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Environmental Predictors of Geographic Variation in Human Mating Preferences

Kevin J. McGraw

Department of Neurobiology and Behavior, Cornell University, Ithaca, NY, USA

Abstract

Sexual selection theory classically posits consistent and directional mate-preferences for male traits that provide benefits to females. However, flexible mate-choice tactics may persist within a species when males display multiple desirable features that confer different benefits to females under variable environmental conditions. Ecological factors such as population density, resource demand, and sex ratio can influence the value that female animals place on certain male characteristics across mating environments. In this study, I used human mate-preference data from 'lonely hearts' advertisements in the newspapers of 23 cities in the USA to assess geographic differences in female preferences for male traits (e.g. physical attributes, resource-holding potential, emotional characteristics, personal interests) in relation to these ecological parameters. I found that females placed more emphasis on the resource-accruing ability of prospective mates in densely populated cities and cities having greater resource demands (higher cost of living). In contrast, women from densely populated or resource-demanding cities placed less emphasis on the emotional aspects or personal interests of males. Preferences for physical features were not environmentally linked, but instead were a function of the degree to which females advertised their own physical attractiveness. Collectively, these results suggest that certain mate-choice criteria employed by women are sensitive to variation in local environmental conditions and that variable levels of resource or mate availability may favor different mating tactics across human populations.

Kevin J. McGraw, Department of Neurobiology and Behavior, Cornell University, Ithaca, NY 14853 USA. E-mail: kjm22@cornell.edu

Introduction

Mate selection has been a topic of widespread interest to evolutionary biologists ever since Darwin (1871). Because of conserved sexual dimorphisms in gamete size and number across animal taxa, females tend to exercise

particular care when choosing individuals with which to mate (Parker et al. 1972). Males displaying favorable traits that indicate their superior health, competitive ability or propensity to care for offspring are preferred as mates (Andersson 1994).

Many of the classic examples of sexually selected traits and preferences represent tightly co-evolved systems in which the female preference is stable across populations and selects directionally for the most exaggerated form of the male trait (Møller 1994; Hill et al. 1999). However, there is mounting evidence that conspecific mating preferences can vary both within and among populations (Jennions & Petrie 1997). There is a series of cases in which considerable geographic variation in the expression of male traits has been noted, with females exhibiting highly plastic mating preferences that track changes in male phenotype (e.g. guppies, *Poecilia reticulata*, Houde & Endler 1990; Endler & Houde 1995; African cichlids, Deutsch 1997; Seehausen & van Alphen 1998; pied flycatchers, *Ficedula hypoleuca*, Alatalo et al. 1986; Lundberg & Alatalo 1992; Saetre & Slagsvold 1996; Pärt & Qvarnström 1997; Saetre et al. 1997). Such variable mate-choice strategies can result from changes in ecological conditions that are amenable to different ornamental displays across the geographic range of the species (Endler 1993) as well as those that favor different combinations of direct and/or indirect benefits that males can provide to their mates (Griffith et al. 1999).

A variety of environmental features may shape geographic patterns of female mate-choice. For example, the density of a population can influence the degree of competition for both resources and mates (Eschel 1979; Hubbell & Johnson 1987). In dense populations, resources are typically more limited and mate-encounter rates are elevated, so resource- and mate-competitions are more intense (Crowley et al. 1991; Jirotkul 1999). Because females require certain resources for breeding (e.g. sites, food and defense), they may especially seek competitively superior males with which to mate in areas of high density and resource demand (Qvarnström & Forsgren 1998). Traits such as age, size or strength often indicate the degree to which males successfully acquire resources or mates (Piper 1997; Moynihan 1998). Physical or competitive attributes of females may also affect the importance of receiving direct or indirect benefits from a mate (Waynforth & Dunbar 1995; Bereczkei et al. 1997). Under certain ecological conditions, however, female-mate selectivity may be relaxed, particularly if competitions in dense areas generate skewed sex ratios and leave fewer prospective mates for females to encounter (O'Donald 1978; Clutton-Brock et al. 1997).

Although environmentally regulated variability in mating strategies has received much recent emphasis in a number of animals (Parker & Burley 1998), the potential for similar, flexible mate-choice tactics in human sexual systems has largely been neglected. Human mating preferences have been subject to critical empirical testing within ecological and evolutionary frameworks over the last three decades (Buss 1994), but most studies have evaluated predictions of parental investment or sexual selection theory that center around intersexual differences in

mate choice (Kenrick & Keefe 1992; Thiessen et al. 1993). Moreover, this work has often elucidated consistent cross-cultural patterns, such that women place higher value on traits that signal age, status and resource-acquisition ability than do men, whereas men prefer characteristics that indicate youth and reproductive capacity more than women (Buss 1989). Clearly, a more thorough investigation of the environmental factors that may underlie intrasexual variation in human mate choice is warranted.

The goal of this study was to test the hypothesis that geographic differences in human female mating preferences are linked to variation in local environmental conditions. Specifically, I was interested in evaluating the degree to which ecological features, such as population density, resource demand, and sex ratio, predict variability in the emphases that women place on four aspects of prospective male mates: physical attractiveness, resource-holding potential, emotional appeal and personal interests. Female mating preferences were obtained from 2300 'lonely hearts' advertisements (LHA) that were placed in newspapers from 23 cities in the USA. LHA have been used in many recent evolutionary studies of human mate choice, and results from these data corroborate various theories of reproductive investment (Greenlees & McGrew 1994; Waynforth & Dunbar 1995; Bereczkei et al. 1997). In addition to population density and sex ratio figures used for each city, I used three separate indices of resource use: (1) mean annual cost of living (resource demand); (2) mean annual personal income (resource availability); and (3) female labor force participation (a more specific proxy for female resource-holding potential in the absence of personal income data for women only). Traits that females advertised about themselves were also used to examine how the features of women relate to the characteristics sought in a mate.

I formulated the following predictions regarding geographic patterns of human mate-preferences:

(1) Population density: females from more densely populated cities should place more emphasis on traits indicative of resource-accruing ability (e.g. physical attributes, resource-holding potential) and long-term investment (e.g. emotional aspects, personal interests) in a mate.

(2) Sex ratio: females from more competitive mating environments (e.g. a female-biased sex ratio) should more often seek physical- and resource-based competitive features in men.

(3) Cost of living: females from cities that demand more personal resources should seek more resources from males.

(4) Personal income and

(5) Labor participation: women from cities in which personal income is higher, and participation in the labor force is greater, should place more emphasis on acquiring resources from a mate, based on previous studies of positive-assortative mating by socioeconomic status (Wiederman & Allgeier 1992; Waynforth & Dunbar 1995).

(6) Female characteristics: similarly, females who advertise a high resource base should place more of a demand for resources from males.

Methods

Ecological and Demographic Data

I obtained estimates of population density (people/km^2), sex ratio (% female), and average per-capita income (in dollars) for the 23 US cities included in this study from the 1999 County and City Extra databook (Gaquin & Littman 1999). Cost-of-living indices were calculated as percentages relative to the national average (100%) at four levels ($10 712, $24 000, $48 000, $72 000) found in the 2000 Geographic Reference Report (Economic Research Institute, Redmond, WA, USA). The percentage of women participating in the civilian labor force was available for all but one of these cities (Montgomery, AL, USA) in Table 23 of the 1998 Geographic Profile of Employment and Unemployment (Bureau of Labor Statistics, US Department of Labor).

Female Mating Preferences

I randomly selected 100 uniquely numbered and heterosexual ('women seeking men') LHA from the primary newspapers of each of 23 major cities (population size > 150 000 people) in the USA (Table 1). Cities were chosen based on the availability of newspapers within the Cornell University library system. Because no two cities were within 150 km of each other, it is assumed that few individuals posted advertisements in newspapers from more than one city and that each city is an independent sample. Whenever possible, advertisements from three specific newspapers (3 Oct., 7 Nov. and 5 Dec. 1999 editions) were used for each city. For only six cities did I use fewer than three newspapers, and 48 of the 61 newspapers (79%) used fell on the aforementioned dates. The 13 newspapers not published on these dates ranged from 5 Sept. to 12 Dec. 1999.

For each advertisement, I counted the total number of words that appeared, including those from the title when one was present. City newspapers varied in the word limits placed on advertisements, but neither maximum (per advertisement) nor mean word count was correlated significantly with any of the predictor variables used in this study (Spearman rank correlations, all $-0.3 < r_s < 0.2$; all $p > 0.15$). I scored four attributes of males that were commonly mentioned by females and thus may factor into human mate choice: (1) physical attractiveness (e.g. athletic, handsome, tall); (2) resource-holding potential (e.g. financially stable, intelligent, professional); (3) emotional appeal (e.g. compassionate, loving, sincere); and (4) personal activities/interests (e.g. music, the outdoors, theater). Assignment of additional words to these categories follows methods outlined in previous studies that used such designations (Deaux & Hanna 1984; Wiederman 1993; Greenlees & McGrew 1994) and was highly repeatable (Lessells & Boag 1987) for naive raters who scored a random subset of advertisements ($0.7 < r < 0.97$, $n = 20$, $p < 0.0001$ for all four trait categories). The number of words in each of these four groups was summed for each advertisement so that I could determine the proportion of descriptive words that fell into each category.

Table 1: Newspaper issues used to collect data from 'lonely hearts' advertisements (LHA) for this study. A total of 61 newspapers from 23 US cities were sampled between September and December 1999

City	State	Newspaper	3 Oct.	7 Nov.	5 Dec.	Other dates	Number of newspapers
Atlanta	GA	Atlanta Constitution	x	x	x		3
Boston	MA	Boston Globe	x	x	x		3
Buffalo	NY	Buffalo News	x	x	x		3
Charlotte	NC	Charlotte Observer			x		1
Chicago	IL	Chicago Tribune	x	x	x		3
Cleveland	OH	Cleveland Plain Dealer	x	x	x		3
Denver	CO	Denver Post		x		28 Nov.	2
Detroit	MI	Detroit Free Press	x	x	x		3
Hartford	CT	Hartford Courant	x	x	x		3
Houston	TX	Houston Chronicle	x	x			2
Kansas City	MO	Kansas City Star	x	x	x		3
Los Angeles	CA	Los Angeles Times				10 and 17 Oct.	2
Miami	FL	Miami Herald	x	x		5 Sept.	3
Montgomery	AL	Montgomery Advertiser	x	x			2
New Orleans	LA	New Orleans Times Picayune	x	x		5 Sept.	3
Orlando	FL	Orlando Sentinel				21 Nov., 12 Dec.	2
Philadelphia	PA	Philadelphia Inquirer	x	x		5 Sept.	3
Pittsburgh	PA	Pittsburgh Post-Gazette				1 Oct., 5 Nov.	2
Salt Lake City	UT	Salt Lake Tribune	x	x	x		3
San Francisco	CA	San Francisco Chronicle	x	x		5 Sept.	3
Seattle	WA	Seattle Times	x	x	x		3
St. Louis	MO	St Louis Dispatch	x	x		5 Sept.	3
Washington	DC	Washington Post	x		x	31 Oct.	3
Totals		23	18	18	12	13	61

I applied the same procedures to characterize the degree to which females mentioned these same traits about themselves in advertisements. Mean proportions per category, determined by averaging the values for all females within a city, were used in statistical analyses.

Statistical Analyses

I analysed variability in the mating preferences of females in a number of ways. First, to describe the basic mate-preference pattern among all females included in the study, I determined the overall proportion of words mentioned in each of the four categories and compared the relative emphases that females placed on each male trait. These data were not normally distributed (Shapiro-Wilk W-test, $p < 0.05$), so I used a Kruskal–Wallis H-test to search for an overall difference in trait preference. I also used Kruskal–Wallis H-tests to determine preferences for particular traits within each of the 23 cities. When analyses from these tests exceeded significance thresholds, post hoc paired comparisons were performed sensu Siegel & Castellan (1988) to determine specific differences among traits. To assess between-city variability in the relative frequencies of words appearing from each category, I used tests for equality of coefficients of variation (Zar 1984).

I performed forward stepwise multiple regressions to determine the degree to which six characteristics of the mating and competitive environment — population density, sex ratio, cost of living, personal income, female labor participation and the advertised features of females — predicted variability in the emphases that females placed on each of the four male traits. Each of the six predictors was normally distributed (Shapiro-Wilk W-test, $p > 0.05$) and met the other assumptions of multiple regression analyses.

Results

Geographic Variation in Female Mating Preferences

When data from all cities were pooled (Appendix 1), I found that words indicating physical attractiveness and emotional stability were used significantly more often than were those representing resource-accruing ability and personal interests (Fig. 1). Within each of the 23 US cities sampled, females showed distinct preferences for particular male traits (Kruskal–Wallis H-tests, $p < 0.0001$ for all cities). Certain preferences were robust from city to city; in all but one of the cities, females used the greatest proportion of descriptive words in their advertisements to emphasize emotional aspects of prospective mates (sign test, $p < 0.001$, Fig. 2). However, other preferences were less consistent across cities. In 11 of the 22 cities in which emotional appeal was most highly rated, physical attractiveness was equally favored (Fig. 2). Physical attractiveness, resource-holding potential, and personal interests exchanged ranks within the hierarchies of cities (Fig. 2), and female preferences for these three traits were

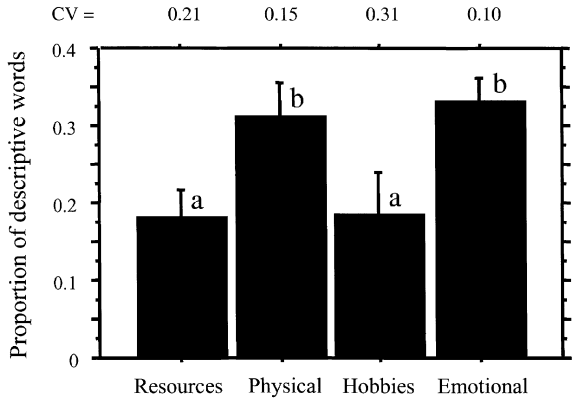

Fig. 1: Bar chart (mean + 1 SD) showing the degree to which females in this study (n = 2300 advertisements) advertised for four different traits in prospective male mates. There was an overall difference in the proportion of words used to describe the four attributes — resource-holding potential, physical attractiveness, emotional appeal and personal interests — of prospective mates (Kruskal–Wallis H-test, $H = 65.5$, $p < 0.0001$); letters denote significant differences between individual traits from post hoc planned comparisons (sensu Siegel & Castellan 1988; $p < 0.0001$). Coefficients of variation (CV) for each trait are also given at the top of the figure

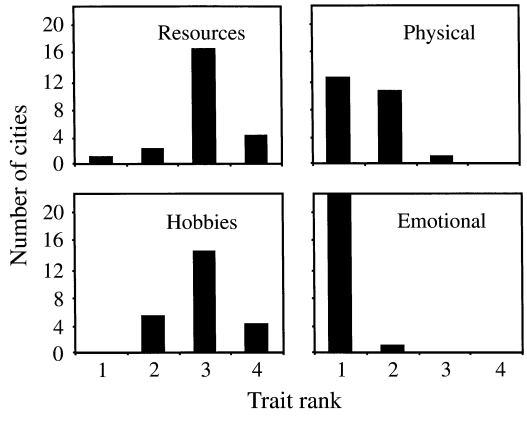

Fig. 2: Histograms illustrating the frequency with which male traits were ranked as most preferred (rank of 1), second-most preferred, third-most preferred or least preferred within the female preference hierarchies for 23 cities in the USA sampled in this study. Trait ranks were determined in each city based on significant differences that were obtained from post hoc analyses (sensu Siegel & Castellan 1988) of Kruskal–Wallis H-tests. Traits for which I found no significant intra-city differences in female preference were assigned identical ranks, and ranking schemes for cities in which this occurred were adjusted accordingly (e.g. 1, 2, 2, 4). In contrast to ranks for emotional appeal, note the inter-city variability of ranks for traits that represent resource-holding potential, physical attractiveness and personal interests

significantly more variable from city to city than were those for emotional appeal (tests for equality of coefficients of variation, all $p < 0.05$).

Environmental Predictors of Female Mate-Preferences

I found that the stepwise regression models significantly predicted the degree to which females emphasized each of the four male traits considered in this study (Table 2). Both population density and cost of living explained a significant portion of the between-city variation in the importance of resource-indicating features to females (final model: $F_{2,19} = 33.1$, $r^2 = 0.78$, $p < 0.0001$), such that women from more densely populated cities and cities having a higher cost of living placed more value on resources in a mate than women from less densely populated cities with lower costs of living (Table 2). Cost of living also significantly predicted female emphases on emotional appeal in males (final model: $F_{1,20} = 6.09$, $r^2 = 0.23$, $p = 0.02$). However, in this case, women from cities with high costs of living placed less emphasis on emotional characteristics of mates (Table 2). Similarly, females from densely populated cities, and cities with a female-biased sex ratio, advertised less often for personal interests and hobbies in a mate (final model: $F_{2,19} = 12.0$, $r^2 = 0.56$, $p = 0.0004$; Table 2). Geographic patterns of female preferences for physical features in a mate were uncoupled from all of the environmental parameters considered in this study; instead, the frequency with which females advertised their own physical features predicted the degree to which they mentioned physical attributes of prospective mates (final model: $F_{1,20} = 8.84$, $r^2 = 0.31$, $p = 0.008$). Females that listed more physical characteristics about themselves in turn sought physical features in males more often (Table 2). In no model did female labor participation or personal income have a significant effect on mating preferences.

Discussion

In this study, I collected data from LHA placed in the newspapers of various USA cities to evaluate the hypotheses that the mating preferences of American women vary geographically and in response to environmental conditions that traditionally mediate competitions for mates and resources in other animals. Overall, emotional appeal was the most preferred male trait in nearly every city, and these female preferences were the least variable from city to city. This result is consistent with studies by Buss (1994), who reviewed the mating practices of 37 cultures from 33 countries and found that the three most highly valued aspects of a mate were love, a dependable character and emotional stability. Females consistently seek these emotional qualities in a mate to secure reliable paternal care during future breeding attempts (Buss 1994).

In contrast, I noted considerable among-city variability in the degree to which women advertised for traits such as resource provisioning, physical features and personal interests in men. Preferences for these features were significantly linked to variation in ecological conditions across geographic

Table 2: Stepwise multiple regression models used to examine environmental predictors of mating preferences among women from 23 US cities. Each model (preferred trait = dependent variable) is denoted by a different column; predictors (independent variables) are found in each row. In each model, 'female qualities' represents only the proportion of descriptive words in the advertisement that females used to indicate similar features in themselves (e.g. in the 'physical' model, this variable indicates how often females advertised their own physical features). Predictors were entered into the final model (bold type in table) when they explained a significant portion of the residual variation in the dependent variable; independent variables were excluded if they no longer increased the proportion of variance explained. Coefficients below are the partial regression coefficients

	Physical Coefficient	p	Resources Coefficient	p	Emotional Coefficient	p	Hobbies Coefficient	p
Population density	0.11	0.65	**0.59**	**0.0004**	0.27	0.24	**−0.79**	**0.0001**
Sex ratio	0.26	0.26	0.001	0.99	0.06	0.80	**−0.33**	**0.05**
Cost of living	0.20	0.38	**0.39**	**0.01**	**−0.48**	**0.01**	−0.32	0.15
Personal income	0.13	0.57	0.28	0.23	−0.24	0.29	−0.26	0.27
Labor participation	0.03	0.88	0.18	0.46	−0.07	0.76	−0.28	0.23
Female qualities	**0.55**	**0.008**	0.27	0.26	0.29	0.20	−0.10	0.67

regions. American women from densely populated cities and cities having a high cost of living placed more emphasis on traits indicative of a man's resource-holding potential than females from less populous and less costly areas. This suggests that, in environments in which there is an increased demand for acquiring mates and resources, women shift their mating priorities and more often seek mates able to provide them with resources. Several studies have found that women who have more resources to offer also require more in a mate (Wiederman & Allgeier 1992; Waynforth & Dunbar 1995). However, in this study, female preferences for resources in men were not dependent on women being economically successful, as measured by personal income, female labor participation, and the degree to which females advertised their own resource-holding potential. In fact, by comparing the economic opportunities of women (e.g. labor-force participation) directly to population density, it appears that women make up a smaller proportion of the workforce in densely populated cities ($r_s = -0.32$, $n = 50$, $p = 0.03$). This finding supports the idea that resource limitations among females increase the value of resource provisioning by their mates under certain environmental conditions.

Whereas population density and cost of living were positively associated with female preferences for resource-holding potential in men, these same ecological parameters were negatively linked to other traits that women sought in a mate. Females from more densely populated cities and cities having female-biased sex-ratios placed less emphasis on personal interests and hobbies in men. Moreover, women from cities with high costs of living valued emotional appeal less, despite low levels of geographic variation in female preferences for this trait. Because emotional and personal attributes of men may play more of a role in the maintenance of pair bonds (see above), as opposed to the acquisition of mates or resources, females may prefer qualities in men that facilitate long-term pair-stability when other environmental selection pressures are weakened (e.g. when mates or resources are not limiting factors). In support of this, Simpson & Gangestad (1992) found that women who were more likely to become emotionally attached to partners valued the personal qualities of a mate more and other features less, including financial resources. To test the specific idea that advertisements for pair-bond duration may vary across mating environments, I examined my newspaper advertisements for the frequency with which women expressed an interest in long-term partnerships (e.g. lasting relationship, marriage, marriage-minded; sensu Deaux & Hanna 1984). Females from more densely populated cities indicated their desires for a long-term relationship significantly less often ($r_s = -0.55$, $n = 23$, $p = 0.01$), which corroborates the notion that mate-preferences for emotional stability in certain geographic regions may indicate the desire of women to secure long-term pair associations.

Among the mating preferences considered in this study, only female advertisement for physical attractiveness in a mate could not be explained by the ecological factors that I included in the models. Instead, the proportion of words that females used to describe their own physical characteristics was the

lone predictor of the degree to which they valued attractiveness in men. Women who offer attractiveness often increase their demands when selecting a mate (Waynforth & Dunbar 1995; Bereczkei et al. 1997), and positive assortative-mating by phenotypic quality is a common feature in animals (Andersson et al. 1998; Regosin & Pruett-Jones 2001). Moreover, preferences for facial (Perrett et al. 1994, 1998; Cunningham et al. 1995) and body (Singh 1994a,b; Singh & Luis 1995; Furnham et al. 1997) attractiveness are consistent across human cultures. Why might this component of human mating systems vary independently of the environment? Rather than serving more as an indicator of the direct resource benefits that females can obtain by mating with an attractive mate, males may instead reveal their genetic quality (and thus indirect benefits) more reliably with their phenotype (Pomiankowski 1988). There is now much empirical support for the idea that male phenotypic attractiveness is an honest signal of 'good genes' in humans (Gangestad et al. 1994; Grammer & Thornhill 1994; Perrett et al. 1999).

To my knowledge, this is the most extensive published study of LHA to date and among the first to document environmental predictors of geographic variation in human mating preferences. Most studies that have probed for potential extrinsic sources of variability in human mate selection have uncovered preferences for traits such as age (Kenrick & Keefe 1992) and earning or reproductive capacity (Buss 1989) that are seemingly invariant among human populations. As exceptions, Gangestad & Buss (1993) found that a greater emphasis is placed on the physical attractiveness of prospective mates in areas of the world where parasite prevalence, and the need to obtain healthier, pathogen-resistant males, is greater. Wetsman & Marlowe (1999) and Yu & Shepard (1998) found that, unlike those from Western cultures, men from agricultural or horticultural societies in Tanzania and Peru, respectively, fail to exhibit preferences for low waist-to-hip ratios in females, but instead express interest in partners with increased body mass. These two findings, from societies that are potentially constrained by resource access, and those reported in this study highlight the influence that environmental variability and resource demand may have on human sexual strategies.

Conclusions

Although the results presented in this study help to clarify the proximate mechanisms by which social and ecological conditions may shape the mating tactics of humans, the fitness consequences of these variable behaviors are still unresolved. For example, in cities or societies where competitions for resources and mates are intense, do women mated to men who offer more resources sire more or higher quality offspring during their lifetime? In less competitive areas, are there benefits to devaluing physical- and resource-based traits and placing greater emphasis on personal interests in a mate? These elements of human reproduction will be useful to investigate in future research to better understand our repertoire of sexual behaviors from an evolutionary perspective.

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Appendix 1: Raw data collected for all response and predictor variables in this study[1]

City	State	Response variables[2]				Predictor variables				
		Physical	Resources	Emotional	Hobbies	PD	SR	PI	COL	WW
Atlanta	GA	0.32	0.19	0.31	0.17	229	51.0	27241	116.8	67.0
Boston	MA	0.30	0.23	0.35	0.13	349	51.5	30366	155.0	63.6
Buffalo	NY	0.37	0.16	0.38	0.09	287	52.1	23588	103.3	59.7
Charlotte	NC	0.29	0.17	0.34	0.20	154	51.6	25446	109.5	77.6
Chicago	IL	0.33	0.22	0.32	0.14	481	51.2	29195	120.0	60.9
Cleveland	OH	0.35	0.20	0.30	0.15	311	52.0	26025	107.8	59.4
Denver	CO	0.31	0.16	0.31	0.22	105	50.7	28650	109.6	68.6
Detroit	MI	0.35	0.18	0.30	0.18	320	51.6	27113	117.7	57.3
Hartford	CT	0.31	0.17	0.36	0.16	282	51.4	30473	109.2	72.4
Houston	TX	0.25	0.16	0.34	0.24	216	50.1	26556	103.4	60.6
Kansas City	MO	0.30	0.13	0.37	0.20	122	51.4	25949	105.8	64.7
Los Angeles	CA	0.33	0.24	0.36	0.07	870	49.9	24522	138.7	56.8
Miami	FL	0.28	0.21	0.33	0.19	430	51.9	24341	116.0	55.3
Montgomery	AL	0.21	0.12	0.38	0.29	61	51.9	21973	98.3	Unavailable
New Orleans	LA	0.35	0.12	0.32	0.22	149	52.3	22179	106.1	57.9
Orlando	FL	0.32	0.16	0.35	0.17	162	50.8	22425	111.1	63.1
Philadelphia	PA	0.33	0.18	0.31	0.18	389	51.9	28413	124.7	58.5
Pittsburgh	PA	0.30	0.18	0.35	0.18	197	52.5	25359	105.6	54.0
Salt Lake City	UT	0.23	0.18	0.33	0.26	298	50.2	21271	108.8	66.3
San Francisco	CA	0.34	0.28	0.27	0.11	632	50.4	32933	166.2	67.3
Seattle	WA	0.28	0.17	0.29	0.25	180	50.2	28269	120.8	66.7
St Louis	MO	0.29	0.14	0.35	0.22	155	51.8	26337	105.6	62.8
Washington	DC	0.42	0.18	0.27	0.13	291	51.1	30204	153.9	65.8

[1] PD = population density (people/km^2), SR = sex ratio (% females), PI = annual personal income (dollars), COL = annual cost of living (% relative to 100% as the average), WW = women in the workforce (% of total women).

[2] Proportions of total descriptors.