—over five times as many as expected. This confirmed that many responses were unrealistic and that some effort to detect and eliminate bogus responses was needed. Descriptive statistics of the variables for the final sample are presented in Table 1.

Multivariate Analyses

Each dependent variable was analyzed using hierarchical regression. First, the dependent variables were regressed on all the control and independent variables. Then, quadratic terms for age, breast size, WHR, and BMI were added to the regression models. Finally, interactions of the independent variables with BMI were added to the regression models. The results are summarized in Table 2 and described below. One-tailed p-values are reported for the main effects below because directional effects were expected and tested.

Table 1 Descriptive statistics

	N	*M*	*SD*	Range
Restaurant expensiveness	431	24.83	15.59	5–80
Uniform rating	430	3.50	2.27	1–10
Age (years)	432	26.27	7.19	18–64
BMI	420	22.89	3.66	12.91–36.58
Height (inches)	423	65.30	2.78	56–74
Weight (pounds)	429	138.98	24.36	90–250
WHR	399	.80	.08	.57–1.05
Waist (inches)	412	29.60	4.10	22–44
Hips (inches)	401	36.98	3.97	26–52
Breast size (bra cup size)	419	2.85	1.01	1–5
Attractiveness rating	429	7.32	1.31	1–10
Sexiness rating	427	6.79	1.68	1–10
Percent Tip	431	17.78	3.45	8–30
Blond	430	24%		0–1
Current server	432	65%		0–1
West	432	13%		0–1
South	432	34%		0–1
Midwest	432	23%		0–1
Married	426	19%		0–1

Age

Self-rated attractiveness declined linearly with age, $B = -.03$, $t(361) = -3.34$, $p < .001$. However, age did not have a linear effect on self-rated sexiness $B = .00$, $t(360) = .25$ or percent tip, $B = -.00$, $t(360) = -.02$. Rather significant, negative quadratic terms indicated that self-rated sexiness, $B = -.004$, $t(356) = -3.53$, $p < .001$, and percent tip, $B = -.006$, $t(356) = -2.48$, $p < .02$, first increased and then decreased with age. Self-rated sexiness reached its peak value among women 31–35 while percent tip reached its peak value among women 36–40 (see Table 3).

Breast Size

Self-rated physical attractiveness, $B = .29$, $t(361) = 4.74$, $p < .001$, sexiness, $B = .43$, $t(360) = 5.06$, $p < .001$, and percent tip, $B = .46$, $t(360) = 2.50$, $p < .01$), all increased linearly with waitresses' breast sizes (see Table 3). The breast size effect on self-rated attractiveness was qualified by a significant interaction with BMI, $B = .05$, $t(353) = 2.50$, $p < .02$, indicating that the positive effect of breast size was greater for large women than for small women.

Hair Color

Self-rated attractiveness, $B = .09$, $t(361) = .69$, and sexiness, $B = .08$, $t(360) = .46$, were unaffected by hair color, but blonds reported receiving larger percentage tips, $B = 1.08$, $t(360) = 2.70$, $p < .005$, than did waitresses with other hair colors.

Waist-to-Hip Ratio

Self-rated attractiveness, $B = -1.49$, $t(361) = -2.03$, $p < .04$ and sexiness, $B = -1.65$, $t(360) = -1.65$, $p < .05$, declined with increasing WHR (see Table 3). However, WHR did not significantly affect percent tip, $B = -.04$, $t(360) = -.02$.

Body Mass

Self-rated attractiveness, $B = -.16$, $t(361) = -8.87$, $p < .001$ and sexiness, $B = -.18$, $t(360) = -7.11$, $p < .001$, as well as percent tip ($B = -.10$, t (360) $= -1.82$, one-tailed $p < .035$) all declined linearly with increases in BMI (see

Table 2 Coefficients and standard errors from regression analyses

	Attractiveness ($n = 374$)		Sexiness ($n = 373$)		Percent tip ($n = 373$)	
	B	*SE*	*B*	*SE*	*B*	*SE*
Step 1						
Intercept	12.06***	.67	10.66***	.92	16.90***	2.00
West	.17	.19	.35	.26	−1.39*	.56
South	−.17	.15	−.13	.20	.15	.44
Midwest	−.26	.16	−.24	.22	−.63	.47
Restaurant expensiveness	.00	.00	.00	.01	.05***	.01
Current server	−.17	.12	−.11	.17	.38	.36
Uniform	.07*	.03	.08*	.04	.13	.08
Married	−.12	.16	−.03	.23	−.12	.49
Age	−.03**	.01	.00	.01	−.00	.03
Breast size	.29***	.06	.43***	.09	.46*	.18
Blond	.09	.13	.08	.18	1.08**	.40
WHR	−1.49*	.73	−1.65	1.00	−.04	2.18
BMI	−.16***	.02	−.18***	.03	−.10	.05
R^2	.32***		.22***		.14***	
Step 2						
Age^2	−.00	.00	−.00**	.00	−.01*	.00
Breast size^2	.07	.06	−.01	.08	.18	.17
WHR^2	−13.10	6.93	−16.51	9.40	−11.91	20.65
BMI^2	−.00	.00	−.00	.00	−.00	.01
ΔR^2	.02		.03*		.02	
Step 3						
BMI × age	.00	.00	.01	.00	.00	.01
BMI × breast size	.05*	.02	.03	.03	−.03	.05
BMI × blond	−.04	.04	−.05	.06	.23	.12
BMI × WHR	−.26	.21	−.15	.28	.77	.63
ΔR^2	.02		.01		.02	

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3). In addition, as previously mentioned, BMI interacted with breast size to affect self-rated attractiveness.

Discussion

Self-Reported Attractiveness

The results of this study indicated that waitresses' self-rated physical attractiveness increased with their breast sizes and decreased with their ages, waist-to-hip ratios, and body sizes. In general, these results replicate previous research and extend those earlier findings by demonstrating that the effects of these body characteristics on female physical attractiveness generalize to a larger, more diverse, and more ecologically valid set of stimuli than has been studied before. However, the main effects of breast size and hair color failed to replicate previous research and support theoretically based expectations.

Previous studies have found that men and women perceive moderately large breasts as more attractive than either smaller or larger breasts (Jones, 1996; Tantleff-Dunn, 2001, 2002). Moderately large breasts signal sexual maturity more than small breasts and are more likely than very large breasts to be firm and perky, so these findings are consistent with the idea that developed, nulliparous breasts are signs of fecundity that men have been selected to find attractive (Symons, 1995). The linear effect of breast size in this study is at odds with this theory and research. It is possible that many of the large breasted women in this study had breast implants, so that their breasts appeared firm and perky despite their size. Unfortunately, the survey contained no questions that assessed this possibility. Alternatively, breast size may simply be a more important determinant of female attractiveness than is breast shape. Previous research may have failed to find linear effects of breast size on female attractiveness because it tended to manipulate breast size on an otherwise constant female figure and the largest breast size may have seemed

Table 3 Means and *SD* of residual values for each dependent variable by age, bra size, WHR and BMI categories[a]

	Self-rated attractiveness			Self-rated sexiness			Average percent tip		
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Age									
≤20	63	.05	.87	63	−.11	1.39	63	−.46	3.51
21–25	173	.14	1.01	172	.01	1.36	173	.09	3.36
26–30	68	−.17	1.05	68	−.11	1.42	68	.09	2.99
31–35	27	−.07	.86	27	.38	1.74	27	.19	2.38
36–40	23	−.35	1.48	23	.18	1.72	22	.25	2.98
≥41	20	−.32	1.87	20	−.03	2.07	20	−.13	2.91
Bra size									
A and smaller	36	−.31	1.01	36	−.61	1.36	36	−.37	3.19
B	109	−.22	1.10	109	−.26	1.61	109	−.38	3.21
C	112	.01	1.12	112	.04	1.40	112	−.00	3.26
D and DD	111	.25	1.04	111	.43	1.37	110	.36	3.14
DDD and larger	6	1.04	1.11	5	.25	2.26	6	2.18	2.95
WHR[b]									
≤.60	5	.04	.91	5	−.22	1.07	5	.16	1.43
.70	95	.11	.92	95	.21	1.22	94	.05	3.04
.8	173	.06	1.08	172	.04	1.44	173	.08	3.39
.9	89	−.18	1.22	89	−.13	1.72	89	.15	3.12
≥1.0	12	−.58	1.08	12	−.63	1.27	12	−.52	2.28
BMI[b]									
≤18	21	.40	1.33	21	.43	1.62	21	.81	2.37
19	36	.38	.82	36	.49	1.41	36	−.00	2.85
20	37	.26	1.08	37	.34	1.34	36	.48	3.21
21	57	.32	.96	57	.45	1.36	57	.34	3.58
22	64	.16	.94	64	.14	1.21	64	−.07	3.09
23	36	.11	.97	35	.06	1.20	36	.12	2.87
24	27	−.36	1.00	27	−.43	1.64	27	−.52	2.98
25	26	−.22	1.59	26	−.64	1.83	26	−.65	4.00
26	17	−.23	1.18	17	−.29	1.84	17	−.72	2.95
27	22	−.38	1.01	22	−.16	1.76	22	−.64	2.53
≥28	31	−1.24	1.56	31	−1.16	1.90	31	−.33	3.98

[a] From analyses regressing each dependent variable on the control variables, hair color, and the linear and quadratic effects of the other independent variables (i.e., age, breast size, WHR and BMI) not including the independent variable whose levels the mean residuals are reported by

[b] Rounded to nearest tenth

unnaturally disproportionate to body size. In contrast, the current study used naturally occurring variations in breast size as they co-varied with body size, so large breasts may not have seemed so disproportionate. Consistent with this explanation, breast size interacted with BMI such that the linear effects of breast size on self-rated attractiveness were greater among women with larger bodies.

Second, previous research had also found that men find blonds more attractive than women with other hair colors (Cunningham et al., 1997; Feinman & Gill, 1978; Jones, 1996; Miller, 2006). However, the blond waitresses in this study did not perceive themselves to be more attractive than the waitresses with other hair colors. It is possible that hair color preference may be sex related. The existing research on the effects of women's hair color on rated attractiveness has used men as subjects. Women find dark hair color more attractive than blond hair in males (Feinman & Gill, 1978), so perhaps women prefer dark hair in females as well. However, 24% of the current sample of waitresses reported being blond, which is much larger than the 14% of a similar sample of U.S. waiters who reported being blond in another unpublished online survey (Lynn, 2007). Thus, it is clear that many of the waitresses in the current study dyed their hair blond. This disproportionate self-selection into the blond hair group is inconsistent with the idea that women prefer dark hair over blond hair in females (unless women are going against their own preferences to attract men), but it could explain the weak relationship between hair color and self-rated attractiveness. If waitresses did use hair dyes to self-select into the hair color group they considered most

attractive, then that self-selection would attenuate any effects of hair color on self-reported attractiveness.

Self-Reported Sexiness

The current findings regarding self-rated sexiness parallel those for self-rated attractiveness with the exception of the main effect of age and the interaction of BMI with breast size. Although older women considered themselves less attractive than did younger women, they did not consider themselves less sexy. Women's sexual desire peaks in their early to mid-30s (Schmitt et al., 2002) and 85% of the waitresses in this study were under 35 years old, so the effects of increased sexual desire may have offset the negative effects of reduced self-perceived attractiveness on self-ratings of sexiness among the "older" women in this sample. Consistent with this possibility, there was a significant negative quadratic effect of age on self-rated sexiness with the peak ratings occurring among 31–35 year olds (see Table 3).

The interaction of BMI with breast size that significantly affected self-rated attractiveness did not have significant effects on self-rated sexiness. However, the interaction involving self-rated sexiness was in the same direction as the interaction involving attractiveness ratings. Furthermore, the interaction effect on self-rated attractiveness was modest in size and the statistical power of interactions tested with observational field data is very low (McClelland & Judd, 1993), so the failure to replicate that interaction with self-rated sexiness as the dependent variable may simply reflect a lack of statistical power.

Average Tip Percentage

The results of this study also indicated that waitresses in their 30's and those with large breasts, blond hair, and/or slender bodies received larger average tips than their counterparts without these characteristics. The tip data obtained in this study were the waitresses' reports of their average tips from all customers. Waitresses were not asked more specifically about their average tips from male customers, because it seemed likely that servers pay more attention to, and are able to more accurately report, their overall tip percentage than their tip percentage from specific groups. However, there are no reasons to believe that women's ages, body sizes, breast sizes, and hair colors have similar but stronger effects on the tips of female customers than on the tips of male customers. If anything, sexual competition and jealousy may lead women to tip attractive waitresses less than unattractive ones. Thus, the current measure of average tips from all customers provides a conservative test of the evolutionary theory previously described.

There is already substantial evidence that age and body size affect interpersonal behavior as well as rated attractiveness (Campos et al., 2002; Kurzban & Weeden, 2005; Lynn & Shurgot, 1984; Pawlowski & Koziel, 2002), but little research has demonstrated effects of breast size and/or hair color on interpersonal behavior (for a recent and rare empirical article on the effects of women's breast size on men's behavior, see Gueguen, 2007). Thus, the effects of breast size and hair color on tips in this study are particularly important as they provide much needed evidence that these determinants of female physical beauty affect more than ratings of attractiveness. Specifically, they support evolutionary theories of mate selection (Geary et al., 2004) and attraction (Buss, 1988), which together suggest that the determinants of female physical attractiveness should also affect gift giving and other courtship and mating behaviors.

Although the tipping results of this study conceptually replicated and extended some findings from previous research on female physical attractiveness, they failed to replicate and extend other findings. In particular, the quadratic effect of age on tips differs from the linear effects of age on date selection observed in other studies (Campos et al., 2002; Kurzban & Weeden, 2005; Pawlowski & Koziel, 2002) and the null effects of WHR on tips differs from the linear effects on attractiveness ratings observed in other studies (Henss, 2000; Marlowe et al., 2005; Singh, 2004; Weeden & Sabini, 2005) including this one.

Previous research has found that female attractiveness declines with age (Jackson, 1992) and that effect was replicated in this study. Based on these findings and evolutionary theory, which suggests that men should be most attracted to women in their teens for long-term relationships and to women in their twenties for short-term relationships (Buss, 1989), a negative relationship between age and tips was expected. However, tips did not decline with age. Instead, tips were quadratically related to age with the largest tips going to women in their thirties (see Table 3). Perhaps the male restaurant customers were most attracted to the waitresses in their late teens and early twenties as expected, but tipped the waitresses who were in their thirties more than those who were younger because they thought they had a better chance of picking-up the older waitresses. Alternatively, the majority of the male customers in this study, whose average age was probably greater than 35 years old, may have been most attracted to waitresses in their thirties. This later possibility, although inconsistent with a simplistic view of evolutionary theory, is consistent with a more sophisticated view of evolutionary theory advanced by Kenrick and Keefe (1992). Specifically, they argue that natural selection would have favored both a male preference for young women and a male preference for women who are similar to the self. These competing preferences mean that a man's ideal age in a woman increases as he ages, but does not increase as fast as his own age. In other words, as men age, they prefer women increasing younger than themselves, but nonetheless prefer increasingly older

women in an absolute sense. Given that the median age in the U.S. is 35 years old (U.S. Census Bureau, 2000) and that median age of paying restaurant customers is almost certainly even older, Kenrick and Keefe's theory suggests that most of the men is this study may have preferred women in their thirties, which is the age group among waitresses that received the largest tips.

Previous research has also found a negative effect of WHR on ratings of female attractiveness and that finding was replicated in this study. However, WHR was unrelated to tips in this study. Since evolutionary theory (Buss, 1988) and previous research (Lynn & Simons, 2000) both suggest that men should tip attractive women more than less attractive women, the failure to find a WHR effect on tipping is puzzling. Perhaps the effects of WHR on perceptions of physical attractiveness are too small to affect more overt behaviors. In that case, the evolutionary significance of men's preference for low WHR's would be called into question because perceptual tendencies can affect fitness only if they also affect behavior. Alternatively, the failure to find a WHR effect on tipping may be due to the possibility that the waitresses' clothing obscured their WHRs to their tipping customers. Such an obscuring effect would not have impacted waitresses' self-ratings since they have plenty of opportunities to see themselves without clothes.

The possibility that clothing obscures WHRs raises some potentially interesting ideas about the co-evolution of clothing, male preferences, and female physical characteristics. Given a male preference for a WHR of .7, women in colder climates requiring bulkier clothing may evolve smaller WHRs than do women in more temperate climates because only women with very small WHRs display the curvaceous figures when clothed that men prefer. Consistent with this speculation, Frost (2006) cited several studies finding that European women, who evolved in relatively cold climates, have narrower waists and broader hips than do women from other areas of the world. To the extent that clothing also obscures other female physical characteristics, then similar effects of clothing on the evolution of those other female physical characteristics and/or male preferences for those characteristics should also be evident.

Conclusion

In general, some of the findings in this study replicated previous research on the determinants of female attractiveness using more ecologically valid stimuli, but other findings in this study did not replicate previous research. Furthermore, some of the determinants of female physical attractiveness affected the real-world interpersonal behavior of tipping and others did not. These findings highlight the importance of using more ecologically valid stimuli in order to get a complete and accurate understanding of the determinants and consequences of female physical attractiveness.

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