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Forced Into The Beauty Pageant:

An Economic Analysis of Female Well-Being and the Pursuit of Ideal Beauty

by

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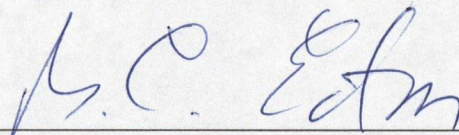
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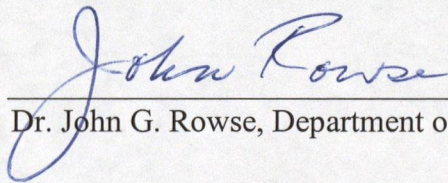
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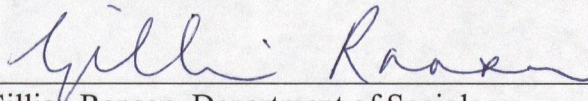
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Forced Into The Beauty Pageant: An Economic Analysis of Female Well-Being and the Pursuit of Ideal Beauty " submitted by Sarah E. Lang in partial fulfillment of the requirements of the degree of Master of Arts.



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Abstract

To examine the effect of appearance and the ‘beauty game’ on female well-being, I developed Veblen economic models based on the stipulations, supported by psychological, sociological, biological, and economic literature, that beauty is a relative good and that female behavior is driven by competition. By starting with a simple identical-two-person-discrete-choice model and then expanding to more complex, continuous choice, multi-person identical and non-identical player models, I found robust results that increases in the price and decreases in the technology of beauty enhancement (from makeup to cosmetic surgery) cause an improvement in well-being. Furthermore, as the artificial images seen in the media become more glamorized and as exposure to and the influence of this artificial ideal image increase, women end up worse off.

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INTRODUCTION

In a ground-breaking study conducted by Dove®,¹ researchers reported a disturbing fact: in the year 2005, 67% of all women aged 15 to 64 withdrew from life-engaging activities because they felt bad about their appearance. These activities included actions like offering an opinion on a controversy, going to school, to the beach, and even to the doctor!

This statistic is one indication of a larger phenomenon that has been studied exhaustively: a woman's well-being is driven, at least in part, by her perception of her appearance as it relates to an idealized target image. In particular, women whose self-image diverges significantly from their ideal target image are unhappy, dissatisfied, and dysfunctional. Due to sociological, biological, and psychological factors, women often measure their own beauty, not in absolute terms, but as relative to the beauty possessed by others.

Since relative appearance is important, women are motivated to enter a contest where they compete to be the most beautiful. By spending money on beauty enhancement through the consumption of cosmetics, plastic surgery, and dieting, women are able to improve their initial endowment of natural beauty; however, due to the nature of the beauty game, as expenditures on beauty enhancement increase, women become worse off.

My economic model will show how this competitive behavior affects women's well-being, and how advertisers and the media can use this behavior to sell more products. Sadly, my model shows that utility (that is, a woman's well-being) decreases as a result of participation in the beauty game. The cost of lipstick may not dent a woman's income, but cosmetic surgery is expensive. The result is that many women spend more and more of their income on beauty enhancement, often at the expense of other goods. Furthermore, the costs of beauty enhancement are not only monetary but often

¹D'Agostino, Heidi, Nancy Etcoff, Susie Orbach, and Jennifer Scott. "*Beyond Stereotypes: Rebuilding the Foundation of Beauty Beliefs*" Findings of the 2005 Dove Global Study (Dove, 2006) 14, 37-38.

psychological, social, and physical. As each woman spends more on her looks, she raises the standard that other women must beat to win. The result is often greater dissatisfaction and, in extreme cases, depression and eating disorders that threaten health.

With the 2007 U.S. expenditure on female beauty enhancement approaching \$100 billion,² it seems that a portion of this money could be better spent. (See **Figure 1.**) In fact, as a nation we spend only about 18% more on education, and approximately \$24 billion less on prescription and non-prescription drugs. (See **Figure 2.**) As the amount of expenditures indicates, the beauty industry is large. As social, psychological, and biological studies indicate, the problems it causes are equally large. In fact, they are large enough to warrant the exploration of the topic in this thesis.

Beauty is a relative concept

To begin the exploration, let's start with the competitive aspect of beauty: As a society, we appear to value beauty by comparing one person to another. A beautiful person owns a higher value of beauty than an unattractive person, but this measurement is completely relative.

For example, if a woman, let's call her 'Jane', gets dressed up to go out on the town, and stops by a house party where her peers are less attractive than she is, then when she sees that she is the prettiest girl in the room, she feels great. Her beauty or image brings her a lot of well-being and happiness because she believes she is more attractive than everyone around her. Jane is winning the beauty contest. But when Jane leaves the party, she goes downtown into a club that is filled with models and supermodels flaunting their tiny waists and their long legs. As Jane looks around, she compares herself to everyone that she sees in her new situation. Now, she finds herself well below average on the beauty scale. Although Jane looks the same as she looked at the house party, her competitors

² All currency is represented in U.S. dollars.

have changed, so Jane is now the ugliest girl in the room. She feels horrible about how she looks so her image, at this moment, brings her unhappiness and lowers her well-being. This example shows that since beauty is a relative good, Jane cannot gain any intrinsic value from her image. She can only obtain value if she looks relatively better than the next person.

Beauty leads to success

Beauty matters to women because they are heavily judged on how they look, often more than on their actions or performance; therefore, the prettier a woman is compared to the average, the more successful she will be at the mating game. In addition, she will collect the ‘beauty premium’ that is the preferential treatment given to beautiful people.

Numerous studies have explored the connections between beauty and success in finding a mate, winning a job, and being more successful in general. Research experiments have shown that men desire beauty as much as, if not more than, other qualities in women. John Marshall Townsend and Gary D. Levy (1990) found that men were significantly less likely to want to go on a date with, have sex with, marry, or even have a cup of coffee with a woman that was considered less attractive³. It appears that beauty enhancement is a way for women to win the best mate because society and evolution have pressured men to judge women more on their looks and less on their intelligence and performance.

According to Dr. Nancy Etcoff, a psychologist and faculty member of the Harvard Medical School and of the Harvard University’s Mind/Brain/Behavior Initiative, attracting the best mate also leads to further advantages such as an increase in social status and better offspring.⁴ Attractive women often ‘marry up’ to men whose education

³ John Marshall Townsend and Gary D. Levy, “Effects of Potential Partners’ Physical Attractiveness and Socioeconomic Status on Sexuality and Partner Selection,” *Archives of Sexual Behavior* 19 (1990).

⁴ Nancy Etcoff, *Survival of the Prettiest, the Science of Beauty*. (New York: Doubleday, 1999) 65-66.

and income are greater than their own. Beautiful women also have a better chance of getting hired or promoted than their less attractive peers.

It seems that, for women, beauty doesn't only equal success in the mating game, but it leads to success in the job market as well. Economists have used experimental, theoretical, and econometric models to study this topic.

For example, by conducting mock interview experiments, Mobius and Rosenblat (2006) found that attractiveness had no correlation with job performance; however, job performance of attractive subjects was significantly overestimated by employers. Furthermore, Hammermesh and Biddle (1994) found through empirical tests that attractiveness was positively associated with higher wages...and a better mate: "The economic penalties facing below-average looking women are not limited to hourly earnings. Both their success in the marriage market and their likelihood of working outside the home are reduced by their bad looks. No such effect exists for below-average-looking men."⁵

Hollywood films and advertisers create idealized images

The filmmakers and advertisers know that people enjoy looking at beauty. They use beautiful actors to entice people to watch films and television shows and to buy more magazines. Whether it's a horror flick or a comedy, Hollywood knows that beauty and sex sell. Even the gory horror suspense movie, Alien, featured a perfectly toned Sigourney Weaver. A Girls Incorporated study found that Hollywood influences girls and young women by convincing them that "skinny is beautiful and that girls have to be attractive to men."⁶

⁵ Daniel S. Hammermesh and Jeff E. Biddle. "Beauty and the Labor Market." The American Economic Review 84 (1994): 1189.

⁶ Girls and Media, New York: Girls Incorporated, 2002.

The U.S. Census Bureau reported that expenditure on advertising was \$215 billion in 1999 and growing.⁷ This massive expenditure and growth seems to indicate that advertising works. Many advertisements use a technique called image advertising by associating their products with ideal images. They attempt to manipulate people into thinking that they can attain the unattainable if they consume the product displayed. Image advertising doesn't just focus on a target market of consumers. Instead, this type of marketing aims to convince an entire audience of both target consumers and non-consumers that an image is desirable and that the only way to attain that image is through purchasing a specific product.

For example, if Calvin Klein uses ultra-thin supermodel Kate Moss to sell women's jeans, both men and women viewing these advertisements associate Calvin Klein jeans with Kate Moss. Even though men are not the target consumers, they are part of the target audience. If Calvin Klein can convince male non-consumers that their jeans represent perfect beauty, then more pressure is put on the target consumers to buy these jeans. As women are flooded with images of perfect unattainable beauty, their sense of what is normal is warped. The influence of Hollywood and image advertising is working, as evidenced by a 17-year-old girl's comments in a Women's E-News (2006) report, "I know in my head that the images are excessive, but to me they feel normal."⁸

By competing in the beauty game, women are worse off

Women incorporate artificial images into an ideal that they measure themselves against; however, real people can't compete with artificial perfection and win. Several recent studies have explored the links between beauty ideals, body dissatisfaction, self esteem, and eating disorders. The studies illustrate that the greater importance a girl or woman places on appearance, the greater the likelihood that there will be a negative impact on

⁷ United States, U.S. Census Bureau, Statistical Abstract of the United States: 2000, 21 Dec. 2005, 21 Nov. 2007 <<http://www.census.gov/prod/2001pubs/statab/sec18.pdf>>.

⁸ Sandra Kobrin, "Teens Call Hyper-Sexualized Media Images 'Normal'" Women Enews 29 Oct. 2006, 14 May 2007 <<http://www.womensenews.org/article.cfm/dyn/aid/2940/context/cover/>>.

self-esteem and body image. In the most extreme cases, negative self-esteem and body image can lead to life-threatening eating disorders such as anorexia and bulimia.

Laurie Mintz, an associate professor at the University of Missouri studying eating disorders and the impact of media on psychological health, observes that: "No matter how close or far one is from this unrealistic ideal, women still don't feel that they're close enough."⁹ Dr. Laurie Essig, a sociology professor at Middlebury College who is researching the economics behind plastic surgery, notes that: "Middle-class Americans are buying into the idea of better living through surgery. Makeover shows, magazines and advertising campaigns have convinced people that flatter stomachs, inflated bosoms, smoother brows and whiter teeth will so improve their careers or their romantic lives that it is even worth going into debt."¹⁰

Debt isn't the only negative impact of the beauty contest. Competition can lead women into unhealthy harmful practices. Dr. Sarah Murnen, a professor of psychology at Kenyon College, claims that "the promotion of the thin, sexy ideal in our culture has created a situation where the majority of girls and women don't like their bodies...and body dissatisfaction can lead girls to participate in very unhealthy behaviors to try to control weight."¹¹ Furthermore, a study on over 24,000 Canadian women showed that women who have undergone breast implant and other cosmetic surgery have a higher rate of suicide.¹² While breast implants and nose jobs haven't been proven to cause suicide, enduring these cosmetic surgeries does not seem to be making women better off.

⁹ Shannon Proudfoot, "All Women Affected by Perfection," The Calgary Herald 02 Apr. 2007, 30 Apr. 2007 <www.canada.com>.

¹⁰ Singer, Natasha. "Who is the Real Face of Plastic Surgery?" The New York Times 16 Aug. 2007, sec. E: e1+.

¹¹ Nanci Hellmich, "Do Thin Models Warp Girls' Body Image?" USA Today 25 Sept. 2006.

¹² Paul J. Villeneuve, et al., "Mortality Among Canadian Women with Cosmetic Breast Implants." American Journal of Epidemiology 164 (2006): 334-341.

Women are spending billions

Where women lie in the distribution of natural beauty often determines how much of their income they spend to compete in the beauty game. New products, new procedures and an ever increasing ideal target image force many women to keep spending to try to attain the unattainable. In 2006, expenditures on cosmetics, cosmetic surgery, and dieting amounted to an \$89.4 billion industry in the U.S. (See Figure 1.)

Cosmetics

Spending on women's cosmetics reached \$21.17 billion in manufacturers' sales in the United States in 2002, and in Europe, the total cosmetics market was worth over \$86.67 billion in retail sales in 2004.¹³ The internet has provided a growing outlet for cosmetics. Market View (2005) estimated that beauty-related internet sales increased by 13% in 2001 to reach \$2.2 billion in 2002.

Cosmetic Surgery

In the United States, women spent approximately \$10.5 billion on cosmetic procedures to improve their appearance in 2006.¹⁴ While the procedures are costly, they are becoming more commonplace. As reported recently in The New York Times, there has been a 'democratization' of cosmetic surgery. Instead of an expensive procedure mostly adopted by the super wealthy or those who make their living in the image industry (such as models), it has been redefined as a 'coveted yet attainable luxury purchase...a commodity to be financed with credit cards and loans.'¹⁵ If women are judged on their looks, and the more beautiful one is, the more success one will attain in life, then expenditure on beauty enhancement is rational. As noted by Dr. Laurie Essig, a sociology professor at Middlebury college who is researching the economics behind

¹³ Cosmetics Industry: Facts and Figures, Eurostat, European Commission, 2006, 18 Nov. 2007 <http://ec.europa.eu>

¹⁴ Approximation based on women receiving 92% of all cosmetic procedures and total expenditure equal to \$11.36 billion dollars (ASPS 2006).

¹⁵ Singer, Natasha. "Who is the Real Face of Plastic Surgery?" The New York Times 16 Aug. 2007, sec. E: e1+.

plastic surgery: “In a bosom-obsessed society where you think you can earn \$20,000 more with bigger breasts, is it insane to consider taking out a loan to have surgery?”¹⁶

Dieting Expenditures

The U.S. weight loss industry almost doubled from 1990 to 2006 to an astonishing \$55.4 billion.¹⁷ While many people spending money on weight loss and dieting may be truly obese, most are likely to be aiming for the ‘thin-ideal’. In 1985, D.M. Thompson et al. found that “Of women between the ages of 24 and 54 who diet, 76% diet for cosmetic rather than health reasons.”¹⁸ Unfortunately, though people are spending more and more to lose weight, the methods of dieting are mostly inefficient. In fact, according to the National Eating Disorders Association, “95% of all dieters will regain their lost weight in 1-5 years.”¹⁹ Judith Ruskay Rabinor, Ph.D., director of the American Eating Disorder Center in Lido Beach, New York, argued that “the emphasis we place on being unnaturally thin pushes people into dieting. But any diet eventually backfires and packs pounds on the people trying to lose them.”²⁰

Furthermore, “We live in an environment that promotes obesity,” adds Edward Abramson, Ph.D., a professor of psychology at California State University. “Biologically, we are not constructed to deal with ubiquitous fast food outlets that offer to supersize everything. Americans' sedentary lifestyle, coupled with an excess of food, opens the door to our widening girth.”²¹ Widespread availability of foods that promote weight gain

¹⁶Singer.

¹⁷ Weight Loss Market to Reach \$58 Billion in 2007, Marketdata Enterprises, Inc., EMaxHealth, 2007, 18 Nov. 2007 <<http://www.emaxhealth.com>>.

¹⁸ D.M. Thompson, et al., “Anorexia Nervosa and Bulimia: The Socio-cultural Context.” International Journal of Eating Disorders 3 (1985): 20-36, qtd. in Understanding Statistics on Eating Disorders, National Eating Disorder Information Centre, NEDIC, 2005, 18 Nov. 2007 <<http://www.nedic.ca>>.

¹⁹ F. Grodstein, et al., “Three-year follow-up of participants in a commercial weight loss program: can you keep it off?” Archives of Internal Medicine 156 (2006): 1302, qtd. in Statistics: Eating Disorders and Their Precursors, National Eating Disorders Association, 2005, 18 Nov. 2007 <www.NationalEatingDisordersAssociation.com>.

²⁰ The Widening of America, Multi-Service Eating Disorder Association, 2007, 18 Nov. 2007 <www.medainc.org>.

²¹ The Widening of America, Multi-Service Eating Disorder Association, 2007, 18 Nov. 2007 <www.medainc.org>.

coupled with pressure to lose weight and poor weight loss methods appear to be leading Americans to spend a growing amount on weight loss without seeing satisfying results.

Conclusions

The beauty contest is leaving women worse off because their income is devoted to beauty enhancement. Thanks to credit cards, other loans, and excessive behavior, income doesn't restrict expenditure on beauty enhancement. This causes some women to go into debt or engage in unhealthy behavior just to better their position in the game.

The gap between a woman's actual image and the ideal image has implications that drive her to chase the unattainable ideal. With the increase in new methods and the improvement on old methods, big expenditures on beauty enhancement are becoming the norm. And the results are often devastating psychologically, physically, as well as financially. This leads us to model the effects of the beauty game on women's well-being.

Overview of the Model

Using sociologist and economist Thorstein Veblen's approach, I model the beauty contest as a 'Veblen game' and I define beauty as a 'pure Veblen good.' A pure Veblen good is measured by its relative value compared to other goods; therefore, it has no intrinsic value. Veblen goods can be referred to as positional goods because their worth is calculated on a scale of how much better or how much worse they are compared to the next good. In my economic model, I am defining beauty as a pure Veblen good because beauty is assessed by comparing one person's looks to another; therefore, the beauty contest is modeled as a Veblen game.

Central to the model is the concept of the reference group. A reference group consists of people who engage in any sort of interaction from knowing each other to seeing images of each other. A reference group can be as small as a two-person peer group and as big as a culture of people. The key trait of a reference group is that its members adhere to the same societal norms, so ideas of what is beautiful and what is unattractive will be similar. An urban North American female, for example, would probably be part of a different reference group than an Inuit female living in the Northern Canadian Arctic; therefore, when I refer to the within-reference group average image, I am referring to the average image of all of the women within the same reference group.

To explain my economic model, I will focus on a representative individual, 'Jane'. Jane's 'beauty' is a combination of the natural beauty that she is born with and her expenditure on beauty enhancement. Since Jane can not change her natural beauty, the only way for her to improve her image is through expenditure on beauty enhancement. Jane can choose to spend her income on either beauty enhancement or on all other goods, which is represented, in my model, by a composite good.

To examine the effect of the Veblen beauty game, I model Jane's well-being, or utility, as a combination of how she fares in the beauty contest and her consumption of all other goods. She competes in the beauty contest by comparing herself to an ideal target image, so the beauty contest is measured as the gap between her actual image and her ideal target image. The target image is defined as a weighted average of the within-group reference image and the artificial images that Jane sees in the mass media. The within-reference group average image is an average of the actual images of all of the women in Jane's reference group, and the artificial image is an average of all of the artificial images that she sees in the mass media such as enhanced female images in advertisements and Hollywood actresses. As Jane spends on beauty enhancement, she improves her image and starts to close the beauty gap between her own image and the target ideal image.

The more Jane spends on all other goods and the better she finishes in the beauty contest, the happier she is. Obviously, there is a trade off because every dollar spent on beauty enhancement is a dollar less that can be spent on all other goods and vice versa. This tradeoff means that there is an equilibrium where the marginal benefit of spending an additional dollar on beauty enhancement equals the marginal cost of spending that dollar. In equilibrium, Jane has no incentive to deviate from her chosen expenditures. Given what everyone else has chosen and given the parameters such as price of beauty enhancement and technology, Jane has maximized her utility by choosing the equilibrium amount of beauty enhancement.

It's important to note that the terms income and expenditure are not exclusively monetary. Instead, income is a combination of all of the resources Jane acquires, and expenditure on beauty enhancement can include non-monetary expenses like the effort of dieting or the cost of anorexia. The trade-off applies in the non-monetary situation too. For example, the more time Jane spends dieting, the less time and energy she has to consume other goods or pursue other gratifying activities.

Two-person discrete model

In the simplest model, Jane is part of a two-person reference group. In this two-person discrete choice model, both players, Jane and the other woman, are identical, so they both have the same natural endowments of beauty and equal incomes. Furthermore, they have two discrete actions to choose from. Each woman can either choose to spend a discrete amount of income on beauty enhancement or she can choose to spend nothing. There is a benefit to winning the beauty contest and a cost of losing. The only way to win the contest is to spend on beauty enhancement, and if both players spend then no one wins. Both players are better off if neither one spends, but if the value of winning is greater than the expenditure on beauty enhancement, then both players will spend, and they will end up worse off. In this simple model, I am able to analyze how the outcome of the game depends on the values of the benefit of winning, the cost of losing, and the expenditure parameters.

Multiple-person continuous model

Next I expand into a multiple-person continuous model. Now, Jane is a representative individual in a reference group of many women. In this expansion, all players are still identical, so they all have equal natural beauty and incomes, but because beauty enhancement is now continuous they can choose to spend any amount on beauty not just one discrete value. In this case, Jane will maximize her utility by choosing to purchase the equilibrium amount of beauty enhancement. At this equilibrium, she experiences the minimal beauty gap between her image and the target while maximizing her consumption of all other goods. Jane won't want to deviate from this equilibrium because then she will receive a lower utility. This equilibrium expenditure occurs at the value where Jane's well-being is maximized given the values of the exogenous variables such as price, technology, and artificial image. Since everyone is identical, everyone will make the same decisions as Jane; therefore, everyone will wind up at the same equilibrium values of expenditure, own image, and utility. I can then examine how changes in these parameters will affect Jane's equilibrium expenditure and well-being.

Non-identical players

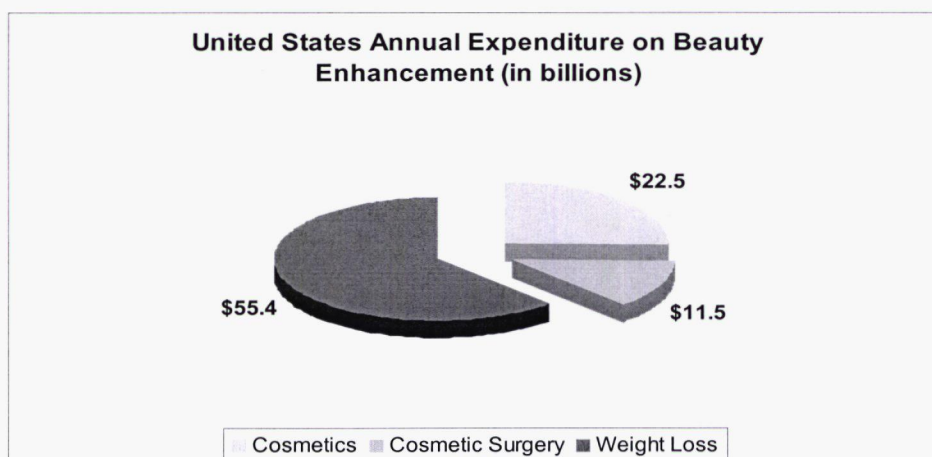
In my last expansion, I examine non-identical players. Jane is now one person in a society where there is a distribution of natural beauty and income. In this example, women range from unattractive to beautiful and from rich to poor. This model is the most interesting because every player ends up with a different individual equilibrium value of expenditure, own image, and utility. Equilibrium values will differ based on where individuals sit in the distributions of natural beauty and income, given other's decisions, and based on the values of the exogenous variables (such as price, technology, and artificial image). I can increase and decrease these parameters to find out who in the distribution is made better off and who is made worse off. For example, I discover that when the price of beauty enhancement increases, all but the richest most unattractive women are made better off. This result stems from the fact that the richest most unattractive women must rely heavily on purchasing beauty enhancement in order to

compete in the beauty contest. Therefore, these women face serious negative consequences from a price increase that no longer allows them to purchase as much beauty enhancement.

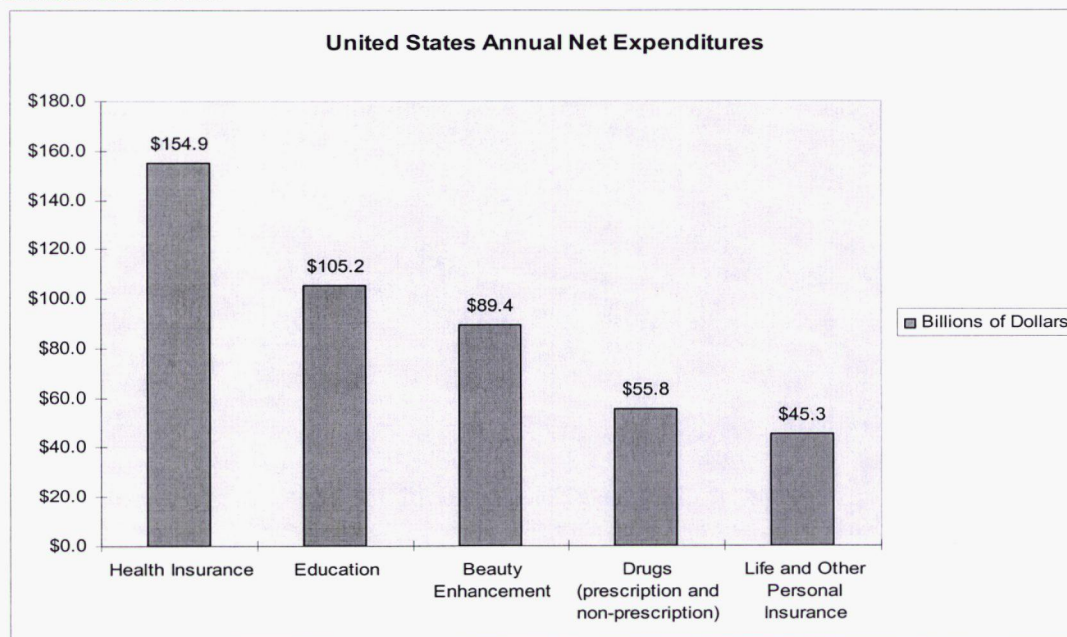
Furthermore, as image enhancement technology increases, beauty expenditure becomes more effective. Each dollar spent can be turned into a greater image improvement. While this efficiency may seem to make women better off, I will show in the model that an increase in technology causes most women to end up worse off because better technology causes the ideal image to make larger upward moves.

In both the identical and non-identical models, the within-group average image is endogenous, so it is affected by any external change such as changes in the price or technology of beauty enhancement. On the other hand, the artificial image is exogenous and it's controlled by the media, so I can focus on the effects of advertising by analyzing how increases and decreases in the perfection of and exposure to the artificial image affect Jane's and every other player's well-being.

Before entering into the details of the economic model, I will examine the motivation behind women's behavior. Due to sociological, biological, psychological, and economic factors, appearance is important to women, and since beauty is a relative good, women are motivated to enter a Veblen game where they compete to be the most beautiful. In the next section, the literature review, I will explore these motivating factors and the Veblen concept of beauty.

Figure 1: Beauty Enhancement is a \$90 Billion Industry

Sources: Overview of the 2002 U.S. Cosmetic Market, U.S. Cosmetic Industry, Market View, 2005, 18 Nov. 2007 <www.cosmeticindustry.com/overview02final.html>. 2006 Statistics, American Society for Aesthetic Plastic Surgery, ASAPS, 2007, 19 Nov. 2007 <<http://www.surgery.org>>. Weight Loss Market to Reach 58 Billion in 2007, Marketdata Enterprises, Inc., EMaxHealth, 2007, 18 Nov. 2007 <<http://www.emaxhealth.com>>.

Figure 2: Expenditures on Beauty Enhancement Rival Those of Education and Health Insurance

Sources: Consumer Expenditures on insurance, education and drugs in 2004, Bureau of Labor Statistics, U.S. Department of Labor, <http://www.bls.gov/cex/home.htm>. Expenditure on Beauty based on 2002 expenditure on cosmetics (Market View 2005), 2006 expenditure on cosmetic procedures (American Society of Plastic Surgery 2007), 2006 expenditure on weight loss (Marketdata, 2007), and annual growth rates of .1%, 9%, 6% respectively.

LITERATURE REVIEW

I. Female Beauty Is a Relative Concept

In the eyes of both women and men, beauty is a relative concept. As stated by Darwin, “If everyone were cast in the same mold, there would be no such thing as beauty.”²²

In recent years, psychologists and sociologists have explored the relative nature of beauty, conducting many experiments that analyze the impact of beauty on women, men and even infants. Generally, these studies examine the ‘contrast effect’ where participants tend to compare the beauty of several subjects, usually in photographic form. The contrast effect states that one is apt to judge a person’s characteristics relative to others. For example, an average woman may appear unattractive in a room full of beautiful women and appear attractive in a room full of less-attractive women. The results of all of these studies have led me to the conclusion that beauty is a relative, not an absolute, concept. Some of the best and most representative studies are reviewed below.

Perceptions of Beauty: Studies of Men and Women

Douglas T. Kenrick and Sara E. Gutierres, along with colleagues, have conducted numerous studies that explore and confirm judgments of beauty and that illustrate, through the contrast effect, that beauty is a relative concept. In a 1989 study, Kenrick and Gutierres wanted to test the contrast effect by analyzing whether men and women responded differently to average and highly attractive female nudes depending on the order in which the nudes were viewed.²³ They learned that both men and women found the average-looking women less attractive after they had viewed the highly attractive nudes.

²²Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (Princeton: Princeton University Press, 1981) 354, qtd. in Nancy Etcoff, *Survival of the Prettiest, the Science of Beauty* (New York: Doubleday, 1999) 5.

²³ Douglas T. Kenrick, et al., “Influence of Popular Erotica on Judgments of Strangers and Mates.” *Journal of Experimental Social Psychology* 25 (1989): 159-167.

In the first experiment, 107 male and 89 female participants were asked to view 16 slides of highly attractive nude females from *Playboy* and *Penthouse* magazines. In control tests, subjects were shown either 16 nude abstract art slides or 16 photos of averagely attractive nude women. After viewing the slides, subjects observed a target photo of an average-looking nude female (the photo was rated as averagely attractive in a separate study). For both men and women, “exposure to the [highly attractive] centerfolds lowered judgments of the average target’s attractiveness compared to both the art and the average attractive controls.”²⁴

In a second experiment, Kenrick et al. tested the influence of erotica on men’s and women’s satisfaction with their mate. In this study, the contrast effect was pronounced for men, but not for women. Subjects consisted of male and female undergraduate students, who were in a heterosexual marriage or live-in relationship. The experimental group subjects were shown 16 *Playboy*, *Penthouse*, or *Playgirl* centerfold slides of the opposite sex. Control group subjects were exposed to 16 abstract art slides. All subjects rated the aesthetic beauty of the slides, and then their relationship satisfaction was measured in a survey that included three partner attractiveness ratings and thirteen items from Rubin’s (1970) Love Scale. While the results showed that in women there was no correlation between viewing highly attractive nude males and satisfaction with one’s own partner, “males who found the Playboy-type centerfolds more pleasant rated themselves as less in love with their wives.”²⁵

In a 1993 study, Douglas T. Kenrick et al. looked at the effects of opposite-and same-sex beauty on mood or ‘affect’ by surveying respondents after they viewed a variety of images.²⁶ They found that people feel good when they observe beauty in the opposite sex but feel bad about themselves when confronted with beauty in others of the same sex.

²⁴ Kenrick et al. 162.

²⁵ Kenrick et al. 159.

²⁶ Douglas T. Kenrick, et al., “Effects of Physical Attractiveness on Affect and Perceptual Judgments: When Social Comparison Overrides Social Reinforcement” *Personality and Social Psychology Bulletin* 12 (1993): 195-199.

In the study, 80 female and 80 male college students were exposed to six photographs of either average or attractive faces and then asked to rate a target photograph according to attractiveness. (Attractiveness of the facial photos was determined in a separate experiment where a series of photos were rated by subjects that weren't involved in this study. The ratings were averaged to attain a less biased measurement of attractiveness.) The subjects also answered a series of survey questions to evaluate their mood based on the Mood Adjective Check List (MACL; Nowlis, 1970). Subjects of each sex were randomly divided into four groups of 20.

- The first group viewed six photos of average-looking faces then rated the average target photo and indicated their mood.
- The second group measured mood before viewing the six average photos and rating the average target photo.
- The third and fourth groups viewed six attractive photos. Group three measured mood before rating the average target photo, and group four reversed that order by rating the target then measuring mood.

Using one-tailed comparisons or F-tests, this study discovered robust results for the existence of a contrast effect: “viewing highly attractive faces decreases the apparent attractiveness of an average face whether the raters were of the same sex as the target photos or of the opposite sex.”²⁷

The study found that there was no significant relationship between viewing average faces and mood, but when subjects viewed more attractive photos of the opposite sex, their mood was positively affected. Furthermore, subjects in the fourth group condition that were exposed to attractive photos of the opposite sex, then an average target photo, reported a less positive mood than the subjects in the third group who reported their mood before viewing the average target photo. In addition, when subjects were shown photos of attractive people of the same sex, they reported less positive moods.

²⁷ Kenrick et al.198.

In summary, this study found that seeing beautiful members of the opposite sex puts one in a better mood; seeing relatively less attractive member of the opposite sex lowers one's mood, and seeing beautiful members of the same sex lowers one's mood as well.

In 1999, Sara E. Gutierres et al. analyzed the role of beauty and dominance in the context of the mating game by looking at how exposure to highly attractive and highly dominant same-sex profiles affected one's self-satisfaction.²⁸ Both men and women rated themselves as less desirable in a relationship after they viewed profiles that contained masculine or feminine characteristics considered more pleasing than their own.

In the study, university student subjects viewed 8 same-sex target profiles that included a photograph. The target profiles were either highly attractive or unattractive and either highly dominant or non-dominant; therefore, each subject was exposed to one of four combinations:

- highly attractive/highly dominant
- highly attractive/non-dominant
- unattractive/highly dominant
- unattractive/non-dominant.

The profile pictures consisted of either highly attractive models or yearbook pictures from a different university. (The pictures were rated in a separate experiment where they were categorized as highly attractive or unattractive.) After viewing these profiles, subjects answered a 27-item questionnaire that examined their perception of themselves and their desirability as a marriage partner. The researchers analyzed the data using two tailed t-tests to measure the relationship between variables.

²⁸ Sara E. Gutierres, et al., "Beauty, Dominance, and the Mating Game: Contrast Effects in Self Assessment Reflect Gender Differences in Mate Selection." Personality and Social Psychology Bulletin 25 (1999): 1126-1134.

Gutierrez et al. found that a woman's self-rating and her perception of her own desirability as a marriage partner was unaffected by the dominance level of the women in the profiles that she viewed. However, women rated themselves "less desirable as a marriage partner after exposure to highly attractive women than after exposure to less attractive women."²⁹ For men, attractiveness had no effect on their self ratings; however, "men rated themselves as significantly less desirable as a marriage partner when they were exposed to highly dominant men than when they were exposed to non-dominant men."³⁰

In a 1983 study, Thomas F. Cash et al. wanted to determine what impact photos of 'unattractive', 'attractive', and 'professionally attractive' women had on the college women participating in their study.³¹ They found that women compared themselves less favorably to the 'attractive' and 'professionally attractive' women and more favorably to the 'unattractive' women.

In the study, 51 female college students were asked to view 25 photos in 3 different conditions. In the first two conditions, subjects viewed photos of 'attractive' or 'professionally attractive' women. Both 'attractive' and 'professionally attractive' photographs were taken from magazine advertisements or articles and had been rated as 'attractive' in a separate experiment. The difference between the two sets of photos was that 'professionally attractive' images had randomly assigned brand names attached to them to imply that they were fashion models. Subjects in the third condition viewed photographs of unattractive women. After viewing and answering questions on the photos, subjects rated their own physical attractiveness and their body dissatisfaction on 10-point and 6-point rating scales respectively.

The results of this procedure "revealed that, as predicted, subjects exposed to attractive persons rated their own physical attractiveness lower (Mean = 5.6) than subjects exposed

²⁹ Gutierrez et al.1131.

³⁰ Gutierrez et al.1130.

³¹ Diane Walker Cash, et al., "'Mirror, Mirror, on the Wall...?': Contrast Effects and Self-Evaluation of Physical Attractiveness." *Personality and Social Psychology Bulletin* 9 (1983): 351-358.

to stimulus persons who were plainer in appearance (Mean = 6.8).”³² Furthermore, subjects rated themselves more favorably compared to the ‘professionally attractive’ photos than compared to the ‘attractive’ photos.

In 2001, Itzhak Aharon et al. wanted to determine the responses of heterosexual males to images of attractive and average males and females.³³ Not surprisingly, heterosexual men chose to view images of beautiful women for an extended period of time and chose to make images of average-looking women and both good- and average-looking men disappear quickly.

Using a ‘keypress’ experiment, heterosexual males viewed images of attractive and average males and females. The subjects were able to either press a key to extend the viewing time of each image or press another key to make the image disappear. The facial images were rated as average or attractive in a separate experiment. Subjects were exposed to 80 images which they viewed an average of three to four times. When subjects saw the same image repeated for the second, third, or fourth time, the viewing time for that image remained consistent, and subjects chose to view images of attractive females for a significantly longer time than they chose to view images of average females and attractive males.

The second part of this study looked at the neuroimaging effects of beautiful facial images and concluded that seeing beautiful female faces triggers brain reward activity in heterosexual men. Male test subjects viewed 4 sets of facial images: average female, average male, attractive female, and attractive male. These images had been judged as average or attractive in a separate experiment. By performing functional magnetic resonance imaging (fMRI) on areas of the brain that are associated with reward circuitry, Aharon et al. (2001) were able to see how men’s brain activity was affected by viewing beauty. When heterosexual males were shown pictures of beautiful females the nucleus

³² Cash et al. 354.

³³ Itzhak Aharon, et al., “Beautiful Faces have Variable Reward Value: FMRI and Behavioral Evidence.” *Neuron* 32 (2001): 537-551.

accumbens (NAc) area of the brain was significantly more activated than when these males were shown pictures of average looking females or beautiful males. NAc activity is part of a complex reward function in the brain that includes the expectancy of reward.

In this study, Aharon et al. (2001) noted that male's brain reward system activity in response to beautiful women is similar to the reward stimulus findings in response to money and drugs; therefore, "extending the set of categories of stimuli producing NAc activity beyond homeostatic, monetary, and drug rewards to include rewards with direct social relevance, such as beautiful faces."³⁴

Perceptions of Beauty: Studies of Infants

In 1987, Judith H. Langlois et al. performed two studies involving 'looking time' to test whether infants could discern differences in facial beauty.³⁵ The first study provides strong evidence that the importance of beauty is partially instinctual and not solely a learned behavior. Preference for beauty has a strong biological component that appears to increase with age.

The first study utilized 31 infants (11 girls and 20 boys) with a mean age of 6 months and 20 days. The experimenters showed the infants 16 slides of white female faces; 8 photos were rated attractive and 8 were rated unattractive in a separate experiment, and all physical attributes such as facial hair, facial expression, and hair style were consistent in all 16 slides. In one condition, attractive slides were paired next to unattractive slides in a random order (attractive slides were randomly on the right or left in each pairing). In the other condition, a pair of either two attractive faces or two unattractive faces was projected. These 10-second slide showings began when the infant first glanced at one photo and ended when the infant looked at the center of the screen.

³⁴ Aharon et al. 545.

³⁵ Judith H. Langlois, et al., "Infant Preferences for Attractive Faces: Rudiments of a Stereotype?" *Developmental Psychology* 23 (1987): 363-369.

The results revealed that 6-8 month old infants gazed longer at the attractive slides in both conditions. In the comparison condition, infants chose to look at the attractive faces for longer than they looked at the unattractive faces. In the similar attractiveness condition, infants stared longer at pairs of attractive/attractive slides than at the unattractive/unattractive slides. These results were significant using multivariate analysis of variance regressions; therefore, this study concluded that 6-8 month olds prefer attractive faces. Attractiveness of the mother was also measured, in case infants with more beautiful mothers had a stronger tendency to prefer beautiful faces, but this variable proved to be insignificant. Furthermore, the sex of the infant was irrelevant to beauty preference.

This study was repeated using 2-3 month old infants to see if the results held for younger infants. Thirty infants, 16 girls and 14 boys, with the average age of 2 months and 21 days were tested. The multivariate analysis discovered that only the comparison condition provided significant results for the younger infants; therefore, these younger infants preferred attractive faces, but only to a significant degree when the attractive faces were shown next to unattractive faces. "These two studies indicate that both older and younger infants look longer at attractive than at unattractive faces when the stimuli are presented in contrasting pairs...In the condition in which attractiveness levels were contrasted across trials only the older infants looked longer at the attractive faces."³⁶

This study appears to show that infants view beauty as a relative good, and perhaps 6-8 month olds have seen enough faces to have an internal beauty scale or reference group; therefore, these older infants don't need a direct comparison to judge what is beautiful and what is not beautiful. "This difference in looking time [between attractive and unattractive faces] indicated that infants were capable of discriminating between the faces of female adults on the basis of adult-rated attractiveness and that they showed a visual preference for the attractive faces. This finding extends downward in age."³⁷

³⁶ Langlois et al. 366.

³⁷ Langlois et al. 366.

In 1991, Langlois et al. performed similar studies to test the robustness of the 1987 results and to extend the study to male faces, to non-white female faces, and to infant faces.³⁸ The results indicated again that infants prefer attractive faces to unattractive faces. The slide viewing procedure replicated the comparison condition in the earlier study, but the slide content was expanded to include the faces of males, non-white females, and infants. This study further showed that infants prefer attractive to unattractive faces, whether the faces are those of males, white females, non-white females, or infants. “The results of these studies unambiguously show that 6-month-old infants can discriminate attractive from unattractive faces and that they visually prefer attractive faces of diverse types.”³⁹

³⁸ Judith H. Langlois, et al., “Facial Diversity and Infant Preferences for Attractive Faces.” Developmental Psychology 27 (1991): 79-84.

³⁹ Langlois et al. 82.

II. Female Beauty Leads to Success

Many studies suggest that we enjoy looking at beauty. Other studies indicate that women who are more beautiful will fare better in the mating game. Beauty also leads to job and other opportunities, so the result is that there are benefits to being beautiful. No wonder beauty matters so much to women.

The Mating Market

In this section I focus on whether and how beauty benefits women in their search for a mate. Many studies have indicated that most men prefer beautiful women. If women are in competition to find the best mate, then it stands to reason that beauty is important to them.

To test the effects of attractiveness and socioeconomic status in the mating game, Townsend and Levy (1990) conducted a survey study to assess which of these characteristics made a person more or less desirable in different levels of a relationship.⁴⁰ They determined that the beauty of a potential mate mattered for both men and women, but when women make relationship decisions, a man's socioeconomic status can override his looks.

Townsend and Levy exposed 212 female and 170 male undergraduate students to a series of 3 profiles. These profiles depicted college students and consisted of a photograph and a narrative that described their education path, and predicted job and potential income. The profile photos, which had been rated in a previous experiment, were categorized into the following groups:

- high attractiveness
- average attractiveness
- low attractiveness.

⁴⁰ John Marshall Townsend and Gary D. Levy, "Effects of Potential Partners' Physical Attractiveness and Socioeconomic Status on Sexuality and Partner Selection," Archives of Sexual Behavior 19 (1990).

Photos and socioeconomic descriptions were randomly paired together to form a range of profiles, for example, high attractiveness/high status, high attractiveness/low status, low attractiveness/high status, average attractiveness/low status.

After viewing each profile, subjects answered a series of questions designed to assess the level of relationship they would be willing to engage in with the profiles. Subjects rated the following 6 partner selection questions on a scale from 1 = high willingness to 3 = undecided to 5 = high unwillingness:

1. "I would have a cup of coffee and a casual conversation with a person like this."
2. "I would go out on a date with a person like this."
3. "I would be willing to have sex with a person like this."
4. "I would be willing to have a serious relationship with a person like this, that could lead to marriage."
5. I would be willing to have a serious sexual relationship with a person like this, that could lead to marriage."
6. "I would be willing to marry a person like this."⁴¹

Using correlation tests, Townsend and Levy revealed that level of partner attractiveness mattered for both men and women when choosing their willingness to engage in anything from a date to sex to marriage. On a more interesting note, for women, a man's high status compensated for his low attractiveness rating. For example women were just as likely to want to have a sexual relationship that leads to marriage with a high status man whether he was unattractive or highly attractive. However, in men's preferences, this socioeconomic status compensation did not occur. Men consistently found low attractiveness less acceptable. For example, men were less likely to want to have a coffee with, have sex with, and marry women that were rated lowest on the attractiveness scale.

⁴¹ Townsend and Levy 153.

Kenrick et al. (1994) conducted an empirical study to test the evolutionary biologist's theory that when choosing mates, females most value the dominance characteristic in males, and males most value the beauty characteristic in females.⁴² The study essentially confirmed the theory that women prefer dominant men and men prefer attractive women.

In the experiment, 198 female and 165 male undergraduate students participated under the assumption that they were testing a new on-campus internet dating service. All subjects were determined to be in a heterosexual relationship, either dating or marriage. Each subject was exposed to seven constructed (bogus) target profiles of the opposite sex that included a photograph, name, hometown, hobbies and "three bogus personality scores ('Social Facility/Likeability,' 'Conscientiousness/Task Orientation,' and Dominance/Ascendance')"⁴³

In order to test the effects of high- and low-**dominance** personality traits, all targets were given average scores for Facility/Likeability and Conscientiousness/Task Orientation, but scores varied from high to low for Dominance/Ascendance. To test the effects of **attractiveness**, the target profile photographs were either of highly attractive professional models or of average-looking students.

After viewing the seven target profiles, the subjects completed a survey regarding their current relationship and partner. Relationships and partners were measured on 15 and 20 dimensions respectively using a 7-point preference scale.

The results showed that men who viewed highly attractive profiles were significantly less satisfied with their own partners and relationships than men who viewed profiles of average women, but only when these highly attractive profiles included the low-dominance personality trait. When men viewed highly dominant profiles, attractiveness did not influence their commitment to their relationships.

⁴² Douglas T. Kenrick, Steven L. Neuberg, Kristin L. Zierk, and Jacquelyn M. Krones, "Evolution and Social Cognition: Contrast Effects as a function of Sex, Dominance, and Physical Attractiveness," *Personality and Social Psychology Bulletin* 20 (1994): 210-217.

⁴³ Kenrick, et al., 212.

In contrast, women were not influenced by attractiveness. Women who viewed profiles of highly dominant men were significantly less satisfied with their relationships than women who viewed profiles of low-dominance men, but physical attractiveness did not sway a woman's satisfaction with her current partner.

In addition to the above articles, some reviewed in Section I give insights about men's desires for beautiful women which could affect their decisions in the mating game:

- The Aharon et al. (2001) brain reward experiments found that men prefer to look at beautiful women. Aharon et al. claimed that the reward activity is similar to the reward experienced by drug addicts and gamblers when they take drugs or win money respectively.⁴⁴ This study provides evidence that men prefer to watch beautiful women. Since men presumably spend more time with their mate than with other women, they may be compelled, biologically, to choose the most beautiful woman they can get.
- The 1989 Kenrick et al. study concluded that "males who found the Playboy-type centerfolds more pleasant rated themselves as less in love with their wives."⁴⁵ Furthermore, their 1993 study found that subjects who viewed attractive photos of the opposite sex reported a significantly positive change in mood.⁴⁶ Both of these results support the assumption that men prefer beautiful women, so they may be tempted to prefer a more beautiful mate.
- Gutierres et al. (1999) found that women's perception of their own desirability as a marriage partner was unaffected after viewing female profiles that showed a high dominance level; however, these women rated themselves significantly less favorably as marriage partners after viewing profiles of attractive females. According to this study, women believe that they are being judged by their looks

⁴⁴ Itzhak Aharon, et al., "Beautiful Faces Have Variable Reward Value: FMRI and Behavioral Evidence," Neuron 32 (2001) 537-551.

⁴⁵ Kenrick et al. "Influence of Popular Erotica on Judgments of Strangers and Mates." Journal of Experimental Social Psychology 25 (1989) 159.

⁴⁶ Douglas T. Kenrick, et al., "Effects of Physical Attractiveness on Affect and Perceptual Judgments: When Social Comparison Overrides Social Reinforcement" Personality and Social Psychology Bulletin 12 (1993): 195-199.

in the mating game due to societal views instilled within them. On the other hand, men were affected by the dominance levels but unaffected by the attractiveness of the same-sex profiles. This study offers further evidence that, in the mating game, women, unlike men, are judged on the basis of beauty.⁴⁷

Beauty Opens Doors

The results of the mating story suggest that men will judge attractive women more favorably than they judge unattractive women. Since men compose the majority of upper management in the workforce—84.4% of corporate officers in Fortune 500 companies are male⁴⁸—then I can assume there is a sad fate for unattractive women with respect to getting hired and promoted in the work place. It appears that, for women, beauty doesn't only equal success in the mating game, but it leads to success in the job market as well. The 'beauty premium' describes this idea that beautiful people are given preferential treatment by others. Economists have used experimental, theoretical, and econometric models to study this topic, and I have detailed several studies that bear out this effect.

Hammermesh and Biddle (1994) conducted an empirical study of the effect of attractiveness on wage earnings and found that "Other things equal, wages of people with below average looks are lower than those of average-looking workers; and there is a premium in wages for good-looking people that is slightly smaller than this penalty."⁴⁹

Using data from the Canadian Quality of Life (1981), the American Quality of Life (1971) and Quality of Employment (1977) surveys, the researchers built econometric models designed to test the importance of beauty on income level. They utilized these three surveys because in each survey interviewers had rated individuals' appearances and had gathered comprehensive information on background, job detail, and wage earnings.

⁴⁷ Sara E. Gutierrez, et al., "Beauty, Dominance, and the Mating Game: Contrast Effects in Self-Assessment Reflect Gender Differences in Mate Selection." *Personality and Social Psychology Bulletin* 25 (1999): 1126-1134.

⁴⁸ *The Catalyst Pyramid: U.S. Women in Business* (New York: Catalyst Inc., 2007).

⁴⁹ Daniel S. Hammermesh and Jeff E. Biddle. "Beauty and the Labor Market." *The American Economic Review* 84 (1994): 1192.

To gain consistency in the data, Hammermesh and Biddle excluded individuals that worked part-time (less than 20 hours per week), made an hourly wage of less than \$1, or were older than 64 or under 18. To isolate the marginal effect of looks on wages, they also made an effort to control for variables that could influence wages such as education, socioeconomic status, and family history.

Through regressions of the data using six different econometric equations, Hammermesh and Biddle found robust results:

“...in all six groups, people with above-average looks receive a pay premium ranging from as little as 1 percent to a high estimate of 13 percent (for women in the QAL). In five groups...workers with below average looks receive a pay penalty, ranging from 1 percent to as much as 15 percent.”⁵⁰

I can see from this result that according to Hammermesh and Biddle’s study, the penalty of being unattractive seems greater than the benefit of being beautiful.

As part of their study on the ‘beauty premium’, Hammermesh and Biddle uncovered an interesting result that pertains to the mating story. By holding age and education constant, and regressing women’s attractiveness on the education level of her husband, Hammermesh and Biddle found that while a woman’s looks weren’t associated to her chances of getting married, her looks were positively correlated to the earning potential of her husband. In other words, the more unattractive a woman is, the more likely she is to marry a man that is less educated and therefore has the potential to make less money:

“All else equal, below-average looking women marry men whose educational attainment is one year less than what the women’s own characteristics, including her educational attainment predict. Women face an additional economic penalty for bad looks in the form of marriage to husbands whose potential earnings abilities are lower. The results show that the economic penalties facing below-average-looking women are not limited to hourly earnings. Both their success in the marriage market and their likelihood of

⁵⁰ Hammermesh and Biddle 1181.

working outside the home are reduced by their bad looks. No such effect exists for below-average-looking men.”⁵¹

Hammermesh and Biddle also agree that looks matter in the mating game, and they matter more for women than for men.

To examine the importance of beauty and beauty stereotypes in the labor market, Mobius and Rosenblat (2006) simulated different employment interview processes and analyzed the results.⁵² The study found that, while attractiveness had no correlation with job performance, attractive worker’s performance was significantly overestimated by employers. These results support my assertion that there is a ‘beauty premium’ in the workplace; that is, employers believe that attractive people are more capable than unattractive people and are thus more likely to be hired.

In the study, the researchers simulated the interview process, running 33 experiments that consisted of subjects that were divided into ‘employers’ or ‘workers’ categories.

The workers completed digital resumes that included age, sex, work experience, education, extra-curricular activities, and the time that it took to complete a practice maze. As a proxy for projected job performance, workers were then asked to report how many mazes of increased difficulty they believed they could finish in 15 minutes. A photograph was taken of each worker and these photographs were rated according to attractiveness by test subjects in a separate experiment.

Each employer was assigned to one of the following 5 types of interviews:

- (1) resume only with no picture,
- (2) resume and picture,
- (3) up to 5 minute phone interview with resume but no picture,
- (4) up to 5 minute phone interview with resume and picture, or

⁵¹ Hammermesh and Biddle 1189.

⁵² Markus M. Mobius and Tanya S. Rosenblat. “Why Beauty Matters.” The American Economic Review 96 (2006): 222-235.

(5) face-to-face interview lasting up to 5 minutes with resume and picture.

In a random rotation, each employer interviewed all 5 workers. Following the interview process, each employer estimated how many mazes she or he believed each worker could complete in 15 minutes. To give subjects an incentive to act truthfully, and to imitate real hiring situations, penalties were assessed for both the workers and the employers for inaccurate estimates. Workers then spent 15 minutes completing these more difficult mazes in order to simulate their work performance.

The study found that attractiveness had no correlation with job performance; however, the performance of attractive subjects was significantly overestimated by employers. Furthermore, attractive subjects gave higher estimates of their own performance than unattractive subjects, suggesting that attractive people are more confident than unattractive people.

Mobius and Rosenblat also discovered that beauty stereotypes and confidence couldn't account for the entire beauty premium in all of the conditions that had a communication aspect. For example, employers overestimated attractive worker's performances even in the phone interview with no picture, so surprisingly beauty mattered in an interview process where employers communicated with but had no idea of what subjects looked like. This result seems to suggest that more attractive people are better communicators.

Andreoni and Petrie (2006) created an experimental 'game' to learn more about the choices people make in a social situation involving contributions to a public good.⁵³ They concluded in their study, "Beauty, Gender, and Stereotypes", that beauty is important because people are more apt to cooperate with and be more generous towards beautiful people when performance is not observed.

⁵³ James Andreoni and Ragan Petrie. "Beauty, Gender and Stereotypes: Evidence from Laboratory Experiments." Working Paper (2006).

In their experiment, subjects were divided into groups of five players and given 20 tokens to divide up between a public good and a private good. In this game, each token spent on the private good gave a payoff of \$.02, and each token spent on the public good gave a payoff of \$.01 to **all** individuals in the group. The game was repeated for 8 rounds and then subjects were reallocated to different groups to play again against different people.

This is a game of cooperation and coordination because if each individual contributed all of his or her tokens to the public good, then each player would get a payoff of \$1.00. On the other hand, if each individual spends all of his or her tokens on the private good, then each player will receive a payoff of \$0.40. We can see that individuals are better off if they cooperate and donate all of their tokens to the public good; however, individuals have the incentive to deviate because if all but one person contributes all of his tokens to the private good, then he will receive a payoff of \$1.20, but if everyone deviates, then everyone receives a payoff of \$0.40. I created a few examples of a single round to better illustrate the game:

Example 1: Payoff if Players contribute ALL tokens to the Private Good

Each player receives \$0.02 for every token he or she contributed to the private good

Player	Contribution to Private Good	Contribution to Public Good	Payoff
Bob	20	0	\$0.40
Jane	20	0	\$0.40
John	20	0	\$0.40
Mark	20	0	\$0.40
Sue	20	0	\$0.40
Total Number Tokens to Public Good:		0	

Example 2: Payoffs if Players contribute ALL tokens to the Public Good

Each player receives \$.01 for every token that **any** player contributed to the public good

Player	Contribution to Private Good	Contribution to Public Good	Payoff
Bob	0	20	\$1.00
Jane	0	20	\$1.00
John	0	20	\$1.00
Mark	0	20	\$1.00
Sue	0	20	\$1.00
Total Number Tokens to Public Good:		100	

Example 3: Payoffs if Players contribute varying amounts to the Private and to the Public Good

Each player receives \$0.02 for every token he or she contributed to the private good and each player receives \$.01 for every token that any player contributed to the public good

Player	Contribution to Private Good	Contribution to Public Good	Payoff
Bob	7	13	\$0.59
Jane	14	6	\$0.73
John	10	10	\$0.65
Mark	20	0	\$0.85
Sue	4	16	\$0.53
Total Number Tokens to Public Good:		45	

Example 4: Payoffs All BUT ONE PLAYER contributes ALL tokens to the Public Good

Each player receives \$0.02 for every token he or she contributed to the private good and each player receives \$.01 for every token that any player contributed to the public good

Player	Contribution to Private Good	Contribution to Public Good	Payoff
Bob	0	20	\$0.80
Jane	0	20	\$0.80
John	0	20	\$0.80
Mark	20	0	\$1.20
Sue	0	20	\$0.80
Total Number Tokens to Public Good:		80	

Now that we know how the payoff schedule works, we can see that this study is an extended ‘prisoner’s dilemma’ experiment. The extension in this study occurs when pictures of the individual group members are displayed during the game, so individuals can see what the other players look like while they are deciding their contributions.

In a separate experiment, prior to the game, each subject’s photo was rated according to appearance and helpfulness and then grouped as attractive, average, or unattractive, and as helpful or unhelpful. It is important to note that on average, women were rated as significantly more attractive and more helpful than men were rated.⁵⁴

To test the influence of beauty on cooperation (or donation to the public good), Andreoni and Petrie set up two separate conditions. In the ‘No Information’ condition only the photos of individual group members were shown and contributions were not revealed. On the other hand, in the ‘Information’ condition, the amount that each individual contributed to the public good in the previous round was shown below his or her photo.

The total payoff for each 8-round game was calculated and analyzed. The results from this experiment showed that in the ‘No Information’ condition, where individuals did not have the contribution information of their group members, attractive people made 9% more than average looking people, and 15% more than unattractive people.⁵⁵

Consequently, in the ‘Information’ condition, when individuals had the contribution information of all group members, the attractive people did not receive higher payoffs than other players. After testing the significance of these results, Andreoni and Petrie concluded that “returns to beauty are significant, but only when performance cannot be observed.”⁵⁶

⁵⁴ Andreoni and Petrie 8.

⁵⁵ Andreoni and Petrie 10.

⁵⁶ Andreoni and Petrie 10.

Andreoni and Petrie deduced that the reason that more beautiful players made more money was not attributed to selfishness because more attractive people did not contribute less to the public good than unattractive people. (Preceding sentence is difficult to follow. Can you streamline it? If not, let it go.) In fact, the average looking people displayed the most selfish behavior because they contributed significantly less to the public good. Interestingly, this study found that when contribution information was hidden, an increase in the number of attractive people in the group lead to an increase in average contribution to the public good, “The average percent contributed in groups with no attractive people is 29.8%, but in groups with at least one attractive person, the average increases to 41.4%. This difference is significant and suggests the presence of beauty may engender more cooperation.”⁵⁷

This study also analyzed gender differences and found that, “Overall, men and women make the same amount of money...However, women make \$1.67 more than men in the No Information treatment, and men make \$1.38 more than women in the Information treatment.”⁵⁸ Andreoni and Petrie examined some of the probable causes of this discrepancy.

First, they found that, on average, both women and men contribute roughly the same amount to the public good, so selfishness doesn’t explain the difference in payoffs. Based on the fact that women’s photos were rated as significantly more attractive than men’s, Andreoni and Petrie speculate that when there is No Information, women’s beauty plays a large role in their higher payoffs:

“the gender premium to women is not due solely to more selfishness on their part. Women seem to be benefiting from a combination of their slightly lower contributions and their beauty. While they are not significantly more selfish, they are more beautiful, and returns to beauty are high.”⁵⁹

⁵⁷ Andreoni and Petrie 13.

⁵⁸ Andreoni and Petrie 16.

⁵⁹ Andreoni and Petrie 18.

Second, Andreoni and Petrie note that expectations can play a bigger role in the Information condition. Men's photos were not just rated as significantly less attractive, but they were also rated as significantly less helpful, or more unhelpful. Men may be expected to contribute less to the public good due to their unhelpful appearance, but in the Information condition, when their contributions are shown, they exceed expectations. Men don't contribute more than women; they are just expected to contribute less, so when they contribute the same amount, they may be considered very cooperative and helpful. This perceived extra cooperation could entice others to contribute more to the public good, thus causing men to receive higher payoffs in the Information treatment.

Furthermore, Andreoni and Petrie found that men contribute more of the extreme values than women. In other words, men contribute either all of their tokens or none of their tokens much more than women do. Also, as the number of men in the group increases, men are more likely to contribute all of their tokens to the public good and less likely to contribute zero. This behavior is much stronger in the 'Information' condition. Andreoni and Petrie infer that men may appear to others to be setting a 'good example', and this good example behavior will lead others to contribute more to the public good as well.

III. Idealized Female Beauty Projected by Mass Media Has Negative Effects

Artificial images of idealized beauty in the mass media bombard women and influence their perception of their own beauty, often leading to self-dissatisfaction. It has become a truism that mass media, in the form of commercial advertising and Hollywood images, have created an unattainable ideal of beauty. In this section, I will review experiments that were designed to examine women's attention to and interpretation of the mass media. Many of these studies also look at the consequences that the idealized images have on the well-being of the consumer, in particular, a woman's satisfaction with her own image.

Image Advertising: Advertisers Use Beauty to Sell Products

Advertisers have long used beautiful images--of people, of places, of life styles--to sell products ranging from cars, to travel, to cigarettes. By associating a beautiful image with a product, the advertiser tries to persuade the consumer that use of the product will help one attain this beautiful image. This connection between ideal and real image is especially clear when it comes to the beauty market. It is big business and has real effects on the consumers, who are mostly women. In this section, I will examine studies that investigate the impact of beauty product advertising on women who are the target market.

A number of research psychologists have written extensively on this topic. Lisa Groesz and her associates reviewed many studies and summed up the issue clearly as follows:

“Targeting markets to sell products such as diets, cosmetics, and exercise gear, the media construct a dreamworld of hopes and high standards that incorporates the glorification of slenderness and weightloss.”⁶⁰

Hargreaves and Tiggemann (2003) wanted to understand the effect of television commercials that contain idealized female actresses on the body dis/satisfaction and ‘appearance schema’ activation of adolescent girls and boys. Appearance schemas are

⁶⁰ Lisa M. Groesz et al., “The Effect of Experimental Presentation of Thin Media Images on Body Satisfaction: a Meta-Analytic Review,” *International Journal of Eating Disorders* 31 (2002): 2.

knowledge structures about appearance that measure how important appearance is in one's mind. These schemas "can be activated by appearance-related cues, and when activated, influence subsequent emotions and information processing."⁶¹ Hargreaves and Tiggemann's experiment showed that exposure to ideal images in commercials had a negative effect on how girls feel about their bodies; furthermore, they found that this negative effect lasts indefinitely.

In the study, subjects consisting of 160 females and 197 males aged 13-15 viewed either 20 television commercials that showed idealized thin female images or 20 television commercials containing no female images. Body dissatisfaction was measured before commercial viewing, immediately after viewing, and again 15 minutes after viewing, and the samples underwent a filler activity between viewing commercials and having appearance schema activation measured.

Commercials containing idealized female images caused an increase in body dissatisfaction in girls both right after and 15 minutes after viewing, but had no effect on the body dissatisfaction of boys. Furthermore, appearance schema activation increased in both girls and boys. This result indicates that commercials showing female idealized images increase the importance of body image for the entire adolescent audience, no matter what the commercial is selling.

In an extensive study conducted in 2005 that made use of measurement systems devised by other researchers, Brown and Dittmar studied the effect that the degree of a young woman's attention to advertising has on her body satisfaction.⁶² They found that advertising featuring ultra-thin models will decrease women's body satisfaction whether women pay a lot or a very little amount of attention to the advertisements.

⁶¹ Duane Hargreaves and Marika Tiggemann, "The Effect of 'Thin Ideal' Television Commercials on Body Dissatisfaction and Schema Activation during Early Adolescence," *Journal of Youth and Adolescence* 32 (2003): 368.

⁶² Amy Brown and Helga Dittmar, "Think 'Thin' and Feel Bad: 'The Role of Appearance Schema Activation, Attention Level, and Think-Ideal Internalization for Young Women's Responses to Ultra-thin Media Ideals,'" *Journal of Social and Clinical Psychology* 24 (2005): 1088-1113.

In the study, 75 undergraduate women were exposed to advertisements that contained ultra-thin models from magazines that are aimed at young women and to advertisements of objects such as cars that didn't contain any models or cues to body image. In the experiment, five ads were flashed for 150 milliseconds and five ads were shown for 10 seconds. Participants were asked to focus on the long advertisements and to pay little attention to the short flashed advertisements.

- In the 'high attention' condition, the neutral ads were flashed for 150 milliseconds and the ultra-thin model ads lasted 10 seconds.
- In the 'low attention' condition, the ultra-thin model ads were shown in the quick flashes, and neutral ads were shown for 10 seconds
- For the 'control' condition, both the quick flashes and the long 10-second exposures consisted of neutral ads.

After subjects finished viewing the images in one of the three conditions, their appearance schema activation, weight-focused anxiety, and thin-ideal internalization were measured to assess the effect of the image exposure.

Appearance schema activation was tested using a shortened version of the Hargreaves and Tiggemann (2002) word-stem completion task. "The rationale behind this task is that women whose appearance schemata have been activated will produce more appearance-related words than women for whom schema-activation has not occurred."⁶³ This means, for example, that if women whose appearance schema has been activated see the letters 'SLE', they are likely to complete the word as SLENDER. Respondents were scored from 0 to 10 depending on their completed word appearance relation strength.

Weight focused anxiety was measured using a version of the Physical Appearance State and Trait Scale (PASTAS; Reed Thompson, Brannick, & Sacco, 1991). On a five-point

⁶³ Brown and Dittmar 1095.

scale, subjects rated how anxious, nervous, or tense they feel when asked about “six weight-related body sites...such as waist, hips or thighs.”⁶⁴

To measure **thin-ideal internalization**, experimenters used an abbreviated version of the Socio-cultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995). “Internalization was assessed using statements, such as ‘I believe that clothes look better on thin models’ or ‘Photographs of thin women make me wish I were thin,’ and respondents were asked to indicate how much they (dis)agreed with each statement on a five-point scale (1= completely disagree to 5= completely agree).”⁶⁵

In interpreting the results, Brown and Dittmar first tested to see if there was a correlation between the study variables. Specifically, they looked to see if **thin-ideal internalization** and **appearance schema activation** were correlated with **weight-related anxiety**. The results showed that in the low-attention and high-attention conditions, thin-ideal internalization and appearance schema activation were significantly correlated with weight-related anxiety (with a higher correlation in the high attention condition); whereas, there was no significant correlation in the control condition.

These results led Brown and Dittmar to conclude that it would be valuable to test the relationships between length of exposure, thin-ideal internalization, and weight-related anxiety. Using multistage regression analysis, they tested the impact that length of exposure and thin-ideal internalization had on a woman’s weight-related anxiety.⁶⁶ They found that length of exposure had significant effects on weight-related anxiety. Furthermore, length of exposure did not affect internalization, suggesting that once subjects are exposed to thin models, they internalize this thin ideal, and their attention level does not matter. More regressions were run to test how internalization and exposure duration affect appearance schema activation, and results showed that “for

⁶⁴ Brown and Dittmar 1095.

⁶⁵ Brown and Dittmar 1096.

⁶⁶ Brown and Dittmar 1099.

appearance schema activation, the contrast between exposure to no models and thin models is highly significant ($\beta = .35$; $p < .005$), and the positive value of the regression coefficient confirms that exposure to thin models increases schema activation.”⁶⁷

Next, Brown and Dittmar tested the relationship between appearance schema activation and weight related anxiety, and found that appearance schema activation seemed to be a precursor to experiencing weight-related anxiety. “[Appearance schema activation] needs to be switched on before anxiety occurs.”⁶⁸

As the final stage in the study, Brown and Dittmar discovered that the increase in weight-related anxiety due to longer exposure to the ultra-thin ideal was independent of internalization and appearance schema activation. In digging deeper, they drew three further conclusions:

- First, exposure to thin models increased body-related anxiety in women with significant thin-ideal internalization regardless of the degree of attention focused on the thin images.
- Second, independent of the level of thin-ideal internalization, “women who paid full attention to thin images experienced more body focused anxiety than those under low attention conditions.”⁶⁹
- Lastly, appearance schema activity was a precondition that caused exposure to thin models to lead to weight-related anxiety. This appearance schema activation occurred despite the length of exposure to ultra-thin images and despite levels of internalization.

While length of exposure to ultra-thin ideal images can strengthen body-related anxiety, mere flashes of these ideal images are enough to cause body dissatisfaction due to

⁶⁷ Brown and Dittmar 1104.

⁶⁸ Brown and Dittmar 1107.

⁶⁹ Brown and Dittmar 1108.

internalization of the thin ideal and appearance schema activation. “Fleeting attention to ultra-thin images was sufficient to set the think ‘thin’ and feel bad sequence in motion.”⁷⁰

Eric Stice and Heather E. Shaw have done many studies to assess the factors that lead to eating disorders in young women. In a 1994 study, Stice and Shaw wanted to understand the influence of thin ideal media images on ‘negative affect’, body dis/satisfaction and bulimic symptoms.⁷¹ Their results indicated that these ideal images negatively influenced the subjects’ ‘affect’, and body satisfaction, which in turn, could lead to bulimia. The researchers used a variety of measurement systems to study these effects:

- **‘Affect’** or affective state is a measurement of mood; therefore, **negative affect** is the state of unhappiness or depression. A subject’s negative affect was evaluated with a 7-item visual-analogue mood scale by rating items that assessed depression, happiness, shame, guilt, confidence, anxiety, and stress. An abbreviated version of the Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) was also used to measure negative affect.
- **Ideal-Body Stereotype Endorsement** or internalization of the thin-ideal measured the importance of the thin-ideal to the subject. For example, on a 5-point scale subjects rated how much they agree with statements such as “The ideal woman should be slender and thin.”⁷²
- **Body dissatisfaction** was calculated according to the Satisfaction and Dissatisfaction with Body Parts Scale, where subjects rated different body sites such as hips, waist, and legs on 6-point scales.
- **Bulimic Symptomatology** was assessed with the BULIT-R (Thelen, Farmer, Wonderlich, & Smith, 1991) “Prior research has demonstrated that this 28-item self-report scale is a valid measure of bulimia nervosa in both clinical and non-clinical populations, and that it possesses sufficient construct validity.”⁷³

⁷⁰ Brown and Dittmar 1108.

⁷¹ Eric Stice and Heather Shaw, “Adverse Effects of the Media Portrayed Thin-Ideal on Women and Linkages to Bulimic Symptomatology,” *Journal of Social and Clinical Psychology* 13 (1994): 288-308.

⁷² Stice and Shaw 295.

⁷³ Thelen et al., 1991, qtd in Stice and Shaw 296.

Stice and Shaw tested 157 female undergraduates to examine the effects of exposure to thin models in magazines. Subjects were divided into three groups: two experimental and one control. The first experimental group viewed a binder with 12 images that contained highly idealized full-body images of models from *Cosmopolitan* magazine. These images that represented the thin ideal had been rated as very thin and highly attractive. The second experimental group was exposed to a binder containing 12 full-body images of average-weight models. The experimenters noted that they had difficulty finding images of average-weight models in the most popular women's magazines, so the photos rated as average-weight in the pilot study were taken from magazines targeted at larger women. The control group viewed a binder of 12 images that contained no models.

Stice and Shaw found the following key results.

- First, subjects exposed to the ultra-thin ideal model images showed “increased feelings of depression, unhappiness, shame, guilt, stress, and decreased confidence”⁷⁴ compared to those that viewed average size or no models. “Additionally, exposure to thin models resulted in body dissatisfaction.”⁷⁵ Therefore, exposure to the thin ideal leads to increased negative affect and body dissatisfaction.
- Second, negative affect was significantly correlated with eating disordered behavior. “Specifically, depression, shame, stress, and guilt were positively associated with bulimic symptomatology.”⁷⁶
- Third, Stice and Shaw found that increases in body dissatisfaction, and endorsement or internalization of the thin-ideal also provided significant increases in bulimic symptomatology.

Results from this regression analysis showed that exposure to ultra-thin ideals caused an increase in negative affect and body dissatisfaction. Negative affect and body

⁷⁴ Stice and Shaw 298.

⁷⁵ Stice and Shaw 298.

⁷⁶ Stice and Shaw 299.

dissatisfaction combined with internalization of the thin ideal were significant predictors of bulimic behavior.

In 1991, Marsha L. Richins hypothesized that “young adult females compare their level of attractiveness with that of models in ads targeted towards them.”⁷⁷ To test this hypothesis, Richins conducted several studies that showed female college students advertisements from popular female fashion magazines and asked for their responses. The first study was a small open discussion format, where the majority of participants admitted to comparing themselves to models in advertisements and had negative feelings about themselves as a result. To test this result empirically, Richins conducted several more studies to assess how widespread this comparison to models is among female college students and to quantify the effects.

In these studies, Richins asked female college students to respond to either advertisements featuring physically idealized female models, or ads without models, and then to respond to photos of average looking women. The results indicated that the students frequently compared themselves with the models shown in ads directed toward them, and as a result felt worse about and less satisfied with their own attractiveness.

Eighty female college students were exposed to one perfume ad, one jewelry ad, one clothing ad, and three cosmetics ads. In the experimental groups, these ads contained highly attractive models, and in the control group, the ads contained no models. The highly attractive female models were rated as highly attractive in a separate experiment. Interestingly, the experimenters tried to gather a set of advertisements containing average-looking models for a third condition, but they couldn't find more than one ad that featured an average-looking model.

Subjects were told that the purpose of the study was to examine how people evaluate print ads; therefore, subjects would be more apt to give unbiased answers regarding the

⁷⁷ Marsha L. Richins, “Social Comparison and the Idealized Images of Advertising,” Journal of Consumer Research 18 (1991): 72.

average photos and their own self ratings. After exposure to either the experimental or control condition advertisements, each subject was shown two average-looking female photos. Subjects then answered survey questions that included attractiveness ratings of the average looking female photos, self-ratings of physical attractiveness, and satisfaction with own physical attractiveness. Questions such as “when I see models in clothing ads, I think about how well or how badly I look compared to the models” were embedded throughout the survey to determine if individuals compare themselves to models in magazines.

Self-esteem and peer rated attractiveness were used as covariates. Self-esteem was measured using questions embedded throughout the survey, and a photo of each subject was taken and rated by peers in a separate study. These peer ratings of attractiveness were used to determine how accurately subjects were describing their own physical attractiveness.

In one part of the study, Richins used directional t-tests on the collected data to determine that subjects who were exposed to advertisements with highly attractive models rated the average-looking photographs significantly lower than the subjects that were exposed to advertisements with no models; however, this result was not robust.

Richins did find robust results for comparison and lowered satisfaction with appearance. Subjects consistently compared themselves with models in advertisements. Furthermore, subjects’ self ratings of their own appearance and their satisfaction with their appearance decreased after exposure to the advertisements containing models, “subjects exposed to ads with attractive models were less satisfied with their appearance than subjects exposed to ads without models.”⁷⁸ Richins concluded that an increase in self comparison with models could be accountable for the decrease in self-satisfaction with appearance.

⁷⁸ Richins 78.

“Analysis revealed that a change in comparison standards was probably responsible for the lower satisfaction.”⁷⁹

In 2005, Daniel Clay et al. ran a detailed econometric experiment to test the effect that fashion model exposure has on body satisfaction and self-esteem through intermediate variables that included age, awareness and internalization of societal attitudes, and social comparison.⁸⁰ The researchers found that exposure to models in magazines causes a decrease in body satisfaction and self-esteem in adolescent girls. Interestingly, the negative impact of media exposure increased with age partially due to the increases in awareness and internalization of societal influences, and in social comparison that girls face as they get older.

Clay et al. (2005) set out to determine if body image influenced self-esteem because if body image does have a big impact on self-esteem then socio-cultural influences that cause body dissatisfaction would lower self-esteem in adolescent girls.⁸¹

Using the Halliwell and Dittmar (2004) digital enhancing method, Clay et al. realistically manipulated the model's body sizes to create images of larger or wider looking women. Three conditions were created where subjects viewed (1) the actual image of an ultra-thin model, (2) image of the same model that had been digitally widened to average-sized, or (3) advertisements with no models. It is important to note that in condition (2), the models were digitally enhanced to appear larger yet they were no less glamorized (airbrushed etc.) than in their original photos (condition 1).

The researchers then divided 136 adolescent girls, aged 11-16, into the three conditions. They examined their responses in three areas using a variety of measurement techniques as described below:

⁷⁹ Richins 81.

⁸⁰ Daniel Clay et al, “Body Image and Self Esteem Among Adolescent Girls: Testing the Influence of Sociocultural Factors,” *Journal of Research on Adolescence* 15 (2005): 451-477.

⁸¹ Clay et al., 454.

- **Awareness and internalization of socio-cultural attitudes toward appearance** was measured using a shortened version of the SATAQ (Heinberg et al. 1995), where participants ranked the importance of awareness statements such as “‘Attractiveness is very important if you want to get ahead in our culture’” and internalization statements such as “‘photographs of thin women in magazines make me wish that I were thin’”⁸² on a 6-point strongly disagree to strongly agree scale.
- **Social comparison with media models** was measured using the same procedure on the SATAQ statement “‘I tend to compare my body to people in magazines and on TV.’”⁸³
- **Body satisfaction and self-esteem** were assessed similarly using a seven-item five-point scale, and ten-item four-point scale respectively.

First Clay et al. found that subjects who viewed advertisements with models (both ultra-thin models and digitally widened models) revealed significantly lower levels of body satisfaction and self-esteem than subjects who viewed no models. On the other hand, viewing ultra-thin models versus average-sized models didn’t cause a significant difference in the body satisfaction or the self-esteem of subjects. Since both the ultra-thin and average-size model images were glamorized using airbrushing and other digital enhancement techniques, Clay et al. assumed that the negative effect of average-size models on adolescent girls was probably due to the fact that the average images remained idealized.

Additionally, after extensive correlation tests, Clay et al. proved the following results:

- Changes in body dissatisfaction accounted for a significant portion of the changes in self-esteem.
- “Age [that is, as girls grew older, the outcomes were more pronounced] was positively associated with both awareness and internalization of socio-cultural

⁸² Clay et al., 459.

⁸³ Clay et al., 460.

attitudes, and with social comparison, and was negatively associated with body dissatisfaction and self-esteem.”⁸⁴

- Awareness of socio-cultural attitudes was positively associated with internalization, and internalization was positively associated with social comparison. All of these variables were negatively associated with body satisfaction and self-esteem.

As they hypothesized, the effects that Clay et al. found appeared in the “causal chain from age to body satisfaction and self-esteem, via awareness of socio-cultural attitudes towards appearance, internalization of socio-cultural attitudes toward appearance, and social comparison with media models.”⁸⁵ Moreover, Clay et al. uncovered direct evidence that as girls grew older, the effects were more pronounced: “age was a significant direct predictor of both awareness and internalization of socio-cultural attitudes toward appearance; awareness also predicted internalization, internalization predicted social comparison, and social comparison, in turn predicted body satisfaction.”⁸⁶

Hollywood: Television and Film Sell Idealized Beauty

“Through the flashy images of ‘perfect’ female beauty promoted ubiquitously in magazines, television, and films, female and male viewers alike may quickly infer that a female’s body is her most important attribute and thus a lifelong project.”⁸⁷

As the literature review indicated in Section II, people enjoy looking at beautiful images. The film industry understands that ‘perfect beauty’ is important because people will enjoy movies more if there is an element of beauty included. But there is often a downside to this enjoyment. Several studies have examined the impact of Hollywood images on women’s satisfaction with their own bodies. These studies have generally

⁸⁴ Clay et al., 465.

⁸⁵ Clay et al., 467.

⁸⁶ Clay et al., 468.

⁸⁷ Brumberg, 1997, qtd in Groesz et al., 2.

shown that some television and film images produce negative body images on the part of female viewers.

In 1996, Tiggemann and Pickering studied the effect of different types of television shows on adolescent females' body dissatisfaction and drive for thinness.⁸⁸ They found that certain types of television shows correlated to an increase in body dissatisfaction and drive for thinness.

In this simple yet interesting study, 94 11th grade adolescent girls completed surveys that included questions on television watching, physical attributes, and body dissatisfaction. Body Mass Index (BMI) was calculated, and subjects also rated their perception of their weight on a scale from 1 = very underweight to 7 = extremely overweight. Body Dissatisfaction was measured on a similar rating scale from very satisfied to very dissatisfied.

To measure Drive for Thinness, Tiggemann and Pickering administered the Drive for Thinness subscale of the Eating Disorder Inventory (1983; Garner, Olmsted, and Polivy). This survey is the Eating Disorder Inventory's top predictor for anorexia nervosa, and it examines weight-loss related issues such as the subject's attention to dieting, and fear of weight gain. Lastly, to find out the subjects' television watching habits, researchers had subjects circle all of the shows that they had watched from a copy of the previous week's television guide.

Tiggemann and Pickering uncovered the following preliminary results⁸⁹:

- On average, subjects watched 3.2 hours of television daily in the previous week.
- Some of the shows that girls commonly reported watching for more than 1 hour in the last week were situation comedies, soaps and dramas, news programs, sports, movies, and music videos.

⁸⁸ Marika Tiggemann and Amanda S. Pickering, "Role of Television in Adolescent Women's Body Dissatisfaction and Drive for Thinness," International Journal of Eating Disorders 20 (1996): 199-203.

⁸⁹ Tiggemann and Pickering 201.

Using simple correlation tests, Tiggemann and Pickering found that “In particular, body dissatisfaction was significantly positively correlated with watching soap operas or serials [dramas] and movies, and negatively correlated with watching sports. Drive for thinness was [positively] correlated with time spent watching music videos.”⁹⁰

Based on their study results, Tiggemann and Pickering report that the media and particularly what girls watch matters to their well-being.

Media Images: A Meta-Analysis

There are so many studies on the effects of mass media on female body satisfaction that Groesz, Levine, and Murnen (2002) conducted a meta-analysis to quantitatively test the robustness of the media’s negative influence on body satisfaction and to determine the overall size effects of the media’s influence.⁹¹ This meta-analysis showed that the media images of idealized females do have a negative influence on girls and women.

Furthermore, the analysis revealed that women with pre-existing body dissatisfaction issues and younger women (or girls) were more negatively influenced by the thin media images than women without pre-existing body dissatisfaction issues, or older women.

The researchers focused on studies using female samples that were exposed to all sorts of media images such as actresses and models on television, and in magazines. This meta-analysis also narrowed the studies to ones where the control variable was an image(s) of average models, attractive non-models, overweight models or inanimate objects. The studies chosen measured either body dissatisfaction or physical attractiveness. Finally, the studies had to contain sufficient information. Using these criteria, 140 studies were whittled down to a meta-analysis of 25 studies.

Groesz et al. coded the studies evaluated in this meta-analysis into four groups based on the dependent variable that the study was measuring: body satisfaction, weight satisfaction, physical attractiveness, and body size estimation. The researchers then

⁹⁰ Tiggemann and Pickering 201.

⁹¹ Groesz et al., 1-16.

normalized the size of the effects that each study found in order to compare the studies and determine overall effects. Essentially, the size effects were calculated by looking at the difference between the control and experimental group results and dividing that difference by a pooled standard deviation. This value was then weighted using the sample size of the study. This method allowed Groesz et al. to standardize all of the different studies onto one scale, so that they could examine the overall effects of all of the studies.

In a meta-analysis, there are so many variables that only certain hypotheses can be accurately tested. For example, different types of media exposure such as television and billboards may have stronger or weaker effects on body dissatisfaction, so it's hard to measure the effect of quantity or exposure time when dealing with studies that are using different types of media.

In terms of the overall effect of media images on body dissatisfaction in women, this meta-analysis illustrated that a woman's body dissatisfaction increases after viewing media images of idealized females. Through this meta-analysis, Groesz et al. also confirmed that females with a prior history of eating disorders or high body dissatisfaction suffered more body dissatisfaction from media exposure than their counterparts, that younger women would be more vulnerable to thin idealized images, and that higher doses of exposure will increase body dissatisfaction.

IV. The More Beauty Matters to Women, the Worse They Feel

Several recent studies explore the links between beauty ideals, body dissatisfaction, self-esteem, and eating disorders. The studies illustrate that the greater importance a girl or woman places on appearance, the greater the likelihood that there will be a negative impact on self-esteem and body image. In the most extreme cases, negative self esteem and body image lead to eating disorders such as anorexia and bulimia.

Negative Body Image

Duane Hargreaves and Marika Tiggemann conducted several studies to determine the influences on adolescent beauty ideals and the outcome of those influences. In a 2002 longitudinal study of adolescent girls and boys, they found that ‘appearance schematicity’ in adolescent girls was a precursor to body dissatisfaction.⁹² Appearance schematicity measures the importance of appearance in one’s life. This study tested whether appearance schematicity and body dissatisfaction increased over a two-year period and whether or not these two conditions are correlated. For girls, this study revealed that as the feeling that their looks are more important increases, their body dissatisfaction increases.

The study used a method developed by Thompson and Heinberg (2005) in which a sample of 10th grade boys and girls completed questionnaires on Weight Dissatisfaction and Overall Appearance Dissatisfaction to determine their individual composite body dissatisfaction measure. The subjects then completed an Appearance Schemas Inventory (ASI), developed by Cash, Cash & Labarge (1996) to measure “core beliefs and assumptions about the importance, meaning, and implications of appearance in one’s life.” The ASI consisted of questions such as “What I look like is an important part of who I am” and “Attractive people have it all” that subjects rated on a 5-point scale (from *strongly agree* to *strongly disagree*)⁹³.

⁹² Duane Hargreaves and Marika Tiggemann, “The Role of Appearance Schematicity in the Development of Adolescent Body Dissatisfaction,” *Cognitive Therapy and Research* 26 (2002):691-700.

⁹³ Hargreaves and Tiggemann 694.

Two years later, the same subjects, now in 12th grade, were tested for a second time using the same methods of composite body dissatisfaction and ASI measurements. Hargreaves and Tiggemann then examined the change in body dissatisfaction and appearance schematicity over time and the correlation within individuals between these two conditions over time. While they found no significant change in appearance schematicity over time, Hargreaves and Tiggemann did find significant changes in body dissatisfaction: “62% of girls reported an increase in body dissatisfaction during the 2-year period. In contrast, 64% of boys reported a decrease or no change.” Furthermore, this study found a significant correlation between appearance schematicity and body dissatisfaction for both genders in the tenth grade study [Time 1], and just for girls in the 12th grade study (Time 2), “[at Time 1] those higher on appearance schematicity were also more dissatisfied with their bodies. Schematicity and body dissatisfaction were also significantly positively related at Time 2, for girls...but not for boys.”⁹⁴

In a detailed and comprehensive study, Stormer and Thompson (1995) surveyed the effect of social comparison, age of maturation, verbal teasing, and socio-cultural influences on female body dissatisfaction.⁹⁵ The results of this experiment showed that increases in social comparison, verbal teasing, and societal influences surrounding beauty lead to an increase in body dissatisfaction in young adult women. The attitudes of 162 female undergraduate subjects between the ages of 17 and 30 were surveyed using detailed questionnaires.

- **Social Comparison** was measured using the Appearance Comparison Scale (ACS), and the Comparison Target Importance Rating (CTIR). The ACS determined the subject’s general level of social comparison, such as the frequency that one compares own body size with the body sizes of other women. The CTIR analyzed the subjects’ tendency to compare themselves to six specific target

⁹⁴ Hargreaves and Tiggemann 694.

⁹⁵ Susan M. Stormer and J. Kevin Thompson, “Explanations of Body Image Disturbance: a Test of Maturational Status, Negative Verbal Commentary, Social Comparison, and Sociocultural Hypotheses,” *International Journal of Eating Disorders* 19 (1996): 193-202.

groups: family, closest friends, other students, average university student, celebrities/famous people, and the average U.S. citizen.

- **Age of Maturity** was simply the age at which a subject began menstruating signaling the age of puberty.
- **Adolescent Teasing** or negative verbal commentary was measured with the 11-item Perception of Teasing Scale (POTS) that included an extension of questions centered on weight related teasing.
- Lastly, **Socio-Cultural Influence**, or the awareness and internalization of societal attitudes regarding thinness and attractiveness, was assessed with the 14-item Socio-cultural Attitudes Toward Appearance Questionnaire (SATAQ). The SATAQ includes questions that focus either on awareness or internalization of socio-cultural norms and ideals. For example, an awareness question could be, “Attractiveness is very important if you want to get ahead in life.”, and an internalization question would be “I wish I looked like a swimsuit model.”⁹⁶

Six criteria were used as proxy variables for body dissatisfaction.

- **The Figure Rating Scale (FRS)** estimated the gap between the subject’s ideal image and her self-perceived image. Each subject was shown nine female figures (from very thin to overweight); she then chose the figure that best represented her ideal size and also the figure that she thought best represented her actual size. Each subject’s discrepancy score was calculated as the gap between her ideal image and self-perceived image.
- **The Physical Appearance State and Trait Anxiety Scale (PASTAS)** contained 16 self-reported items that determine anxiety associated with weight and non-weight appearance characteristics.
- **The Multidimensional Body-Self Relations Questionnaire-Physical Appearance Evaluation Subscale (MBSRQ-PAE)** calculated a subject’s happiness with her overall appearance.

⁹⁶ Stormer and Thompson 196.

- **The Body Image Automatic Thoughts Questionnaire (BIATQ)** looked for correlations between body image and positive or negative thoughts.
- **The Body Image Avoidance Questionnaire (BIAQ)** examined avoidance of appearance related activities such as shopping and physical intimacy due to body image anxiety associated with these activities.
- **The Eating Disorder Inventory**, a common evaluation of the characteristics of eating disorders, consisted of a satisfaction scale for nine separate body parts, a measurement of a subject's dieting habits, desire to lose weight, fear of weight gain, and a frequency assessment of bulimic tendencies such as bingeing and purging.

Stormer and Thompson treated self-esteem and obesity as covariates to control for the fact that these variables have been consistently correlated with body dissatisfaction.

Many regressions were run to test the correlation between the described variables and body dissatisfaction. Some of the specific results of interest to us are as follows:

- Subjects that more frequently compared their bodies to the bodies of other women and subjects that were more aware of societal norms and ideals regarding beauty had a significantly bigger gap between their perception of their own image and their ideal image.
- The Social Comparison (ACS and CTIR), Internalization of Socio-Cultural Norms (SATAQ-I), and Verbal Teasing (POTS) measures all have a significant effect on overall Body Image Anxiety (PASTAS) through changes in the covariates: self-esteem and obesity.
- The Eating Disorder Inventory Body Dissatisfaction measure was significantly affected by changes in the covariates caused by fluctuations in frequency of Appearance Comparison and Internalization of Societal Values.
- Frequency of Appearance Comparison, Internalization of Societal Values, and verbal teasing also directly account for variation in a subject's overall happiness with her appearance.

- In addition, frequency of Appearance Comparison, Awareness of Societal Values, and Importance of Comparison Target predict the level of Body Image Avoidance, so the higher these predictor variables are, the more activities a woman will avoid.
- Frequency of Appearance Comparison and Internalization of Societal Values also showed significant effects on two measures of Eating Disturbances, restricting behavior and bulimia. These variables also added unique variance to the composite body image score which was the subject's assessment of individual body parts.⁹⁷

To summarize these interlinking results, social comparison, which consists of frequency of comparison and importance of target image, causes a gap between a woman's perception of her own image and her ideal image. An increase in social comparison, or increases in awareness and internalization of societal values such as more exposure to ideal beauty in the media, increases the gap and leads to more body dissatisfaction. Furthermore, social comparison, along with socio-cultural values and verbal teasing, all have negative impacts on body satisfaction as they increase.

Eating Disorders

Roughly 10 million females suffer from eating disorders such as anorexia and bulimia. While the number of people suffering from eating disorders is approximately 5 times more than the number of people suffering from Schizophrenia, research funding for eating disorders is around one thirtieth the amount designated to Schizophrenia research. There has been a "rise in incidence of anorexia in young women 15-19 in each decade since 1930, [and] the incidence of bulimia in 10-39 year old women TRIPLED between 1988 and 1993."⁹⁸

⁹⁷ Stormer and Thomson

⁹⁸ H.W. Hoek and D. van Hoeken, "Review of the prevalence and incidence of eating disorders." International Journal of Eating Disorders (2003): 383-396, qtd. in Statistics: Eating Disorders and Their Precursors, National Eating Disorders Association, 2005, 18 Nov. 2007 <www.NationalEatingDisordersAssociation.com>.

Between 0.3-1 percent of young women have anorexia nervosa, which makes anorexia as common as autism, and around 1-3 percent of young women have bulimia nervosa. Anorexia and bulimia can lead to permanent health problems and even death. Up to 10 percent of women with anorexia nervosa may die due to anorexia-related causes.⁹⁹

These pathological forms of dieting behavior, namely anorexia and bulimia, may not be expensive in monetary terms, but they cost women their health and sometimes their lives. "The death rate for eating disorders is high: it ranges between 18% (in 20-year studies) and 20% (in 30-year follow-up studies). In fact, the annual death rate associated with anorexia is more than 12 times higher than the annual death rate due to all other causes combined for females between 15 and 24 years old."¹⁰⁰

In 1988, Laurie B. Mintz and Nancy E. Betz studied 643 non-anorexic and non-obese undergraduate college women to look at the prevalence of certain disordered eating behaviors and to determine the different relationships between eating behaviors and body satisfaction, self esteem, and endorsement of socio-cultural norms.¹⁰¹ They found a high incidence of eating disorders among the college women studied, and significant relationships between the severity of eating disorders and body dissatisfaction, lower self-esteem, and the influence of socio-cultural norms. The study encompassed several measurement techniques as follows:

- First, using the Weight Management, Eating, and Exercise Habits Questionnaire (developed by Ousley 1986), Mintz and Betz segmented subjects into groups that ranged from normal eating habits to bulimia. Specifically, the subjects were grouped as: normal, chronic dieters, bingers, purgers, sub-threshold bulimics, and bulimics.

⁹⁹ Burden and Prevalence of Eating Disorders, Eating Disorders Coalition for Research, Policy & Action, 2007, 18 Nov. 2007 <<http://www.eatingdisorderscoalition.org/reports/statistics.html>>.

¹⁰⁰ Carolyn Cavanaugh, "What we know about eating disorders: facts and statistics." in Raymond Lemberg and Leigh Cohn eds. Eating Disorders: A reference sourcebook (Phoenix, AZ: Oryx Press, 1999), qtd. in Understanding Statistics on Eating Disorders, National Eating Disorder Information Centre, NEDIC, 2005, 18 Nov. 2007 <<http://www.nedic.ca>>.

¹⁰¹ Laurie B. Mintz and Nancy E. Betz, "Prevalence and Correlates of Eating Disordered Behaviors Among Undergraduate Women," Journal of Counseling Psychology 35 (1988): 463-471.

- Next, Mintz and Betz measured body satisfaction with the Body Parts Satisfaction Scale which calculates total body dissatisfaction by averaging each subject's satisfaction rating of 24 individual body parts.
- They used the Rosenberg (1965) Self-Esteem Scale to focus on a subject's self-acceptance and self-esteem.
- Finally, they measured the endorsement of socio-cultural norms using a modified version of Streigle-Moore, Silberstein, and Rodin's (1985) Beliefs About Attractiveness questionnaire.

The results of this study showed that eating disorders were prevalent among undergraduate students surveyed, "82% of subjects reported one or more dieting behaviors at least daily, and 33% reported more serious forms of weight control (i.e., use of laxatives or vomiting) at least once a month. Thirty-eight percent reported problems with bingeing."¹⁰²

In analyzing the relationship that subject's eating habits have with body satisfaction and self-esteem, Mintz and Betz found similar results. Bulimics reported significantly lower body satisfaction and self-esteem ratings than all other categories. Furthermore, sub-threshold bulimics and bingers had significantly lower body satisfaction and self-esteem than normals. Lastly, bulimics reported a significantly higher endorsement of socio-cultural norms than all other groups. While not all relationships were significantly different, there was a consistent decrease in body satisfaction and self-esteem and a consistent increase in endorsement of socio-cultural norms as eating disorders moved in a more severe direction.

¹⁰² Mintz and Betz 468

V. In Their Pursuit of Beauty, Women Spend Billions

Women can and do manipulate or enhance their own beauty through cosmetics, cosmetic procedures and dieting. Women range from being naturally unattractive to naturally attractive and where women they lie in this distribution often determines how much of their income they spend on beauty enhancement. However, no matter how beautiful they are, new products, new procedures and an ever increasing ideal target image persuade many women to keep spending to try to reach the ideal. In fact, women spent close to \$90 billion in the U.S. in 2006 on beauty enhancement. This section details women's expenditure on cosmetics, cosmetic procedures, and dieting in an attempt to determine how far a woman can deviate from her natural endowment of beauty.

Expenditure on Cosmetics

Cosmetics is a huge worldwide industry worldwide accounting for \$22.54 billion in U.S. manufacturers sales in 2002¹⁰³ and over \$86.67 billion in retail sales in Europe in 2004.¹⁰⁴ (See **Figure 3.**) The side-effects of this large expenditure on cosmetics are obvious. The more women spend on cosmetics, the less they can spend on other goods.

According to research by Market View (2005), the U.S. Cosmetics industry comprised the following market shares:

- 34% Color Cosmetics: face makeup, eye makeup, lip color, nail color, and application accessories
- 31% Skin Care: facial treatment and suncare
- 15% Body and Bath: corrective hand and body, bath and shower products, aromatherapy and home fragrance
- 14% Women's Fragrance: perfumes/colognes, ancillary products

¹⁰³ Overview of the 2002 U.S. Cosmetic Market, U.S. Cosmetic Industry, Market View, 2005, 18 Nov. 2007 <www.cosmeticindustry.com/overview02final.html>.

¹⁰⁴ Cosmetics Industry: Facts and Figures, Eurostat, European Commission, 2006, 18 Nov. 2007 <http://ec.europa.eu>

- 6% Men's Products: cologne/aftershave, ancillaries, treatment. Men's products accounted for \$1.37 billion leaving women with a share of the cosmetics industry worth \$21.17 billion.¹⁰⁵

Market View segments these values into the following distribution methods: Prestige (department stores, specialty stores and chain department stores), Broad (drug stores, food stores, cosmetic discounters, warehouse clubs and mass merchandisers), and Alternative (direct sales, direct mail/internet/TV/print shopping, free standing stores, health food stores, salons and spas). In addition, the internet has provided a growing outlet for cosmetics with beauty-related internet sales increasing by 13% in 2001 to reach \$2.2 billion in 2002.¹⁰⁶

Expenditure on Cosmetic Procedures

Plastic surgeons are reporting tremendous increases in surgical and nonsurgical cosmetic procedures over the past 10 years. These procedures are costly in financial as well as psychological terms. Many organizations have been scrutinizing some of these trends.

In 2006, The American Society for Aesthetic Plastic Surgery (ASAPS) reported that Americans spent roughly \$11.36 billion dollars on cosmetic surgery and this figure does not include anesthesia, operating room facilities or other expenses related to the procedures. Women accounted for 92% of cosmetic procedure patients (both surgical and nonsurgical). Surgical procedures include breast augmentation and liposuction while non-surgical procedures include the non-invasive Botox® and laser hair removal.¹⁰⁷

With expenditures of over \$1.1 billion each, breast augmentation and rhinoplasty (nose jobs) were the leading cosmetic surgical procedures. The more recently popular Botox®

¹⁰⁵ Overview of the 2002 U.S. Cosmetic Market.

¹⁰⁶ Overview of the 2002 U.S. Cosmetic Market.

¹⁰⁷ 2000/2005/2006 National Plastic Surgery Statistics, American Society of Plastic Surgeons, ASPS, 2007, 19 Nov. 2007 <<http://www.plasticsurgery.org>>.

was the top minimally invasive (or ‘nonsurgical’) procedure that cost Americans a total of roughly \$2 billion.¹⁰⁸

The ASAPS also reported a 446 percent increase in the total number of cosmetic procedures since 1997 with most of the growth coming from nonsurgical, which increased by 747 percent, while surgical procedures increased by 98 percent. In 2006, 11 million cosmetic procedures were performed. The breakdown of procedures consisted of 1.9 million surgical and 9.1 million minimally invasive procedures. Botox® procedures lead with 4.1 million, an increase of 420% from 2000 to 2006.¹⁰⁹ The cosmetic procedure with the highest growth rate—4887% — is the surgical method called a lower body lift. I presume that these large increases were due to better technology such as a new surgery or procedure development.¹¹⁰ (See Figure 4.)

The number of surgical procedures performed each year is growing. It seems that women are going under the knife to try to improve just about everything on their bodies. Surgeries include the familiar ones--Breast Implants, Tummy Tucks, and Facelifts—as well as \$20 million on buttock implants and lifts and another \$2.3 million on vaginal rejuvenations.¹¹¹

Women who get cosmetic surgeries deal with the typical risk of any surgery; however, this surgery isn’t necessary to improve one’s health or save one’s life. There are further harmful side-effects of cosmetic surgery as well. A study on over 24,000 Canadian women showed that women who have undergone breast implant and other cosmetic surgeries have a higher rate of suicide.¹¹² Further studies linked breast implants to suicide as well, while breast implants and nose jobs haven’t been proven to cause suicide, women

¹⁰⁸ 2006 Average Surgeon/Physician Fees, American Society of Plastic Surgeons, ASPS, 2007, 19 Nov. 2007 <<http://www.plasticsurgery.org>>.

¹⁰⁹ 2006 Quick Facts, American Society of Plastic Surgeons, ASPS, 2007, 19 Nov. 2007 <<http://www.plasticsurgery.org>>.

¹¹⁰ 2000/2005/2006 National Plastic Surgery Statistics.

¹¹¹ 2006 Average Surgeon/Physician Fees.

¹¹² Paul J. Villeneuve, et al., "Mortality Among Canadian Women with Cosmetic Breast Implants." American Journal of Epidemiology 164 (2006): 334-341.

who have bought and endured these cosmetic surgeries seem to be worse off which leads us to examine the question of how the Veblen beauty game affects women's well-being.

Other psychological problems associated with cosmetic procedures have been reported as well. The British Association of Aesthetic Plastic Surgeons (BAAPS) found that over 40% of patients receiving Botox® reported that they "had a compulsive drive for using it repetitively."¹¹³

Expenditure on Dieting and Weight loss

There were an estimated 72 million dieters in the U.S in 2006.¹¹⁴ That was roughly 25% percent of the total U.S. population.¹¹⁵ Given this magnitude, it is not surprising that expenditures on dieting and weight loss make up the largest category of beauty enhancement spending. Although some percentage of the expenditures are necessary for health-related reasons and should probably be eliminated as a 'beauty enhancement', and another percentage can be attributed to men, I can estimate that a large percentage is female beauty enhancement expenditure given that "71% of adolescent girls want to be thinner despite only a small proportion being over a healthy weight"¹¹⁶...[and] 52% of girls begin dieting before age 14."¹¹⁷ D.M. Thompson et al. (1985) found further evidence to support that female dieting seems to be primarily a form of beauty

¹¹³ Shannon Fox, "Aesthetic Procedure Addiction," *Aesthetic Buyers Guide* Sept. 2007, 19 Nov. 2007 <www.miinews.com>.

¹¹⁴ *Weight Loss Market to Reach 58 Billion in 2007*, Marketdata Enterprises, Inc., EMaxHealth, 2007, 18 Nov. 2007 <<http://www.emaxhealth.com>>.

¹¹⁵ Source: U.S. Census Bureau, 2006 Population Estimates, Census 2000, 1990 Census

¹¹⁶ C. Johnson, et al., "Incidence and correlates of bulimic behavior in a female high school population," *Journal of Youth and Adolescence* 13 (1984): 15-26, qtd. in *Understanding Statistics on Eating Disorders*, National Eating Disorder Information Centre, NEDIC, 2005, 18 Nov. 2007 <<http://www.nedic.ca>>.

¹¹⁷ Susan J. Paxton, et al., "Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys," *Journal of Youth and Adolescence* 20 (1991): 361-379, qtd. in *Understanding Statistics on Eating Disorders*, National Eating Disorder Information Centre, NEDIC, 2005, 18 Nov. 2007 <<http://www.nedic.ca>>.

enhancement. “Of women between the ages of 24 and 54 who diet, 76% diet for cosmetic rather than health reasons.”¹¹⁸

According to Marketdata Enterprises Inc., the weight loss industry was worth \$55.4 billion in 2006 and is estimated to be worth \$68.7 billion in 2010, a 6.0% annual growth rate over the next few years. (See **Figure 5.**) This industry was worth only \$30 billion in 1990, so obviously Americans are spending money on dieting at a feverish rate. The 2006 expenditures on weight loss include everything from weight loss programs such as Weight Watchers, to diet pills and diet soda.¹¹⁹

- \$4.4 billion on bariatric surgeries which reached record levels of 177,000 procedures; since major insurers still don’t cover these surgeries, growth has slowed as many “obese Americans are having the procedure done in Latin America, where the cost is substantially less.”
- Diet soft drink’s share of the soft drink market had risen to 29.5% in 2006 to 19.5 billion dollars.
- \$459 million on diet prescription drugs.
- \$2.7 billion on diet programs including Weight Watchers (\$1.2 billion), NutriSystem (\$568 million), LA Weight Loss (\$500 million), and Jenny Craig (\$462 million).

One of the more frustrating effects of this spending is that is often inefficient and sometimes dangerous. In fact, according to the National Eating Disorders Association, “95% of all dieters will regain their lost weight in 1-5 years.”¹²⁰ Judith Ruskay Rabinor, Ph.D., director of the American Eating Disorder Center in Lido Beach, New York argued

¹¹⁸ D.M. Thompson, et al., “Anorexia Nervosa and Bulimia: The Socio-cultural Context.” International Journal of Eating Disorders 3 (1985): 20-36, qtd. in Understanding Statistics on Eating Disorders, National Eating Disorder Information Centre, NEDIC, 2005, 18 Nov. 2007 <<http://www.nedic.ca>>.

¹¹⁹ Weight Loss Market to Reach 58 Billion in 2007

¹²⁰ F. Grodstein, et al. , “Three-year follow-up of participants in a commercial weight loss program: can you keep it off?” Archives of Internal Medicine 156 (2006): 1302, qtd. in Statistics: Eating Disorders and Their Precursors, National Eating Disorders Association, 2005, 18 Nov. 2007 <www.NationalEatingDisordersAssociation.com>.

that “the emphasis we place on being unnaturally thin pushes people into dieting. But any diet eventually backfires and packs pounds on the people trying to lose them.”¹²¹

Dieting can lead to dissatisfaction, and in extreme cases, anorexia and bulimia. “Studies indicate that dieting occurs in approximately 50-70% of North American adolescent high school girls, with even greater numbers reporting body dissatisfaction and expressing a desire to be thin.”¹²² Cosmetic dieting does have harmful side effects. According to the National Eating Disorders Association (2005), “35% of ‘normal dieters’ progress to pathological dieting. Of those, 20-25% progress to partial or full-syndrome eating disorders.”¹²³

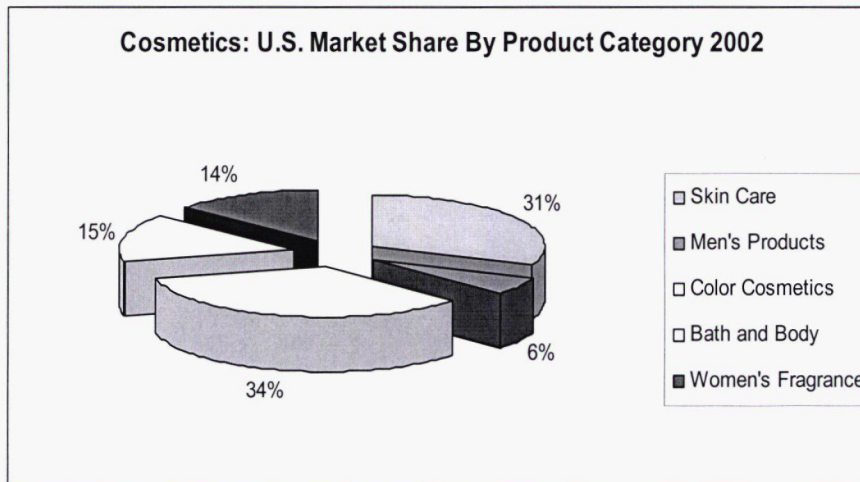
¹²¹ The Widening of America, Multi-Service Eating Disorder Association, 2007, 18 Nov. 2007 <www.medainc.org>.

¹²² M. Lieberman, et al., “Interpersonal Influence and Disordered Eating Behaviors in Adolescent Girls: the Role of Peer Modeling, Social Reinforcement, and Body-Related Teasing.” Eating Behaviors 2 (2001): 215-236.

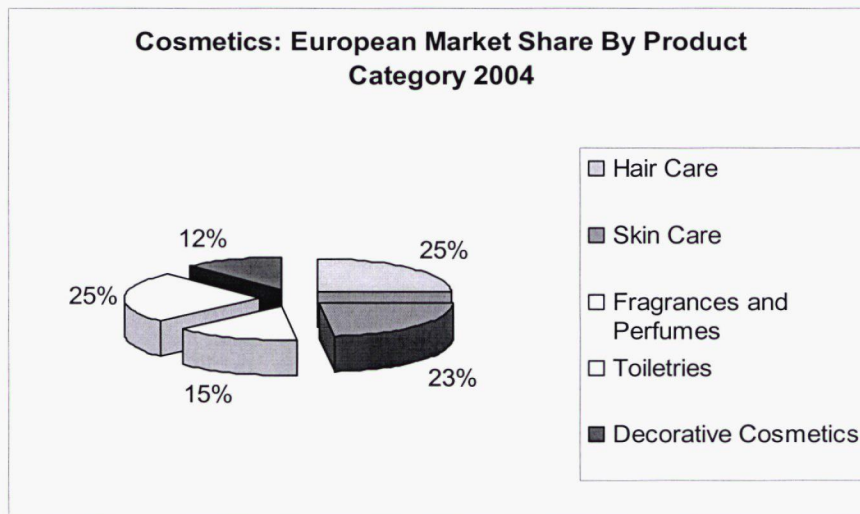
¹²³ CM Shisslak, et al., “The spectrum of eating disturbances.” International Journal of Eating Disorders 18 (1995): 209-19, qtd. in Statistics: Eating Disorders and Their Precursors, National Eating Disorders Association, 2005, 18 Nov. 2007 <www.NationalEatingDisordersAssociation.com>.

Section V Figures

Figure 3: U.S. and European Cosmetics Industry



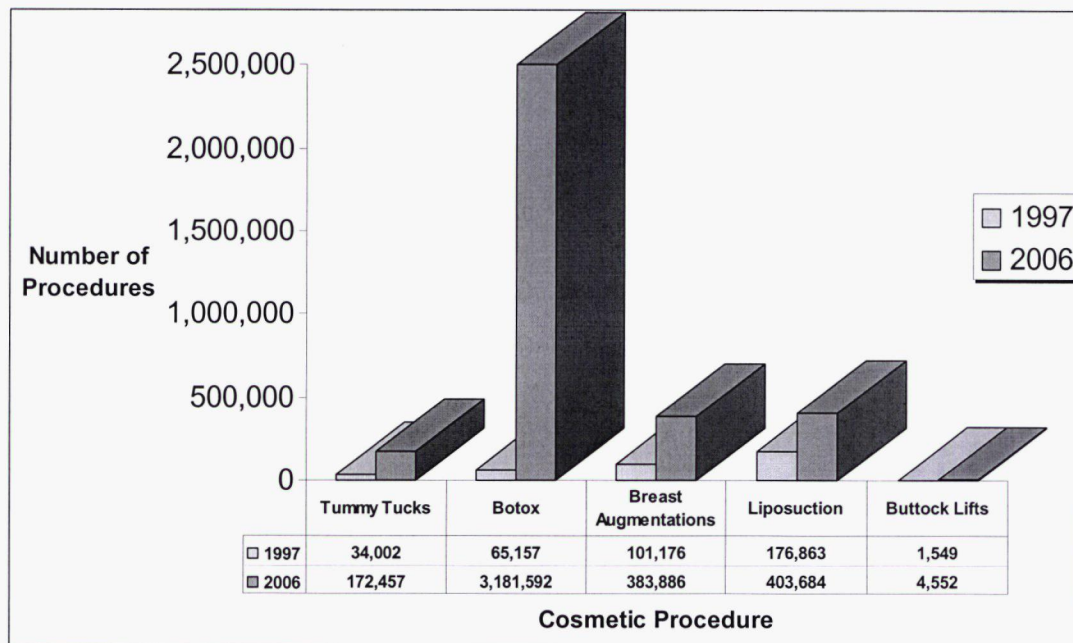
Source: Overview of the 2002 U.S. Cosmetic Market, U.S. Cosmetic Industry, Market View, 2005, 18 Nov. 2007 <www.cosmeticindustry.com/overview02final.html>.



Note: Hair Care examples: hair color, products for waving and straightening, conditioning. Skin Care examples: creams, emulsions, lotions. Fragrances and Perfumes examples: perfume, toilet waters, Colognes. Toiletries examples: bath and shower preparations. Decorative Cosmetics examples: make-up products for the face like eye shadow, blush, lipstick, and nail care.

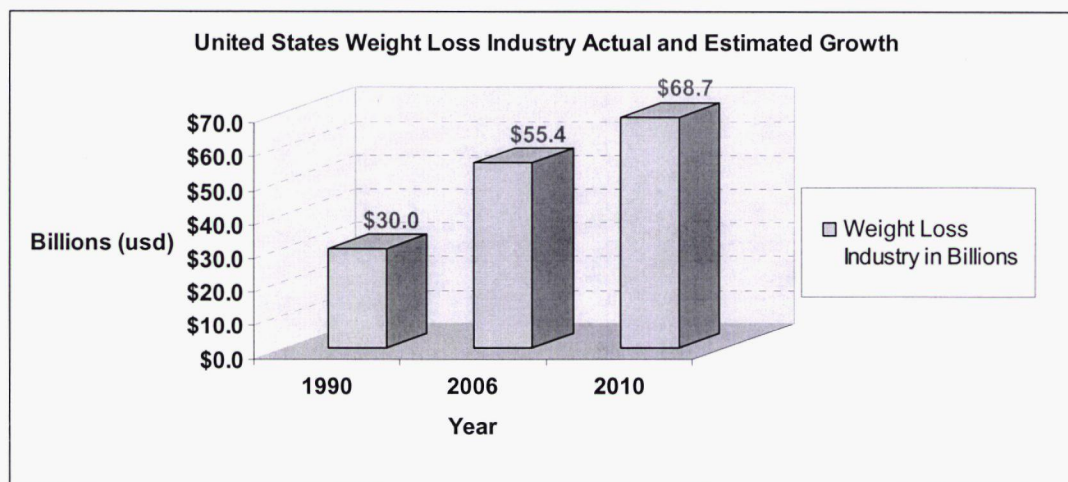
Source: European Commission 2006. <http://ec.europa.eu>
Estimations Based on Colipa (2004)

Figure 4: United States Cosmetic Surgery Procedure Growth 1997 to 2006



Source: 2006 Statistics, American Society for Aesthetic Plastic Surgery, ASAPS, 2007, 19 Nov. 2007 <<http://www.surgery.org>>.

Figure 5: Actual and Estimated Growth in the U.S. Weight Loss Industry



Source: Weight Loss Market to Reach 58 Billion in 2007, Marketdata Enterprises, Inc., EMaxHealth, 2007, 18 Nov. 2007 <<http://www.emaxhealth.com>>.

VI. Conclusions Drawn from the Literature

The many studies that I examined found that women judge their appearance—and are judged by others—relative to those in their reference group. In other words, beauty is a relative concept.

This tendency to compare is known as the ‘contrast effect’, a factor that drives competitive behavior. For example, if there is a prize for beauty, then one woman must appear to be more attractive than the other women in her reference group in order to win that prize. Part of this competition may be the remnants of evolution where women want a dominant (successful) mate and men want a beautiful (fertile) mate, so men compare and compete over dominance and women compare and compete over beauty in order to attract the opposite sex. Aharon et al. (2001) indicated that men were biologically programmed to prefer attractive females over average looking females and Gutierrez et al. (1999) showed that women were negatively affected by the attractiveness of other women.

For women, comparing their appearance unfavorably to others can lead to a negative effect on mood. In the Kenrick (1993) study, women suffered a decrease in mood after viewing photos of attractive women. Apparently, the women in the study felt bad about themselves because they were less attractive than the women in the photos.

In another example illustrating the relative nature of beauty, women compared themselves more negatively to highly attractive women that they believed were non-models than to highly attractive women who they believed were models. In the Cash et al. (1983) study, the researchers were careful to explain that photographs of both the ‘non-models’ and ‘models’ were taken from the same source and were equally attractive; however, the images of ‘models’ included randomly assigned brand names which implied that they were fashion models. Plausibly, the surveyed women felt they were in more direct competition with attractive women who were not fashion models. This study leads

me to wonder about the impact of increasingly popular 'reality television' where Hollywood pretends that glamorized, scripted, and edited shows are completely real. If women tend to compare themselves more to images that they believe are real, then the impact of the artificial images in reality television could cause greater body dissatisfaction than artificial images that are more clearly fictional.

Beauty opens doors for women in the mating game, in the workplace, and in life in general. Since beauty is a relative good, and the rewards of being beautiful are great, women are compelled to compete to be the most attractive. There appears to be a 'beauty premium' that is stronger for women than for men, and it results in beautiful women benefiting more in situations where nothing is known about them except their appearance.

Women are judged heavily on their looks by men and this affects mating choices. Hammermesh and Biddle (1994) found that better looking women were more apt to marry men who had a higher earning potential whereas unattractive women consistently married men who had lower earning potentials. This empirical evidence of a beauty premium in the mating market did not exist for men. Furthermore, Aharon et al. (2001) and Kenrick et al. (1989, 1993) established that men prefer to look at beautiful women, which suggests that men may be compelled both biologically and socially to choose a better-looking mate.

Beauty also leads to success in the workplace and in other areas of life. In their 1994 study Hammermesh and Biddle demonstrated that better looks equate to higher wages. In an interesting study, Mobius and Rosenblat (2006) hid the appearance of potential employees in a telephone interview but found that beautiful people were still favored. From this result, I hypothesize that people are enticed to engage in communicating with beautiful people, so more attractive people will have more practice communicating than less attractive people. This practice could help more attractive people develop better communication skills which will give them an advantage in many areas of life.

The mass media influence women's perception of beauty by manipulating the target image that women compete to attain. As the media enhance female images and increase exposure of these glamorized images, women are made worse off. Due to the internet, television, Hollywood, and advertising in just about every public place and private home, exposure to the thin ideal is inevitable and constant and leads to a decrease in body satisfaction for many women.

Image advertising successfully increases the importance of body image in a broad audience, not just the audience targeted for purchase of the products advertised. For example, Hargreaves and Tiggemann (2003) showed that after adolescents viewed television commercials featuring thin female idealized images, the importance of female body image increased for adolescent boys as well as for girls.

Activities such as flipping through television channels, viewing brief pop-ups on the internet, or simply walking by magazine stands that feature ultra-thin models are sufficient to cause body dissatisfaction in young adult women. This argument was illustrated in Brown and Dittmar (2005), "fleeting attention to ultra-thin images was sufficient to set the think 'thin' and feel bad sequence in motion."¹²⁴ The Stice and Shaw (1994) studies found correlation evidence indicating that exposure to the thin ideal in magazines can increase the risk of bulimic behavior in young women.

The more important socio-cultural norms about beauty and thinness are to women and girls, the more dissatisfied they are with themselves. Furthermore, social comparison causes a gap between a woman's perception of her own image and her ideal image. When women and girls are exposed to external factors that increase the importance of appearance in their lives, such as the bombardment of body images from the media, this gap will widen causing body dissatisfaction to increase. Finally, girls seem to be more

¹²⁴ Brown and Dittmar 1108.

susceptible to body dissatisfaction than boys, possibly signaling that girls worry more about their looks than boys do.

Increasing the importance of appearance often prompts women to increase their expenditure, both personal and monetary, on beauty thus leaving women worse off than if appearance did not matter. The more body dissatisfaction women and girls face, the more likely they are to take expenditure on beauty to the extreme. In terms of personal cost, Mintz and Betz (1988) research has shown that bulimia and anorexia are extreme forms of expenditure that are very costly to health and well-being. As for monetary expenditures, women are spending billions on cosmetics, cosmetic surgery, and dieting. It appears that women have an incentive to compete in the beauty game even though it results in negative psychological, financial and sometimes physical consequences.

I will use evidence drawn from the research literature to develop each component of my economic model described in the next chapter. It is important to note that while the studies I have examined are extensive and strong, there are limitations to the research. Many of the studies are laboratory experiments performed on samples of undergraduate college women, so while the results give great insight, I can not generalize that they hold for all women and girls in real-life settings.

In addition, I should point out that some women do choose to abstain from competing in the beauty game. I believe, however, that enough women do compete to make my models interesting and relevant to many women in many different cultures.

THE MODEL

“Every woman somehow finds herself, without her consent, entered in a beauty contest with every other woman. No matter how irrelevant to her goals, how inappropriate to her talents and endowments, or how ridiculous the comparison, women are always compared to one another and found wanting.”¹ Why are women forced into this beauty contest, and why can’t they get out? Furthermore, with advertising and Hollywood producing artificial idealized images, can there actually be a winner or will women just continue to feverishly spend time, money, and effort to try to attain an unattainable ideal beauty? By using economic theory, I will analyze why women seem stuck in this beauty contest and the implications of this contest on their lives and well-being. In addition, my economic model will show how exogenous variables like the mass media enters and impacts the results of this contest.

Discrete Two-Person Model

I will start with a simple two-person discrete model of the Veblen beauty game where there is a value to winning the beauty contest, a cost for losing, and a cost to enhance beauty.

Model: simple 2x2 matrix

Two identical players: w_1 = woman1, and w_2 = woman 2. Since w_1 and w_2 are identical, they have the same incomes and equal natural beauty.

Two actions: NS = No Spending on beauty; S = Spending on beauty

Parameters:

v = expected value of winning the beauty contest

ε = expected cost of losing the beauty contest

e = cost of or expenditure on beauty enhancement

where $v > 0$, $\varepsilon > 0$, $e > 0$

¹Nancy Etcoff, *Survival of the Prettiest, the Science of Beauty*. (New York: Doubleday, 1999) 68.

Matrix:

		<i>w2</i>	
		<i>NS</i>	<i>S</i>
<i>w1</i>	<i>NS</i>	(0, 0)	($-\varepsilon, v - e$)
	<i>S</i>	($v - e, -\varepsilon$)	($-e, -e$)

I can look at this simple 2x2 matrix as a story of two women vying for a prize. As I saw in the literature review, the prize of winning the beauty contest could be attracting the best mate or getting hired for a sought after job. If neither woman spends on beauty enhancement, then no one incurs the cost of beauty enhancement, and both women have an equal probability (one-half) of attracting the best mate or getting the job. On the other hand, if both women choose to spend on beauty enhancement, then they each incur the cost of enhancement yet still only have a 50% chance of winning the prize. If only one woman spends on beauty enhancement, then she increases her probability of winning the prize at the cost of her expenditure on beauty. I examine these strategy sets in further detail below.

Strategy sets:

NS, NS : No spending on beauty enhancement by either woman. Each woman incurs no cost of beauty enhancement and each has a 50% chance of winning the prize.

S, S : Both players spend. Each incurs the beauty enhancement cost and each has a 50% chance of winning the prize.

NS, S or *S, NS* : One player spends and the other does not. The player choosing *S* wins the beauty contest, so she increases her chances of winning the prize (greater than 50%), but she incurs a beauty expenditure cost. The player choosing *NS* loses the beauty contest thus decreasing her chances of winning the prize (less than 50%), but she incurs no expenditure cost.

Discussion: dominant strategies and Nash Equilibria

To facilitate the discussion I can think of choosing to spend money on beauty enhancement as representing an attempt to attain an ideal target image and choosing not to spend represents choosing to be happy and healthy or satisfied with one's own image. There are various implications depending on the magnitudes of the parameters:

- If the expected value of winning is greater than the expenditure on beauty enhancement ($v > e$), and the expected cost of losing is greater than the expenditure on enhancement ($\epsilon > e$), then S, S is the dominant strategy, so S, S is the Nash Equilibrium. At S, S , both players are worse off than they would be at NS, NS because both spend on beauty and neither wins the beauty game or increases her chances of winning the prize. Due to the magnitudes of the parameters, S, S is the only Nash Equilibrium because it's the only strategy set where players have no incentive to deviate; however, S, S is NOT Pareto Optimal since players would be better off at NS, NS .
- If the expected value of winning is less than the expenditure on enhancement ($v < e$), and the expected cost of losing is less than the expenditure on enhancement ($\epsilon < e$), then the dominant strategy is NS, NS , so players end up with the best possible outcome. Compared to the first case, the cost of beauty enhancement, e , is greater, and therefore, NS, NS is the Nash Equilibrium, and it's Pareto Optimal.

This poses the interesting idea that increasing the cost of beauty enhancement can cause women to be better off. For example, taxing cosmetic surgery to the point where the cost of surgery is greater than the cost of losing the beauty game could make women better off. I will explore this situation further as the models become more complex.

- If the expected value of winning is less than the expenditure on beauty enhancement ($v < e$), but the expected cost of losing is greater than the expenditure on enhancement ($\epsilon > e$), then there is no dominant strategy. There are multiple Nash Equilibria at NS, NS , and S, S , but only NS, NS is Pareto Optimal.

In this situation, there is a small expected benefit of winning, but a big expected cost of losing. Neither player wants to spend to win the beauty game because spending costs

more than the expected value of winning; however, no one wants to lose because the expected cost of losing is more than expenditure on beauty enhancement. Here, players have a coordination problem. Now, advertisers and social influences can help to solve this coordination problem. For example, by flooding players with advertisements depicting perfect beauty, w_1 may believe that w_2 will probably spend due to the advertising influence, so in order to avoid losing, w_1 will spend. w_2 will think and act in the same manner which shows how advertisers can solve the coordination problem causing both women to choose S . Beauty enhancement advertisers have incentives for both women to choose S because the more women spend, the more profit the beauty enhancement industry makes. Unfortunately, in this equilibrium of S, S both women are worse off.

- If the expected value of winning is greater than the expenditure on enhancement ($v > e$), but the expected cost of losing is less than the expenditure on enhancement ($\varepsilon < e$), then again I have no dominant strategy and multiple Nash Equilibria, but this time they occur at S, NS and NS, S . At these Nash Equilibria, neither player can be made better off without making the other player worse off; therefore, both are Pareto Optimal.

I have shown how the magnitudes of the parameters effect each woman's well-being in the simple two-person-discrete-choice model. Some of the factors that influence these parameters are the mass media and the prices of beauty enhancement products. I will further examine these factors and others as I expand the model in the next few sections.

Continuous Multiple-Person Model

To analyze the topic in more detail, I move to more complicated models. I start by expanding to a multiple-person model where consumption is continuous and relative beauty is the gap between an individual's own image and the ideal target image. Each woman's utility is comprised of how a woman fares in the beauty game, and her consumption of all other non-beauty goods.

Person i 's preferences are captured by the following utility function,

$$U(y_i, I_i - \Phi) = G(y_i) + D(I_i - \Phi), \quad (1)$$

where y_i = consumption of a Hicksian composite good which represents all non-beauty goods. I will sometimes refer to y as simply 'all other goods'.

I_i = person or woman i 's (physical) image.

Φ = the ideal target image.

$(I_i - \Phi)$ = the gap between woman i 's own image and the ideal target image.

G and D are increasing and concave functions of their arguments. It makes sense to assume that the composite good is essential, $y_i > 0$, so I assume $G'(0) = \infty$.

Person i 's image, I_i , is characterized by the following equation:

$$I_i = \Omega_i + \lambda F(x_i) \quad (2)$$

where Ω_i = person i 's image endowment (her natural beauty).

x_i = quantity of image enhancement or consumption of beauty enhancement.

$F(x_i)$ = beauty improvement as a function of beauty enhancement consumption. For example if x_i = a nose job and breast augmentation, then $F(x_i)$ determines the improvement in person i 's looks after the nose job and breast augmentation. F is an increasing and concave function of its argument.

$\lambda > 0$ is a shift parameter that captures improvements in technology. I include $\lambda > 0$, so that I can do comparative static exercises with respect to technology. As it turns out, an improvement in the technology of image enhancement (an increase in λ) makes people in the reference group worse off in most of the variants of the model that I examine.

Person i 's choice problem is

$$\max_{x_i, y_i} U(y_i, I_i - \Phi) = G(y_i) + D(I_i - \Phi) \quad (3)$$

The constraints for this choice problem are the equation above, and her budget constraint

$$y_i + px_i = M_i \quad (4)$$

where M_i = income.

Person i allocates her income to consumption of the Hicksian composite good, y_i , and to image enhancement, x_i .

p = the price of the image enhancement good, x_i . The price of the composite good, y_i , is assumed to be 1 (that is, the composite good is the numeraire).

In this model I am assuming that people have identical preferences (the same functions G and D) and access to the same image enhancement improvement (F), but that their income M_i and image endowment Ω_i possibly differ.

Let us rewrite the maximization problem as

$$\max_{x_i} G(M_i - px_i) + D(\Omega_i + \lambda F(x_i) - \Phi) \quad (5)$$

Then, assuming that $x_i > 0$, the first order condition (FOC) is

$$\lambda F'(x_i) D'(\Omega_i + \lambda F(x_i) - \Phi) = p G'(M_i - px_i) \quad (6)$$

There will not always be an interior solution. In a corner solution, $p G'(M_i) > \lambda F'(0) D'(\Omega_i + \lambda F(0) - \Phi)$, so the marginal benefit of spending an additional

unit of income on the composite good is greater than the marginal benefit of spending any income at all on image enhancement given that no one else is spending any income on image enhancement. Therefore, in this corner solution, no one will spend any income on beauty enhancement. In the model, I will focus on the interior solutions, so I assume $x_i > 0$, and also $y_i > 0$.

Target Image: The Image That Women Pursue

The target image, Φ , is a weighted average of the images chosen by people in the reference group and the artificial images seen externally by people in the reference group.

Φ is characterized by the following equation:

$$\Phi \equiv \alpha\Phi_G + (1 - \alpha)\Phi_A \quad 0 \leq \alpha \leq 1 \quad (7)$$

where Φ_G = the within-reference group average image. Φ_G is driven by the behavior of people in the reference group.

Φ_A = the artificial image, which may be an average of artificial images. The artificial image can be made up of artificially enhanced images of people such as Kate Moss on the cover of Vogue Magazine or completely artificial images like Barbie. Φ_A is exogenous to the behavior of the people in the reference group, so the advertising story is told through this artificial ideal. I should note that when I refer to an increase in the artificial image (an increase in Φ_A), I am speaking of an increase in the perfection of the artificial image such as more or better digital enhancement which leads to a more beautiful yet real looking artificial image.

The weights given to Φ_G and Φ_A are α and $1 - \alpha$ respectively. If $\alpha = 1$, then I can see that the ideal image is comprised entirely of the within-reference group average image, and likewise, if $\alpha = 0$, then the ideal image is made up entirely of the artificial image. These weights represent the influence of Φ_G and Φ_A in comprising the ideal target image, Φ . For example, an increase in exposure to the artificial ideal image through more media distribution outlets (such as the internet) will cause $(1 - \alpha)$ to increase, or more simply, α will decrease.

Now that I have described the multiple person continuous model, I will analyze the model when all players have identical incomes and identical natural beauty endowments. Afterwards, I will expand the model even further by analyzing non-identical players.

Identical Players

I will start by assuming that everyone in the reference group is identical – that is, each woman's income and natural beauty is identical:

$$\Omega_i = \Omega \text{ and } M_i = M \text{ for all } i$$

As a result there will be a symmetric equilibrium in which everyone purchases the same amount of image enhancement, call it x^* , and achieves the same image which is the within-group average image. Hence, $I_i^* = \Phi_G$, so

$$\Phi_G = \Omega + \lambda F(x^*) \quad (8)$$

In this case, using the FOC for the individual's choice problem derived above and the definition of Φ as a weighted average $\alpha\Phi_G + (1 - \alpha)\Phi_A$, I get the following characterization of the equilibrium of the model

$$\lambda F'(x^*) D'(\Omega + \lambda F(x^*) - (\alpha(\Omega + \lambda F(x^*)) + (1 - \alpha)\Phi_A)) = pG'(M - px^*) \quad (9)$$

or simplify to

$$\lambda F'(x^*) D'((1 - \alpha)(\Omega + \lambda F(x^*) - \Phi_A)) = pG'(M - px^*) \quad (10)$$

This FOC equation represents the equilibrium condition for each individual; therefore, the marginal benefit of spending an additional unit of income on beauty enhancement equals the marginal cost of spending that unit.

I am interested in various comparative static results:

$$\frac{dx^*}{dp} = \frac{G' - px^*G''}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} < 0 \quad (11)$$

$$\frac{dx^*}{dM} = \frac{pG''}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} > 0 \quad (12)$$

$$\frac{dx^*}{d\Omega} = \frac{-(1-\alpha)\lambda F'D''}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} < 0 \quad (13)$$

$$\frac{dx^*}{d\Phi_A} = \frac{(1-\alpha)\lambda F'D''}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} > 0 \quad (14)$$

$$\frac{dx^*}{d\lambda} = \frac{-F'D' - (1-\alpha)\lambda F'D''F}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} \gtrless 0 \quad (15)$$

$$\frac{dx^*}{d\alpha} = \frac{(\Omega + \lambda F(x^*) - \Phi_A)\lambda F'D''}{\lambda F''D' + (1-\alpha)(\lambda F')^2 D'' + p^2 G''} \gtrless 0 \quad (16)$$

These comparative static results (equations 11 thru 16) are quite general, but others are of interest. Unfortunately, some of them are algebraically quite messy and difficult to evaluate; therefore, to explore the model further, I have chosen some convenient functional forms that allow me to get closed form solutions for the model. I will be able to solve for x^* , y^* , and u^* , so that I can perform comparative statics to see what happens to x^* , y^* , and u^* when the exogenous variables change.

Using An Example:

$$G(y) = -\frac{\delta}{y} \quad \delta > 0 \quad (17)$$

$$D(I - \Phi) = -\frac{\beta}{\gamma + (I - \Phi)} \quad \beta > 0, \gamma > \Phi > 0 \quad (18)$$

$$F(x) = x \quad (19)$$

The individual's maximization problem is then

$$\max_x -\frac{\delta}{M - px} - \frac{\beta}{\gamma + \Omega + \lambda x - \Phi} \quad (20)$$

The first order condition is then

$$\frac{\beta\lambda}{(\gamma + \Omega + \lambda x - \Phi)^2} = \frac{\delta p}{(M - px)^2}$$

Or

$$(M - px)(\beta\lambda)^{1/2} = (\gamma + \Omega + \lambda x - \Phi)(\delta p)^{1/2} \quad (21)$$

Now, let's solve for x^* :

$$M(\beta\lambda)^{1/2} + (\Phi - \gamma - \Omega)(\delta p)^{1/2} = x^*[\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}]$$

Or

$$x^* = \frac{M(\beta\lambda)^{1/2} + (\Phi - \gamma - \Omega)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} \quad (22)$$

Substitute the definition of ideal target image

$$\Phi \equiv \alpha\Phi_G + (1 - \alpha)\Phi_A \quad 0 \leq \alpha \leq 1 \quad (23)$$

Recall that Φ_G is the within-group average image and Φ_A is exogenous (determined by external factors, like advertising).

Therefore,

$$x^* = \frac{M(\beta\lambda)^{1/2} + (\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma - \Omega)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} \quad (24)$$

Now, solve for y^* :

Recall that $y^* = M - px^*$, so

$$y^* = M - p\left[\frac{M(\beta\lambda)^{1/2} + (\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma - \Omega)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}}\right] \quad (25)$$

Last, I can solve for u^* by subbing the equations of x^* and y^* into the utility function:

$$u^* = -\frac{\delta}{y^*} - \frac{\beta}{\gamma + \Omega + \lambda x^* - \Phi} \quad (26)$$

Now that I have equations for x^* , y^* , and u^* , I plug these formulas into Excel to analyze the comparative statics. I use this method more elaborately in the Simulations section, but here I can simply give parameters the following values and see what happens to x^* , y^* , and u^* when I change p , M , Ω , Φ_A , λ , α .

Parameter Values: $\beta = 1$, $\delta = 1$, $\gamma = 26$,

Income, $M = 27$, and Natural Beauty, $\Omega = 14$.

The exogenous variables will be held at the following values when changes in them are not being analyzed: $p = 1$, $\lambda = 1$, $\Phi_A = 33$, $\alpha = .65$

Comparative Statics for Identical Players Using Example:

Now, using the example, I can look at how the equilibrium consumption of beauty, x^* , changes with respect to the parameters p , M , Ω , Φ_A , λ , and α . I will make sure that these comparative statics correspond with the comparative statics in the general model, and I will gain further insight into the signs of $\frac{dx^*}{d\lambda}$ and $\frac{dx^*}{d\alpha}$ because their signs are not clear in the general model. I will also discuss how equilibrium consumption of all non-beauty goods, y^* , and how equilibrium utility, u^* , change when the each of the parameters changes.

There are a few important points to note. First, since in equilibrium, $I^* = \Phi_G$, and $\alpha < 1$, any increase or decrease in own image, I^* , brought about by a change in consumption of beauty enhancement, will cause an equal increase or decrease in the within-group average image, Φ_G , because all players are identical. I have set $\alpha < 1$, so the target image, Φ , will increase or decrease by less than individual image, I^* , increases or decreases; therefore, the gap between actual and target image, $(I^* - \Phi)$, will shrink if I^* increases and widen if I^* decreases.

Second, since $\alpha > 0$, any change in the within-group reference image, Φ_G , will cause a change in the target image, Φ , which induces a positive feedback effect. A positive

feedback effect from Φ_G means that as the within-group image increases, the target image increases, enticing women to consume more beauty enhancement in equilibrium. This is also true in the opposite direction for a decrease in Φ_G which causes a decrease in x^* . Since Φ_G and x^* move in the same direction, I have a positive feedback effect.

Last, it is important to note that since $p = 1$ in all of the comparative statics except for a change in price, I can use the terms consumption and expenditure on beauty enhancement interchangeably except for a when I am discussing a change in price.

1. Increase price, p , by 20% from 1 to 1.2:

Equilibrium consumption of beauty, x^* , decreases, so $\frac{dx^*}{dp} < 0$.

Equilibrium consumption of non-beauty goods, y^* , increases, so $\frac{dy^*}{dp} > 0$.

Equilibrium utility, u^* , increases, so $\frac{du^*}{dp} > 0$.

Therefore, an increase in price causes a decrease in consumption of beauty enhancement, and also an increase in consumption of all other goods. This increase in y^* causes utility to improve, but the story doesn't end here. A decrease in consumption of beauty enhancement causes one's own image, I^* , to decrease and since $I^* = \Phi_G$, the within-group average image decreases as well. As Φ_G decreases, the target image, Φ , decreases. Using the example and parameter values, the gap between actual and target image ($I^* - \Phi$) to widen, so in this case, own image decreased by more than the target image. A widening gap between actual image and ideal target image, decreases utility; however, the increase in y^* increases utility by enough to cause an *overall* increase in utility. Therefore, an increase in price causes women to be better off.

2. Increase income, M , from 27 to 30:

Equilibrium consumption of beauty, x^* , increases, so $\frac{dx^*}{dM} > 0$.

Equilibrium consumption of non-beauty goods, y^* , increases, so $\frac{dy^*}{dM} > 0$.

Equilibrium utility, u^* , increases, so $\frac{du^*}{dM} > 0$.

As income increases, individuals will spend more money on image enhancement, and own image will increase by more than target image increases due to $\alpha < 1$, so the gap between actual and target image shrinks. Obviously, when income

increases, individuals can spend more on beauty enhancement without reducing expenditure on all other goods, in fact expenditure on all other goods increases too; therefore, utility will go up in both the beauty game and on the standard goods consumption account.

3. Increase natural beauty, Ω , from 14 to 17:

Equilibrium consumption of beauty, x^* , decreases, so $\frac{dx^*}{d\Omega} < 0$.

Equilibrium consumption of non-beauty goods, y^* , increases, so $\frac{dy^*}{d\Omega} > 0$.

Equilibrium utility, u^* , increases, so $\frac{du^*}{d\Omega} > 0$.

As natural endowment of beauty increases, the equilibrium expenditure on beauty will decrease. In this case everyone is born more beautiful, so I^* is greater causing Φ_G to be higher. A higher within-group average image means a higher target image, but as I explained earlier, since $\alpha < 1$, the beauty gap will shrink.

Furthermore, with more natural beauty, women are able to spend less on beauty enhancement in equilibrium freeing up more income to spend on all other goods. Once again, women are better off in both the beauty game and on the standard goods consumption account.

4. Increase the perfection of the artificial image, Φ_A , from 33 to 36:

Equilibrium consumption of beauty, x^* , increases, so $\frac{dx^*}{d\Phi_A} > 0$.

Equilibrium consumption of non-beauty goods, y^* , decreases, so $\frac{dy^*}{d\Phi_A} < 0$.

Equilibrium utility, u^* , decreases, so $\frac{du^*}{d\Phi_A} < 0$.

An increase in the artificial image increases expenditure on beauty enhancement and, therefore, decreases expenditure on all other goods. This result gives power to commercial interests that sell image enhancement, assuming that they can manipulate the artificial image, Φ_A , through their advertising. Their ability to increase sales by increasing Φ_A is proportional to $(1 - \alpha)$ – the larger is the weight given to the artificial image in the construction of an ideal image, the larger is the effect on sales.

Furthermore, $\frac{du^*}{d\Phi_A} < 0$, so as the artificial ideal increases, equilibrium utility decreases. A decrease in utility is clear because as the artificial image increases, the target image will increase making everyone further away from the ideal target. Now in equilibrium, individuals must spend more on beauty enhancement. Even with

increased expenditure on beauty, there is a wider gap between actual image and the target image due to the fact that increases in both Φ_A and Φ_G are pushing the target image up. As a result, utility will decrease in the beauty game. Furthermore, women have less income to spend on all other goods, so their utility will decrease on the standard goods consumption account too. This outcome is consistent with the literature where I found that as the artificial images portrayed in the media become thinner and more glamorized, women become worse off.

5. Increase technology, λ , by 10% from 1 to 1.1:

Equilibrium consumption of beauty, x^* , increases, so $\frac{dx^*}{d\lambda} > 0$.

Equilibrium consumption of non-beauty goods, y^* , decreases, so $\frac{dy^*}{d\lambda} < 0$.

Equilibrium utility, u^* , decreases, so $\frac{du^*}{d\lambda} < 0$.

In the general model (eqn. (15)), I found that the sign of $\frac{dx^*}{d\lambda}$ depended on the value of α . Using the example where $\alpha = .65$, $\frac{dx^*}{d\lambda} > 0$, so improving the image enhancement technology increases sales for beauty enhancement producers, and increases beauty expenditure for consumers. When each individual spends more on beauty enhancement, her individual image, I^* , will increase, so the within-group average image, Φ_G , increases, causing the target image, Φ , to increase. Since $\alpha < 1$, the overall beauty gap will shrink causing a rise in utility. However, the decrease in consumption of all other goods, y^* , causes a decrease in utility of a larger magnitude than the shrink in the beauty gap. As a result an improvement in technology makes individuals worse off.

6. Increase the weight or influence of the within group average image, α , from .65 to .71:

Equilibrium consumption of beauty, x^* , decreases, so $\frac{dx^*}{d\alpha} < 0$.

Equilibrium consumption of non-beauty goods, y^* , increases, so $\frac{dy^*}{d\alpha} > 0$.

Equilibrium utility, u^* , increases, so $\frac{du^*}{d\alpha} > 0$.

In the general model (eqn. (16)), the sign of $\frac{dx^*}{d\alpha}$ depends on whether $\Phi_A \gtrless \Phi_G$ (recall $\Phi_G = \Omega + \lambda F(x^*)$). Because the mass media uses tools such as professional makeup and lighting, and digital enhancement to create unrealistically perfect images, it seems safe to assume that the artificial image is higher than the within-group average image; therefore, $\Phi_A > \Phi_G$. If $\Phi_A > \Phi_G$, then $\frac{dx^*}{d\alpha} < 0$. This

assumption holds true in my example, so the higher the weight given to the within-group average in forming the target image, the smaller the amount spent on image enhancement.

Also, since $\Phi_A > \Phi_G$, as the weight on the within-group average image increases, the weight on the artificial image decreases, so the target image, Φ , will decline. In this example, α remains less than 1 (which makes sense seeing as the literature showed that the artificial image does influence women's perceptions of beauty), so the decrease in I^* is less than the decrease in Φ , and the beauty gap shrinks.

A decrease in the beauty gap coupled with an increase in consumption of all other goods means that utility increases on every account.

Although I have only showed detailed comparative statics using convenient functional forms of the model, I believe that these comparative statics hold much more generally.

Non-Identical Players

Now I am extending the model to analyze non-identical players. I will continue to assume that these women have the same preferences for the composite good and the target image (the same functions G and D) and access to the same image enhancement improvement (F), but now their incomes and natural endowments of beauty will differ.

Using An Example:

Assume uniform distributions for both Ω_i and M_i , and a linear enhancement improvement.

As I did with the Identical Players, assume the following functions:

$$G(y_i) = -\frac{\delta}{y_i} \quad \delta > 0 \quad (27)$$

$$D(I_i - \Phi) = -\frac{\beta}{\gamma + (I_i - \Phi)} \quad \beta > 0, \gamma > \Phi > 0 \quad (28)$$

$$F(x_i) = x_i \quad (29)$$

The individual's maximization problem is then

$$\max_{x_i} -\frac{\delta}{M_i - px_i} - \frac{\beta}{\gamma + \Omega_i + \lambda x_i - \Phi} \quad (30)$$

The first order condition is then

$$\frac{\beta\lambda}{(\gamma + \Omega_i + \lambda x_i - \Phi)^2} = \frac{\delta p}{(M_i - px_i)^2}$$

Or

$$(M_i - px_i)(\beta\lambda)^{1/2} = (\gamma + \Omega_i + \lambda x_i - \Phi)(\delta p)^{1/2} \quad (31)$$

Now, solve for x_i^* as a function of Ω_i and M_i .

First,

$$M_i(\beta\lambda)^{1/2} + (\Phi - \gamma - \Omega_i)(\delta p)^{1/2} = x_i^*[\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}]$$

So,

$$x_i^* = \frac{M_i(\beta\lambda)^{1/2} + (\Phi - \gamma - \Omega_i)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} \quad (32)$$

Substitute the definition of ideal target image

$$\Phi \equiv \alpha\Phi_G + (1 - \alpha)\Phi_A \quad 0 \leq \alpha \leq 1 \quad (33)$$

Therefore,

$$x_i^* = \frac{M_i(\beta\lambda)^{1/2} + (\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma - \Omega_i)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} \quad (34)$$

Now assume that M_i is uniformly distributed on $[\underline{M}, \overline{M}]$ with mean or average income $M_m \equiv \frac{\overline{M} - \underline{M}}{2}$, and that Ω_i is uniformly distributed on $[\underline{\Omega}, \overline{\Omega}]$ with average image endowment $\Omega_m \equiv \frac{\overline{\Omega} - \underline{\Omega}}{2}$. Then, I can integrate individual decisions to get Φ_G . For individual i ,

$$I_i^* = \Omega_i + \lambda x_i^*$$

Or

$$I_i^* = \Omega_i + \lambda \frac{M_i(\beta\lambda)^{1/2} + (\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma - \Omega_i)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}}$$

So,

$$I_i^* = \frac{\Omega_i[\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}]}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} + \lambda \frac{M_i(\beta\lambda)^{1/2} + (\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma - \Omega_i)(\delta p)^{1/2}}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}}$$

Or,

$$I_i^* = \frac{1}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} [\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma] \lambda(\delta p)^{1/2} + M_i \lambda(\beta\lambda)^{1/2} + \Omega_i p(\beta\lambda)^{1/2} \quad (35)$$

Now I can integrate to get one equation that will give us Φ_G as a function of exogenous parameters. Here I am simply using the definition of Φ_G as the average image within the group:

$$\Phi_G \equiv \iint I_i^* f_M(M_i) dM_i f_\Omega(\Omega_i) d\Omega_i \quad (36)$$

Basically, by solving for Φ_G , I am aggregating the equilibrium images of all the people in the group, and using the mean values of income and natural beauty to determine the within-group average image. Note that I am integrating I_i^* from $\underline{M}$ to $\overline{M}$ and from $\underline{\Omega}$ to $\overline{\Omega}$.

The integration yields the following equation:

$$\Phi_G = \frac{1}{\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} [[\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma]\lambda(\delta p)^{1/2} + M_m\lambda(\beta\lambda)^{1/2} + \Omega_m p(\beta\lambda)^{1/2}] \quad (37)$$

Then, rearranging I get

$$\Phi_G [\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}] = [[\alpha\Phi_G + (1 - \alpha)\Phi_A - \gamma]\lambda(\delta p)^{1/2} + M_m\lambda(\beta\lambda)^{1/2} + \Omega_m p(\beta\lambda)^{1/2}]$$

Finally, solving explicitly for Φ_G I get

$$\Phi_G^* = \frac{[(1 - \alpha)\Phi_A - \gamma]\lambda(\delta p)^{1/2} + M_m\lambda(\beta\lambda)^{1/2} + \Omega_m p(\beta\lambda)^{1/2}}{(1 - \alpha)\lambda(\delta p)^{1/2} + p(\beta\lambda)^{1/2}} \quad (38)$$

This in turn allows us to find expressions for all endogenous variables: x_i^* , I_i^* , and Φ_G^* as functions of exogenous variables: $\alpha, p, M_m, \Omega_m, \lambda, \Phi_A$. Now I can plug these expressions into Excel to run simulations that show the comparative statics of the model when the exogenous variables change. These comparative statics for non-identical players are shown in the following Simulations section. In the Simulations section I am able to examine who is made better off and who made is worse off when these exogenous variables change.

SIMULATIONS: Comparative Statics for Non-Identical Players

First I will set up the equilibrium condition, and then I will run simulations in Excel to analyze the comparative statics of the model with respect to $p, \lambda, \Phi_A, \alpha, \Omega_m, M_m$. By allocating numbers to represent a society, I am able to see how equilibrium utility changes with respect to the exogenous variables. For example, a better technology (that is, a larger λ) can hurt all poor people, and a higher price can make them better off.

Equilibrium Conditions

I can drop λ in this analysis because technology and price are linear, and I can see from simply rearranging the FOC to: $\frac{\lambda}{p}[F'(x_i)D'(\Omega_i + \lambda F(x_i) - \Phi) = G'(M_i - px_i)]$ that price, p , and technology, λ , move in exactly opposite directions. Therefore, comparative statics with respect to technology must mirror the comparative statics with respect to price.

In essence, there are two endogenous variables in the model: x_i^* and Φ_G^* . That is, the equilibrium consumption of beauty enhancement and the equilibrium within-group average image.

There are two equilibrium conditions:

the first order condition for person i ,

$$D'(\Omega_i + x_i^* - \alpha\Phi_G^* - (1 - \alpha)\Phi_A) = pG'(M_i - px_i^*) \quad (39)$$

or

$$\frac{D'(\Omega_i + x_i^* - \alpha\Phi_G^* - (1 - \alpha)\Phi_A)}{G'(M_i - px_i^*)} = p \quad (40)$$

and the aggregation that defines Φ_G^* :

$$\Phi_G^* = \iint [\Omega_i + x_i^*(M_i, \Omega_i)] f(M_i, \Omega_i) dM_i d\Omega_i \quad (41)$$

Note: I am integrating from $\underline{M}$ to $\overline{M}$ and from $\underline{\Omega}$ to $\overline{\Omega}$.

Equation (40) is the individual choice problem for person i , and equation (41) captures the aggregation of all the players with a distribution of income from $\underline{M}$ to $\overline{M}$ and a distribution of beauty endowment from $\underline{\Omega}$ to $\overline{\Omega}$.

Comparative Statics

In this section, I put the equilibrium condition formulas into an excel program to examine who is made better off and who is made worse off when the parameters, $p, \lambda, \Phi_A, \alpha, \Omega_m, M_m$, change in a non-identical player society.

Baseline

I use a baseline as the standard in the comparative statics. Anytime an exogenous variable is changed, I compare new values to the baseline. In the simulations I hold the parameters that I'm not examining at the following baseline values:

$$\beta = 1, \delta = 1, \gamma = 26$$

The rest of the baseline consists of the following:

$p = 1, \lambda = 1, \Phi_A = 33, \alpha = .65$, a beauty endowment distribution of $\Omega \in [10, 18]$, an income distribution of $M \in [23, 31]$, so $\Omega_m = 14$, and $M_m = 27$.

It's important to note that I am looking for interior solutions here, so I checked to make sure that all of the values of y_i^* and x_i^* that I generate are positive. In order to abide by this requirement and the requirements to maintain that $\gamma > \Phi$, and $\Phi_A > \Phi_G$, I can't give M or Ω too big of a distribution, and I have to be careful when I change the exogenous variables.

Now that the baseline has been established, I can systematically manipulate each exogenous variable and assess the effects. Recall that since $p = 1$ in the baseline, I can use the terms consumption and expenditure on beauty enhancement interchangeably in all comparative statics except for a change in price.

Comparative Statics: Price and Technology

I will start by looking at how changes in price, p , and changes in technology, λ , effect the well-being of women in the simulated society. I know that a change in p mirrors a change in λ .

Effects of a Change in Price, p :

I can hold $\lambda = 1$ and look to see who in the distribution of incomes and endowments is made better off or worse off when there is a price increase by 20% from $p = 1$ to $p = 1.2$.

First, I will examine the increase in price using the individual choice problem (eqn. (40)) and intuition. An increase in price means that the marginal cost of beauty enhancement has increased, so in equilibrium, people will buy less beauty enhancement, x_i^* decreases. Recall that both G and D are concave, so as x **increases**, the marginal cost and the marginal benefit of x decrease. Likewise, as x **decreases**, the marginal cost and the marginal benefit of x increase; therefore, the impact effect of an increase in price is a decrease in beauty enhancement consumption. Next, I can look at the feedback effect from a change in the within-group average image, Φ_G^* . If all individuals decrease their consumption of beauty enhancement, then the within-group average image will decrease. When the within-group average image decreases, the overall target image decreases which allows women to purchase less beauty enhancement in order to maintain the equilibrium gap between actual and target image. The fact that Φ_G^* and x_i^* move in the same direction (both decrease) means that there is a positive feedback effect from Φ_G^* .

[See Appendix A.1: Comparative Statics of an Increase in Price]

Analysis: More people are better off with an increase in price!

I see in the simulation that when price increases, individuals decrease the amount of beauty enhancement that they purchase. This decrease in x_i^* is due to both the impact effect and the positive induced feedback effects from the within-group average image, Φ_G^* . By using the functional form equations and parameter values, I found that the feedback effect works in the following way: when price increases from 1 to 1.2, the within-group

average image decreases from 19.67 to 17.66, so holding all else constant, the target image, Φ , decreases from 24.33 to 23.03. A lower target image means that each woman needs to buy less beauty enhancement to minimize the gap between her own image and the target image; therefore, x_i^* decreases.

The decrease in consumption of beauty enhancement influences utility in two opposite ways. First, a decrease in x_i^* caused by both the impact effect and the feedback effect will free up more income to spend on other goods, so y_i^* increases causing equilibrium utility, u_i^* , to increase. On the contrary, the decrease in x_i^* causes a woman's own image, I_i^* , to decrease, so the gap between actual and target image, $I_i^* - \Phi$, will widen. Even though the target image, Φ , decreases, the simulation shows that each woman's own image, I_i^* , decreases by more than the target causing a wider gap between one's own image and the target; therefore, the second effect of a decrease in beauty enhancement consumption is a decrease in equilibrium utility, u_i^* .

Depending on which effect is bigger, the individual will be better off or worse off. By looking at Appendix A.1, we can see that the small minority of women that are at the rich and unattractive end of the spectrum end up worse off from the price increase. For these women, the decrease in utility caused by a wider gap between actual and ideal image is greater than the increase in utility caused by an increase in y_i^* . This result stems from the fact that these women relied heavily on their expenditure on beauty enhancement to improve their looks and fare well in the beauty contest. The price increase means that they can't compete as well in the beauty contest.

Conversely, the majority of the population is better off from the price increase on beauty enhancement products. For these women, the increase in utility caused by an increase in y_i^* is greater than the decrease in utility caused by a wider gap between actual and target image. Before the price increase, all but the poorest unattractive women could afford to spend income on image enhancement which raised the beauty bar or the Φ_G^* . With the price increase, more women can't afford to spend as much on their image, so they choose to spend their income outside of the beauty game, lowering the beauty bar, and making them better off!

As I mentioned in the simple two-person discrete choice model, the fact that most women are better off from an increase in the price of beauty enhancement raises the question of taxation. If taxes were placed on beauty enhancement products from mascara to cosmetic surgery, this increase in price could cause women to be made better off.

Effects of a Change in Technology, λ :

Now I will hold price constant at $p = 1$, and examine how an increase in technology from $\lambda = 1$ to $\lambda = 1.1$ effects women's well-being depending on their income and natural beauty endowment.

An increase in technology mimics a decrease in price. Money pays for beauty enhancement and technology dictates how efficient each dollar is in buying enhancement. In other words, as technology gets better, each dollar can buy more beauty enhancement, or 'you get more bang for your buck'. In this simulation, I am increasing technology, which will act in the opposite way as an increase in price. According to the previous results, an increase in price caused the majority of women to be better off, so an increase in technology should cause the majority of women to be worse off.

[See Appendix A.2: Comparative Statics of an Increase in Technology]

Analysis: The empirical results support my assumption.

As I saw with a change in price, the impact effect of an increase in technology should be an increase in consumption of beauty enhancement (more 'bang for your buck' mimics a decrease in price enticing an increase in consumption). In the simulation, I see a consistent increase in each individual's x_i^* when technology improves due to the impact effect and a positive feedback effect. The positive feedback effect works in the following way: a small improvement in technology, λ , from 1 to 1.1 causes the within-group average image, Φ_G^* , to increase from 19.67 to 20.88. An increase in technology causes each individual's own image, I_i^* , to increase which leads to an aggregate increase in the within-group average image. This increase in Φ_G^* pushes the target image up which will make women worse off and persuade them to buy more beauty enhancement. The increase in x_i^* brings women closer to the new target image, but also means that women have less income to spend on all other goods. Furthermore, I have seen how an increase

in technology causes both own image, I_i^* , and target image, Φ , to increase. Whether the beauty gap widens or shrinks depends on the magnitudes of these increases.

From the simulations, I can see that the decrease in consumption of all other goods, y_i^* , coupled with the increase in target image, Φ , cause a greater loss in utility for most women than the small gain they make through the increase in actual image; therefore most women are worse off. The only women that are better off from the technology increase are the women at the very rich very naturally unattractive ends of the distributions. These less attractive wealthy women experience a large benefit from better technology because they depend on their expenditure on beauty enhancement to make them competitive in the beauty game. At the other end of the spectrum, the very naturally attractive poor women who rely on nature, not expenditure, are made much worse off. The story of Cinderella provides a nice explanation of what the numbers in the model and simulation are showing.

What would have happened to Cinderella if image enhancement technology was advanced in the Medieval Ages? Cinderella was born beautiful, and her Evil Step-sisters were born ugly, so Cinderella had a high endowment of beauty, $\Omega_{rella} = 18$, while genetics left her Step-sisters with low endowments of beauty, $\Omega_{step} = 10$. On the other hand, in Cinderella's step-family, income was distributed in the reverse order, so while Cinderella was beautiful, she was poor and bound to scrubbing floors in her rags, $M_{rella} = 23$. Conversely, her Evil Step-sisters owned all of the wealth, so they were ugly, but they had money, $M_{step} = 31$.

In Medieval Times, image enhancement technology, consisting of expensive dresses, girdles and make-up, was primitive compared to the plastic surgery of today. If the image enhancement technology in the Medieval Ages increased by introducing cosmetic surgery, how would the poor but beautiful Cinderella and her rich but ugly Evil Step-sisters benefit or lose? Let's look at the model for some answers: since an increase in image enhancement from girdles to cosmetic surgery is such a huge jump, it probably would have been equivalent to more than doubling λ , but for simplicity, I will refer to the numbers in Appendix A.2.

The result of an increase in technology from $\lambda = 1$ to $\lambda = 1.1$ is that the wealthy unattractive Evil Step-sisters can stretch each dollar into a much greater improvement in

their looks...which is exactly what they did. While Cinderella and her Fairy Godmother were getting Cinderella ready for the Ball, the Evil Step-sisters were recovering from breast augmentation, liposuction, and nose jobs.

Weeks later Prince Charming, the best mate in the Kingdom, came knocking on Cinderella's door looking for the beautiful woman who lost her glass slipper. When the door opened, he saw Cinderella and her now super-model-look-alike Evil Step-sisters. If technology increased enough, the Evil Step-sisters could have bought smaller feet too; therefore, at the end of the fairy tale, the Evil Step-sisters could afford to make the glass slipper fit. Now Cinderella didn't look so good compared to her image improved Evil Step-sisters.

As a result, a wealthy but born ugly Evil Step-sister got the best mate, and she became Queen. An Evil Step-sister was able to buy her beauty, and in accordance to what I discovered in the literature review, this beauty brought her success in the mating game, and in the job-market, making her much better off. On the contrary, the endowment of beauty that Cinderella was born with was not enough to win her the beauty contest, so she was left with an unhappy ending of scrubbing floors in her rags. If beauty enhancement technology hadn't increased, the Fairy-tale would have ended as we know it, with Cinderella marrying Prince Charming and becoming Queen.

I can see how the improvement in image enhancement technology has clearly made Cinderella worse off, and this story proves that when I look at the extremes, a big increase in technology will only leave the naturally ugly yet wealthy women better off, and the poor but naturally beautiful will be left worse off. Furthermore, if I focus on the entire distribution of wealth and beauty, we can see that Cinderella is in the majority. Most women are made worse off from an increase in technology due to the positive feedback effects from the increase in Φ_G^* .

Comparative Statics: Artificial Image

Now I will examine what happens when the perfection of the artificial image, Φ_A , increases. We can think of the impact effect of such a change and then the induced feedback effects.

First by looking at the individual choice equation (40): $\frac{D'(\Omega_i + x_i^* - \alpha\Phi_G^* - (1-\alpha)\Phi_A)}{G'(M_i - px_i^*)} = p$, I can analyze what happens when there is an increase in Φ_A *ceteris parabis*. The impact effect is that when Φ_A increases, the numerator in the individual choice condition increases, so to maintain the equality (with p), the denominator must increase which requires that x_i^* increase; therefore, the impact effect is positive, meaning that in the first round, an increase in Φ_A leads everyone to increase their expenditure on beauty enhancement. Then, when I aggregate these increases, I see that Φ_G^* will increase, leading to a feedback effect. The feedback effects occur in the following manner: Φ_G^* has increased, so the numerator in this condition increases. To maintain the equality (with p), the denominator must decrease which requires that x_i^* increases again. Like the impact effect, the feedback effects are positive because both Φ_G^* and x_i^* move in the same direction. Using the simulation, we can see these effects empirically.

[See Appendix A.3: Comparative Statics of an Increase in Artificial Image]

Analysis: Everyone is worse off!

From the simulation, I found that when Φ_A increases from 33 to 36, Φ_G^* increases from 19.67 to 20.44, so an increase in Φ_A causes the within-group average image, Φ_G , to increase. Both the increase in the artificial image and the increase in the within-group average image will cause the target image to rise. The rise in the target image will increase the beauty gap, so women will want to spend more on beauty enhancement to chase the target image; therefore, the impact effect and the feedback effect will cause expenditure in beauty to increase.

Everyone loses in this case. As shown in the simulation, everyone spends more on the Veblen good, x_i^* , than they did before the increase in Φ_A , so no one wins on the

consumption of standard goods account. In other words consumption of y_i^* decreases. Furthermore, everyone loses on the relative consumption account too. I can see this result by looking at each individual's own image, I_i^* , and the gap between actual (own) and target image. I observe that for all individuals, consumption of beauty enhancement, x_i^* , goes up, and the gap between actual and target image widens. Even though expenditure on beauty enhancement increases, causing actual image, I_i^* , to increase, the gap gets still gets wider because the increase in artificial and within group images, Φ_A and Φ_G , cause the target image, Φ , to increase by more than actual image, I_i^* , increases. The increase in expenditure on beauty enhancement isn't enough to shrink the beauty gap, and it also causes a decrease in expenditure on all other goods, so obviously, utility decreases on both the relative good and consumption of standard goods accounts. This is a strong, and quite surprising result: everyone is further from the ideal image in the new equilibrium than in the initial equilibrium even though expenditure on beauty enhancement increases. No wonder everyone is worse off!

This result agrees with the evidence that more perfection or idealization of artificial images in the mass media has a negative effect on women and girls. I saw evidence of this negative effect in the literature review section where exposure to thinner and more idealized media images lead women to suffer a decrease in well-being due to higher body dissatisfaction or even to symptoms as severe as eating disorders.

Comparative Statics: Weight on Within-Reference Group Average Image

Now I can look at the effect of a change in α to see what happens when the influence of the within-reference group average image changes compared to the influence of the artificial image. Here I will analyze the effects of an increase in α , the weight on the within-reference group average image, Φ_G .

Recall that the target image is composed of a weighted average of the within-group average image, and the artificial image: $\Phi = \alpha\Phi_G + (1 - \alpha)\Phi_A$, so an increase α in means that the influence of the within-group average image increases and the influence of the artificial image decreases. Artificial images in the media are digitally enhanced to

perfection. Since real people cannot be as perfect as digitally enhanced images, I can assume that the artificial image is greater than the within-group average image or $\Phi_A > \Phi_G$. In this case I would expect that an increase in the weight on the within-group average image and a decrease in the weight on the artificial image will cause the target image to decrease leading women to be better off.

[See Appendix A.4: Comparative Statics of an Increase in Weight on Within-Reference Group Average Image]

Analysis: Everyone is better off! The prediction was correct.

Since $\Phi_A > \Phi_G$, as α increases, more weight is placed on Φ_G and less on Φ_A which lowers the target image, Φ . Therefore, expenditure on beauty enhancement will decrease because women aren't chasing such a high target, so the impact effect of an increase in α is a decrease in x_i^* .

From the simulation, I calculated that the induced feedback effect of an increase in α causes Φ_G^* to decrease from 19.67 to 19.05. The decrease in the within-group average image is a result of everyone spending less on enhancement dictating a decrease in each individual's own image, I_i^* . This decrease in within-group average image causes the target image to decrease more, so expenditure on beauty enhancement will decrease more as well. The fact that Φ_G^* and x_i^* both decrease mean that there is a positive feedback effect.

This decrease in expenditure on beauty enhancement frees up more income to spend on all other goods which will cause utility to increase. Furthermore the decrease in target image, Φ , shrinks the beauty gap causing an additional increase in utility. On the other hand, I know that a decrease in expenditure on beauty enhancement also causes individual's own image, I_i^* to decrease which widens the beauty gap. The simulation shows that the target image decreases by more than actual image because the beauty gap shrinks for all individuals. A shrinking gap coupled with an increase in y_i^* means that everyone is better off.

This result demonstrates that any policies or programs implemented in the real world that cause an increase in α will make women better off. Possibly educating the public to make

people aware of the fact that the majority of artificial images are fake, will entice women to stop trying to compete with the artificial image. Instead, they may place more focus on trying to attain the within-group average image. I saw evidence of this behavior in the literature review section where Cash et al. (1983) found that women were more apt to compare themselves to images that they thought were from their peer group rather than advertisement images.

Comparative Statics: Distributions of Natural Beauty and Income

Here I look at the effect of a change in the natural endowment of beauty distribution and the income distribution. These results are straightforward, so they don't require an in-depth discussion.

Effects of a Change in Natural Beauty, Ω :

First I increased the beauty endowment distribution from $\Omega \in [10, 18]$ to $\Omega \in [12, 20]$, so the new $\Omega_m = 16$. The results are as follows:

[See Appendix A.5: Comparative Statics of an Increase in Natural Beauty]

Effects of a Change in Income, M :

Next I increased the income distribution from $M \in [23, 31]$ to $M \in [25, 33]$, so the new $M_m = 29$.

[See Appendix A.6: Comparative Statics of an Increase in Income]

Analysis: These results are not surprising. Everyone is better off when there is an increase in the beauty endowment or income *ceteris parabis*.

Obviously, the more naturally beautiful everyone is, the higher is each woman's own image, I_i^* , so the smaller the gap between actual and target image. Now, in equilibrium, women will spend less on beauty enhancement freeing up more income for all other goods. An increase in each woman's own image will increase the within-group average image inducing a feedback effect: Φ_G^* goes from 19.67 up to 21.14 causing an increase in

x_i^* . The simulation show that the impact effect from a higher Ω_i increasing I_i^* is bigger than the positive feedback effect because I see a consistent decrease in x_i^* for all individuals. The end result is that x_i^* decreases, and the gap between actual and target image decreases causing utility to go up on both accounts.

The results are similar for income. As people get richer, *ceteris parabis*, they are better off in this game. This result is obvious. More income means individuals can consume more at the same prices, so they are better off. As income mean and distribution increase, Φ_G^* increases from 19.67 to 21.14, and there is a positive feedback effect because expenditure on beauty enhancement increases as well. Since income rises for everyone, when expenditure on beauty enhancement increases, expenditure on all other goods doesn't have to decrease. In this comparative static, both x_i^* and y_i^* increase causing an increase in utility from the shrink in the beauty gap and from an increase in expenditure on all other goods.

CONCLUSIONS AND EXTENSIONS

Conclusions

By starting with the simplest model and then expanding to complex models, I learned what factors make women better off when their utility includes the beauty game element. I began with a simple two-person discrete choice model, then expanded to a multiple-person continuous choice identical player model and finally to a multiple-person continuous choice non-identical player model. In these versions of the model, I discovered the following interesting results that instigate a discussion of policies that could possibly make women better off:

Price and Technology

An increase in the price and a decrease in the technology of beauty enhancement make women better off. Changes in price and technology affect utility and consumption of beauty enhancement in opposite ways. Because an increase in technology makes each dollar more efficient, it mimics a decrease in price and vice versa.

- In the two-person discrete choice model, I showed that as the cost or expenditure on beauty enhancement increased, women ended up in a Nash Equilibrium that was Pareto Optimal. On the other hand, when the cost or expenditure on beauty enhancement was lower, women finished at a Nash Equilibrium that was not Pareto Optimal. An increase in cost of beauty enhancement in this simple model could be caused by either an increase in price or a decrease in technology.
- In the multiple-person continuous choice identical player model, I found that the effects of a change in price and technology depended on the values of the parameters in the general model. When I examined the model using functional forms, I found that an increase in price or a decrease in technology caused women to be better off and vice-versa.

- In the multiple-person continuous choice non-identical player model, I discovered interesting results. The majority of women became better off when there was an increase in the price or a decrease in the technology of beauty enhancement, and this majority became worse off when there was a decrease in price or an increase in technology of beauty enhancement. The women at the wealthy unattractive ends of the income and beauty spectrums were the only people made worse-off from an increase in price of beauty enhancement. Likewise, they were the only women made better off by an increase in technology.

These results raise the question of what policies could be implemented to make women better off. Overall, the majority of women are better off when prices of beauty enhancement increase, so taxes on products like cosmetic surgery and make-up could actually improve women's well-being. Even though taxation may be met with disapproval, especially from women who have a high consumption of beauty enhancement, increasing price through taxation seems far easier than implementing a policy to halt or decrease technology.

The Artificial Image and the Weight on the Within-Reference Group Average Image

When the perfection of the artificial image increases or the weight on the within-reference group average image decreases, women end up worse off. I established that the artificial image generated by the mass media is higher than the within-group average image due to the fact that cameras and digital enhancement can produce an image far more perfect than something that we would see in reality. In composing one's target image, the weight on the within-group average image and the weight on the artificial image must add up to one, so a decrease in the weight on the within-group image causes an increase in the weight on the artificial image and vice versa. The weight on an image measures the importance or the influence of that image. Therefore, a decrease in the weight on the within-group average image will have the same effect on women's expenditure and well-being as an increase in the artificial image.

- In the two-person discrete choice model, I found that when the value of winning was less than expenditure on beauty and the cost of losing was greater than that expenditure, advertisers and Hollywood could solve the coordination problem that players faced. In this case, advertisers and Hollywood could affect each player's decision by improving the artificial ideal or by flooding her with many images of the artificial ideal which would influence her to believe that the artificial ideal is important. In other words, by increasing the perfection and importance of the artificial image, advertisers and Hollywood can help players coordinate their decisions to end up in the Nash Equilibrium where they both spend on beauty enhancement. In this Nash Equilibrium, advertisers and Hollywood are better off from higher profits, but women are worse off.
- In the multiple-person continuous choice identical player model, I found that an increase in the perfection or idealization of the artificial image caused an increase in expenditure on beauty enhancement and a decrease in utility. I also found that an increase in the weight on the within-reference group average image caused a decrease in expenditure on beauty and an increase in utility.
- In the non-identical player model expansion, I found the same results as in the identical player model. All of the women in our distribution of income and natural beauty faced an increase in expenditure on beauty and were made worse off when there was an increase in the artificial image or a decrease in the weight on the within-group average image.

Overall, as the perfection of the artificial image increases, women are made worse-off, and as the weight on the within-group reference image increases, women are made better off. These two results are connected because they show that women's utility decreases as the artificial image becomes more idealized and influential.

As shown in the introduction and literature review, the influence of artificial image has been increasing. The mass media can control the influence of artificial image by increasing people's exposure to advertising, and the mass media can control the value of the artificial image by glamorizing and perfecting each image through digital enhancement and supermodel selection. First, advertisers have increased exposure: The U.S. Census Bureau reported that expenditure on advertising rose by over \$85 billion from 1990 to 1999.¹ Also, the media in which advertisements are distributed have increased with communication and technology advancements such as the internet. Second, the actual artificial image has been improved through better computer programs and technology that allow for more and better digital enhancement. Based on these facts and my models, I can assume that these increases in the value and weight of the artificial image could be responsible for some of the increase in expenditure on beauty. Furthermore, as I saw in the literature review and the model sections, this better-enhanced-more-influential artificial image could be responsible for a decrease in women's and girl's well-being.

As the weight on the within-reference group average image increases (causing a decrease in the weight on the artificial image) women are better off. The weight on the within-group average image captures the importance or the influence of the within-group average image compared to the artificial ideal.

Education programs that expose the extent of digital enhancement in all advertisements could help to reduce the influence of the artificial image. Even if women know that magazine advertisements are air-brushed, I have found from my own experience that my peer group (college-educated females) doesn't realize the extreme measure of digital enhancement that goes into each image that we see. My peers do not know that images of ultra-thin super models are also usually digitally stretched and thinned out in every area of their body except their breasts which are enlarged. Cash et al. (1983) found that a

¹ United States, U.S. Census Bureau, Statistical Abstract of the United States: 2000, 21 Dec. 2005, 21 Nov. 2007 <<http://www.census.gov/prod/2001pubs/statab/sec18.pdf>>.

woman was less likely to compare herself to an image that she thought was artificial than to an image that she thought was from a member of her reference group. Therefore, education could help decrease the weight or influence of the artificial image, thereby increasing the weight on the within-group average image and making women better off.

Regulations keeping advertisers from depicting such extremely glamorized images would help reduce the artificial image making women better off; however, these regulations would be difficult to pass because they probably would be met with a lot of resistance from the beauty industry, advertising companies, and Hollywood.

Natural Beauty and Income

An increase in natural beauty and income make women better off. These results seem pretty straightforward: the naturally prettier and the wealthier one is, the happier she will be.

- In the two-person discrete choice model, analyzing a higher income and more natural beauty isn't very applicable, so I will focus on the expansions of this model.
- In the multiple-person continuous choice identical player model, I show that an increase in natural beauty and an increase in income both have the same effects on utility but opposite effects on expenditure. When natural beauty increases, women are born closer to the ideal image, and therefore, they don't need to spend as much on beauty enhancement, so they can free up income to spend on all other goods. The beauty gap is naturally smaller and expenditure on all other goods is higher, so women are better off from an increase in natural beauty. When income increases, women can spend more on beauty enhancement without spending less on all other goods; therefore, the beauty gap can shrink while expenditure on all other goods increases, so utility will rise from an increase in income.

- In the multiple-person continuous choice non-identical player model, I found the same results as in the identical player model, so these results held for players with a distribution of income and natural beauty.

These results have interesting implications for policy ideas and applications. With better health care, natural beauty should increase a bit because birth defects and deformities will be reduced. The only way to significantly increase natural beauty is through genetic engineering which has so many ethical issues and problems of its own, that it would be more of a problem than a solution to well-being.

As far as income is concerned, as long as everyone's income increases, everyone will be better off. Since the world population more commonly faces an increase in income distribution than an overall increase in income, I ran a few tests to see the outcome of a change in income distribution. The wealthier a woman is compared to the mean, the better off she is. The reverse is also true: the poorer a woman is compared to the mean, the worse off she is. As the mean income in the reference group decreases, *ceteris parabis*, the average expenditure on beauty enhancement decreases causing a decrease in the within-group average image which in turn lowers the target image. A lower target image shrinks the beauty gap making women better off.

Since I am holding everything but mean income constant, all the women who were in the reference group originally don't experience a change in income, so a decrease in mean income will make them better off. However, in order to make the mean income decrease, below-average-income women must enter the reference group without changing the distribution of natural beauty. For example, let's start with the reference group of Beverly Hills housewives, and let's say that these women are very wealthy and spend thousands of dollars monthly on make-up, cosmetic surgery, and dieting. If some equally attractive but less wealthy Midwest farmers joined the Beverly Hills reference group (I'm not sure how this initiation would work), then the Beverly Hills housewives would be better off. With the inclusion of the less wealthy Midwest farmers, the mean expenditure

on cosmetic surgery, dieting, and Botox® would be lower, so the within-group average image would decrease. On the other hand, the Midwest farmers would be worse off because the Beverly Hills reference group probably has a much higher average income than the Midwest farmer reference group. Because the mean expenditure on beauty and the within-group average image are much higher in Beverly Hills, the Midwest farmers are made worse off. This situation is a solution to improving well-being for the wealthy Beverly Hills housewives, but not for the less-wealthy Midwest farmers.

Extensions

My models are based on the Veblen component of the beauty game. Individual's positional concerns with beauty are apparent in the literature review, and the fact that beauty is a more important characteristic in women than in men is another issue that is supported by the literature.

To extend this paper, I could run my own experiments to test and hopefully strengthen my argument that beauty is a relative good and that beauty seems to be more important to women than to men. I can test both women's and men's positional concerns regarding their own and other's beauty, wealth, and intelligence to see how strong these relative concerns are and to see if there are significant differences between men and women.

I could also examine the different assumptions in the functional forms of the non-identical player model. For example, the beauty improvement function could be concave or possibly convex. Furthermore, I could explore the comparative statics of the general models for both identical and non-identical players to prove that the results that I have found hold more generally.

In addition, I could expand outside of the Veblen competition model to explore conformity behavior among women. While I cannot examine both conformity and competition behavior in the same economic model, I could add to this paper by testing the theory that females base their behavior on conformity as young adolescents, and transform into competitors as they grow older.

REFERENCES

- Aharon, Itzhak, Nancy Etcoff, Dan Ariely, Christopher F. Chabris, Ethan O'conner, and Hans C. Breiter. "Beautiful Faces Have Variable Reward Value: FMRI and Behavioral Evidence." Neuron 32 (2001): 537-551.
- Akerlof, George A., and Rachel E. Kranton. "Economics and Identity." Quarterly Journal of Economics 115 (2000): 715-753. JSTOR. University of Calgary, Calgary. 15 May 2006 <<http://links.jstor.org>>.
- Andreoni, James, and Ragan Petrie. "Beauty, Gender and Stereotypes: Evidence From Laboratory Experiments." Working Paper (2006).
- Borah, Gregory, Marlene Rankin, and Philip Wey. "Psychological Complications in 281 Plastic Surgery Practices." Plastic and Reconstructive Surgery 105 (2000): 1241-1246.
- Brown, Amy, and Helga Dittmar. "Think "Thin" and Feel Bad: the Role of Appearance Schema Activation, Attention Level, and Thin-Ideal Internalization for Young Women's Responses to Ultra-Thin Media Ideals." Journal of Social and Clinical Psychology 24 (2005): 1088-1113.
- Burden and Prevalence of Eating Disorders. Eating Disorders Coalition for Research, Policy & Action. 2007. 18 Nov. 2007
<<http://www.eatingdisorderscoalition.org/reports/statistics.html>>.
- Carroll, Joseph. Health, Age, and Income Factor Into Americans' Self-Image. Gallup Poll News Service. Princeton, NJ, 2003. 1-6. 03 July 2006.
- Carroll, Joseph. Who's Worried About Their Weight? Gallup Poll News Service. Princeton, NJ, 2005. 1-4. 03 July 2006 <<http://www.gallup.com>>.

- Cash, Thomas F., Diane Walker Cash, and Jonathan W. Butters. "'Mirror, Mirror, on the Wall...?': Contrast Effects and Self-Evaluation of Physical Attractiveness." Personality and Social Psychology Bulletin 9 (1983): 351-358.
- Clay, Daniel, Vivian L. Vignoles, and Helga Dittmar. "Body Image and Self-Esteem Among Adolescent Girls: Testing the Influence of Sociocultural Factors." Journal of Research on Adolescence 15 (2005): 451-477.
- Chao, Angela, and Juliet B. Schor. "Empirical Tests of Status Consumption: Evidence From Women's Cosmetics." Journal of Economic Psychology 19 (1998): 107-131.
- Eaton, B. Curtis. Applied Microeconomic Theory. Cheltenham, U. K.: Edward Elgar P, 2002. 372-388.
- Eswaran, Mukesh, and B. Curtis Eaton. "Well-Being and Affluence in the Presence of a Veblen Good." Diss. Univ. of Calgary, 2005.
- Etcoff, Nancy. Survival of the Prettiest, the Science of Beauty. New York: Doubleday, 1999.
- Etcoff, Nancy, Susie Orbach, Jennifer Scott, and Heidi D'agostino. "Beyond Stereotypes: Rebuilding the Foundation of Beauty Beliefs" Findings of the 2005 Dove Global Study. Dove, a Unilever Beauty Brand. 2006. 2-63. 10 June 2006 <<http://www.campaignforrealbeauty.com>>.
- Etcoff, Nancy, Susie Orbach, Jennifer Scott, and Heidi D'agostino. The Real Truth About Beauty: a Global Report. Dove, a Unilever Beauty Brand. 2004. 1-48. 29 July 2006 <<http://www.campaignforrealbeauty.com>>.

Field, Alison E., Lilian Cheung, Anne M. Wolf, David B. Herzog, and Steven L.

Gortmaker. "Exposure to the Mass Media and Weight Concerns Among Girls."

Pediatrics 103 (1999): 1-5.

Frank, Robert H. Luxury Fever. New York: The Free P, 1999.

Fox, Shannon. "Aesthetic Procedure Addiction." Aesthetic Buyers Guide Sept. 2007. 19

Nov. 2007 <www.miinews.com>.

Gauvin, L, M Lieberman, D R. White, and W M. Bukowski. "Interpersonal Influence and Disordered Eating Behaviors in Adolescent Girls: the Role of Peer Modeling, Social Reinforcement, and Body-Related Teasing." Eating Behaviors 2 (2001): 215-236.

Gimlin, Debra. "The Absent Body Project: Cosmetic Surgery as a Response to Bodily Dys-Appearance." Sociology 40 (2006): 699-716.

Graydon, Shari. In Your Face. Annick P Ltd., 2004.

Graydon, Shari. Made You Look. Annick P, 2003.

Groesz, Lisa M., Michael P. Levine, and Sarah K. Murnen. "The Effect of Experimental Presentation of Thin Media Images on Body Satisfaction: a Meta-Analytic Review." International Journal of Eating Disorders 31 (2002): 1-16.

Gutierrez, Sara E., Douglas T. Kenrick, and Jenifer J. Partch. "Beauty, Dominance, and the Mating Game: Contrast Effects in Self-Assessment Reflect Gender Differences in Mate Selection." Personality and Social Psychology Bulletin 25 (1999): 1126-1134.

Hammermesh, Daniel S., and Jeff E. Biddle. "Beauty and the Labor Market." The American Economic Review 84 (1994): 1174-1194.

- Hargreaves, Duane, and Marika Tiggemann. "The Effect of "Thin Ideal" Television Commercials on Body Dissatisfaction and Schema Activation During Early Adolescence." Journal of Youth and Adolescence 32 (2003): 367-373.
- Hargreaves, Duane, and Marika Tiggemann. "The Role of Appearance Schematicity in the Development of Adolescent Body Dissatisfaction." Cognitive Therapy and Research 26 (2002): 691-700.
- Harter, Susan. "The Perceived Competence Scale for Children." Child Development 53 (1982): 87-97. JStor. University of Calgary, Calgary. 14 May 2007.
- Harter, Susan, Patricia Waters, and Nancy R. Whitesell. "Relational Self-Worth: Differences in Perceived Worth as a Person Across Interpersonal Contexts Among Adolescents." Child Development 69 (1998): 756-766. JStor. University of Calgary Library, Calgary. 14 May 2007.
- Hellmich, Nanci. "Do Thin Models Warp Girls' Body Image?" USA Today 25 Sept. 2006.
- Holmstrom, Amanda J. "The Effects of the Media on Body Image: a Meta-Analysis." Journal of Broadcasting & Electronic Media 48 (2004): 196-217.
- Hussain, Rafat, Margot Schofield, and Deborah Loxton. "Cosmetic Surgery and Health Service Use in Midlife: Women's Health Australia." Medical Journal of Australia 176 (2002): 576-579.
- Irving, Lori M. "Media Exposure and Disordered Eating: Introduction to the Special Section." Journal of Social and Clinical Psychology 20 (2001): 259-269.

Johnston, Victor S., Christopher J. Solomon, Stuart J. Gibson, and Alvaro Pallares-

Bejarano. "Human Facial Beauty." Archives of Facial Plastic Surgery 5 (2003): 371-377.

Keelan, J. Patrick R., Karen K. Dion, and Kenneth L. Dion. "Correlates of Appearance Anxiety in Late Adolescence and Early Adulthood Among Young Women." Journal of Adolescence 15 (1992): 193-205.

Kenrick, Douglas T., Laurie L. Goldberg, and Sara E. Gutierres. "Influence of Popular Erotica on Judgments of Strangers and Mates." Journal of Experimental Social Psychology 25 (1989): 159-167.

Kenrick, Douglas T., Daniel R. Montello, Sara E. Gutierres, and Melanie R. Trost. "Effects of Physical Attractiveness on Affect and Perceptual Judgments: When Social Comparison Overrides Social Reinforcement." Personality and Social Psychology Bulletin 19 (1993): 195-199.

Kenrick, Douglas T., Steven L. Neuberg, Kristin L. Zierk, and Jacquelyn M. Krones. "Evolution and Social Cognition: Contrast Effects as a Function of Sex, Dominance, and Physical Attractiveness." Personality and Social Psychology Bulletin 20 (1994): 210-217.

Kilbourne, Jeane. Deadly Persuasions: Why Women and Girls Must Fight the Addictive Power of Advertising. New York: The Free P, 1999.

Kobrin, Sandra. "Teens Call Hyper-Sexualized Media Images 'Normal'" Women\ Enews 29 Oct. 2006. 14 May 2007

<<http://www.womensenews.org/article.cfm/dyn/aid/2940/context/cover/>>.

- Krebs, Dennis, and Allen A. Adinolfi. "Physical Attractiveness, Social Relations, and Personality Style." Journal of Personality and Social Psychology 31 (1975): 245-253.
- Krupka, Erin, and Roberto A. Weber. The Focusing and Informational Effects of Norms on Pro-Social Behavior. Dept. of Social and Decision Sciences, Carnegie Mellon University. 2006. 1-34.
- Lamb, Sharon, and Lyn Mikel Brown. Packaging Girlhood. New York: St. Martin's P, 2006.
- Langlois, Judith H., Jean M. Ritter, Lori A. Roggman, and Lesley S. Vaughn. "Facial Diversity and Infant Preferences for Attractive Faces." Developmental Psychology 27 (1991): 79-84.
- Langlois, Judith H., Lori A. Roggman, and Lisa Musselman. "What is Average and What is Not Average About Attractive Faces?" Psychological Science 5 (1994): 214-220.
- Langlois, Judith H., Lori A. Roggman, Rita J. Casey, Jean M. Ritter, Loretta A. Reiser-Danner, and Vivian Y. Jenkins. "Infant Preferences for Attractive Faces: Rudiments of a Stereotype?" Developmental Psychology 23 (1987): 363-369.
- Lieberman, Melissa, Lise Gauvin, William M. Bukowski, and Donna R. White. "Interpersonal Influence and Disordered Eating Behaviors in Adolescent Girls: the Role of Peer Modeling, Social Reinforcement, and Body-Related Teasing." Eating Behaviors 2 (2001): 215-236.

- Makros, Jenny, and Marita P. McCabe. "Relationships Between Identity and Self-Representations During Adolescence." Journal of Youth and Adolescence 30 (2001): 623-639.
- Martin, Mary C., and James W. Gentry. "Stuck in the Model Trap: the Effects of Beautiful Model in Ads on Female Pre-Adolescents and Adolescents." Journal of Advertising 26 (1997): 19-33.
- Martin, Mary C., and Patricia F. Kennedy. "Advertising and Social Comparison: Consequences for Female Preadolescents and Adolescents." Psychology and Marketing 10 (1993): 513-530.
- Martin, Suzanne. "Advertising to Youth: What Youth Want and What Advertisers Need to Know." Trends & Tudes 5 (2006): 1-5. 15 May 2007 <http://www.harrisinteractive.com/news/newsletters_k12.asp>.
- Marwick, Arthur. Beauty in History. Thames and Hudson, 1988.
- McLaren, L., and L. Gauvin. "Neighborhood Level Versus Individual Level Correlates of Women's Body Dissatisfaction: Toward a Multilevel Understanding of the Role of Affluence." Journal of Epidemiology and Community Health 56 (2002): 193-199. 15 May 2007 <<http://jech.bmj.com/>>.
- McLaughlin, Joseph K., Thomas N. Wise, and Loren Lipworth. "Increased Risk of Suicide Among Patients with Breast Implants: Do the Epidemiologic Data Support Psychiatric Consultation?" Psychosomatics 45 (2004): 277-280.
- McMurray, Coleen. The Fit-Fat Struggle in U.S., Canada, Britain. Gallup Poll News Service. Princeton, NJ, 2004. 1-3. 03 July 2006 <<http://www.gallup.com>>.

- Mellin, Laurel M., Charles E. Irwin Jr., and Sarah Scully. "Prevalence of Disordered Eating in Girls: a Survey of Middle-Class Children." Journal of the American Dietetic Association 92 (1992): 851-853.
- Meyers, Laurie. "Dangerous Dolls? Psychologists Push Back Against Market Forces and Products That Sexualize Young Girls." Monitor on Psychology 37 (2006). APA Online. 14 May 2007.
- Mintz, Laurie B., and Nancy E. Betz. "Prevalence and Correlates of Eating Disordered Behaviors Among Undergraduate Women." Journal of Counseling Psychology 35 (1988): 463-471.
- Mintz, Laurie B., and Nancy E. Betz. "Sex Differences in the Nature, Realism, and Correlates of Body Image." Sex Roles 15 (1986): 185-195.
- Mobius, Markus M., and Tanya S. Rosenblat. "Why Beauty Matters." The American Economic Review 96 (2006): 222-235.
- Murnen, Sarah K., Linda Smolak, J. Andrew Mills, and Lindsey Good. "Thin, Sexy Women and Strong, Muscular Men: Grade School Children's Responses to Objectified Images of Women and Men." Sex Roles 49 (2003): 427-437.
- Nowak, Rachel. "When Looks Can Kill." NewScientist 21 Oct. 2006: 18-21.
- O'dea, Jennifer A. "Self-Concept, Self-Esteem and Body Weight in Adolescent Females: a Three-Year Longitudinal Study." Journal of Health Psychology 11 (2006): 599-611.
- Phillips, Lynn. The Girls Report. The National Council for the Research on Women. New York: The National Council for the Research on Women, 1998.

- Proudfoot, Shannon. "All Women Affected by Perfection." The Calgary Herald 02 Apr. 2007. 30 Apr. 2007 <www.canada.com>.
- Richins, Marsha L. "Social Comparison and the Idealized Images of Advertising." Journal of Consumer Research 18 (1991): 71-83.
- Rosenberg, Morris, Carmi Schooler, Carrie Schoenbach, and Florence Rosenberg. "Global Self-Esteem and Specific Self-Esteem: Different Concepts, Different Outcomes." American Sociological Review 60 (1995): 141-156. JStor. University of Calgary, Calgary. 14 May 2007.
- Rusticus, Shayna A. "Impact of the Thin Ideal Portrayed in Adult Women." American Psychological Association (APA). Annual Meeting of the American Psychological Association (APA). Washington D.C. Aug. 2005.
- Singer, Natasha. "Who is the Real Face of Plastic Surgery?" The New York Times 16 Aug. 2007, sec. E: e1+.
- Solnick, Sara J., and David Hemenway. "Is More Always Better?: a Survey on Positional Concerns." Journal of Economic Behavior and Organization 37 (1998): 373-383.
- Sonmez, Ahmet, Nurdan Biskin, Mehmet Bayramicli, and Ayhan Numanoglu. "Comparison of Preoperative Anxiety in Reconstructive and Cosmetic Surgery Patients." Annals of Plastic Surgery 54 (2005): 172-175.
- Steiner-Adair, Catherine, and Lisa Sjostrom. Full of Ourselves. Teachers College P, 2005.
- Stephens, Debra Lynn, Ronald Paul Hill, and Cynthia Hanson. "The Beauty Myth and Female Consumers: the Controversial Role of Advertising." Journal of Consumer Affairs 28 (1994): 137-153.

- Stice, Eric, and Heather E. Shaw. "Adverse Effects of the Media Portrayed Thin-Ideal on Women and Linkages to Bulimic Symptomatology." Journal of Social and Clinical Psychology 13 (1994): 288-308.
- Stice, Eric, and Heather Shaw. "Eating Disorder Prevention Programs: a Meta-Analytic Review." Psychological Bulletin 130 (2004): 206-227.
- Stice, Eric, Jennifer Maxfield, and Tony Wells. "Adverse Effects of Social Pressure to Be Thin on Young Women: an Experimental Investigation of the Effects of "Fat Talk". " International Journal of Eating Disorders 34 (2003): 108-117.
- Stice, Eric, Lindsay Mazotti, David Weibel, and W. Stewart Agras. Dissonance Prevention Program Decreases Thin-Ideal Internalization, Body Dissatisfaction, Dieting, Negative Affect, and Bulimic Symptoms: a Preliminary Experiment. John Wiley & Sons, Inc., 2000.
- Stormer, Susan M., and J. Kevin Thompson. "Explanations of Body Image Disturbance: a Test of Maturational Status, Negative Verbal Commentary, Social Comparison, and Sociocultural Hypotheses." International Journal of Eating Disorders 19 (1996): 193-202.
- Striegel-Moore, Ruth H., Lisa R. Silberstein, and Judith Rodin. "Toward an Understanding of Risk Factors for Bulimia." American Psychologist 41 (1986): 246-263.
- Sullivan, PF. "Mortality in Anorexia Nervosa." The American Journal of Psychiatry 152 (1995): 1073-1074.

- Tiggemann, Marika, and Amanda S. Pickering. "Role of Television in Adolescent Women's Body Dissatisfaction and Drive for Thinness." International Journal of Eating Disorders 20 (1996): 199-203.
- Thompson, J K., and Leslie J. Heinberg. "The Media's Influence on Body Image Disturbance and Eating Disorders: We've Reviled Them, Now Can We Rehabilitate Them?" Journal of Social Issues 55 (1999): 339-353.
- Thompson, J K., and Eric Stice. "Thin-Ideal Internalization: Mounting Evidence for a New Risk Factor for Body-Image Disturbance and Eating Pathology." Current Directions in Psychological Science (2001): 181-183.
- Townsend, John Marshall, and Gary D. Levy. "Effects of Potential Partners' Physical Attractiveness and Socioeconomic Status on Sexuality and Partner Selection." Archives of Sexual Behavior 19 (1990).
- Vandereycken, Walter, and Greta Noordenbos, eds. The Prevention of Eating Disorders. New York: New York UP, 1998. 23-56.
- Varian, Hal R. "Economic Scene; Beauty and the Fattened Wallet." New York Times 06 Apr. 2006.
- Villeneuve, Paul J., Eric J. Holowaty, Jacques Brisson, Lin Xie, Anne-Marie Ugnat, Louis Latulippe, and Yang Mao. "Mortality Among Canadian Women with Cosmetic Breast Implants." American Journal of Epidemiology 164 (2006): 334-341.
- Whyte, Kenneth. "Why Do We Dress Our Daughters Like Skanks?" Maclean's 01 Jan. 2007: 10-11.
- Wilson, Eric. "When is Thin Too Thin?" The New York Times 21 Sept. 2006.

2006 Average Surgeon/Physician Fees. American Society of Plastic Surgeons. ASPS,

2007. 19 Nov. 2007 <<http://www.plasticsurgery.org>>.

2006 Gender Quick Facts. American Society of Plastic Surgeons. ASPS, 2007. 19 Nov.

2007 <<http://www.plasticsurgery.org>>.

2006 Quick Facts. American Society of Plastic Surgeons. ASPS, 2007. 19 Nov. 2007

<<http://www.plasticsurgery.org>>.

2000/2005/2006 National Plastic Surgery Statistics. American Society of Plastic

Surgeons. ASPS, 2007. 19 Nov. 2007 <<http://www.plasticsurgery.org>>.

2006 Statistics. American Society for Aesthetic Plastic Surgery. ASAPS, 2007. 19 Nov.

2007 <<http://www.surgery.org>>.

The Catalyst Pyramid: U.S. Women in Business. Catalyst Inc. New York: Catalyst Inc.,

2007. 14 Nov. 2007 <<http://www.catalyst.org>>.

Cosmetics Industry: Facts and Figures. Eurostat. European Commission, 2006. 18 Nov.

2007 <<http://ec.europa.eu>>.

"Diet Industry is Big Business." CBS News. 1 Dec. 2006. 18 Nov. 2007

<<http://www.cbsnews.com>>.

The Dove Report: Challenging Beauty. Unilever. 2004. 1-25. 29 July 2006

<<http://www.campaignforrealbeauty.com>>.

Fact Sheet. National Eating Disorder Organization. 27 Apr. 2007

<<http://www.nationaleatingdisorder.org>>.

Fact Sheet Regarding Key Global Figures with Focus on Differences Between Girls and

Women. Dove, a Unilever Brand. Edelman, 2005. 1-2.

<www.campaignforrealbeauty.com>.

Fact Sheet Regarding Key Global Figures with Focus on Most Striking Country

Differences. Dove, a Unilever Brand. Edelman, 2005. 1-3.

<<http://www.campaignforrealbeauty.com>>.

Girls and Media. New York: Girls Incorporated, 2002.

Girls and Their Bodies. New York: Girls Incorporated, 2006.

Girls Speak Out: Girls Rights 2006. Girls Incorporated. Harris Interactive Inc, 2006.1-98.

"Happiness and Economics." The Economist 23 Dec. 2006: 33-35.

Killing Us Softly 3. Dir. Jean Kilbourne. Videocassette. Kinetic Video, 2002.

Overview of the 2002 U.S. Cosmetic Market. U.S. Cosmetic Industry. Market View,

2005. 18 Nov. 2007 <www.cosmeticindustry.com/overview02final.html>.

Personal Weight Situation. Gallup Poll News Service. Princeton, NJ, 2006. 1-14. 03 July

2006 <<http://www.gallup.com>>.

Quick Facts: Highlights of the ASAPS 2006 Statistics on Cosmetic Surgery. American

Society for Aesthetic Plastic Surgery. ASAPS, 2007. 19 Nov. 2007

<<http://www.surgery.org>>.

Report of the APA Task Force on the Sexualization of Girls: Executive Summary.

American Psychological Association. Washington DC: American Psychological

Association, 2007. 1-9.

Statistics: Eating Disorders and Their Precursors. National Eating Disorders Association.

2005. 18 Nov. 2007 <www.NationalEatingDisordersAssociation.com>.

The Supergirl Dilemma. Harris Interactive. New York: Girls Incorporated, 2006.

"Super Slim Me: Fact Sheet." BBC Three. BBC. 15 May 2007

<http://www.bbc.co.uk/bbcthree/programmes/mischief/super_slim_me/factsheet.shtml>.

Understanding Statistics on Eating Disorders. National Eating Disorder Information

Centre. NEDIC, 2005. 18 Nov. 2007 <<http://www.nedic.ca>>.

United States. U.S. Census Bureau. Statistical Abstract of the United States: 2000 . 21

Dec. 2005. 21 Nov. 2007

<<http://www.census.gov/prod/2001pubs/statab/sec18.pdf>>.

Weight Loss Market to Reach 58 Billion in 2007. Marketdata Enterprises, Inc.

EMaxHealth, 2007. 18 Nov. 2007 <<http://www.emaxhealth.com>>.

The Widening of America. Multi-Service Eating Disorder Association. 2007. 18 Nov.

2007 <www.medainc.org>.

"Women and Body Image: the Tyranny of Beauty." Women's Health Journal (2000).

APPENDIX A: Comparative Statics in the Non-Identical Players Model

A.1: Comparative Statics of an Increase in Price

PRICE = 1 UTILITY MATRIX

		Natural Beauty:								
		Ugly			Avg.			Beauty		
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.090
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.090	-0.088
	Avg. 27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.090	-0.088	-0.086
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.090	-0.088	-0.086	-0.084
Rich	29	-0.098	-0.096	-0.094	-0.092	-0.090	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.090	-0.088	-0.086	-0.084	-0.082	-0.081
	31	-0.094	-0.092	-0.090	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

PRICE = 1.2 UTILITY MATRIX

Bold Italics = Better off!!

		Natural Beauty:								
		Ugly			Avg.			Beauty		
		10	11	12	13	14	15	16	17	18
Poor	23	<i>-0.114</i>	<i>-0.110</i>	<i>-0.107</i>	<i>-0.104</i>	<i>-0.101</i>	<i>-0.099</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.091</i>
	24	<i>-0.111</i>	<i>-0.108</i>	<i>-0.105</i>	<i>-0.102</i>	<i>-0.099</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>
	25	<i>-0.108</i>	<i>-0.105</i>	<i>-0.102</i>	<i>-0.099</i>	<i>-0.097</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.090</i>	<i>-0.088</i>
Income:	26	<i>-0.106</i>	<i>-0.103</i>	<i>-0.100</i>	<i>-0.097</i>	<i>-0.095</i>	<i>-0.092</i>	<i>-0.090</i>	<i>-0.088</i>	<i>-0.086</i>
	Avg. 27	<i>-0.103</i>	<i>-0.100</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.090</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>
	28	<i>-0.101</i>	<i>-0.098</i>	<i>-0.096</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>
Rich	29	-0.099	<i>-0.096</i>	<i>-0.094</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.081</i>
	30	-0.096	-0.094	<i>-0.092</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.081</i>	<i>-0.080</i>
	31	-0.094	-0.092	-0.090	<i>-0.088</i>	<i>-0.085</i>	<i>-0.084</i>	<i>-0.082</i>	<i>-0.080</i>	<i>-0.078</i>

Note: Identical utility values are due to rounding.

A.2: Comparative Statics of an Increase in Technology (λ)TECHNOLOGY (λ) = 1 UTILITY MATRIX

		Natural Beauty:								
		Ugly			Avg.			Beauty		
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
Avg.	27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
	29	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081
Rich	31	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

TECHNOLOGY (λ) = 1.1 UTILITY MATRIX*Bold Italics = Better off!!*

		Natural Beauty:								
		Ugly			Avg.			Beauty		
		10	11	12	13	14	15	16	17	18
Poor	23	-0.116	-0.113	-0.11	-0.107	-0.104	-0.102	-0.1	-0.097	-0.095
	24	-0.113	-0.11	-0.107	-0.104	-0.102	-0.099	-0.097	-0.095	-0.093
	25	-0.109	-0.107	-0.104	-0.101	-0.099	-0.097	-0.095	-0.093	-0.091
Income:	26	-0.106	-0.104	-0.101	-0.099	-0.097	-0.094	-0.092	-0.09	-0.088
Avg.	27	-0.103	-0.101	-0.099	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086
	28	-0.101	-0.1	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
	29	-0.098	-0.1	-0.09	-0.092	-0.09	-0.088	-0.086	-0.084	-0.083
	30	-0.096	-0.09	-0.09	-0.09	-0.088	-0.086	-0.084	-0.083	-0.081
Rich	31	-0.093	-0.09	-0.09	-0.09	-0.09	-0.084	-0.082	-0.081	-0.079

Note: Identical utility values are due to rounding.

A.3: Comparative Statics of an Increase in Artificial Image (Φ_A)

Artificial Image $\Phi_A = 33$ UTILITY MATRIX

		Natural Beauty:								
		Ugly	Avg.						Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
	Avg	27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
Rich	29	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081
	31	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

Bold Italics = Better off!!

Artificial Image $\Phi_A = 36$ UTILITY MATRIX

		Natural Beauty:								
		Ugly	Avg.						Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	-0.121	-0.117	-0.114	-0.111	-0.108	-0.105	-0.102	-0.1	-0.097
	24	-0.117	-0.114	-0.111	-0.108	-0.105	-0.102	-0.1	-0.097	-0.095
	25	-0.114	-0.111	-0.108	-0.105	-0.102	-0.1	-0.097	-0.095	-0.093
Income:	26	-0.111	-0.108	-0.105	-0.102	-0.1	-0.097	-0.095	-0.093	-0.091
	Avg	27	-0.108	-0.105	-0.102	-0.1	-0.097	-0.095	-0.093	-0.089
	28	-0.105	-0.102	-0.1	-0.097	-0.095	-0.093	-0.091	-0.089	-0.087
Rich	29	-0.102	-0.1	-0.097	-0.095	-0.093	-0.091	-0.089	-0.087	-0.085
	30	-0.1	-0.097	-0.095	-0.093	-0.091	-0.089	-0.087	-0.085	-0.083
	31	-0.097	-0.095	-0.093	-0.091	-0.089	-0.087	-0.085	-0.083	-0.081

**A.4: Comparative Statics of an Increase in Weight On Within-Reference Group
Average Image (α)**

Weight $\alpha = 0.65$ UTILITY MATRIX

		Natural Beauty:								
		Ugly	Avg.						Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
Avg.	27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
	29	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081
Rich	31	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

Weight $\alpha = 0.71$ UTILITY MATRIX

Bold Italics = Better off!!

		Natural Beauty:								
		Ugly	Avg.						Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	<i>-0.111</i>	<i>-0.108</i>	<i>-0.106</i>	<i>-0.103</i>	<i>-0.1</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>
	24	<i>-0.108</i>	<i>-0.106</i>	<i>-0.103</i>	<i>-0.1</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>
	25	<i>-0.106</i>	<i>-0.103</i>	<i>-0.1</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>
Income:	26	<i>-0.103</i>	<i>-0.1</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>
Avg.	27	<i>-0.1</i>	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>
	28	<i>-0.098</i>	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.082</i>
	29	<i>-0.095</i>	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.082</i>	<i>-0.08</i>
	30	<i>-0.093</i>	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.082</i>	<i>-0.08</i>	<i>-0.079</i>
Rich	31	<i>-0.091</i>	<i>-0.089</i>	<i>-0.087</i>	<i>-0.085</i>	<i>-0.083</i>	<i>-0.082</i>	<i>-0.08</i>	<i>-0.079</i>	<i>-0.077</i>

A.5: Comparative Statics of an Increase in Natural Beauty (Ω)Natural Beauty $\Omega \in [10,18]$ UTILITY MATRIX

		Natural Beauty:								
		Ugly			Avg.				Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
Avg.	27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
	29	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081
Rich	31	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

Natural Beauty $\Omega \in [12,20]$ UTILITY MATRIX*Bold Italics = Better off!!*Avg. $\Omega = 16$

		Natural Beauty:								
		ugly	Avg.							Beauty
		12	13	14	15	16	17	18	19	20
Poor	23	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	24	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.089
	25	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.089	-0.088
Income:	26	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.089	-0.088	-0.086
Avg.	27	-0.101	-0.098	-0.096	-0.094	-0.092	-0.089	-0.088	-0.086	-0.084
	28	-0.098	-0.096	-0.094	-0.092	-0.089	-0.088	-0.086	-0.084	-0.082
	29	-0.096	-0.094	-0.092	-0.089	-0.088	-0.086	-0.084	-0.082	-0.08
	30	-0.094	-0.092	-0.089	-0.088	-0.086	-0.084	-0.082	-0.08	-0.079
Rich	31	-0.092	-0.089	-0.088	-0.086	-0.084	-0.082	-0.08	-0.079	-0.077

A.6: Comparative Statics of an Increase in Income (M)

Income $M \in [23,31]$ UTILITY MATRIX

		Natural Beauty:								
		Ugly				Avg.			Beauty	
		10	11	12	13	14	15	16	17	18
Poor	23	-0.115	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094
	24	-0.112	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092
	25	-0.109	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09
Income:	26	-0.106	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088
Avg.	27	-0.103	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086
	28	-0.101	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084
	29	-0.098	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082
	30	-0.096	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081
Rich	31	-0.094	-0.092	-0.09	-0.088	-0.086	-0.084	-0.082	-0.081	-0.079

Income $M \in [25,33]$ UTILITY MATRIX

Bold Italics = Better off!!

Avg. $M = 29$

		Natural Beauty:								
		Ugly				Avg.			Beauty	
		12	13	14	15	16	17	18	19	20
Poor	25	<i>-0.112</i>	<i>-0.109</i>	<i>-0.106</i>	<i>-0.103</i>	<i>-0.101</i>	-0.098	-0.096	-0.094	-0.092
	26	<i>-0.109</i>	<i>-0.106</i>	<i>-0.103</i>	<i>-0.101</i>	<i>-0.098</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>
	27	<i>-0.106</i>	<i>-0.103</i>	<i>-0.101</i>	<i>-0.098</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>
Income:	28	<i>-0.103</i>	<i>-0.101</i>	<i>-0.098</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>
Avg.	29	<i>-0.101</i>	<i>-0.098</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>
	30	<i>-0.098</i>	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>	<i>-0.082</i>
	31	<i>-0.096</i>	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>	<i>-0.082</i>	<i>-0.08</i>
	32	<i>-0.094</i>	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>	<i>-0.082</i>	<i>-0.08</i>	<i>-0.079</i>
Rich	33	<i>-0.092</i>	<i>-0.089</i>	<i>-0.088</i>	<i>-0.086</i>	<i>-0.084</i>	<i>-0.082</i>	<i>-0.08</i>	<i>-0.079</i>	<i>-0.077</i>