
Playboy Playmate Curves: Changes in Facial and Body Feature Preferences Across Social and Economic Conditions

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Past research has investigated ideals of beauty and how these ideals have changed across time. In the current study, facial and body characteristics of Playboy Playmates of the Year from 1960-2000 were identified and investigated to explore their relationships with U.S. social and economic factors. Playmate of the Year age, body feature measures, and facial feature measurements were correlated with a general measure of social and economic hard times. Consistent with Environmental Security Hypothesis predictions, when social and economic conditions were difficult, older, heavier, taller Playboy Playmates of the Year with larger waists, smaller eyes, larger waist-to-hip ratios, smaller bust-to-waist ratios, and smaller body mass index values were selected. These results suggest that environmental security may influence perceptions and preferences for women with certain body and facial features.

Keywords: *facial features; body features; physical appearance; physical attraction; environmental security*

For decades, psychologists have been studying the ideals of beauty and what makes an individual physically attractive. Researchers have provided detailed accounts of changing trends in U.S. history by studying the measurements of *Playboy* Playmates, Miss America contest winners, and models in popular women's magazines (i.e., *Vogue*, *Ladies Home Journal*) and advertisements across time and their relationships to popular culture and dieting or clothing fads (Garner, Garfinkel, Schwartz, & Thompson, 1980; Mazur, 1986; Owen & Laurel-Seller, 2000; Voracek & Fisher, 2002; Wiseman, Gray, Mosimann, & Ahrens, 1992). Continuous representations of women in the media provide a medium for studying changes across time and conditions. Although these trends are intriguing, questions still remain regarding why these trends occur, what societal and individual envi-

ronmental factors influence these trends, and how different theories can be used to explain these changing preferences for facial and body characteristics in women.

To explain how social preferences are affected by changing environmental security conditions, Pettijohn and Tesser (1999) offer the Environmental Security Hypothesis. Building on existing evolutionary and social ecological theories (Buss, 1994; Cunningham, 1986; McArthur & Baron, 1983; Zebrowitz, Fellous, Mignault, & Andreoletti, 2003), these researchers contend that perceptions and feelings of environmental security influence facial feature preferences. Specifically, when conditions are threatening and uncertain, individuals with more mature facial features are preferred to a relatively greater extent compared to preferences in less threatening conditions. Pettijohn and Tesser (1999) have found evidence that popular American movie actresses from 1932-1995 with mature faces (small eyes, large chins, thin faces) are preferred to a relatively greater extent in social and economic hard times compared to social and economic good times. However, this same pattern of preferences was not found in a sample of popular American movie actors, suggesting that male appearance preference patterns are not equivalent (Pettijohn & Tesser, 2003). In addition, Pettijohn and Tesser (2004) have

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found that when participants were subjected to threat in a lab setting, they showed a general preference to work with a female partner with smaller eyes (a mature feature) over a partner with larger eyes (a neotenus feature). These studies have focused on preferences for facial features under conditions of threat but have not tested changing preferences for mature body features. The current study was undertaken to provide additional support for the Environmental Security Hypothesis by replicating previous findings using an alternative sample and by expanding the set of predictions to investigate preferences for mature body features under conditions of threat.

The Environmental Security Hypothesis considers evolutionary theory and further adjusts evolutionary predictions of preferences within specific conditions of historical and cultural variation. Evolutionary mate selection theories (Buss, 1989; Buss & Barnes, 1986; Symons, 1979) suggest that men and women select mates to maximize reproduction success and cues of reproductive value in women are largely determined by physical appearance. Preferences for specific facial and body features that signal health and reproductive promise have been explained in the context of evolutionary theory (Buss, 1994; Fink & Penton-Voak, 2002; Singh, 1993; Thornhill & Grammer, 1999). Many studies have cited the importance of neotenus facial features in determining female attractiveness and have found support for these ideas cross-culturally, suggesting this preference is related to evolutionary influences (Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Jones, 1995; Zebrowitz, 1997). The Environmental Security Hypothesis suggests that within these evolutionary preference findings, specifics of attractiveness may in part depend on how secure people feel in their surroundings. Additional social influences and contextual information may help to explain the variability within these sets of evolutionary preferences across time.

For example, Singh (1993) has examined the preference for a certain waist-to-hip ratio (WHR) by conducting studies in which men rated the attractiveness of female figures, which varied in total fat and WHR. Men found the average figure to be the most attractive, and regardless of the total amount of fat of the figures, men found the figures with a low WHR most attractive. As WHR increased, suggesting a less curvaceous and more tubular figure, attractiveness ratings decreased. Figures with a low WHR also were rated as healthier and of greater reproductive value than those with a higher WHR. Singh also analyzed *Playboy* centerfolds and winners of Miss America beauty contests in the United States across time through 1990. Singh found that *Playboy* Playmates' WHR increased slightly from .68 to .71 for the years examined. The models got thinner over the years,

indicated by the decreasing percentage of ideal body weight, but the WHR remained relatively constant at .70. But might these preferences be impacted by social and economic security factors?

Consider work by Anderson, Crawford, Nadeau, and Lindberg (1992), which found that the amount of female body fat considered most attractive varies across cultures. In cultures where women have limited economic opportunities and wealth, body fat is considered attractive and negatively correlated with women's political power and economic resources. The terms "fat" and "curvaceous" are not interchangeable, but they are related (Singh, 1993). Because women generally store fat in their hips, buttocks, and breasts, increasing body fat tends to increase curvaceousness, or the difference between bust and waist and waist and hips. Larger bust-to-waist ratios and smaller waist-to-hip ratios would therefore denote greater degrees of curvaceousness. Research also suggests that greater curvaceousness in women is quite attractive to men (Furnham, Hester, & Weir, 1990; Singh, 1993; Singh & Young, 1995).

Silverstein, Peterson, and Perdue (1986) investigated changes in curvaceousness across time by measuring models in *Vogue* and *Ladies Home Journal* between 1901 and 1981. They found that when more women graduated from college or entered the job market, the standard of attractiveness presented in popular women's magazines was less curvaceous. To support their predictions, they explained that women with different body shapes may develop different mating strategies and means for obtaining economic resources. Curvaceous women, which are more attractive to men, can use marriage to gain resources for childrearing. Noncurvaceous women are not as attractive to men so they must use alternative strategies and obtain economic independence through their own means. In some cultures, marriage is the only economic strategy for women, but in the United States, women can pursue careers and have children.

Barber (1998a) tested the idea that the male standard for a woman's attractiveness is more curvaceous than the female standard by measuring bust-to-waist ratios of *Playboy* models, Miss America winners, and models appearing in *Vogue* magazine across time. Consistent with predictions, the male standards (*Playboy* models and Miss America winners) varied less than the female standard (*Vogue*), suggesting standards of attractiveness are influenced by evolutionary factors. Barber (1998b) also supported his assertions by finding correlations between curvaceousness of models in *Vogue* and *Playboy* with economic growth (Standard and Poor's index, per capita gross national product), women's participation in the economy (percentage of married women working, ratio of male to female undergraduate college enrollment, ratio of male to female college degrees awarded), and

reproductive variables (birth rate, female to male ratio, single women/men ages 20-24). In subsequent research, Barber (1999) investigated women's dress fashions as a function of reproductive strategy. Short skirts were correlated with low sex ratios, increased economic opportunities for women, and marital instability. These findings help explain Mabry's (1971) connection between stock prices and women's skirt length. In addition, larger waists were correlated with increased economic opportunities for women.

Studies such as these provide additional support for Environmental Security Hypothesis predictions. Indeed, social and economic hard times include factors such as economic growth, female participation in the economy, and reproductive values that have been investigated in the past. The current study builds and extends these findings by considering an alternative, more general measure of social and economic threat and by considering the impact of threat on facial, body, and age preferences across time. The usefulness and functionality of preferences in different contexts relies less on a strictly evolutionary explanation.

According to ecological theory, social goals can influence social perception and lead the perceiver to focus on adaptive function in the decision-making process (McArthur & Baron, 1983). Perception provides an adaptive function for directing evolutionary and social behaviors. Directly related to the Environmental Security Hypothesis, when social and economic conditions are threatening, individuals should be attuned to the heightened need for security. This attunement should lead to the selection of others with mature features to satisfy these needs. Depending on the situation, individuals use appearance information to make decisions about how they will behave and the choices they will make. However, different situations may influence people's preferences for certain facial and body features. For example, threatening situations cause people to feel scared, stressed, and uncertain. In these situations, it may be functional to prefer a person with mature features, whose facial and body features communicate maturity, independence, and security, qualities that should decrease feelings of fear, stress, and uncertainty.

Maturity may be expressed through different facial features, and indeed, research in this area suggests that mature facial features and neotenous facial features (baby faces) produce different groupings of attributions (e.g., see Zebrowitz, 1997, for a review). Neotenous facial features include larger eyes, a smaller nose, a smaller chin, and round cheeks, whereas mature facial features include smaller eyes, a larger nose, a larger chin, a thinner face, and more pronounced cheekbones. Overall, baby faces are seen as relatively more warm, kind, naïve, honest, agreeable, sociable, trustworthy, and physically

weaker than mature faces. Mature faces are perceived as relatively more powerful, dominant, strong, expert, competent, independent, shrewd, and mature than baby faces. Individuals possessing mature facial characteristics also are considered to possess a higher level of social status and are seen as more important, more influential, more in control, and physically stronger (e.g., Berry & McArthur, 1985; Brownlow, 1992; Brownlow & Zebrowitz, 1990; Cherulnik, Turns, & Wilderman, 1990; Cunningham, Barbee, & Pike, 1990; Cunningham et al., 1995; Enquist & Ghirlanda, 1998; Keating, 1985; Keating & Doyle, 2002; Keating, Mazur, & Segall, 1981; Zebrowitz & McDonald, 1991; Zebrowitz, Tenenbaum, & Goldstein, 1991).

Cunningham and colleagues (Cunningham, 1986; Cunningham et al., 1990, 1995) also have accounted for the interplay between biology, human development, and evolution in determining preferences in their Multiple Fitness model of social perception. Researchers contend that an ideal combination of neonate and sexual maturity features produces the most romantically attractive face. Neonate features would be located in the center of the face, such as large eyes, and sexually mature features would be located in the periphery, such as cheekbone prominence in women and large chin size in men. The Environmental Security Hypothesis further argues that the Multiple Fitness model does not consider changing environmental conditions. This specified combination may not *always* be preferred. Specifically, large eyes may be preferred to a greater extent when social and economic conditions are nonthreatening or large chins may be preferred to a greater extent when conditions are threatening. These preferences, even if rooted in evolutionary biology, may vary depending on environmental conditions and what is functionally advantageous.

Besides facial features, body characteristics such as shape and size, also can communicate maturity and convey attributions associated with strength. For instance, consider research conducted on the attribute of physical height. Tall individuals are commonly perceived to be stronger, more independent, and more dominant than shorter individuals (Adams, 1980; Melamed, 1992; Young & French, 1998). Although many studies of height and dominance/power have considered male height, more recent work by Boyson, Pryor, and Butler (1999) considered female height. Participants were shown a male and female silhouetted drawing of various heights where the woman was shorter or taller than the man. When the woman was taller than the man, the woman was rated as significantly more dominant than the man.

In addition to these body feature investigations, it also makes intuitive sense that relatively older individuals are perceived to be more responsible and mature. Indeed,

researchers have considered self-reported personality factors and have found that age is negatively associated with sensation seeking and positively correlated with responsibility (Adams, 1980). Henss (1991) also has found that people are quite accurate when asked to judge the age of people in their 20s to 60s, often missing the exact age by between 3 to 7 years. In sum, facial features, body features, and age communicate useful information about a person's personality and social utility. These different affordances may be of great consequence in distinct social and economic environments.

CURRENT PREDICTIONS

The current study tests a context-dependent theory of attraction and preferences, as presented in Pettijohn and Tesser's (1999) Environmental Security Hypothesis. It is theorized that when social and economic times are threatening and pessimistic, individuals will prefer others with relatively greater maturity characteristics. These characteristics can be represented through facial features and include preferences for smaller eyes, thinner cheeks, and larger chins. The current study extends beyond facial feature predictions and predicts that mature characteristics also can be represented through body features and include preferences for taller, heavier individuals with larger waists. When social and economic times are nonthreatening and prosperous, facial feature preferences will be for larger eyes, fuller cheeks, and smaller chins, and body feature preferences will be for relatively shorter, lighter individuals with smaller waists. As a secondary hypothesis, it is predicted that greater curvaceousness (indicated by relatively smaller waist-to-hip ratios and relatively larger bust-to-waist ratios) and greater body fat (indicated by body mass index) will be preferred to a relatively greater extent in social and economic good times compared to social and economic hard times. When times are difficult, reproductive fitness may be less important and the ability to acquire resources and be productive may become more important (see Barber, 1998a, 1998b).

In sum, it was hypothesized that there would be significant relationships between facial and body feature measures of *Playboy* Playmates of the Year and social and economic conditions, consistent with the Environmental Security Hypothesis. In difficult social and economic times, compared to good social and economic conditions, there will be a preference for relatively greater mature facial and body characteristics. The current study builds on previous investigations by expanding the time frame of study to include body measurements of *Playboy* Playmates of the Year through the year 2000, adds the dimension of facial feature measurement, and provides a theory to explain how social and economic condi-

tions are related to preferences for certain facial and body features.

METHOD

To test the current hypotheses, three pieces of information were required: (a) a measure of American societal preferences for female facial and body characteristics in models across time, (b) facial photographs and body measurements of the preferred models, and (c) an index of the social and economic condition across time. These pieces of information were identified, collected, and organized.

Data Collection

Playboy Playmate of the Year. In the current investigation, *Playboy* magazine's annual Playmate of the Year competition was selected as a measure of societal preferences for female models (facial and body features). "*Playboy* is the leading men's magazine in the world. It contains award winning fiction, investigative articles, humor, in-depth interviews and pictorials featuring the world's most beautiful women" (www.playboy.com/worldofplayboy/faq/what.html). *Playboy* magazine, part of Playboy Enterprises, Inc., was founded by Hugh Hefner in 1953 and is considered by many to be a cultural icon. "In the United States, *Playboy* reaches nearly 10 million adults each month whose median age is 32. 83% of *Playboy* readers are male and 17% are female" (www.playboyenterprises.com/FAQs).

Each month, *Playboy* features a nude pictorial layout of a selected Playmate of the Month. The Playmate of the Month is chosen from photos of women sent in to *Playboy* or women discovered by photographers. Test shots are taken of potential Playmate candidates and together with photography editors, Hugh Hefner, editor in chief, chooses the Playmates (www.playboy.com/worldofplayboy/faq/playmates.html). Each year since 1960, *Playboy* magazine has named a Playmate of the Year (PMOY) from the year's Playmates of the Month. "Hef chooses the PMOY after taking into account votes cast by readers" (www.playboy.com/playmates/faq/pmoy.html). Subscribers send letters to *Playboy* expressing their preference for particular Playmates during the year and *Playboy* regularly provides a more formal voting opportunity to help decide who becomes Playmate of the Year. In previous years, this voting has taken place by mail, telephone, and the Internet. Although Mr. Hefner makes the final determination, popular opinion is ultimately expressed through his choice.

The Playmate of the Year contest winners were chosen in the current study because they offer a reflection of the popularity of Playmates with magazine audiences in the United States in a continuous fashion across time.¹ Based on the results of the Playmate of the Year competitions,

the Playmates of the Year from 1960 through 2000 were identified from *Playboy* magazine.² The names of each of these Playmates and when they were Playmate of the Year is available in the appendix.

Body features. The body measurements (height, weight, hips, bust, waist) and age of each Playmate of the Year from 1960 through 2000 were collected using accessible *Playboy* data available in *Playboy* publications and online at www.playboy.com.³ Height, hips, bust, and waist measurements were reported in inches and weight was published in pounds.⁴ Waist-to-hip ratio, bust-to-waist ratio, and body mass index were calculated from these measurements. The age when Playmates were named Playmate of the Year was determined using published birth date information. The individual body measures and age of each Playmate of the Year are presented in the appendix.

Facial features. High-quality photographs that captured a complete, front, facial view of each of the 41 *Playboy* Playmates of the Year from 1960 to 2000 were located. The majority of the images were downloaded from the Internet (www.playboy.com) and the remaining photographs were found in magazines and books, scanned using a flatbed scanner, and saved as graphic files. Two raters, unaware of the current set of predictions, provided independent facial measurements of each Playmate based on Cunningham's method of facial measurement (Cunningham, 1986; Cunningham et al., 1995). Raters used a computer program (PhotoMagic, 1993) to measure facial features by placing the mouse cursor at a beginning point, moving the cursor to an ending point, and reporting the change in spatial coordinates for each facial measurement. The areas of the face that were measured included the eyes (eye height, eye width, and eye area), chin (chin length, chin width, and chin area), and thinness of the face (cheek thinness).⁵ All measurements were standardized as ratios to the appropriate vertical or horizontal axis. The reliability of facial feature measurements was calculated by figuring the correlation between the unique component measurements of the two raters and adjusting this value using the Spearman-Brown prophecy formula. All reliabilities were satisfactory (ranging from .97 to .99). Based on the facialmetric assessments made by each independent rater, the mean for each facial feature for each Playmate of the Year was computed. Descriptive statistics of these grouped facial and body measurements and age are provided in Table 1.

Social and economic hard times measure. To evaluate changes in the social and economic environment in the United States from 1960-2000, the General Hard Times Measure (GHTM) used in Pettijohn and Tesser's (1999, 2003) previous work was considered and expanded to include more recent years (1996-2000). This is an

TABLE 1: *Playboy* Playmate of the Year Grouped Descriptive Statistics 1960-2000

Feature	M	Minimum	Maximum	SD
Age	22.27	18	33	2.68
Bust	35.68	32	39	1.35
Waist	23.43	20	27	1.45
Hips	35.21	32	38	1.23
Height	66.95	62	71	2.44
Weight	118.44	102	140	9.13
Waist-to-hip ratio	.67	.57	.73	.04
Bust-to-waist ratio	1.52	1.38	1.80	.10
Body Mass Index	18.57	15.96	20.36	.95
Eye height	.057	.041	.077	.009
Eye width	.192	.158	.228	.017
Eye area	.011	.007	.016	.002
Cheek thinness	.203	.161	.249	.022
Chin length	.229	.198	.263	.017
Chin width	.462	.345	.600	.056
Chin area	.106	.071	.155	.019

NOTE: Values were published in *Playboy* magazine and are available online at www.playboy.com. Age is represented in years. Bust, waist, hips, and height were measured in inches. Weight was reported in pounds. Waist-to-hip ratio (WHR) was calculated by dividing waist measurement by hip measurement. Larger WHRs would indicate less difference between waist and hip measurements than smaller WHRs, hence lesser curvaceousness. Bust-to-waist ratio (BWR) was calculated by dividing bust measurement by waist measurement. Larger BWRs would indicate greater difference between bust and waist measurements than smaller BWRs, hence greater curvaceousness. Body mass index (BMI) was calculated as the product of weight in pounds and the constant 703, divided by height in inches squared (<http://www.cdc.gov/nccdphp/dnpa/bmi>). Larger BMI values indicate greater body fat. Eye height was the distance from the top to bottom of the visible eye at pupil center divided by the length of the face. Eye width was the distance between corners of the visible eye divided by the width of the face at the cheekbones. Eye area was calculated as the product of the eye height ratio and the eye width ratio. Chin length was the distance from the top of the lower lip to the bottom of the chin divided by the length of the face. Chin width was the width of the face at the jaw measured at the middle of the chin height, divided by the length of the face. Chin area was calculated as the product of the chin length ratio and the chin width ratio. Cheek thinness was the inner corner where the lips meet to the outer edge of the cheek divided by the length of the face.

aggregate, standardized, global measure that is composed of U.S. unemployment rate, change in disposable personal income, change in consumer price index, death rate, birth rate, marriage rate, divorce rate, suicide rate, and homicide rate.⁶ Each of the indicators was standardized and the annual percentage change in consumer price index, annual percentage change in disposable personal income, birth rate, and marriage rate were multiplied by -1 so that positive scores on all measures would reflect hard times. All of the standardized scores were then averaged for each year to provide a single GHTM where larger values represent relatively greater hard times and smaller values represent relatively greater good times.

RESULTS

Correlation of Playmate of the Year Facial Features With Social and Economic Conditions

Facial feature measurement values of *Playboy* Playmates of the Year were correlated with the GHTM. There were significant negative relationships between the GHTM and Playmate of the Year eye height, eye width, and eye area measurements. There were no significant relationships between social and economic conditions and Playmate of the Year chin measurements or facial thinness. These relationships are summarized in Table 2.

In Figure 1, the GHTM and Playmate of the Year eye area data were plotted against each other and the best fitting regression line was added. Each data point is labeled by the year it represents (i.e., 74 is the data point for 1974). This figure shows that as the GHTM increases, Playmate of the Year eye area measurements decrease, or become more mature in appearance.

Figure 2 illustrates how the GHTM and Playmate of the Year eye area measurements have varied as a function of time. In general, there is correspondence between these measures. However, it should be noted that the curves do not match between 1963 and 1968, 1975, and between 1995 and 1998. In the 1960s, the United States experienced increased racial tensions and the assassination of important leaders, President John Kennedy and Dr. Martin Luther King. In 1975, America was preparing to celebrate its bicentennial. In the middle to late 1990s, Americans were saddened and upset by the bombing of the Federal Building in Oklahoma City and several instances of school shootings, including Columbine. These events may not have been expressed in the statistics used to measure social and economic conditions in the current study, which may explain the discrepancy.

Correlation of Playmate of the Year Age and Body Features With Social and Economic Conditions

Age and body measurement values of *Playboy* Playmates of the Year also were correlated with the GHTM. There were significant positive relationships between the GHTM and Playmate of the Year age, waist measurement, height, weight, and waist-to-hip ratio. There was a significant negative relationship between the GHTM and bust-to-waist ratio (curvaceousness) and body mass index. There were no significant relationships between social and economic conditions and Playmate of the Year bust size or hip measurements. These relationships are summarized in Table 3.

For further illustration, Figures 3 and 4 show how Playmate of the Year age and height varied across years with the GHTM. In general, these measures also correspond with changes in social and economic conditions. Of interest, the same discrepancy between the GHTM

TABLE 2: Correlations of the General Hard Times Measure With Facial Features of *Playboy* Playmates of the Year (1960-2000)

	r	p
Eye height	-.343	.028
Eye width	-.512	.001
Eye area	-.454	.003
Cheek thinness	-.077	.630
Chin length	-.070	.664
Chin width	-.152	.342
Chin area	-.141	.379

NOTE: N= 41 years. All tests were one-tailed. Larger values on the *General Hard Times Measure* indicate relatively harder social and economic times.

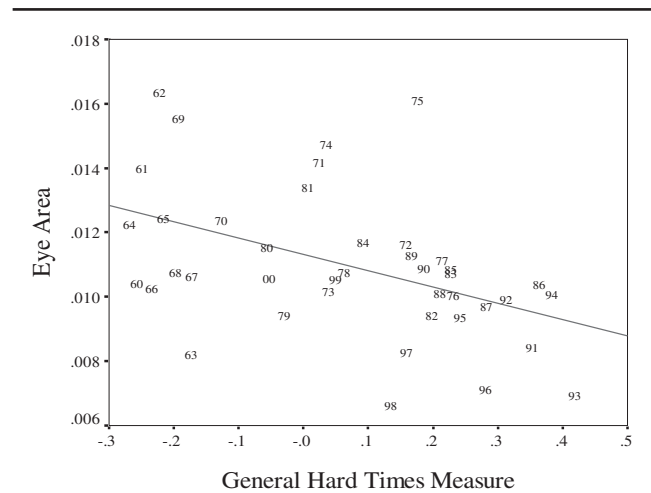


Figure 1 General Hard Times Measure and *Playboy* Playmate of the Year eye area scatterplot.

NOTE: Numbers represent the corresponding year of the individual data points. General Hard Times Measure values are plotted along the x-axis and Playmate of the Year eye area is plotted along the y-axis. Larger General Hard Times Measure values represent relatively hard times and smaller values represent relatively good times. Larger eye area values are considered more neotenus and smaller eye area values are considered more mature. A best-fitting regression line was added to illustrate the relationship between these two variables.

and these Playmate of the Year feature measures can be seen in the 1960s, as previously discussed.

To consider the temporal effect on these outcomes, we found that time (indicated as year corresponding to when each Playmate of the Year was named) was correlated with our measure of social and economic conditions within this set time period (1960-2000). This is not surprising because it is common for social and economic indicators to go through time trends. However, it should be noted that the GHTM was not correlated with time in previous investigations (see Pettijohn & Tesser, 1999), in which the time frame included a wider range of years (1932-1995). Additional regression analyses identifying part and partial correlations for each of the statistically

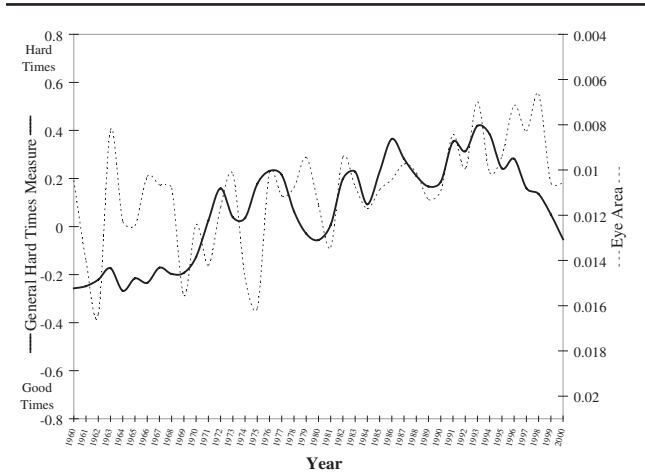


Figure 2 General Hard Times Measure and *Playboy* Playmate of the Year eye area change across time.
 NOTE: The solid line represents the General Hard Times Measure. Along the left vertical axis, larger General Hard Times Measure values indicate relatively hard times and smaller values indicate relatively good times. The dashed line represents measured Playmate of the Year eye area. Along the right vertical axis, smaller eye area values are considered more mature and larger eye area values are considered more neotenus.

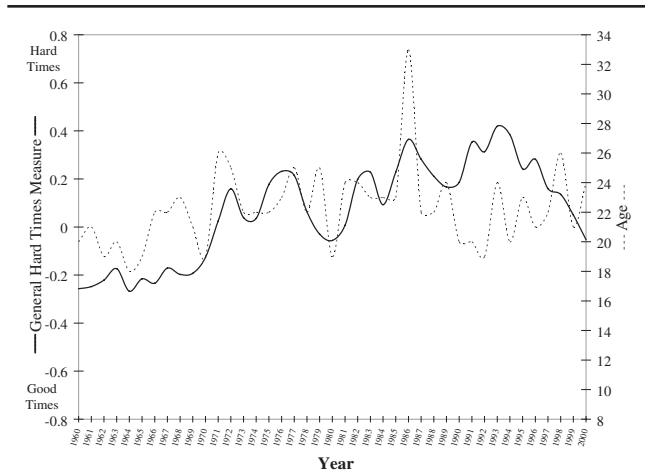


Figure 3 General Hard Times Measure and *Playboy* Playmate of the Year age change across time.
 NOTE: The solid line represents the General Hard Times Measure. Along the left vertical axis, larger General Hard Times Measure values indicate relatively hard times and smaller values indicate relatively good times. The dashed line represents Playmate of the Year age, presented in years, which corresponds with the right vertical axis.

TABLE 3: Correlations of the General Hard Times Measure With Age and Body Features of *Playboy* Playmates of the Year (1960-2000)

	r	p	df
Age	.379	.007	39
Bust	-.107	.252	39
Waist	.273	.044	38
Hips	-.238	.070	38
Height	.607	.001	39
Weight	.343	.014	39
Waist-to-hip ratio	.480	.001	38
Bust-to-waist ratio	-.366	.010	38
Body Mass Index	-.364	.010	39

NOTE: All tests were one-tailed. Larger values on the General Hard Times Measure indicate relatively harder social and economic times. Varied *df* represent unavailability of *Playboy* Playmate of the Year measures for certain years.

significant dependent measures and the independent variables of GHTM and year were conducted. As expected, the additional variable of year in the model reduced the relationships between the Playmate measures and the GHTM, but the dependent variables of age, height, and body mass index remained statistically significant. Another way to assess the impact of time would be to correlate year with each of the facial and body measures and partial out the variance attributed to the GHTM. When this was done, all measures except bust-to-waist ratio and eye width were nonsignificant. Any relationships that may have existed between the

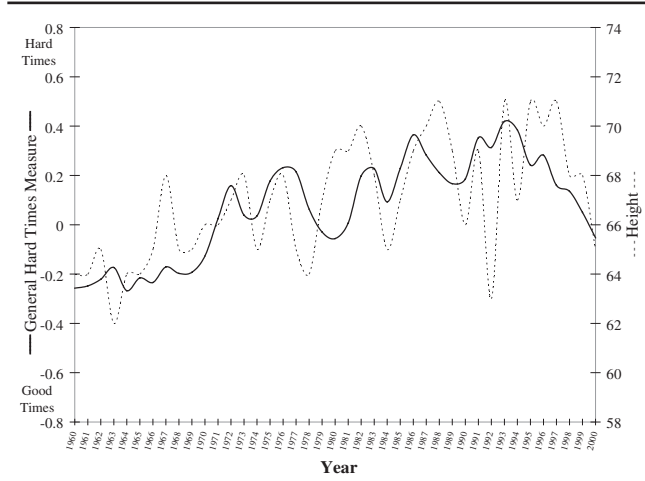


Figure 4 General Hard Times Measure and *Playboy* Playmate of the Year height change across time.
 NOTE: The solid line represents the General Hard Times Measure. Along the left vertical axis, larger General Hard Times Measure values indicate relatively hard times and smaller values indicate relatively good times. The dashed line represents Playmate of the Year height, presented in inches, which corresponds with the right vertical axis.

other Playmate measures and time disappeared when the GHTM was considered. These analyses show that the current relationships between Playmate of the Year measures and social and economic conditions cannot be explained by a simple temporal trend.

In addition, the GHTM was lagged for 1 and 2 years and the relationship between these delayed statistics and Playmate of the Year features was assessed. Results were not stronger than the original outcomes in either case.

DISCUSSION

Consistent with the Environmental Security Hypothesis predictions, when social and economic conditions were difficult, older, heavier, taller *Playboy* Playmates of the Year with larger waists, smaller eyes, larger waist-to-hip ratios, smaller bust-to-waist ratios, and smaller body mass index values were selected. Conversely, as indicated with the prescribed correlations, as social and economic conditions improved, younger, lighter, shorter *Playboy* Playmates of the Year with smaller waists, larger eyes, smaller waist-to-hip ratios, larger bust-to-waist ratios, and larger body mass index values were preferred. Mature features and a more tubular body shape were preferred to a relatively greater extent when times were bad and neotenous features and a more curvaceousness body type were preferred when times were good.

Although there was overall support for the Environmental Security Hypothesis predictions, Playmate of the Year chin size and facial thinness did not follow the predicted pattern of relating positively with hard social and economic conditions. The measures of facial thinness, chin length, chin width, and chin area showed no relationship with the General Hard Times Measure, whereas the eye measures were significantly negatively related to social and economic hard times. One way to explain this discrepancy may lie in the weighted importance of body features over facial features for this particular sample. Nude models are selected for their beauty, but the significance of physical attractiveness may be connected more with body features than facial features for *Playboy* centerfolds. Having a strong chin or a thin face may be of smaller consequence for Playmates, whereas body features, such as height and fat distribution, may be of larger consequence in determining attractiveness. In contrast, movie actresses may rely more on facial appearance than body appearance for their profession, hence the connection of eye size, chin size, and facial thinness with social and economic conditions in the actress sample (Pettijohn & Tesser, 1999). In addition, research findings concerning eye size differences and attributions have yielded robust findings in the arena of facial feature investigations, whereas other facial features have been more variable (see Zebrowitz, 1997).

Although relationships between feature measurements and the state of the social and economic environment were exposed, the range of facial and body measurement values was somewhat restricted. For example, the statement that taller and older Playmates of the Year were selected in social and economic bad times must be

taken in context. The tallest Playmate in the sample was 71 in. tall, the shortest was 62 in., and the oldest Playmate in the sample was 33 years old, the youngest was 18. Certainly, these values do not represent extremes. Furthermore, according to the National Center for Chronic Disease Prevention and Health Promotion (www.cdc.gov/nccdphp/dnpa/bmi), when considering body mass index (BMI), 19 of the 41 Playmates of the Year would be classified as underweight (below 18.5) and the remaining 22 would be classified as average (18.5-24.9). None fell into the overweight or obese categories and the average BMI of all Playmates of the Year was slightly above the minimum to be placed into the normal category. Therefore, these results may only be generalized to nonobese female populations (see Singh, 1993).

Of interest, recent research has found that underweight female figures were rated as more attractive than normal weight or overweight figures, and figures with a high waist-to-hip ratio (.86) were considered more attractive than the figures with a low waist-to-hip ratio across all weight conditions (Puhl & Boland, 2001). These findings run counter to Singh's (1993) original results and a follow-up (Singh & Young, 1995) showing that larger body size, waist-to-hip ratio, and hips also made women appear older and less desirable. Tassinary and Hansen (1998) also show that waist size, hip size, and weight can be varied to produce differences in waist-to-hip ratio judgments of attractiveness. These recent findings suggest that preferences may have stronger sociocultural influences that depend less on evolution and that these ideals may change. Perhaps the samples, which were tested at different times and in different locations, experienced differences in environmental security that could partially explain this discrepancy. Within an average range of body shapes and weights, larger waist-to-hip ratios may be preferred to a relatively greater extent when environmental security is high compared to uncertain conditions. This possibility warrants future investigation.

Although correlational in nature, these results suggest that environmental security may influence perceptions and preferences for Playmates with certain body and facial features. We recognize the limitations of using the *Playboy* Playmate of the Year competition as a source of preferences for female attractiveness over time. *Playboy* is in business to sell magazines. They would not be able to sell magazines if they featured unattractive women who were not desirable to their subscribers. Therefore, it is in the company's best interest to know what the public wants in order to be successful. Some have speculated that model photos are airbrushed and "corrected" in editing. To the extent that any alterations are made, we would argue that they would be in the direction of the current societal trends. Furthermore, if

images are always corrected in the same fashion, this practice could not account for the current pattern of changing preferences with social and economic conditions. Does *Playboy* mirror American culture? We believe so, and the editors of *Playboy* magazine certainly think so. According to Hugh Hefner, "No other magazine and no other images more dramatically reflect the cultural changes that America has been through during the last half of the 20th century" (*The Playmate Book*, 1996, p. 13).

We also recognize the limitations of using the GHTM as an indicator of social and economic conditions in America over time. The GHTM is a gross, societal indicator that is not sensitive to all social and economic threat. As noted earlier, events such as assassinations of important political and social leaders and acts of violence in the United States, such as September 11, 2001, may not be captured in the current measure. The GHTM also does not allow for a precise assessment of how particular groups (i.e., men) or individuals themselves are influenced by the social and economic conditions. Future experimental work may correct these limitations. However, the GHTM includes many of the components cited in previous archival research on societal threat (i.e., Doty, Peterson, & Winter, 1991; McCann, 1991; Sales, 1972, 1973), such as unemployment, consumer price index, suicide, homicide, and divorce, and provides a nice consistency of methodology in which to make comparisons to American actresses (Pettijohn & Tesser, 1999). In other archival investigations, societal measures of threat in America have been related to powerful and charismatic presidential candidate preferences (McCann, 1991, 1997; McCann & Stewin, 1987), authoritarian church affiliation, attack dog preference, strong literary character personality, prevalence of violent sporting events (Doty et al., 1991; Sales, 1972, 1973), mature facial feature preferences in popular American actresses (Pettijohn & Tesser, 1999), and even television viewing preferences for meaningful content (McIntosh, Schwegler, & Terry-Murray, 2000). These outcomes are in line with the current findings involving *Playboy* Playmates of the Year. Our likes and dislikes are indeed influenced by environmental conditions and perceptions of threat.

Culture also may influence preferences for attraction in female facial and body features. Anderson et al. (1992) suggest that attitudes toward female fatness across cultures are influenced by availability of food, climate, social dominance of women, and women's value in the workplace. The current study investigated American preferences, and cross-cultural replications would certainly strengthen our findings. In addition, it should be noted that the Playmates of the Year were predominately of Anglo-American and of European decent. Although

monthly Playmates from many cultural and racial backgrounds have been featured in *Playboy*, only one Playmate of the Year has been African American (1990: Rene Tenison). Considering the lack of diversity in the Playmate of the Year, it is important to consider the implications for preferences between and within different races. For example, research has shown that U.S. African American men prefer larger African American female body types compared to Anglo-American men's preferences for smaller Anglo-American female body types (Jackson & McGill, 1996; Rosenfeld, Stewart, Stinnett, & Jackson, 1999). This research suggests a race-specific prototype of body attractiveness to help explain cultural differences and regional variations within cultures. If a particular race is exposed to a greater social and economic threat than another race, this threat may influence preferences in the manner suggested in the current Environmental Security Hypothesis.

Although relationships were reported in the current study, we do not account for all of the variance in selections and recognize that other factors certainly influence preferences for *Playboy* Playmate of the Year. Besides those mentioned previously, model leg length, hair color, and the presence of a tan (Broadstock, Borland, & Gason, 1992) may influence perceived attractiveness as well. As noted in the commentaries to Voracek and Fisher's (2002) study on temporal changes of Playmate body measures, geographical and historical variation in body size are important considerations (McQueen, 2003) and the media is not the only influence on body image changes (Boynton, 2003). Complex social factors, evolutionary forces, and learning are central to determining body shape and size preferences.

The results of the current investigation provide additional support for the Environmental Security Hypothesis and extend support from facial feature preferences to include body feature preferences. These findings are intriguing and suggest our preferences are shaped by our environmental perceptions of security. Additional work considering how personality preferences are influenced by environmental security may be useful. Alternative replications in various cultures or using different samples, such as models, beauty contestants, or other highly visible representations of societal preferences of attraction, would increase reliability of these findings. But perhaps the most essential line of future research includes experimental manipulations of facial and body features presented under varying degrees of environmental threat. Some initial work has been done in this area (Pettijohn & Tesser, 2004), but additional studies are necessary to determine under what conditions facial and body preferences hold true to predictions and how the mind perceives beauty under different circumstances.

APPENDIX

Playboy Playmate of the Year Individual Descriptive Statistics 1960-2000

<i>Year</i>	<i>Name</i>	<i>Age</i>	<i>Bust</i>	<i>Waist</i>	<i>Hips</i>	<i>Height</i>	<i>Weight</i>
1960	Ellen Stratton	20	35	20	35	64	110
1961	Linda Gamble	21	38	27	37	64	112
1962	Christa Speck	19	38	22	36	65	122
1963	June Cochran	20	36	20	34	62	102
1964	Donna Michelle	18	38	22	37	64	118
1965	Jo Collins	19	36	24	36	64	112
1966	Allison Parks	22	36	24	36	65	117
1967	Lisa Baker	22	35	23	35	68	132
1968	Angela Dorian	23	36	21	35	65	109
1969	Connie Kreski	21	35	23	36	65	118
1970	Claudia Jennings	19	35	23	36	66	115
1971	Sharon Clark	26	35	24	36	66	115
1972	Liv Lindeland	25	36	23	34	67	108
1973	Marilyn Cole	22	36	24	35	68	119
1974	Cyndi Wood	22	34	22	34	65	103
1975	Marilyn Lange	22	39	—	—	67	130
1976	Lillian Müller	23	36	24	35	68	125
1977	Patti McGuire	25	35	23	35	65	115
1978	Debra Jo Fondren	22	35	24	36	64	114
1979	Monique St. Pierre	25	36	26	36	67	117
1980	Dorothy Stratten	19	36	24	36	69	123
1981	Terri Welles	24	36	24	36	69	120
1982	Shannon Lee Tweed	24	36	25	36	70	128
1983	Marianne Gravatte	23	34	21	32	68	105
1984	Barbara Edwards	23	35	23	34	65	105
1985	Karen Velez	23	37	23	35	67	118
1986	Kathy Shower	33	35	24	35	69	122
1987	Donna Edmondson	22	36	23	35	70	127
1988	India Allen	22	35	24	34	71	127
1989	Kimberley Conrad	24	36	24	36	69	122
1990	Reneé Tenison	20	36	23	32	66	112
1991	Lisa Matthews	20	37	24	36	69	120
1992	Corinna Harney	19	34	22	34	63	105
1993	Vickie (Anna Nicole) Smith	24	36	26	38	71	140
1994	Jenny McCarthy	20	38	24	34	67	120
1995	Julie Lynn Cialini	23	34	24	35	71	126
1996	Stacy Sanches	21	34	24	36	70	130
1997	Victoria Silvstedt	22	36	25	37	71	139
1998	Karen McDougal	26	34	24	34	68	125
1999	Heather Kozar	21	36	24	35	68	117
2000	Jodi Ann Paterson	24	32	23	34.5	65	112

NOTES

1. As noted in the Introduction, previous investigations of beauty across time have considered all 12 *Playboy* Playmates of the Month within each year as their sample, not only the *Playboy* Playmate of the Year. We decided to focus on the results of the Playmate of the Year competition in which a single model is determined to represent public preference more so than any of the other individual models within a year and more than the combined measurements of all models within a given year. Using a combination of all Playmate of the Month measurements within a year suggests that all models are preferred to the same extent, but the Playmate of the Year competition and other indicators would suggest otherwise. In addition, a single representation for each year allows for the consideration of a tangible example as opposed to a vague collection of averaged statistics. Therefore, the results of the Playmate of the Year competition was determined to be the best indica-

tor of body, face, and age preferences for female models in the current investigation.

2. Results of the Annual *Playboy* Playmate of the Year contest and photographs of the models were found at www.playboy.com, *The Playmate Book: Five Decades of Centerfolds* (1996), *The Playboy Book: The Complete Pictorial History* (1994), and various issues of *Playboy* magazine.

3. There is the possibility that reported measurements were not entirely accurate, but these values were most likely distorted in the direction of the body ideal of the times.

4. Waist and hip measurements were not provided for Marilyn Lange (Playmate of the Year 1975). Metric body measurement data was originally published for Victoria Silvstedt (Playmate of the Year 1997), but centimeters and kilograms were converted to inches and pounds to maintain consistency in the current investigation.

5. Eye height was the distance from the top to bottom of the visible eye at pupil center divided by the length of the face. Eye width was the distance between corners of the visible eye divided by the width of the

face at the cheekbones. Eye area was calculated as the product of the eye height ratio and the eye width ratio. Chin length was the distance from the top of the lower lip to the bottom of the chin divided by the length of the face. Chin width was the width of the face at the jaw measured at the middle of the chin height, divided by the length of the face. Chin area was calculated as the product of the chin length ratio and the chin width ratio. Cheek thinness was the inner corner where the lips meet to the outer edge of the cheek divided by the length of the face. Cunningham, Roberts, Barbee, Druen, and Wu (1995) provide options for additional facial measurements, but these other areas of the face were not the focus of the current investigation. Please see Cunningham's previous research for additional information regarding facialmetric assessment.

6. Unemployment rate was recorded as the percentage of the workforce unemployed. Disposable personal income was recorded as the annual percentage change in the per capita dollar amount of disposable personal income. Consumer price index was recorded as the annual percentage change in consumer price index, or inflation. Death rate was recorded as the number of deaths per 1,000 of the population. Birth rate was recorded as the number of births per 1,000 of the population. Marriage rate was recorded as the number of marriages per 1,000 of the population. Divorce rate was recorded as the number of divorces per 1,000 of the population. Suicide rate was recorded as the number of suicides per 100,000 of the population. Homicide rate was recorded as the number of homicides per 100,000 of the population. Data were taken from *Statistical Abstract of the United States* (U.S. Bureau of Census, 1977-2001), *Historical Statistics of the United States: Colonial Times to 1970* (U.S. Bureau of Census, 1975), *International Historical Statistics: The Americas 1750-1988* (Mitchell, 1993), *Information Please Almanac* (1993-1996), the *World Almanac and Book of Facts* (1993-1996), and the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics (<http://www.cdc.gov/nchs>).

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